PROCEEDINGS

OF THE
16th MEETING

OF THE
EUROPEAN SOCIETY FOR COGNITIVE PSYCHOLOGY

2 – 5 SEPTEMBER
CRACOW, POLAND

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WELCOME

We warmly welcome you at the 16th Conference of the European Society for the Cognitive Psychology in Krakow! The local committee is happy to have over 600 guests on a meeting with almost 500 contributions on the cutting-edge research from cognitive psychology and related fields. We wish everyone an interesting conference and pleasant say in Krakow. We hope that you will enjoy its famous architecture and Old Town, magnificent cultural events, extraordinary Polish cuisine as well as the city's unique atmosphere.

ORGANISING COMMITTEE

Edward Nęcka - conference chair
Michał Wierzchoń - conference secretary
Aneta Brzezicka
Adam Chuderski
Aleksandra Gruszka
Jarosław Orzechowski
Tomasz Smoleń
Radosław Sterczyński
Błażej Szymura
Kamila Śmigasiewicz
Maciej Taraday
Szymon Wichary
Katarzyna Żyła

THE PROGRAMME – SPECIAL EVENTS

We would like to draw your attention to the following events:

Date	Time	Event
Wednesday, Sept. 2nd	17.30 – 18.30	Broadbent Lecture (Annette Karmiloff-Smith)
Wednesday, Sept. 2nd	19.30	Welcome reception
Thursday, Sept. 3rd	18.30 – 19.30	Keynote Lecture (Ellen Bialystok)
Friday, Sept. 4th	17.30 – 18.30	Business Meeting ESCoP
Friday, Sept. 4th	18.30 – 19.30	Bertelson Award Lecture (Simon Farrell)
Saturday, Sept. 5th	15.30 – 16.30	Keynote Lecture (Randall Engle)
Saturday, Sept. 5th	8.30	Conference Dinner

LOCATION

The place of the conference is the Jagiellonian University Conference Building – Auditorium Maximum, located close to the city's historic centre.

Address: **Auditorium Maximum UJ, Krupnicza street 33, Krakow**

The Auditorium Maximum will host the opening ceremony as well as all scientific events, i.e. plenary sessions, symposiums, thematic sessions, and poster sessions. The conference dinner will take place at the Wieliczka Salt Mine.

ORAL PRESENTATIONS

All oral presentations are meant to last 15 minutes + 5 minutes for discussion. Chairs and speakers are asked to stick to the time schedule. The oral presentations will take place in lecture halls at the Auditorium Maximum. All rooms are equipped with microphones, PCs and multimedia projectors. It is possible to give the presentation making use of your own laptop computer. If you wish to use the PC at the lecture halls please test your presentation on one of the PC in the computer room (seminar room no. 2) on the second floor, which have the same configuration as the PCs in the presentation rooms. Presentations must be uploaded or your computer must be connected to the multimedia projector at least 20 minutes before the session. Our staff will assist you with the computer configuration, if needed.

POSTER SESSIONS

There will be three poster sessions, on Thursday, Friday and Saturday. Each will consist of approximately 100 posters, organized by theme. Poster sessions will take place in the Exhibition room A&B (D1 and D2 on the map) at the Auditorium Maximum. The presenting author of a poster has to be present during the poster session. Please mount your poster in the morning of your presentation, so that people can take a look at it before the session. Make sure you remove the poster at the end of the day, so it does not get lost.

EDITORIAL COMMENT

All abstracts have been evaluated for scientific quality.
The oral presentations have been selected on the basis of the following criteria:

- not more than one contribution by the same presenting author;
- priority to ESCoP members.

PROGRAM COMMITTEE

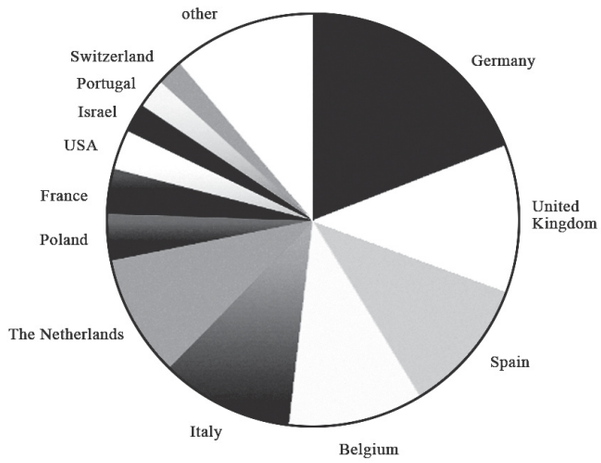
Maria Teresa Bajo Molina
Robert Balas
Cristina Cacciari
Bernhard Hommel
Alina Kolańczyk
Małgorzata Kossowska
Joanna Kwaśniewska
Tomasz Maruszewski
Edward Nęcka
Joanna Rączaszek-Leonardi
Grzegorz Sędek
Michał Wierzchoń
Zofia Wodniecka

SPECIAL THANKS

We are very grateful to Marilou Vandierendonck for her invaluable contribution to the preparation of the conference.

ABOUT THE EUROPEAN SOCIETY FOR COGNITIVE PSYCHOLOGY (ESCoP)

ESCoP is a large Society with almost 500 members, across a range of European countries and beyond (see graph below).



ESCoP's mission is t*he furtherance of scientific enquiry within the field of Cognitive Psychology and related subjects, particularly with respect to collaboration and exchange of information between researchers in different European countries*.

There are three types of membership within the Society: associated members (postgraduates or postdoctoral researchers who are developing their research career), full members and retired members.

The Society encourages scientific research through the publication of the European Journal of Cognitive Psychology. Other forms of communication include less formal newsletters sent to all members, ESCoP website (www.escop.eu), and an electronic mailing list. The Society also promotes research through its regular conference meetings, has a highly successful programme of summer schools. It has recently initiated research workshops to act as a catalyst for the establishment and networking of research groups in emerging areas of cognitive psychology.

The Society has a constitution and a committee who oversee the workings of the Society. From relatively humble beginnings, ESCoP has developed into a broad, successful and respected Society that promotes research in cognate subjects. A history of the executive officers of the Society has been compiled and this could be referenced here.

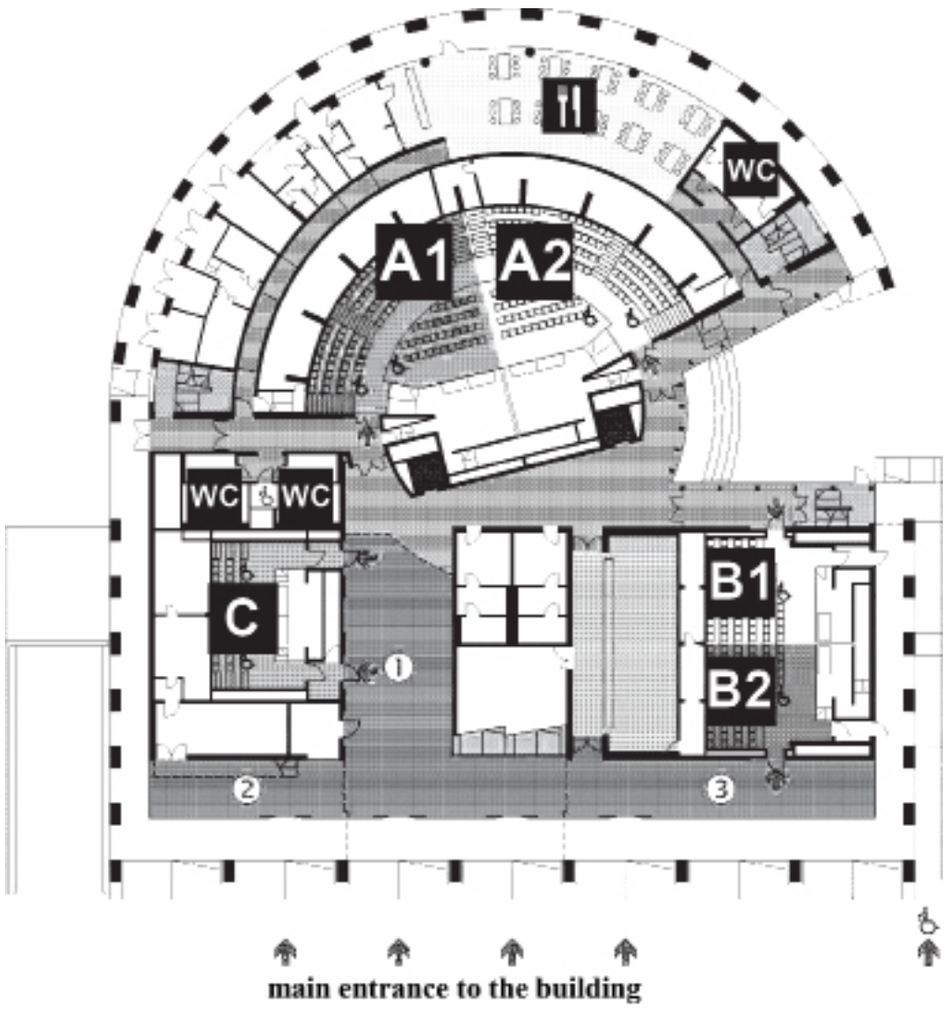
SOCIETY COMMITEE

Axel Cleeremans
Claus Bundesen
Nuria Sebastian Galles
Bernhard Hommel
Diane Pecher
Cristina Cacciari
Iring Koch
Nachshon Meiran
Andrea Kiesel
André Vandierendonck
Janet van Hell

ABOUT JAGIELLONIAN UNIVERSITY

Jagiellonian University, founded in 1364, is one of the oldest European universities. Among the most prominent alumni of this university are Nicolaus Copernicus, whose heliocentric theory of the solar system revolutionized our understanding of the world, and Karol Wojtyla, later elected Pope John Paul II. The oldest preserved building of the university is Collegium Maius, dating back to the 15th century. Psychology was founded in Krakow in 1903, when Professor Wladyslaw Heinrich established the laboratory of Experimental Psychology. Nowadays, the Institute of Psychology houses scholars conducting research in all the major fields of psychological research. The Faculty of the Institute of of Psychology currently teaches around 1000 students.

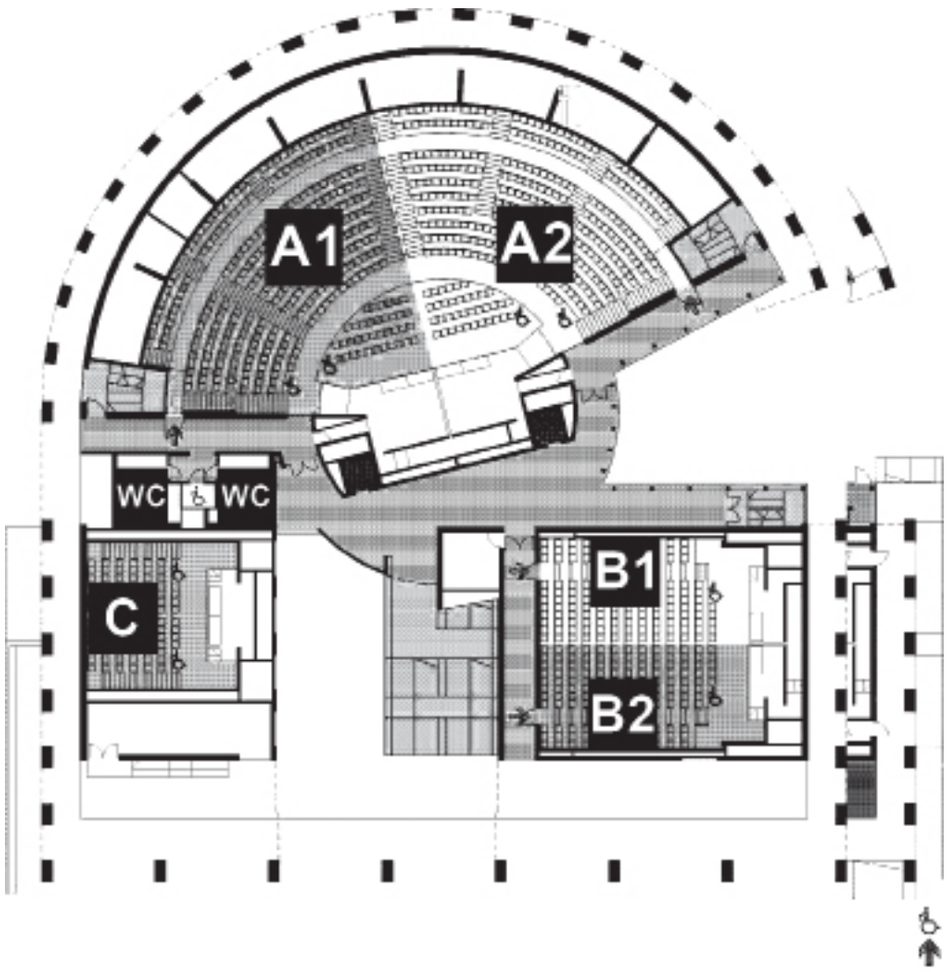
LEVEL 0



Legend:

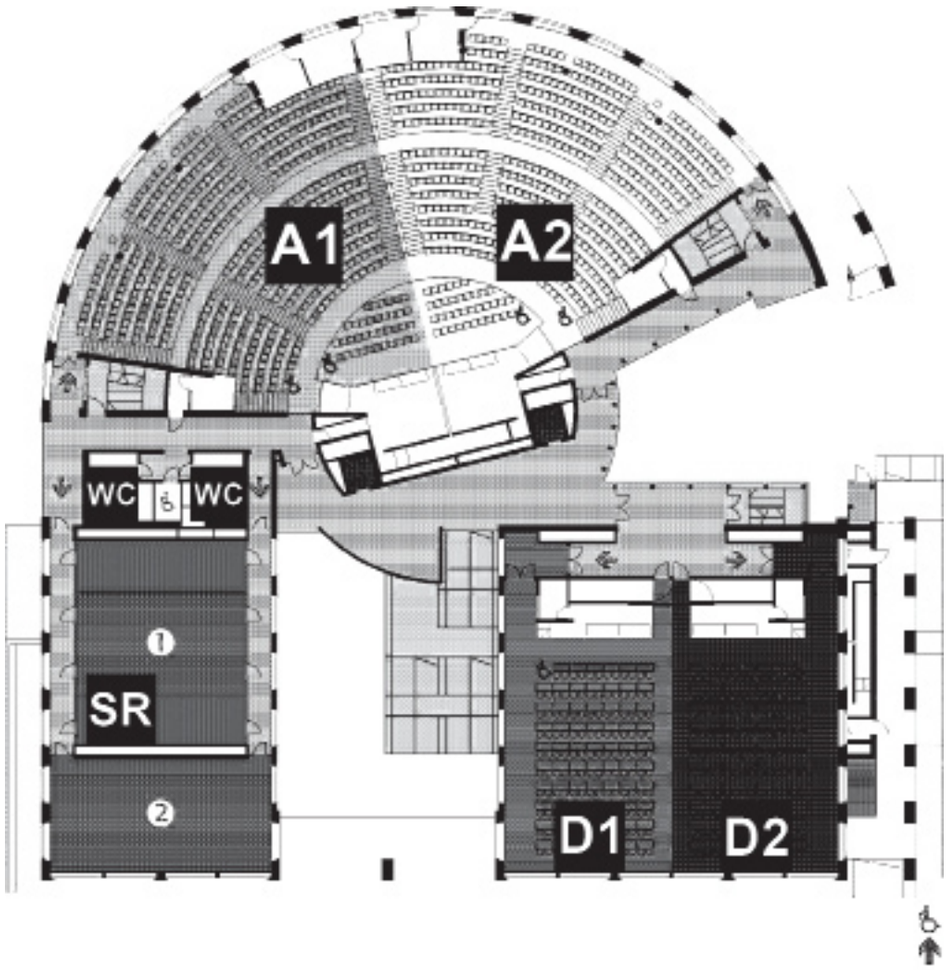
A1 A2 B1 B2 C - conference-and-lecture rooms

LEVEL 1



Legend:
A1 A2 B1 B2 C - conference-and-lecture rooms

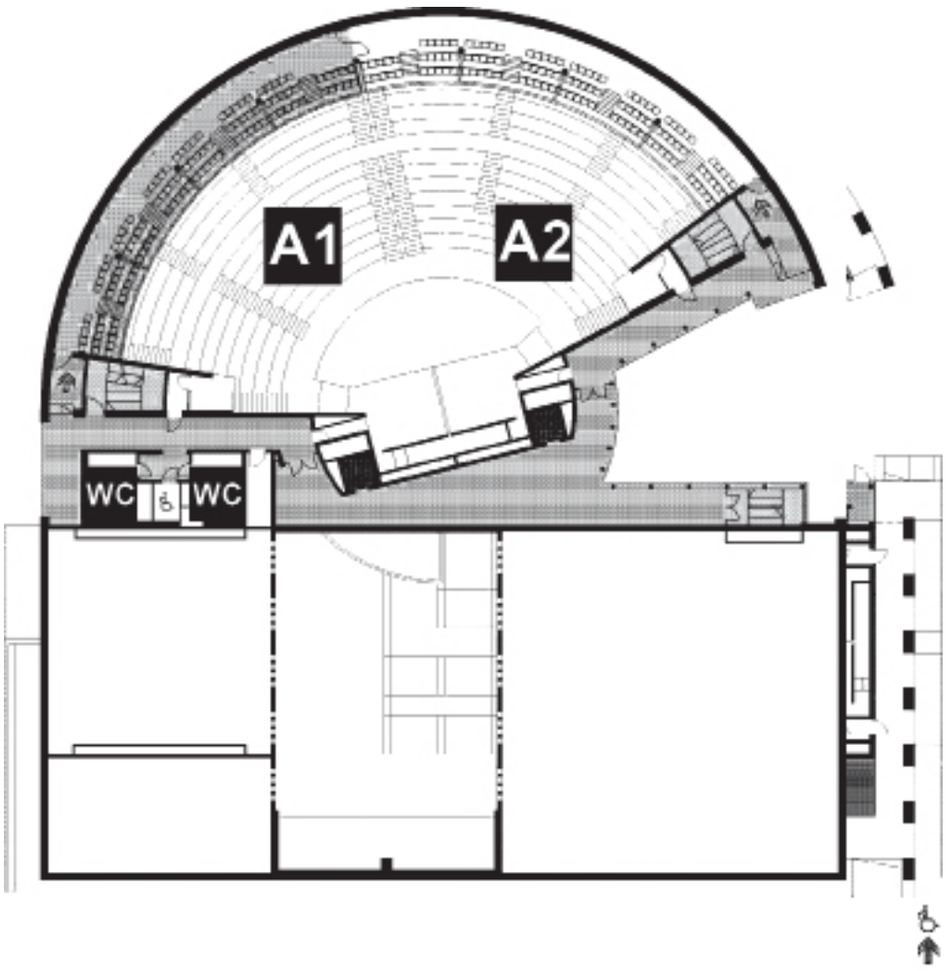
LEVEL 2



Legend:

A1 A2 - conference-and-lecture rooms
D1 D2 - conference-and-lecture rooms (flat)
SR - seminar room

LEVEL 3



Legend:
A1 A2 - conference-and-lecture rooms

		Conference and lecture hall C	Seminar room 1	Medium lecture hall A
THURSDAY, 3RD SEPTEMBER	9.00 – 10.40	SYMPOSIUM: The cognitive neuroscience of temporal preparation: towards a taxonomy	SESSION: Emotion and cognition I	SESSION: Working memory I
	11.00 – 12.40	SESSION: Cognition and behavioral disorders	SESSION: Word recognition	SYMPOSIUM: A piece of the action: novel insights into the neurocognitive bases of action selection
	14.00 – 16.00	SESSION: Number cognition	SESSION: Language processing	SESSION: Action control
	16.20 – 18.20			
FRIDAY, 4RD SEPTEMBER	9.00 – 10.40	SESSION: General cognition I	SYMPOSIUM: Mechanisms underlying the unusual additional experiences in synesthesi	SYMPOSIUM: Testing the limits of unconscious cognition
	11.00 – 12.40	SYMPOSIUM: On models of human memory	SYMPOSIUM: Mathematical cognition from different perspective	SESSION: Working memory III
	14.00 – 16.00	SESSION: Cognitive development and aging	SYMPOSIUM: Neurocognitive contributions to understanding mathematical deficiencies	SESSION: Language production II
	16.20 – 18.20			
SATURDAY, 5RD SEPTEMBER	9.00 – 10.40	SESSION: Sensory processes	SESSION: Emotion and cognition II	SYMPOSIUM: Contextbased control of vision and action
	11.00 – 12.40	SESSION: General cognition II	SESSION: Social aspects of attention	SESSION: Perception and pattern recognition
	14.00 – 15.30			

	Medium lecture hall B	Large lecture hall A	Large lecture hall B	Exhibition room A & B
9.00 – 10.40	SESSION: Memory I	SESSION: Task switching I	SESSION: Semantic and syntactic processing I	
11.00 – 12.40	SESSION: Working memory II	SYMPOSIUM: Neurocognitive correlates of cognitive control	SYMPOSIUM: Orthographic processing in printed word perception IV	
14.00 – 16.00	SESSION: Verbal working memory	SESSION: Implicit learning	SESSION: Executive control	
16.20 – 18.20				POSTER SESSION I
9.00 – 10.40	SESSION: Visual and spatial attention	SYMPOSIUM: Bilingualism as a window on cognition and language processing	SESSION: Task switching II	
11.00 – 12.40	SESSION: Language production I	SESSION: Bilingualism I	SESSION: Higher order cognition	
14.00 – 16.00	SESSION: Memory II	SYMPOSIUM: Implicit learning	SESSION: Cognitive control	
16.20 – 18.20				POSTER SESSION II
9.00 – 10.40	SESSION: Implicit processing	SESSION: Semantic and syntactic processing II	SESSION: Task switching III	
11.00 – 12.40	SESSION: Time perception and control	SESSION: Attention and inattention	SESSION: Bilingualism II	
14.00 – 15.30				POSTER SESSION III

WEDNESDAY, 2ND SEPTEMBER

Time	Event
13.00 – 17.00	Registration
14.30 – 16.30	**MEETING** Women In Cognitive Science
17.00 – 17.30	Opening ceremony
17.30 – 18.30	KEYNOTE LECTURE *(Large lecture hall)* Modules, genes and evolution: insights from developmental disorders A. KARMILOFF-SMITH
19.30 – 21.00	Welcome reception

THURSDAY, 3RD SEPTEMBER

Time	Event
9.00 – 10.40	Six parallel symposiums or thematic paper sessions **SYMPOSIUM: The cognitive neuroscience of temporal preparation: towards a taxonomy** *(Conference and lecture hall C)* · Neurophysiology of Exogenous Temporal Expectations (G. ROHENKOHL) · Individual differences in automatic aspects of temporal preparation (J.D. MCAULEY) · Time in action: neural and developmental dissociations in implicit temporal preparation (A. VALLESI) · Segregating controlled and automatic components in temporal preparation (S.A. LOS) · Temporal orienting in patients with lesion in the Frontal Cortex and Basal Ganglia (M. TRIVIÑO, Á. CORREA, M. ARNEDO, J. LUPIÁÑEZ) **SESSION: Emotion and cognition I** *(Seminar room 1)* · Emotion improves and impairs early vision (R. ZEELENBERG, B. BOCANEGRA) · A spatiotemporal trade-off in visual acuity due to emotion (R. BOCANEGRA, R. ZEELENBERG) · Role of color in determining attentional preference for emotional stimuli (M. KUNIECKI, S. WICHARY, S. GRZYBOWSKI, P. JAŚKOWSKI) · Parsimony Principle Applied to the Anger Superiority Effect: Evolutionary Theory or Simple Perceptual Bias? (M. MARTIAL,N. VEMEULEN, D. LUNDQVIST, P. NIEDENTHAL) **SESSION: Working memory I** *(Medium lecture hall A)* · Immediate memory for objects and object colour (M. PILLING, A. GELLATLY) · Evidence for time-based resource sharing between verbal and visuo-spatial working memory (E. VERGAUWE, P. BARROUILLET, V. CAMOS) · Visuo-spatial working memory: Identifying resources in pattern and sequence recall (E. NIVEN, R. LOGIE, S. DELLA SALA) · Working memory is the perception-action interface in spatial-compatibility tasks: Evidence from dualtask experiments (P. WÜHR) · Can long duration display items be substitution masked? (A. GELLATLY, M. PILLING, D. GUEST) **SESSION: Memory I** *(Medium lecture hall B)* · Item-specific and relational processing in memory for frequency (U. OLOFSSON) · Encoding of affordance-relevant object features affects responses in future contexts (S. EREN, A. HOHENBERGER) · Actions in memory – Means versus ends (K. UMLA-RUNGE, H. ZIMMER, G. ASCHERSLEBEN, C. KRICK, W. REITH) · Influence of time distribution of learning sessions on memory performance (E. GERBIER, O. KOENIG) **SESSION: Task switching I** *(Large lecture hall A)* · Inhibition of preceding task sets in task switching: Contrasting task-specific and switch-specific cuing (M. GADE, I. KOCH)

· Integration of action effects in a task-switching paradigm (S. LUKAS, A. PHILIPP, I. KOCH)
· Central crosstalk in task switching – Evidence from manipulating input-output modality compatibility (D. STEPHAN, I. KOCH)
· Dissecting task sets (B. LIEFOOGHE, A. VANDIERENDONCK)
· Partitioning task switch costs with ERP: lexical access is delayed by a switch (H. ELCHLEPP, S. MONSELL, A. LAVRIC)

SESSION: Semantic and syntactic processing I *(Large lecture hall B)*
· Anticipatory processing in language comprehension: idiomatic vs. literal expressions (C. CACCIARI, F. VESPIGNANI, N. MOLINARO, F. PESCIARELLI, P. CANAL)
· The lasting benefits of double meaning in the processing of idiomatic expressions (M. VAN MULKEN)
· Metaphorical mapping during a decision task (I. BOOT, D. PECHER)
· Embodiment and language: cross-linguistic evidence on abstract and concrete sentences (C. SCOROLLI, A. BORGHI, R. NICOLETTI)
· Three time-scales of influence between linguistic and conceptual processing: grammatical gender effects in Polish and Italian (J. RĄCZASZEK – LEONARDI, N. CARAMELLI, W. PACIOREK)

10.40 – 11.00 Coffee break

11.00 – 12.40 Six parallel symposiums or thematic paper sessions

SYMPOSIUM: Neurocognitive correlates of cognitive control *(Large lecture hall A)*
· Integrative Neuromodulation of cognitive control (L.S. COLZATO, B. HOMMEL)
· The Neural Substrate of Decision Making with Prior Information: Empirical Data and a Formal Model (B.U. FORSTMANN, S. BROWN, G. DUTILH, J. NEUMANN, E-J. WAGENMAKERS)
· The difficulty law of motivation: fMRI (noise) increases cognitive control (B. HOMMEL, L.S. COLZATO, W.P.M. VAN DEN WILDENBERG, C. CELLINI)
· Online and proactive cognitive control during action selection in Parkinson's disease (W.P.M. VAN DEN WILDENBERG, S.A. WYLIE, K.R. RIDDERINKHOF, T.R. BASHORE)
· Bidirectional priming processes in the Simon task (G. DREISBACH, M. METZKER)

S**YMPOSIUM: Orthographic processing in printed word perception IV** *(Large lecture hall B)*
· Consonants and vowels contribute differently to visual word recognition: ERPs of relative position priming (M. CARREIRAS, J.A. DUÑABEITIA, N. MOLINARO)
· The hard problem of representing letter order (D. NORRIS, S. KINOSHITA)
· An Overlap Model account of perceptual matching and short term priming data (P. GOMEZ, M. PEREA, R. RATCLIFF)
· Perceptual Patterns in Letter-String Processing (C. WHITNEY, Y. MARTON)
· Recent developments in the study of orthographic input coding: Further support for a spatial coding model (C.J. DAVIS, S.J. LUPKER, J.S. BOWERS)

SYMPOSIUM: A piece of the action: novel insights into the neurocognitive bases of action selection *(Medium lecture hall A)*
· Behavioral adaptation following error feedback (W. NOTEBAERT, E. N. CASTELLAR, W. FIAS, T. VERGUTS)
· Posterior medial frontal cortex modulates activity in visual areas after errors (C. DANIELMEIER, T. EICHELE, B.U. FORSTMANN, M. TITTGEMEYER, M. ULLSPERGER)
· Action selection: a necessary concept ? (B. BURLE)
· The Striatum Facilitates Decision-Making under Time Pressure (B.U. FORSTMANN, G. DUTILH, S. BROWN, J. NEUMANN, D.Y. VON CRAMON, K.R. RIDDERINKHOF, E-J. WAGENMAKERS)
· Probing functional interactions between brain regions during action selection and action reprogramming (R. B. MARS)

SESSION: Cognition and behavioral disorders *(Conference and lecture hall C)*
· The influence of depression and aging on generation of mental models (G. SĘDEK, A. BRZEZICKA)
· Evaluation body representation in schizophrenic persons using semantic judgement (T. BELLON, F. LOWENTHAL)

· Is IOR really impaired in schizophrenia? (F. KALOGEROPOULOU, A. VIVAS, P. WOODRUFF)
· Representation of survey and route spatial texts in children with nonverbal (visuospatial) learning disabilities (C. CORNOLDI, I. MAMMARELLA, C. MENEGHETTI, F. PAZZAGLIA)
· Dissociation, memory ability and self-appraisal of memory (R. POLCZYK)

SESSION: Working memory II *(Medium lecture hall B)*
· A developmental investigation of maintenance mechanisms in working memory through the phonological similarity effect (G. MORA, V. CAMOS, P. BARROUILLET)
· Developmental differences in working memory: Where do they come from? (V. GAILLARD, P. BARROUILLET, C. JARROLD, V. CAMOS)
· Working memory as bipartite system: Evidence from recognition experiments and computational modeling (Z. STETTNER, A. CHUDERSKI, J. ORZECHOWSKI)
· Refining a Model of Verbal Short-Term Memory Span (S. MORRA, C. DELFANTE)
· The involvement of verbal working memory in novel word learning (A. SZMALEC, W. DUYCK, M. PAGE)

SESSION: Word recognition *(Seminar room 1)*
· Enemies and friends in the neighborhood must sound similar (D. PECHER)
· Syllable priming depends on the frequency of the first syllable in the lexical decision task (F. CHETAIL, N. DOIGNON-CAMUS, S. MATHEY)
· The influence of emotional orthographic neighbourhood in primed lexical decision tasks (S. MATHEY, P. GOBIN)
· GR8 msg! Are these actual words? (L. GANUSHCHAK, A. KROTT, A. MEYER)
· Constituents of Noun-Noun Compounds in a Morphological Masked Priming task (G. ARCARA, C. SEMENZA, S. MONDINI

12.40 – 14.00 Lunch break

14.00 – 16.00 Six parallel symposiums or thematic paper sessions

SESSION: Action control *(Medium lecture hall A)*
· Does tool use require cognitive capacity? (W. KUNDE)
· Manipulation of initial motor complexity in a reaching task (G. GALVEZ-GARCIA, J. LUPIÁÑEZ)
· Subjective duration of anticipated and non-anticipated action effects (C. HAERING, J. HOFFMANN)
· Anticipatory Preparation and Execution of Grasping Movements (O. HERBORT)
· Real life motor training modifies spatial performance: The advantage of being drummers (A. PELLICANO, C. IANI, S. RUBICHI, P. RICCIARDELLI, A. BORGHI, R. NICOLETTI)
· Development in Action-Effect Learning, a Pupillometric/Eyetracking Study (S. VERSCHOOR, M. SPAPÉ, S. BIRO, B. HOMMEL)

SESSION: Implicit learning *(Large lecture hall A)*
· Increasing dopamine levels in the brain improves feedback-based procedural learning: An artificial grammar learning experiment (M. DE VRIES, C. ULTE, P. ZWITSERLOOD, S. KNECHT)
· Is a visual search process required for pure perceptual sequence learning? (D. COOMANS, N. DEROOST)
· The Role of Transparency in Probabilistic Category Learning (F. KEMENY, A. LUKACS)
· Chunking in Serial Reaction Time tasks: an objective measure of conscious learning (A. PASQUALI, L. JIMENEZ, A. CLEEREMANS)
· Stability of Implicit Knowledge Representation (M. WIERZCHOŃ, D. ASANOWICZ, J. BARBASZ)
· Knowledge applied to new domains: The unconscious succeeds where the conscious fails (R. SCOTT, Z. DIENES)

SESSION: Verbal working memory *(Medium lecture hall B)*
· Two Maintenance Mechanisms of Verbal Information in Working Memory (V. CAMOS, P. LAGNER, P. BARROUILLET)
· Forgetting in immediate serial recall: time vs. interference. When the encoding rates determine the winner (A. GUIDA, P. BARROUILLET, V. CAMOS)
· Selection processes in working memory (E. LANGE, C. STARZYNSKI)

· Switch costs and focus of attention in working memory: Evidence from a word updating task (J. GRABOWSKI, M. JANCZYK)
· More than phonological similarity: An acoustic similarity effect with auditory and visual presentation (J. SCHWEPPE, R. RUMMER, M. GRICE)
· Evidence for a psycholinguistic model of verbal short-term memory: The role of the task (R. RUMMER, J. SCHWEPPE)

SESSION: Number cognition *(Conference and lecture hall C)*
· Exploring the Representation of Fractions and Negative Numbers (D. GANOR-STERN, M. PINHAS, A. KALLAI, J. TZELGOV)
· Zero is Perceived in Our Minds as the "Smallest" (M. PINHAS, J. TZELGOV)
· Procedures are activated and used by adults to solve simple addition and subtraction, but not multiplication (C. THEVENOT, M. FAYOL)
· The development of numerical representation investigated with the priming paradigm (B. REYNVOET, B. DE SMEDT)
· Repeated stimuli bias in addition: Is 15+15 smaller than 13+17? (P. CHARRAS, J. LUPIÁÑEZ)
· Arabic digit number's phonology is activated fast (J. GARCIA-ORZA, A. ESTUDILLO)

SESSION: Language processing *(Seminar room 1)*
· Frequency effects in word recognition and naming: Evidence from the psychological refractory period (A. CLELAND, A. HATZIDAKI)
· The locus of frequency effect: Insights from Taiwan Sign Language (Y. CHIU, O. TZENG, D. HUNG)
· A Test of the Distinction between Identification and Production Priming in the Lexical Decision Task (P. SPATARO, C. ROSSI-ARNAUD, N. MULLIGAN)
· Priming influence on typicality of objects (N. RADCHIKOVA)
· Non verbal communication devices can favor language, reading and number acquisition(F. LOWENTHAL, O. SIMON, A. TREMBLEZ, J. TRAPPENIERS)

SESSION: Executive control *(Large lecture hall B)*
· Modeling task selection in voluntary task switching (A. VANDIERENDONCK, J. DEMANET, B. LIEFOOGHE, F. VERBRUGGEN)
· Voluntary control: dissociating task selection and execution in the voluntary task switching procedure (J. DEMANET, F. VERBRUGGEN, B. LIEFOOGHE, A. VANDIERENDONCK)
· Voluntary switches are corrected repetitions (K. VANDAMME, A. SZMALEC, B. LIEFOOGHE, A. VANDIERENDONCK)
· Task switching based on precues versus knowledge of a task sequence (T. KLEINSORGE)
· Back in control: Executive control depends on episodic retrieval (M. SPAPÉ, G. BAND, B. HOMMEL)
· There is no "the" Heuristic System: Modes of Cognitive Control in Judgment and Decision Making (E. COKELY)

16.00 – 16.20 Coffee break

16.20 – 18.20 **POSTER SESSION I** *(Exhibition room A & B)*

18.30 – 19.30 **KEYNOTE LECTURE** *(Large lecture hall)*
Lifelong Bilingualism: Linguistic Costs, Cognitive Benefits, and Long-term Consequences
E. BIALYSTOK

FRIDAY, 4TH SEPTEMBER

Time	Event
9.00 – 10.40	Six parallel symposiums or thematic paper sessions **SYMPOSIUM: Mechanisms underlying the unusual additional experiences in synesthesia** *(Seminar room 1)* · A foundation for Savantism? Cognitive Benefits in Time-Space Synaesthesia (J. SIMNER) · Neural Basis of Individual Differences in Synesthetic Color Experience (R. ROUW) · Examining the Neurocognitive Mechanisms in Synaesthesia (L. FUENTES) · The role of the parietal cortex in (grapheme-colour) synaesthesia (P.H. WEISS) **SYMPOSIUM: Testing the limits of unconscious cognition** *(Medium lecture hall A)* · Perceptual criterion and motor threshold (F. WASZAK) · How deep can unconscious information be processed? A meta-analysis (E. VAN DEN BUSSCHE, W. VAN DEN NOORTGATE, B. REYNVOET) · Selective impairment of masked priming in dual-task performance (R. FISCHER, A. KIESEL, W. KUNDE, M. BERNER, T. SCHUBERT) · ERP evidence for unconscious priming of inhibitory control (G. HUGHES) · Automatic activation of executive functions: Do subliminally presented task cues activate task sets? (A. KIESEL, W. KUNDE, B. HOMMEL) **SYMPOSIUM: Bilingualism as a window on cognition and language processing** *(Large lecture hall A)* · The effect of a foreign and native accent on word recognition in L1 and L2 (L.B. FELDMAN) · Co-activation of phonology in bimodal and unimodal bilinguals (J.G. VAN HELL, E. ORMEL, J. VAN DER LOOP, D. HERMANS) · Asymmetrical use of gender information during the processing of unilingual and code-switched speech (G. DUSSIAS, C. GERFEN, J. GULLIFER, J. VALDES KROFF, R.E. GUZZARDO) · Retrieval Induced Forgetting in bilingual language selection (P. ROMAN, M. VAN DE VELDE, T. BAJO) · Evidence for inhibition in native language production during immersion in the second language (C. GERFEN, J. TAM, R.R. MCCLAIN, A. SEMENOV, H. KITAJIMA, J.F. KROLL, J.A. LINCK) **SESSION: Task switching II** *(Large lecture hall B)* · Developmental Differences in Toddlers` Behavioral Restraint Predict General Executive Function Ability 14 Years Later (N. FRIEDMAN, A. MIYAKE) · Affect modulates switch costs: The influence of emotional cuing on switching between three tasks (E. NĘCKA, M. TARADAY, J. RUSIŃSKA) · When the emotion is no longer relevant: Switch-cost asymmetries when categorizing emotional faces (S. SCHUCH, I. KOCH) · The influence of affectively valent response-effects in task switching (H. HOROUFCHIN, A. PHILIPP, I. KOCH) · Positive affect and executive control (H. VAN STEENBERGEN, G. BAND, B. HOMMEL) **SESSION: General cognition I** *(Conference and lecture hall C)* · The Role of Consciousness in a Theory of Visual Attention (TVA) (C. BUNDESEN) · Frequency and Motivational State: Evolutionary Simulations Suggest an Adaptive Function for Network Oscillations (B. HEEREBOUT, H. PHAF) · The role of the noradrenergic system in the trade-off between exploitation and exploration: A psychopharmacological study (M. JEPMA, E. WAGENMAKERS, E. TE BEEK, J. VAN GERVEN, S. NIEUWENHUIS) · Can prior strategy use affect subsequent strategy selection? (V. SCHILLEMANS, K. LUWEL, I. BULTÉ, P. ONGHENA, L. VERSCHAFFEL) · DUAL Architecture: Modeling Various Cognitive Processes on the Basis of Mechanisms for Analogy-making (G. PETKOV, B. KOKINOV) **SESSION: Visual and spatial attention** *(Medium lecture hall B)* · Congruency reversal in Accessory-Signal Simon tasks with auditory stimuli (E. SOETENS, K. MAETENS) · How to measure distinct components of visual attention fast and reliably (S. VANGKILDE, S. KYLLINGSBAEK, T. HABEKOST, C. BUNDESEN, P. MARKLUND, L. NILSSON)

· Sidedness coding is stimulus but not response dependent (G. OTTOBONI, A. TESSARI, R. CUBELLI, C. UMILTA)
· Does power shift attention on a vertical dimension? An ERP study (K. ZANOLIE, S. VAN DANTZIG, I. BOOT, J. WIJNEN, D. PECHER)
· Object-based allocation of visual attention: Evidence from an eye-movement study (M. ZIESSLER)

10.40 – 11.00 Coffee break

11.00 – 12.40 Six parallel symposiums or thematic paper sessions

SYMPOSIUM: On models of human memory *(Conference and lecture hall C)*
· A unified modelling framework for immediate serial recall, Hebb effects, and the learning and recognition of phonological word-forms (M. PAGE)
· From primary memory to short-term memory to activation-based memory: No tricks, just not like a computer (E. DAVELAAR)
· Modelling complex span – Implementations of the time-based resource-sharing model (K. OBERAUER, S. LEWANDOWSKY, S. FARRELL)
· Testing the stability of forgetting rates (M. LANSDALE)

SYMPOSIUM: Mathematical cognition from different perspective *(Seminar room 1)*
· Age-related changes in arithmetic strategy-transition effects (P. LEMAIRE, M. LECACHEUR)
· How is phonological processing related to individual differences in children's arithmetic skills? (B. DE SMEDT, J. TAYLOR, L. ARCHIBALD, D. ANSARI)
· The Representation of Multiplication and Division facts in Memory: Evidence for Cross-Operation Transfer without Mediation (J. DE BRAUWER, W. FIAS)
· The role of working memory in the use and selection of numerosity judgment strategies (K. LUWEL, V. CAMOS, L. VERSCHAFFEL)
· Cultural differences in exact addition and approximate multiplication (I. IMBO, J-A. LEFEVRE)

SESSION: Bilingualism I *(Large lecture hall A)*
· Semantic and translation priming from a first language to a second and back: Making sense of the findings (S. SCHOONBAERT, W. DUYCK, M. BRYSBAERT, R. HARTSUIKER)
· Going from one to the other: The role of lexical triggering and discourse alignment in code-switching (G. KOOTSTRA, J. VAN HELL, T. DIJKSTRA)
· The influence of semantic constraints on bilingual word recognition during sentence reading (E. VAN ASSCHE, D. DRIEGHE, W. DUYCK, R. HARTSUIKER)
· Semantic networks in second language learners: The role of morphological family size (M. DE ZEEUW, R. SCHREUDER, L. VERHOEVEN)
· Noun-Phrase Production in Bilinguals (J, SADAT, A. COSTA, F. ALARIO)

SESSION: Working memory III *(Medium lecture hall A)*
· Perceptual completion of familiar and novel shapes in visual short-term memory (S. DAVIES)
· Primacy and recency effects shown in bindings of visual features (S. JASWAL, R. LOGIE)
· Acoustical selective attention and concurrent working memory load (K. DITTRICH, C. STAHL)
· To the left, to the left: A tendency to over-represent the left side of space in an auditory-driven working memory task (J. BROOKS, R. LOGIE, D. SERGIO)
· Links between working memory capacity and gesture rates (A. MELINGER, M. KEEHNER)

SESSION: Higher order cognition *(Large lecture hall B)*
· Where does chess reside? The collateral sulci host cognitive expertise (M. BILALIC, M. ERB, L. TURELLA, R. LANGNER, W. GRODD)
· Mental representations of traffic sign information in a response-generation task (J. ROCA, M. BUENO, C. CASTRO, S. MORENO-RÍOS)
· Driving Concurrent tasks: Effects of Making decisions and performing verbal vs. spatial-imagery tasks (M. BUENO, C. CASTRO, S. MORENO-RIOS, J. ROCA, C. VARGAS)
· The role of heuristic and analytic processes in a thematic version of the Wason Selection Task (E. ERDFELDER, K. KLAUER, C. STAHL)
· Developmental differences in metacognitive accuracy in different cognitive domains from adolescence to middle adulthood (K. BAKRACEVIC VUKMAN)

SESSION: Language production I *(Medium lecture hall B)*
· The activation of articulatory information in speech perception: Evidence from electropalatography (I. YUEN, K. RASTLE, M. BRYSBAERT)
· Lexical storage of word-specific pronunciation variation (M. ERNESTUS)
· Are taboo errors detected before they are pronounced? An ERP-study (E. SEVERENS, I. JANSSENS, R. HARTSUIKER)
· Number of features and concreteness in speech production (A. HANTSCH, M. CARREIRAS)
· An electroencephalographic study of speech monitoring (S. RIES, N. JANSSEN, S. DUFAU, F. ALARIO, B. BURLE)

12.40 – 14.00 Lunch break

14.00 – 16.00 Six parallel symposiums or thematic paper sessions

SYMPOSIUM: Implicit learning *(Large lecture hall A)*
· Implicit learning based on instructed action codes (R. GASCHLER, D. WENKE, P. A. FRENSCH)
· Registration of expectancy violations and the detection of sequential regularities (S. SCHWAGER, D. RÜNGER, R. GASCHLER, P.A. FRENSCH)
· Time-course of acquisition of different information types in implicit sequence learning (N. SCHUCK, R. GASCHLER, P.A. FRENSCH)
· Learning a hierarchical embedded structure with semantics in an AGL task (F.H. POLETIEK, P. MONAGHAN)
· Sensory redundancy in perceptual-motor sequence learning (E.L. ABRAHAMSE, R.H.J. VAN DER LUBBE, P. JAŚKOWSKI, W.B. VERWEY)
· Implicit sequence learning depends on attentional resources (R. BALAS, P. SITNICKI)

SYMPOSIUM: Neurocognitive contributions to understanding mathematical deficiencies *(Seminar room 1)*
· Numerical and Mathematical Abilities in Adults with Dyslexia (S.M. GÖBEL, M.J. SNOWLING)
· Developmental Dyscalculia: Beyond the Magnitude Representation (D. SZŰCS, F. SOLTÉSZ)
· Magnitude Representation in Math Learning Disability (M-P. NOËL)
· Co-Morbidity of Mathematical Learning Disabilities with Attention Deficit/Hyperactivity Disorder (ADHD) or with Reading Disabilities (O. RUBINSTEN)
· How Pure is Pure Developmental Dyscalculia? (S. ASHKENAZI, A. HENIK)

SESSION: Language production II *(Medium lecture hall A)*
· Computational modelling of reading (M. COLTHEART)
· Effects of syllable frequency in language production and comprehension (J. CHOLIN, C. BAUS, M. CARREIRAS)
· The Cumulative Within-Category Cost in Picture Processing (E. NAVARRETE, B. MAHON, A. CARAMAZZA)
· Dissociation between an on-line auditory task and a speeded phoneme deletion task as a function of onset density (P. VENTURA, T. FERNANDES, J. MORAIS, R. KOLINSKY)
· Tasks affect dyslexic response to phonology: ERP evidence (N. SAVILL, G. THIERRY)
· The phonological enemy effect in Deaf learners of Spanish as an L3 (P. PINAR, C. GERFEN, J. KROLL)

SESSION: Cognitive development and aging *(Conference and lecture hall C)*
· Training cognitive control in old adults (D. GOPHER, H. BLUMEN, J. STEINERMAN, Y. STERN)
· Effects of reward anticipation on recognition memory in younger and older adults (J. SPANIOL, C. SCHAIN, H. BOWEN)
· Task switching in normal aging: new evidences concerning the manipulation of previous response and number of repetition (V. POSTAL, S. LALLEMAND)
· Balance between representational conservatism and flexibility: a developmental perspective (P. DE FABRITIIS)
· Inter- and intraindividual variability across the lifespan (P. GHISLETTA, D. FAGOT, T. LECERF, A. DE RIBAUPIERRE)
· Influence of aging on inhibition and suppression of irrelevant spatial information (C. RENAU OP T HOOG)

SESSION: Cognitive control *(Large lecture hall B)*
· Reduced dual-task costs with accessory response effects (M. PAELECKE, W. KUNDE)
· Dorsal and ventral processing in PRP situations (M. JANCZYK, W. KUNDE)
· Transfer of dual-task skills acquired during dual-task practice (T. STROBACH, P. FRENSCH, T. SCHUBERT)
· The continuous mind in conflict: studying the dynamics of cognitive control (S. SCHERBAUM, M. DSHEMUCHADSE, R. FISCHER, T. GOSCHKE)
· Crossmodal Action: Evidence from Dual-Task Compatibility (L. HUESTEGGE, I. KOCH)

SESSION: Memory II *(Medium lecture hall B)*
· Trauma exposure in childhood impairs the ability to recall specific autobiographical memories in late adolescence (T. BRENNEN, M. ZOTOVIC, N. POPOVIC, V. GAVRILOV-JERKOVIC)
· Impaired and enhanced memory for the same associative link following think/no-think procedure (M. RACSMÁNY, M. CONWAY, A. KERESZTES)
· Retrieval inhibition of familiar names (A. MARFUL, C. FERREIRA, M. BAJO)
· The relationship between retrieval-induced forgetting and personality (D. GROOME, R. LAW, R. POTTS, T. BUCHANAN, L. THORN)
· The role of scripts in retrieval-induced forgetting for everyday activities (M. MIGUELES, E. GARCIA-BAJOS)
· The writing superiority effect: Advantages of written knowledge recall (J. GRABOWSKI)

16.00 – 16.20 Coffee break

16.20 – 18.20 **POSTER SESSION II** *(Exhibition room A & B)*

17.30 – 18.30 Business meeting

18.30 – 19.30 **KEYNOTE LECTURE** *(Large lecture hall)*
How formal modelling has benefited theories of human memory
S.FARREL

SATURDAY, 5TH SEPTEMBER

Time	Event
9.00 – 10.40	Six parallel symposiums or thematic paper sessions **SYMPOSIUM: Context-based control of vision and action** *(Medium lecture hall A)* · The modulation of the Attentional Blink by fearful faces depends on task context (W.X. SCHNEIDER, J. ZWICKEL, J. RITTER, M. KITZMANTEL, T. STEIN) · Influence of Agency Attribution on Selection Processes (J. ZWICKEL) · Action intentions - another source of top-down control (A. WYKOWSKA, A. SCHUBÖ, B. HOMMEL) · Conceptual mediation of spatial stimulus-response compatibility effect (J. MILES) · How task instructions guide attention: The shielding function of task sets (G. DREISBACH, H. HAIDER) **SESSION: Sensory processes** *(Conference and lecture hall C)* · Feeling, Seeing, and Hearing the Rhythm: Crossmodal Congruency Effects in Rhythm Perception (C. FRINGS, C. SPENCE) · The nose tells it to the eyes: cross-modal associations between olfaction and vision (A. SEIGNEURIC, K. DURAND, T. JIANG, J. BAUDOUIN, B. SCHAAL) · Size Matters: Performance is Modulated by the Ratio of Sizes (T. LEIBOVICH, K. YONA, S. ASHKENAZI, O. RUBINSTEN, A. HENIK) · Multisensory Contrast Bias in Dynamic Stimuli (R. THOMASCHKE, M. BUTZ) · Examining the Neurocognitive Mechanisms in Synaesthesia (R. COHEN KADOSH) **SESSION: Semantic and syntactic processing II** *(Large lecture hall A)* · Written naming of surimposed pictures: evidence for a cascaded account (S. ROUX) · Children`s word monitoring in Czech sentences with morphosyntactic violations: no evidence of grammatical effects (F. SMOLIK) · Temporal dynamics of activating and selecting reference frames in spatial language (M. STRUIKSMA, M. NOORDZIJ, A. POSTMA) · Semantic context effects in the recognition of reduced words (M. VAN DE VEN, B.V. TUCKER, M. ERNESTUS) · The on-line processing of person and number features in Italian subject-verb agreement (S. MANCINI, F. POSTIGLIONE, A. LAUDANNA, L. RIZZI) **SESSION: Task switching III** *(Large lecture hall B)* · Switching auditory selective attention in dichotic listening (I. KOCH, V. LAWO, M. VORLAENDER) · Control of interference in dual-tasking – does conflict monitoring theory can account for the control mechanism in dual-task? (M. OLSZANOWSKI, A. SZMALEC, Z. KŁYSZEJKO, T. RUTKOWSKI) · Testing the attention-shift hypothesis as an explanation for flanker-sequence based congruency modulations (P. ZEISCHKA, N. DEROOST, K. MAETENS, E. SOETENS) · Cue interpretation processes in cued task switching: inferences from the Lateralized Readiness Potential (LRP) (B. VAN LOY, B. LIEFOOGHE, A. VANDIERENDONCK) · Task switching: Task-difficulty effects on the restart and local costs (C. MARTIN, F. BARCELO, M. HERNANDEZ, A. COSTA) **SESSION: Implicit processing** *(Medium lecture hall B)* · To think or not to think? Revisiting Unconscious Thought Theory (A. CLEEREMANS, L. WAROQUIER, D. MACHIORI, O. KLEIN) · Implicit learning of evaluative responses (J. SWEKLEJ, R. BALAS) · On the role of consciousness for context specific modulations of response priming effects (A. HEINEMANN, W. KUNDE) · Can unconscious stimuli induce cognitive control? (W. GEVERS, E. VAN DEN BUSSCHE, B. REYNVOET) · Three awareness scales predict performance in a visual identification task, and suggest no performance without awareness (B. TIMMERMANS, K. SANDBERG, B. BIBBY, A. CLEEREMANS, M. OVERGAARD)

SESSION: Emotion and cognition II *(Seminar room 1)*
· The effects of financial reward schedules on repetition priming in visual search (A. KRISTJANSSON)
· When unrelated affect is a distractor? (R. STERCZYŃSKI)
· Attempts to control threatening stimuli lead to a strong attentional bias in a visual search task (L. NOTEBAERT, S. VAN DAMME, G. CROMBEZ, J. THEEUWES)
· Look out for danger! Attention to threat in anxiety (K. MOGG)
· The role of consciousness in somatic marker mechanism (R. STERCZYŃSKI)

10.40 – 11.00 Coffee break

11.00 – 12.40 Six parallel symposiums or thematic paper sessions

SESSION: Attention and inattention *(Large lecture hall A)*
· Change Blindness: Factors and Involved Components (J. HOFFMANN, A. SEBALD)
· Inattentional deafness: A study of the consequences of auditory inattention (P. DALTON)
· Influence of colour on report of repeated items in RSVP sequences: repetition blindness and repetition benefits (V. COLTHEART, M. ZAMPINI, D. LOACH)
· The Backward Inhibition contribution to the Attentional Blink (F. FERLAZZO, S. SDOIA, S. FAGIOLI, F. DI NOCERA)
· Neural correlates of the interaction between temporal attention and working memory (E. AKYUREK, M. LESZCZYNSKI, A. SCHÜBO)

SESSION: Bilingualism II *(Large lecture hall B)*
· When ROOM means cream and room: translation, homographs, ERPs and overt speech (I. HRISTOFFELS, L. GANUSHCHAK, D. KOESTER)
· Time course of inhibitory processes on bilingual language processing (M. MARTÍN, P. MACIZO, M. BAJO)
· Bilingual advantage in non-linguistic task switching (M. HERNANDEZ, C. MARTIN, F. BARCELO, A. COSTA)
· Conflict monitoring and response inhibition in bilinguals and musicians. Evidence from ERP (Z. WODNIECKA, S. MORENO, E. BIALYSTOK, C. ALAIN)

SESSION: Perception and pattern recognition *(Medium lecture hall A)*
· Object recognition in adolescence (M. JUTTNER, D. PETTERS, E. WAKUI, J. DAVIDOFF)
· Categorical Perception of Objects based on Intrinsic Object Structure (M. HARTENDORP, S. VAN DER STIGCHEL, H. BURNETT, T. JELLEMA, P. EILERS, A. POSTMA)
· An inverted face-inversion effect for other-race faces – ERPs show that the N170 is own-face specific (G. HIRSCHFELD, J. BÖLTE)
· Visual gist of natural scenes derived from image statistics parameters (H. SCHOLTE, S. GHEBREAB, A. SMEULDERS, V. LAMME)

SESSION: Time perception and control (*Medium lecture hall B)*
· The biological clock regulates human attention (A. CORREA)
· Temporal orienting induced by rhythms (D. SANABRIA, M. CAPIZZI, A. CORREA)
· Time Perception and Impulsivity: The Case of Intertemporal Choice (M. DSHEMUCHDASE, S. SCHERBAUM, T. GOSCHKE)
· Dual-task evidence for automatic and controlled mechanisms in temporal preparation (M. CAPIZZI, D. SANABRIA, A. CORREA)

SESSION: General cognition II *(Conference and lecture hall C)*
· The Metamorphosis of the Statistical Segmentation Output: Lexicalization during Artificial Language Learning (T. FERNANDES, R. KOLINSKY, P. VENTURA)
· Co-representing Action Rules in a Shared Bimanual Paradigm (C. JAGER, A. HOLLANDER, W. PRINZ)
· Visual Experiences form the appreciation space of object categories (S.J. FAERBER, H. LEDER, C.C. CARBON)
· The time course of perceptual processes in absolute identification (D. GUEST, J. ADELMAN, C. KENT)

	SESSION: Social aspects of attention *(Seminar room 1)* · Losing the big picture: How religion may control visual attention (L. COLZATO, C. SCOROLLI, W. VAN DEN WILDENBERG, A. BORGHI, B. HOMMEL) · Visual attention to social cues (A. PECCHINENDA) · Cognitive principles of feints in sports (S. SKIRDE, W. KUNDE) · How social are task representations? (B. HOMMEL, L. COLZATO, W. VAN DEN WILDENBERG)
12.40 – 14.00	Lunch break
14.00 – 15.30	**POSTER SESSION III** *(Exhibition room A & B)*
15.30 – 16.30	**KEYNOTE LECTURE** *(Large lecture hall)* How formal modelling has benefited theories of human memory S.FARREL
18.30 – 23.00	Conference dinner

POSTER SESSION I (Thursday, 3rd September, 16.20 – 18.20)

ACTION I

· Limited conscious monitoring of one's own hand movement during sensorimotor transformation (J. MÜSSELER, C. SUTTER)

· Does the side of response affect yes/no response ratio? (K. CIPORA, M. SZPITALAK)

· The agentive concern of sensory attenuation (C. WEISS, A. HERWIG, S. SCHÜTZ-BOSBACH)

· Priming effect on the schematic grasping and semantic decisions for drawings of objects and words: dual routes for action (H. CHAINAY, L. NAOURI, A. PAVEC)

· Eastern and western tools: How culturally acquired action expertise shapes perception-action links (J. TSAI, G. KNOBLICH, N. SEBANZ)

· Probability effects in anticipation investigated with online behavioural measures (Mouse Tracking) (P. BRUHN)

· Numbers impact on motion speed (G. PERRONE, E. BRICOLO, L. GIRELLI)

ATTENTION I

· Irrelevant singletons in visual search: capture ofattention or filtering costs? An ERP study (A. WYKOWSKA, A. SCHUBÖ)

· Attention doesn't explain attentional focusing effects in memory for emotional stimuli (S. CHIPCHASE, P. CHAPMAN)

· Spontaneous appraisal of facial attractiveness in attention tasks (C. LIU, W. CHEN, J. SUI)

· Reverse attentional biases depending on a nonmotivational vs. motivational focus (C. BERMEITINGER, D. WENTURA)

· Salience and relevance in distinct dimension are combined and interact to orient attention (D. FERNANDEZ, G. MICHAEL)

· Testing the efficiency and independence of attentional networks: Evidence from the Lateralized Attention Network Test (LANT) (D. ASANOWICZ, P. WOLSKI)

· Time course of attentional bias for emotional faces. Chronometric and electrophysiological explorations (D. ASANOWICZ, E. WRONKA, W. WALENTOWSKA)

· The effect of joint attention on object processing (A. BÖCKLER, N. SEBANZ, G. KNOBLICH)

BILINGUALISM I

· Utilizing general cognitive processes in foreign language instruction (M. PARADOWSKI)

· Auditory word recognition by bilinguals: Evidence for nonselective lexical access (E. LAGROU, W. DUYCK, R. HARTSUIKER)

· Grammatical Gender Inhibition in Bilinguals (L. MORALES, D. PAOLIERI, T. BAJO)

· Two-digit Arabic numbers and verbal numbers: Exploring the compatibility effect in Spanish/English bilinguals (M. MARTÍN, P. MACIZO, A. HERRERA)

· Exploring bilingual lexical selection with the Retrieval-Induced Forgetting paradigm: facilitation, not inhibition (E. RUNNQVIST, A. COSTA)

· Language, Thought and Articles or how Poles (don't) deal with English articles (K. HANSEN, J. RĄCZASZEK-LEONARDI)

· The nature and efficiency of attentional functioning in bilingual individuals - an implementation of Lateralized Attention Network Test (A. MARZECOVÁ, D. ASANOWICZ, L. KRIVÁ, Z. WODNIECKA)

DISORDERS I

· Cognitive dizontogenesis as a problem in clinical psychology (N. ZVEREVA)
· Exploring working memory skills in children with Non-Specific Language Impairment (F. ZOUROU, B. LÉTÉ, J. ECALLE, A. MAGNAN)
· Subtle Executive Function impairment in HIVinfected and treated phenylketonuric children: a comparison (G. MENTO, V. TARANTINO, P. BISIACCHI)
· Metamemory modulates the Jacoby–Whitehouse illusion in Alzheimer's disease (S. WILLEMS)
· Theory of mind deficit in patients with right hemisphere impairments (A. PLUTA, J. SZUTKOWSKI)
· Beyond success and failure: what fine-grained analysis of performance reveals about cognitive stability in autism? (M. GYORI, B. BATTA, K. NÉMETH, A. BALÁZS, K. STEFANIK, I. KANIZSAI-NAGY)
· Similarities and differences between acquired and congenital pathologies of the Corpus callosum (P. DE FABRITIIS)

EMOTIONS I

· Positive Emotions and Inhibitory Control: The Differentiated Effect of Abstract versus Concrete Emotions (M. KATZIR, T. EYAL, N. MEIRAN, Y. KESSLER)
· The influence of emotional arousal on recognition of fragmented pictures (C. MERCURI, S. MASTROBERARDINO, F. MARUCCI)
· Awareness of Emotions in Anxious and Non-Anxious individuals (D. LAMY, L. RUDERMAN)
· Emotional or Rational? Selective Attention and Emotional Stimuli Inside and Outside the Center of Attention (L. LICHTENSTEIN-VIDNE, A. HENIK, Z. SAFADI)
· Electrophysiological insights into the detection mechanism of personally significant sounds (A. ROYE, T. GRUBER, T. JACOBSEN, E. SCHRÖGER)

HIGHER ORDER COGNITION I

· Unifying model of decision making (T. SMOLEŃ)
· Bimanual coordination skill in expert typists (M. RIEGER)
· SNARC effect for size? (K. CIPORA)
· On how to reduce the illusion of control: Implications for improving scientific reasoning in society
(H. MATUTE, I. YARRITU, F. BLANCO, M. VADILLO)
· Divergent Production in the Training Situation:Analysis and Application of Result Obtained (E. FRANKOVA)
· Studying metaphorical mode of thinking (E. DRYLL)
· Cognitive mechanisms and effects of negativeruminations in behavior regulation (J. BUCZNY)

IMPLICIT COGNITION I

· Subliminal priming: low-level perceptual
congruency can impede response priming (C. POHL, A. KIESEL, W. KUNDE, J. HOFFMANN)
· Action planning can improve object detection in a change-blindness task (E. SYMES, M. TUCKER, R. ELLIS, L. VAINIO, G. OTTOBONI)
· Subliminal behavioral priming: It is all in the brain, but whose brain? (S. DOYEN, C. PICHON, O. KLEIN, A. CLEEREMANS)
· Help your intuition to help you (M. SIEDLECKA)
· Unconscious semantic processing and the complexity of evaluative standards (K. DOBRENKO)

LANGUAGE PRODUCTION I

· The influence of prime lexicality on pseudoword latencies in the lexical decision task (C. ROBERT, S. MATHEY)
· An investigation of early morphological decomposition using transposed-letter priming effects (E. BEYERSMANN, A. CASTLES, M. COLTHEART)
· Balanced and Unbalanced German/English bilinguals processing two-digit number words (P. ROMAN, P. MACIZO, A. HERRERA)
· Phonological activation of to-be-ignored context objects as a function of semantic relatedness in object naming (F. GOERGES, F. OPPERMANN, J. JESCHENIAK, H. SCHRIEFERS)
· The Syllabic-Bridge Hypothesis (D. ZAGAR, N. DOIGNON-CAMUS)
· Is developmental dyslexia modality specific? A visual-acoustic comparison on Italian dyslexic children (C.V. MARINELLI, P. ANGELELLI, G. DI FILIPPO, P. ZOCCOLOTTI)
· The role of iconicity in Taiwan Sign Language
lexical access (Y. CHIU)
· Word-meaning in language comprehension process
(L. ZASYEKINA)

LEARNING AND MEMORY I

· Memory Representations of Truth and Falsity (L. NADAREVIC, E. ERDFELDER)
· On the nature of the survival-processing effect (M. KRONEISEN, E. ERDFELDER)
· Exploring Specificity Effects in Compound Audio-Visual Memory (M. PAPESH, S. GOLDINGER)
· Level of construal moderates the specificity effect in event-based prospective memory (J. RUMMEL, T. MEISER)
· Face-name associative memory across life: gender differences and role of the semantic node (J. STERN, N. FIORI)
· Generation effect in source memory and target predictability (M. NIEZNAŃSKI)
· Valence modulates source memory for faces (R. BELL)
· Production of false memories in the DRM paradigm using lists with two critical items (H. OLIVEIRA, P. ALBUQUERQUE, A. MACHADO)
· Familiar person recognition: do we remember more episodic memories from faces than from names? (C. BARSICS, S. BRÉDART)
· Investigating the cognitive processes underlying the lag effect (C. KÜPPER-TETZEL, E. ERDFELDER)

· Memory trace strength: An integrated memory trace? (L. BRUNEL, M. CHERDIEU, S. LAURENT, R. VERSACE)
· Prospective Memory Monitoring Costs Observed in a Linear Orders Task (R. ALBIŃSKI, A. KLESZCZEWSKA-ALBIŃSKA)
· Investigating global environmental contextdependent recognition memory (R. GEARY-GRIFFIN)
· Life scripts exist for some not for all highly positive autobiographical memories: Evidence from Malaysia (S. HAQUE)

LIFE SPAN I
· Age differences in the rejection of false memories: Effects of warning instructions and presentation rate (P. CARNEIRO, A. FERNANDEZ)
· Exploring Animal Magnetism: modulation of closing-in behaviour in pre-school children (E. AMBRON, M. BRANDIMONTE, R. McINTOSH)
· Relationship between intraindividual variability and level of performance in visuospatial memory: the role of task difficulty (P. GOLAY, T. LECERF)
· Inhibition and Rigidity - A study on the effects of age (J. STEINMETZ, C. HOUSSEMAND)
· Prospective memory in children: A comparative study between 6, 8 and 10 years old (S. MASTROBERARDINO, V. NATALI, F. MARUCCI)
· Neurovisual profile in children with developmental impairments: Results from the ABCDEFV test battery (L. BARCA, F. CAPPELLI, M. STORTINI, E. CASTELLI)
· Working Memory and Aging: Distinction of Verbal and Visuospatial Information in a Combined Task (C. MAINTENANT, D. FAGOT, T. LECERF, A. DE RIBAUPIERRE)
· Development from childhood to adulthood of automatic and controlled processes in visual selective attention (M. WALKER, J. FOULIN, S. DELORD)
· Literacy development in deaf children with cochlear implants (CI): contribution of early exposition to Cued Speech (S. COLIN, A. PENILLARD, J. ECALLE, G. LINA-GRANADE, E. TRUY, A. MAGNAN)

NUMBER COGNITION I
· The magnitude representation of small and large symbolic numbers: an event-related fMRI study (K. NOTEBAERT, B. REYNVOET)
· Naming digits in a blocking paradigm (A. FLORES, A. HERRERA, P. MACIZO)
· Reading strategies and two-digit number processing: An eye-tracking study (O. RAMOS, S. PESTELLI, P. MACIZO, A. HERRERA)
· Visuo-spatial working memory and strategy solution in complex mental arithmetic (A. LUCIDI, A. CORTESE, C. ROSSI-ARNAUD, V. CESTARI)
· The digit repetition effect in two-digit number comparison (S. GAZZELLINI, A. LAUDANNA, W. FIAS)
· Exploring the nature of multiplication priming (J. GARCIA-ORZA, J. DAMAS-LÓPEZ)
· The Mental Representations of Fractions: Adults' Same-Different Judgements (F. GABRIEL, A. CONTENT)

PERCEPTION I
· Hemispheric Lateralization in Face Perception: A sex differences study (G. ORNELLA)
· Facial Identity Processing: Hemispheric and Sex differences (O. GODARD)
· The centre is not in the middle: spatial biases in the bisection of different visual stimuli (P. PREVITALI, L. GIRELLI, L. ARDUINO)
· Effects of stimulus-induced temporal orienting on early auditory processing (K. LANGE)
· The Weibull statistics and the efficiency of natural image categorization (R. AUKSZTULEWICZ, S. GHEBREAB, A. SMEULDERS, V. LAMME, H. SCHOLTE)
· Measures of synaesthetic spatial forms in the general population (M. PRICE, T. SOLBERG, O. BLAKSTAD)
· Masked priming of pronounceable and unpronounceable nonwords: An ERP investigation (S. MASSOL, J. GRAINGER, K. MIDGLEY, P. HOLCOMB)
· Gender-based Prototype Formation in Face Recognition (L. DIAMESSO-MALKAUD, J. BAUDOUIN, R. BROCHARD)
· Interactions between number and space: further evidence for a cognitive illusion (M. RANZINI, G. PERRONE, L. GIRELLI)
SOCIAL COGNITION
· Computer simulation with cellular automata as a new source of hypothesis: social cognition in mate selection (M. RUIZ-SOLER)
· The role of emotional intelligence in course and effectiveness of cognitive processes (M. STOLARSKI)
· Self, others and objects: how they interact and modulate the motor system (L. LUGLI, G. BARONI, C. GIANELLI, A. BORGHI, R. NICOLETTI)
· Executive attention, working memory and emotional intelligence (D. ASANOWICZ, J. ORZECHOWSKI, M. ŚMIEJA)

WORKING MEMORY I
· Serial order and binding in (the so-called) visual working memory (S. TREMBLAY, C. MIMEAU, K. GUÉRARD)
· Interference and Visual Memory for Abstract and Pictorial Stimuli: The Effects of Articulatory Suppression and Spatial Tapping (R. SHAW)
· Visuo-spatial Working Memory for connections (E. COLUCCIA, M. BRANDIMONTE)
· Individual differences in working memory span and false memories in the DRM paradigm (J. PARDO-VÁZQUEZ, J. FERNÁNDEZ-REY)
· Refreshing and rehearsal in the maintenance of the order of verbal information (P. LAGNER, V. CAMOS)
· The interference between working memory and spatial-numerical association (R. STANISZEWSKI, M. GUT, I. SZUMSKA, P. JAŚKOWSKI)

POSTER SESSION II (Friday, 4th September, 16.20 – 18.20)

ACTION II

· When colour discrimination evokes action (L. RIGGIO, C. DE STEFANO, D. ZAVAGNO, N. STUCCHI)
· Processing of action-related nouns modulates motor system activity (B. MARINO, P. GOUGH, V. GALLESE, G. BUCCINO, L. RIGGIO)
· The influence of perspective on action execution (C. SUTTER, J. MÜSSELER, L. WIRTH)
· The role of domain general mechanisms in imagined transformations of the human body (R. POTTS, M. GARDNER)
· Bimanual Coordination in Tool Use (C. SATTLER, C. MASSEN)
· Grasping without vision: Neural correlates of blindactions (C. RENZI, E. RICCIARDI, D. BONINO, L. SANI, T. VECCHI, P. PIETRINI)

ATTENTION II

· Eye-Movements in Repeated Visual Search of Fixed Scenes (M. HOUT, S. GOLDINGER)
· L-theanine and caffeine improve selective attention (S. EINÖTHER, J. RYCROFT, V. MARTENS, E. DE BRUIN)
· Does deeper always mean better? Relation between mnemonics based on different levels of processing and state of attention (D. CZAJAK)
· Spatial attention and neglect: prism adaption and its effect on endogenous orienting (A. MARZECOVÁ, D. ASANOWICZ, P. WOLSKI)
· Attending to spatial location or object in space: what does prism adaptation change? (P. ANTOSZ, D. ASANOWICZ, P. WOLSKI)
· Prismatic displacement and simple reaction times (J. PASZULEWICZ, D. ASANOWICZ, P. WOLSKI)
· Central load and change detection accuracy (J. PASZULEWICZ, D. ASANOWICZ, P. WOLSKI)
· Influences of prism adaptation on reflexive covert attention (Ł. MICHALCZYK, D. ASANOWICZ, P. WOLSKI)

BILINGUALISM II

· Italian-German bilinguals comparing two-digits number words (A. HERRERA, P. MACIZO, D. PAOLIERI, P. ROMÁN)
· The processing of syntactic ambiguities in consecutive translation and reading (N. PAREDES, P. MACIZO, T. BAJO)
· Competition is required to observe inhibition in bilingual language processing (D. PAOLIERI, P. MACIZO, T. BAJO)
· How Spanish-English bilinguals use prior knowledge in their two languages (M. MARTÍN, P. MACIZO, A. HERRERA)
· Intra- and Interlingual Frequency Neighborhood Effect in L1 French Adults Low Proficient L2 English speakers (E. COMMISSAIRE, S. CASALIS)
· The processing of object pronouns Spanish: A comparison of native speakers and L2 learners (E. ROSSI, G. DUSSIAS)
· Bilingualism and the Acquisition of Number Skills (D. GUAGNANO, E. RUSCONI, R. JOB,R. CUBELLI)

DISORDERS II

· Short-form of the Spanish version of WAIS-III for use in the assessment of schizophrenic patients(I. FUENTES, M. ROMERO, C. DASI, J. RUIZ, M. SOLER)
· Implicit and explicit memory in children after traumatic brain injury (M. DE MARTINO, M. PANASITI, C. NUCITA, D. MENGHINI, E. CASTELLI, M. SABBADINI, S. VICARI)
· To do or not to do? Memory for intentions and response inhibition in Autistic Spectrum Disorder and ADHD (P. FILIPPELLO, M. BRANDIMONTE, E. COLUCCIA, M. KLIEGEL, M. ALTGASSEN)
· Amnesics' False Memory Following Incidental and Intentional Encoding: What About Conscious Activation of the Critical Lure? (I. VAN DAMME, G. D'YDEWALLE)
· Alteration of prospective memory functions in obsessive-compulsive disorder (OCD) (G. DEMETER, M. RACSMÁNY, K. CSIGÓ, A. HARSÁNYI, A. NÉMETH)
· Simulation of autobiographical future episodes in patients with amnesic Mild Cognitive Impairment (N. GAMBOZ, S. DE VITO, S. PAPPALARDO, A. IAVARONE, S. DELLA SALA, M. BRANDIMONTE)

EMOTIONS II

· Processing of Emotional Stimuli in Anxious and Depressive Repressors and Sensitizers (A. KLESZCZEWSKA-ALBIŃSKA, R. ALBIŃSKI)
· The dark side of the (positive) mood: how mood and encoding processing affect false memories (E. MENDONÇA, P. CARNEIRO)
· Emotional Valence and Executive Attention: how emotion affects executive processes (J. POZUELOS, M. RUEDA, A. ACOSTA)
· Impact of negative affect on creativity – the threat of social exclusion vs the threat of health (L. DRĄŻEK)

HIGHER ORDER COGNITION II

· Surprise as a response to unexpected events that are difficult to assimilate in the prevalent processing schema (A. TOUROUTOGLOU, A. EFKLIDES)
· How the probability of conditionals task provides a strong support to the revised mental model theory (C. GAUFFROY, P. BARROUILLET)
· Low vs. high spatial frequencies matter for higher cognitive tasks – the case of website evaluations (G. HIRSCHFELD, M. THIELSCH, I. PERABO)
· Draw a man or draw your mum: Drawing and mental representation in children (C. MAINTENANT, C. THEVENOT, M. DUTREVIS)
· A statistical validation of the Planning Index (D. BASSO, G. VIDOTTO, P. BISIACCHI)
· Expertise – Investigating Deliberate Practice (T. KUBIK)
· Unconscious vs. Conscious inferences in deductivereasoning (J. GARCIA-MADRUGA, S. MORENORIOS, I. RODRÍGUEZ-GUALDA)

IMPLICIT COGNITION II

· Effect of study time on familiarity-based recognition (A. PITARQUE, S. ALGARABEL)
· Cognitive load influence on the implicit and explicit memory. Motivational aspects (M. WIERZCHOŃ, M. SZPITALAK)
· The nature of color-induced nasal-thermal sensations (H. GALICH, S. RELLAND, G. MICHAEL)
· Implicit Spatial Perception In Unilateral Neglect (B. TRECCANI, R. SELLARO, R. CUBELLI, N. BESCHIN, S. DELLA SALA, C. UMILTA)
· Access to implicit knowledge: feeling of warmth and post decision wagering (A. HAWROT, M. TARADAY, M. WIERZCHOŃ, D. ASANOWICZ)

LANGUAGE PRODUCTION II

· Phonological activation in sentence production (J. JESCHENIAK, F. OPPERMANN, H. SCHRIEFERS)
· Sequential retrieval of lexical items during noun phrase production (P. AYORA, F-XAVIER ALARIO)
· Grammatical gender effect in bare noun production: Evidence from the picture-word paradigm in Italian and Spanish (D. PAOLIERI, L. MORALES, L. LOTTO, T. BAJO, R. CUBELLI, R. JOB)
· Effects of frequency, neighbourhood density and neighbourhood frequency in spoken word production in European Portuguese (L. OLIVEIRA, S. VICENTE)
· Homograph competition in lexical processing of Italian verbal forms (F. POSTIGLIONE, A. MANCUSO, A. LAUDANNA)
· Sublexical and lexical influences on writing during text production among 5th-to 9th grade French children (S. MAGGIO, B. LÉTÉ, F. CHENU, H. JISA, M. FAYOL)
· Processing italian regular and sub-regular verbal forms (V. AMORE, A. LAUDANNA)
· Root Frequency in Visual Word Recognition of Italian Words (A. LAUDANNA, G. BRACCO)
· The influence of misspelling exposure on word production performance (M. DELATTRE, S. PACTON)
· Orthographic neighborhood effects : evidence for feedback in spelling to dictation (S. ROUX)

LEARNING AND MEMORY II

· Effect of instructions in the confidence-accuracy calibration in eyewitness memory (K. LUNA, B. MARTÍN-LUENGO)
· Encoding of categorical information has no effect on false memory (Y. LEE)
· Categorical perception was induced by rule-based category learning but not by information-integrated category learning (T. SUEGAMI)
· The influence of practice and handedness on the orthogonal Simon effect (N. MILANESE, C. IANI, S. RUBICHI)
· Backward Blocking and Interference between cues in non-causal scenario (C. ORGAZ, D. LUQUE, J. MORÍS, H. MATUTE, P. COBOS)
· The influence of encoding style on the production of false memories (H. DEHON, F. LAROI, M. VAN DER LINDEN)
· Forward and backward blocking in the absence of a causal scenario (M. VADILLO, D. LUQUE)
· Learning variable inter-event contingencies in the traditional laboratory and on the Internet (M. VADILLO, N. ORTEGA-CASTRO, C. ORGAZ, H. MATUTE)
· The role of typicality, organization, and integration of category exemplars in retrieval-induced forgetting (RIF) (E. GARCIA-BAJOS, M. MIGUELES)
· Learning natural objects: A cognitive artifact of the way we were? (A. VRANIC, I. HROMATKO)
· Learning by observation: The role of social comparison and related ability inferences (L. BOUNOUA, F. CURY, E. MONFARDINI, M. MEUNIER, D. BOUSSAOUD, A. BROVELLI, P. HUGUET)
· Using a multidimensional scaling approach to investigate the underlying basis of ease of learning judgments (F. JÖNSSON, B. LINDSTRÖM)

LIFESPAN II

· Working memory plasticity in younger and older adults: Practice gains and transfer (C. BÜRKI, C. LUDWIG, C. CHICHERIO, A. DE RIBAUPIERRE)
· Generalization of the worst performance rule across the lifespan (S. FERNANDEZ, J. DIRK, D. FAGOT, A. DE RIBAUPIERRE)
· Cognitive flexibility in preschoolers. Can verbal regulation help? (A. BLAYE, L. POURCIN)
· Interrogative suggestibility in children: Processing modality and cognitive factors as mediating variables (A. CUNHA, P. ALBUQUERQUE, T. FREIRE)
· Children's learning about formal and functional properties of double letters: The case of French (J. DANJON, S. PACTON)
· Level and Variability in Cognitive Performance across the Lifespan: Insights from Modeling Response Time Distributions (J. DIRK, C. CHICHERIO, P. GHISLETTA, A. DE RIBAUPIERRE)
· The Development of Perceptual Sensitivity to Second-Order Facial Relations in Children (J. BAUDOUIN, M. GALLAY, K. DURAND, R. FABRICE)
· Reading goals from minds. A child's perspective (G. RAPINETT, D. OLAH)
· Understanding of 'false emotion' from the observer's perspective (A. MELON)

NUMBER COGNITION II

· The impact of the mental number line on haptic line bisection: crossmodal interaction in blind and sighted individuals (Z. CATTANEO, M. FANTINO, J. SILVANTO, C. TINTI, T. VECCHI)
· Automatic Numerical Processing in Sequential Presentation (N. BEN-MEIR, D. GANOR-STERN, J. TZELGOV)
· Word order do not determine number processing: Fifty-three and three-fifty are processed similarly (S. PESTELLI, P. MACIZO, A. HERRERA)
· The comparison of two-digit number words when the unit is more relevant (O. RAMOS, A. HERRERA, P. MACIZO)
· The operand-recognition paradigm: a study of subtraction

in high and lower-skilled arithmetic problems solvers (C. CASTEL, C. THEVENOT, M. FAYOL)
· Numerical and physical magnitude: shared representations or shared response codes (S. SANTENS, T. VERGUTS)

PERCEPTION II
· Contrast- and illumination-invariant visual object recognition from active sensation (M. JUTTNER, E. OSMAN, I. RENTSCHLER) · Elemental and configural body representation in the extrastriate and fusiform body area (B. VOGT, N. DAVID, S. SCHÜTZ-BOSBACH)

· Do we always prefer the left side of chimeric faces? (C. COMPARETTI, P. RICCIARDELLI, L. TOSCANI, R. DAINI)
· Sources of spontaneous sensations arising on the hands (G. MICHAEL, J. NAVETEUR)
· Perceptual and semantic influences of objects' properties depend on the type of change (S. SPOTORNO, S. FAURE)
· The rapid extraction of gist in coherent object configurations – A gamma band study (F. OPPERMANN, T. GRUBER, U. HAßLER, M. MÜLLER, J. JESCHENIAK)
· Menstrual cycle related changes in laterality of line orientation task (I. HROMATKO, M. TADINAC)
· Mistakes committed in perceiving visual illusions depending on a way of measurement and an age of research subjects (J. WOJCIECHOWSKI, J. RĄCZASZEK-LEONARDI, A. TARNOWSKI)

SEMANTIC AND SYNTACTIC PROCESSING
· Sequence learning and the development of syntactic knowledge (J.N. WILLIAMS, P. REBUSCHAT)
· ERP contribution to dissociation of pre- and postlexical processes involved in semantic priming (F. FAITA-AINSEBA, S. BOUAFFRE)
· Is the ambiguity advantage due to homonymy, polysemy, or neither? (B. JAGER, A. CLELAND)
· Structural priming of adjective-noun structures in hearing and deaf children (L. VAN BEIJSTERVELDT)
· The time course of motor resonance in the comprehension of action sentences (M. CASTILLO VILLAR)
· Abstract sentences like counterfactuals may activate motoric processes (M. URRUTIA)
· A new tool investigating metaphorical conceptualization of some notions: May it differentiate people in the area of mood? (M. BARCZAK)

WORD RECOGNITION
· How does interhemispheric communication in visual word recognition work? (L. VAN DER HAEGEN, M. BRYSBAERT, C. DAVIS)
· Effect of emotional orthographic neighbourhood in visual word recognition: An ERP study (P. GOBIN, F. FAÏTA-AÏNSEBA, S. BOUAFFRE, S. MATHEY)
· The effect of the morpheme gender in word recognition (V. CEMBRANI, D. PAOLIERI, E. BOSELLI, G. GARDUMI, C. CACCIARI, R. CUBELLI)
· Peripheral information effect in perceptual word identification in French third and fifth graders (R. KHELIFI, L. SPARROW, S. CASALIS)
· Age-of-acquisition and neighbourhood density effects on written word recognition in Portuguese (L. MEIRELES, S. VICENTE)

WORKING MEMORY II
· The advantage of small memory capacity: How individuals detect and utilize two-way correlation in a multiple-way setting (K. KIKUCHI, C. MICHIMATA)
· Phonological loop in a number comparison task (A. HERRERA, P. MACIZO, A. FLORES)
· Time causes forgetting in Working Memory even when Refreshing time and Post-error processes are controlled (S. PORTRAT, P. BARROUILLET, V. CAMOS)
· Contextual cueing depends on visuospatial working memory (A. MANGINELLI, F. GERINGSWALD, S. POLLMANN)
· Working Memory Capacity: Stroop effects in processing and storage domains (C. OLIVEIRA, P. ALBUQUERQUE)
· Age differences in verbal and visuospatial working memory updating (F. FIORE, R. DE BENI, C. CORNOLDI, D. PACHER)
· Working memory involvement in spatial text processing: the effect of experience (R. DE BENI, C. MENEGHETTI, V. GYSELINCK, P. FRANCESCA)

POSTER SESSION III (Saturday, 5th September, 14.00 – 15.30)

ACTION III
· Influence of motor planning on action simulation (P. TAUSCHE, A. SPRINGER, W. PRINZ)
· Perception-Action Coupling Link? Culture Affords Different Actions in East and West (J. TSAI, N. SEBANZ, G. KNOBLICH)
· Motor priming with stimuli masked by crowding (M. CIESIELSKI, P. JAŚKOWSKI)
· Cognitive determinants of efficiency of pilot's behavior in condition of visual illusion of false horizon (H. BEDNAREK, O. TRUSZCZYŃSKI)
· Representational and biomechanical efficiency in the selection of object grasps (R. VAN DER WEL, D. ROSENBAUM)
· Intelligence-differences in dynamical properties of internal clock' (J. DRESZER, G. OSIŃSKI, E. SZELĄG)
· A model of complex coordination patterns

AGING
· Playing against Aging (G. BAND)
· What Race Model tells us about memory processes? (M. LESOURD, L. BRUNEL, R. VERSACE)

· The effect of readers age and situational dimensions on resonance process (S. FARHAT, I. TAPIERO)
· Learning and re-organization of neural networks in patients with Alzheimer's disease (S. BERGAMASCHI, C. SPIRONELLI, A. ANGRILLI, A. CALZA, S. MONDINI)
· Flexible Configural Processing is Preserved in Old Age (A. BODUROGLU, P. REUTER-LORENZ)
· Memory training in aging: How promote transfer through metacognitive principles (S. BOTTIROLI, J. DUNLOSKY, E. CAVALLINI, C. HERTZOG)
· Metamemory in aging: the role of cultural differences (S. BOTTIROLI, C. FASTAME, E. CAVALLINI, C. HERTZOG)
· Inhibition and Ageing: More evidence against a unitary view of inhibition (J. STEINMETZ, C. HOUSSEMAND)

ATTENTION III
· Individual differences in spatial abilities: Evidence for different strategies in an indoor navigation task (A. MELSOM, S. WIKING)
· Can Emotion Modulate Attention or is it the Other Way Around? (N. COHEN, A. HENIK, N. MOR)
· Inattentional deafness due to visual attention (C. LENTINI, L. MORREALE, A. COMPAGNONI, R. DAINI)
· Representational neglect for words and representation neglect for objects: evidence of a double dissociation (L. ARDUINO, C.V. MARINELLI, F. PASOTTI, E. FERRE, G. BOTTINI)
· The effect of masking in the attentional dwell time paradigm (A. PETERSEN)
· Does the spatial-numerical association interfere with orienting and executive attentional processing? (M. GUT, M. WASILEWSKA, I. SZUMSKA, P. JAŚKOWSKI)
· When is retrieval protected?: Divided attention in different memory tasks (A. VRANIC)
· Spatial attention effects on the audiovisual duration illusion (B. SARMIENTO, D. SANABRIA LUCENA)

COGNITIVE CONTROL AND TASK SWITCHING
· Prospective memory time-based: Effects of daylight saving time on the memory of appointments (M. VALAX, B. BARACAT, J. CEGARRA, A. RATTAT)
· Dissociating task errors from response errors (C. DESMET, M. BRASS, W. FIAS)
· The Development of Automaticity in Number Processing (T. DEKALO, A. BERGER, O. RUBINSTEN, J. TZELGOV, A. HENIK)
· Transfer of learning from a spatial compatibility task to a Stroop task (M. MARINI, C. IANI, R. NICOLETTI, S. RUBICHI)
· The reliability of individual differences in retrievalinduced forgetting (R. POTTS, R. LAW, J. GOLDING, D. GROOME)
· The effect of the lexical status of the distractor word in Stroop-like paradigms (C. MULATTI, F. PERESSOTTI, V. CEMBRANI, R. JOB)
· Simon Effect – Not Just Interference! (D. AISENBERG, A. HENIK)
· Goal neglect explained by common executive ability (L. ALTAMIRANO, A. MIYAKE, N. FRIEDMAN)
· Task Identity Conflict: Evidence from the Task Identity Congruency Effect (TICE) in a Spatial Task Switching Paradigm (N. MEIRAN, A. BRAVERMAN)
· Retrieval induces forgetting even when only two items share a cue: A more direct method to test inhibitory models of forgetting (A. KERESZTES, M. RACSMÁNY)
· Possible involvement of attentional inhibition in intentional forgetting (J. MENOR)
· The stressed prefrontal cortex: Acute psychosocial stress disturbs shifting and shielding in a task switching setting (F. PLESSOW, A. KIESEL, C. KIRSCHBAUM)
· Developmental changes in the effects of associative learning on task-switching abilities (J. KARBACH, J. KRAY, A. BLAYE)
· Psychometric properties of attentional control scale: preliminary study on polish sample (M. FAJKOWSKA, D. DERRYBERRY)

IMPLICIT LEARNING
· Deficits in implicit sequence learning in dyslexic children with spared learning of explicit sequences and contextual cueing (J.M.M. VAQUERO, G. JIMÉNEZ-FERNÁNDEZ, S. DEFIOR, L. JIMÉNEZ)
· Dimensional overlap and implicit learning of irrelevant sequences (N. DEROOST, P. ZEISCHKA, D. COOMANS)
· The Impact of Starting Small: the learnablity of hierarchical structures in AGL (J. LAI, F. POLETIEK)
· Flexible control in "implicit" learning of artificial grammars (E. NORMAN, M. PRICE, E. JONES)
· The neural substrates of implicit motor versus non motor sequence learning: an fMRI study using a serial color matching task (F. GHEYSEN, F. VAN OPSTAL, H. VAN WAELVELDE, W. FIAS)
· How people make decisions in artificial grammar learning task – their declarations (A. POPŁAWSKA, A. KOLAŃCZYK)
· Using subjective measures of awareness to investigate implicit learning of word meaning (A. PACIOREK, J.N. WILLIAMS)

LANGUAGE PERCEPTION
· The specific role of inhibition in reading comprehension in good and poor comprehenders (E. BORELLA, B. CARRETTI, S. PELEGRINA)
· Influence of person-distinctive acoustic correlates of affective prosody on emotion comprehension in speech (E. DMITRIEVA, V. GELMAN, K. ZAITSEVA)
· The distance effect in sentence reading (P. MACIZO, A. FLORES, A. HERRERA)
· Readers vs. „Illiterates": The influence of the instruction on feature integration of subliminal primes (H. REUSS, C. POHL, A. KIESEL)
· Pardon me? Paying attention to when people talk influences speech perception (B. BLANCA, D. SANABRIA, J. NAVARRA, A. CORREA)
· Do consonant status and sonority within syllabic boundary influence reading process in French dyslexic children? (N. MAIONCHI-PINO, B. DE CARA, A. MAGNAN, J. ECALLE)
· Effect of sensory training modes with letters knowledge, reading and spelling (H. LABAT, J. ECALLE, A. MAGNAN)

· Lexicality prime effects in poor and good French spellers in rd and 5th grade : A masked priming study (M. JANIOT, S. CASALIS)

LANGUAGE PRODUCTION III

· Verb cognate similarity (S. BULTENA, T. DIJKSTRA, J. VAN HELL)

· Learning word specific spelling with multiple-choice procedures has both positive and negative consequences (C. CARRION, P. PERRUCHET, A. REY, S. PACTON)

· On the interpretation of semantic effects in the picture-word interference paradigm (A. MÄDEBACH, F. OPPERMANN, A. HANTSCH, J. JESCHENIAK)

· Speech errors sometimes help and sometimes hinder the resumption: consistent evidence for phonological interference and semantic facilitation (I. TYDGAT, R. HARTSUIKER, M. PICKERING)

· Evidence from the semantic competitor paradigm for a lexical P component in speech production (K. STRIJKERS, A. COSTA, C. MARTIN)

· Dissociating Frequency from Repetition Effects in Speech Production: An ERP Study of Overt Picture Naming (K. STRIJKERS, P. HOLCOMB, A. COSTA)

· Do competitor acquisition effects generalize to segmentation tasks? (N. DUMAY, M. GASKELL)

· Position encoding in pseudowords, nonwords and numbers: evidences from a perceptual identification task (J. GARCIA-ORZA, M. PEREA, S. MUNOZ, I. FRAGA)

· Global and constituent frequency effects in the processing of Italian compound nouns (M. MARELLI, C. LUZZATTI)

LEARNING AND MEMORY III

· How does knowledge affect memory distortion? Empirical studies on the basis of print advertisements (M. ROMANOWSKA, A. GROCHOWSKA)

· False memory and surprise: round #3 (S. WILLEMS, H. DEHON)

· Testing the limits of Retrieval-Induced Forgetting: No RIF is obtained with item-specific cues (M. HANCZAKOWSKI, G. MAZZONI)

· Directed forgetting of neutral and emotional words: Forgetting \'torture\' is indeed harder than forgetting \'briefcase\' (S. NOERBY, J. WEGENER, A. LARSEN)

· Influences of first and second language on episodic memory retrieval (J. WILLANDER, F. MONIRI)

· Imagination inflation: The role of retention interval between imagination and memory test (S. GOUVEIA, P. ALBUQUERQUE)

· Vividness of autobiographical memory recollection is related to self-rated imagery capability (J. WILLANDER, M. LUNDSTRÖM)

· Mental Representations of Fractions in Numerical Comparison Tasks (F. GABRIEL, A. CONTENT)

OTHERS

· Intra-individual variability in accuracy scores: When biased coefficients always tell the same story (P. GOLAY, D. FAGOT, T. LECERF)

· Music Influence on Cognitive Abilities in Relation to Temperamental Characteristics (A. WASIELA, E. CZERNIAWSKA)

· Temporal preparation and impulsivity (A. CORREA, M. TRIVIÑO, J. LUPIÁÑEZ)

· Application of I-conception as a System (R. KALAMAZH)

· Influence of the type of program in the accuracy, source monitoring and

· confidence of radio advertisements (B. MARTÍN-LUENGO, M. MIGUELES)

· Emotional responses to music are associated with musical expertise and music-driven attention (J. KANTOR-MARTYNUSKA, J. HORABIK)

Wednesday, 2nd September

MODULES, GENES AND EVOLUTION: INSIGHTS FROM DEVELOPMENTAL DISORDERS #1 (BROADBENT LECTURE)

17.30 – 18.30, *Large lecture hall*

A. KARMILOFF-SMITH, University of London

In this Broadbent Lecture, I will contrast Nativist and Neuroconstructivist interpretations of the same data from cognitive, genetic and evolutionary approaches to human development. I will show how domain-specific, cognitivelevel deficits can be traced back to their domain-general, lower-level processing deficits in infancy. Taking an example from spatial cognition, I will argue that animal models of human deficits are often inadequate because they do not compare like with like in terms of the cognitive demands of tasks across species. My overall theme will be that researchers must take a truly developmental approach to the gradual process of modularisation (specialisation and localization of the brain/mind) over ontogenesis, to the dynamics of gene expression over time, as well as to the tradeoff between hyper-specialisation and plasticity over evolutionary time. I will end with some pointers to the clinicalimplications for intervention of the Neuroconstructivist approach.

Thursday, 3nd September

LIFELONG BILINGUALISM: LINGUISTIC COSTS, COGNITIVE BENEFITS, AND LONG-TERM CONSEQUENCES #198

18.30 – 19.30, *Large lecture hall*

E. BIALYSTOK, York University

A growing body of research points to the importance of specific experiences in modifying cognitive outcomes. One such experience is bilingualism, with the most dramatic outcome being evidence for the enhancement of executive control across the lifespan. However, a more complex picture emerges when the cognitive advantages of bilingualism are considered together with the costs to linguistic processing. I will review evidence for both these outcomes and propose a framework for understanding the mechanism that leads to both positive and negative consequences of bilingualism.

Friday, 4nd September

HOW FORMAL MODELLING HAS BENEFITED THEORIES OF HUMAN MEMORY #398 (BERTELSON AWARD)

18.30 – 19.30, *Large lecture hall*

S. FARRELL, University of Bristol

One of the major contributions of cognitive psychology has been to catalogue the numerous biases and fallacies in human reasoning. It is surprising then that little discourse has taken place about the implications of the limits on human cognition for scientific conduct: how we reason about our theories, and how we communicate those theories to others. Given these limits, I will argue that the development, application and reporting of formal models is critical to the science of psychology. I will present examples from the memory literature (particularly short-term memory) where formal modelling has served as a useful adjunctive tool, and where it has taken us beyond the limits of standard verbal theorizing.

Saturday, 5nd September

WORKING MEMORY CAPACITY/EXECUTIVE ATTENTION AS BOTH A STATE AND A TRAIT VARIABLE #529

18.30 – 19.30, *Large lecture hall*

R. ENGLE, Georia Institute of Technology

Early conceptions of cognitive limitations were based on a limited number of items or chunks such as 7±2 or 4±1. However, more recent thinking focuses on abiding individual differences in cognitive control and the role those differences play in other complex cognitive tasks. It is further clear that working memory capacity (WMC) should be thought of as a construct or variable that mediates between many other variables and a wide range of cognitive tasks in which control is required or useful. In a sense, we can think of working memory capacity as both a trait and state variable. Individual differences is one important determinant of working memory capacity but other variables ranging from sleep deprivation to secondary cognitive load to stereotype threat and social pressure will lead to temporary reduction in capability for cognitive control in a wide array of real-world cognitive tasks.

Thursday, 3rd September

SYMPOSIUM
THE COGNITIVE NEUROSCIENCE OF TEMPORAL PREPARATION: TOWARDS A TAXONOMY
9.00 – 10.40
Conference and lecture hall C

Organized and chaired by Á. CORREA, University of Granada & A.C. NOBRE, University of Oxford
Speakers: G. ROHENKOHL, University of Oxford; J.D. MCAULEY, Bowling State Green University; A. VALLESI, University of Toronto; S.A. LOS, Vrije Universiteit of Amsterdam; J. LUPIÁÑEZ, Universidad de Granada

For theoretical and pragmatic reasons, it is important to establish: (1) whether temporal preparation (the ability to prepare efficient responses for specific time intervals) requires controlled or automatic processes, (2) the most efficient procedures to provide subjects with temporal information in order to develop temporal preparation, and (3) specific conditions under which temporal preparation can be optimal or deficient.

This symposium will address these issues by integrating data from different cognitive neuroscience methods, including computational modelling, electroencephalography, functional magnetic resonance imaging, neurological lesions, transcranial magnetic stimulation, developmental and behavioural studies.

Five top scientists from different European and American countries will work on developing a comprehensive taxonomy of multiple temporal-preparation phenomena (foreperiod effects, sequential effects, rhythmic expectations and temporal orienting of attention) by considering specific criteria, such as implicit/explicit, automatic/controlled and exogenous/endogenous aspects involved in temporal preparation.

(1) Neurophysiology of Exogenous Temporal Expectations #2 G. ROHENKOHL

Timing is a central component to our behaviour, which is known to optimize both action and perception. Nevertheless, the mechanisms by which the brain keeps time and uses temporal information to organise behaviour remain unknown. Recently it has been suggested that temporal expectations can be distinctively generated unintentionally ('exogenous') or deliberately ('endogenous'). The current study tested the effect of exogenous temporal expectations on attentional orienting to moving targets. In this task, a ball appeared at the left side of a screen and moved across the screen in steps following either a regular or irregular rhythm. After reaching an occluding band, the ball was temporarily occluded. The task involved making a speeded perceptual discrimination about the target stimulus that reappeared after the occlusion. The results indicated a strong behavioural benefit of temporal orienting. We recorded ERPs elicited by reappearance of the target stimulus, and investigated how temporal expectations influenced perceptual and motor stages of neural processing. The results showed that temporal expectations facilitated both early visual and late motor potentials.

(2) Individual differences in automatic aspects of temporal preparation #3 J.D. MCAULEY

This talk will consider factors affecting automatic aspects of temporal preparation from the perspective of individual differences. The emphasis of the talk will be on recent research combining behavioral methods, computational modeling, and functional magnetic resonance imaging to identify perceptual and neural markers of individual differences in automatic and controlled aspects of temporal preparation. Results support three conclusions. First, there is an automatic entrainment mode of temporal preparation that is distinct from a more controlled interval-based mode. Second, the entrainment mode is mediated by the activation of cortical circuits involved in rhythmic movement control. Third, some individuals more readily engage these cortical circuits involved in an entrainment mode of temporal preparation than do others. An intriguing possibility offered by this work is that individuals with neurological disorders that affect brain areas involved in timing (e.g., Parkinson's disease) may evidence shifts in mode of temporal preparation. This new line of research has the potential to lead to a more complete characterization of deficits in temporal aspects of attention linked to disorders and the development of new diagnostic tools.

(3) Time in action: neural and developmental dissociations in implicit temporal preparation #4 A. VALLESI

Time processing shapes preparation in numerous ways. This talk will focus on the neural and cognitive bases of implicit temporal processing, as required in variable foreperiod tasks. In such tasks, simple or choice responses are required while different foreperiods (preparatory intervals between warning and target stimuli) vary equiprobably and randomly within a block of trials. As a result, a variable foreperiod effect is obtained: responses are faster as the foreperiod increases. Moreover, sequential effects also occur: responses are slower after longer preceding foreperiods. Both single- and multi-process accounts have been proposed to explain these phenomena. TMS, neuropsychological and fMRI studies show a dissociation in right prefrontal cortex, which is critical for the foreperiod effect but not for the sequential effects. Moreover, developmental dissociations show that, while the foreperiod effect appears late in childhood and disappears early in aging, the sequential effects are ubiquitous across the life-span. These dissociations suggest that partially different cognitive and neural mechanisms cause foreperiod and sequential effects. A prefrontally-based process enhancing preparation with increasing conditional probability of target occurrence may underlie the foreperiod effect, whereas sequential effects are probably due to more hardwired mechanisms that modulate the arousal level in the preparatory system.

(4) Segregating controlled and automatic components in temporal preparation #5 S.A. LOS

In the variable-foreperiod paradigm, the foreperiod (FP) between a neutral warning stimulus (S1) and an imperative stimulus (S2) is varied randomly across trials. It has invariably been found that the response time (RT) to S2 decreases as FP increases, which presumably reflects an increase in the participant's preparatory state. Early explanations of the RT-FP function have emphasized the controlled nature of preparation. However, this view has been challenged in recent years, when it transpired that the RT-FP function is intrinsically entangled with a robust asymmetric sequential effect of FP. To understand the nature of the preparation process underlying the RT-FP function, one should focus on this more fundamental sequential effect. In this talk, I will discuss two recent explanations of this effect, one emphasizing automatic influences, another emphasizing an additional controlled influence. Then I will discuss an attempt to distinguish between these views using a dual-task methodology, which allows the RT-FP function and the sequential effect of FP to be studied at varying levels of cognitive control.

(5) Temporal orienting in patients with lesion in the Frontal Cortex and Basal Ganglia #6 M. TRIVIÑO, Á. CORREA, M. ARNEDO, J. LUPIÁÑEZ

We can anticipate and prepare for the appearance of a critical event as to be ready to respond to it as soon as it appears. This study explores different abilities related to this temporal preparation (foreperiod effects, sequential effects and temporal orienting of attention) in two groups of patients. One group had lesions localised in the frontal lobes and presented frontal symptoms in neuropsychological testing, whereas the other group had lesions in the Basal Ganglia. The group with Basal Ganglia lesion showed no deficits in temporal preparation as compared to the control group.
In contrast, the frontal group showed an important deficit in controlled

preparation (temporal orienting and foreperiod effects), whereas automatic preparation (sequential effects: the impact of the previous foreperiod on the current foreperiod) remained intact, as compared to a matched-control group. These results are interpreted by considering that temporal anticipation can be implemented by different mechanisms ranging from voluntary orienting attention in time to more automatic temporal inertia processes.

SESSION
EMOTION AND COGNITION I
9.00 – 10.20
Seminar room 1

Chaired by R. ZEELENBERG

9.00 – 9.20
Emotion improves and impairs early vision #7 R. ZEELENBERG, B. BOCANEGRA, Erasmus University Rotterdam

Recent studies indicate that emotion enhances early vision, but the generality of this finding remains unknown. Do the benefits of emotion extend to all basic dimensions of vision or are they limited in scope? Our results show that the brief presentation of a fearful face, compared to a neutral face, enhances orientation sensitivity for subsequently presented low-spatial-frequency (LSF) gabors, but diminishes orientation sensitivity for high-spatial-frequency (HSF) gabors. This is the first demonstration that emotion not only improves but also impairs low-level vision. The selective LSF benefits are consistent with the idea that emotion enhances magnocellular processing. Additionally, we suggest that the HSF deficits are due to inhibitory interactions between magnocellular and parvocellular pathways. Our findings show that the neural mechanisms underlying emotional vision sacrifice the detection of fine details for the processing of coarse information, suggesting an emotion-induced trade-off in visual processing rather than a general improvement. The magnocellular pathway plays an important role in the perception of motion, depth, direction, global configuration and allows for faster processing than the parvocellular pathway. Thus, this trade-off may benefit perceptual dimensions that are relevant for survival at the expense of those that are less relevant.

9.20 – 9.40
A spatiotemporal trade-off in visual acuity due to emotion #8
B. BOCANEGRA, R. ZEELENBERG, Erasmus University Rotterdam

Many findings suggest that emotion enhances early stages of visual processing. However, a recent study demonstrated that emotion not only improves but also impairs early vision (Bocanegra & Zeelenberg, 2009). It was shown that briefly presented fearful faces enhanced orientation acuity for subsequently presented low-spatial-frequency (LSF) gabors, but diminished acuity for high-spatial-frequency (HSF) gabors. This pattern of benefits and deficits suggests that emotion might boost magnocellular visual processing at the expense of parvocellular visual processing. In the present study we investigated this trade-off hypothesis by testing spatial and temporal acuity with Landolt circles that contained either a small spatial or brief temporal discontinuity (gap detection). Our results show that broadband-spatial-frequency fearful faces, compared to neutral faces, improve temporal acuity but impair spatial acuity. Further experiments indicated that both these effects were entirely due to the LSF components in the faces, and not due to the HSF components. Although not predicted by previous data and models, these findings are consistent with the idea that emotion selectively boosts magnocellular processing and that this boost results in an inhibition of parvocellular processing.

9.40 – 10.00
Role of color in determining attentional preference for emotional stimuli #9
M. KUNIECKI[1], S. WICHARY[2], S. GRZYBKOWSKI[1], P. JAŚKOWSKI[3]
[1]Jagiellonian University
[2]Warsaw School of Social Psychology
[3]University of Finance and Management, Warsaw

What makes a stimulus emotional? Is it color? According to some researchers, color has no role in determining emotional valence of a stimulus while others postulate that color is an important stimulus characteristic, determining its valence and arousal values. In order to shed light on this issue, we conducted two experiments using oculograph for eye-gaze tracing. Both experiments employed lateral presentation of stimuli, however the first one was conducted in free viewing while the second one in antisaccade paradigm. Part of the stimuli were transformed to eliminate physical differences between them – pixels from an emotional picture were used in the neutral stimulus, and vice versa. Results clearly show that color is a significant factor in processing of emotional stimuli even at the very early stages of stimulus evaluation. In the first experiment we found that neutral stimuli with pixels from its emotional counterparts have higher probability of attracting attention than original neutral stimuli. Those results were generally confirmed in the second experiment, however laterality was also important.

10.00 – 10.20
Parsimony Principle Applied to the Anger Superiority Effect: Evolutionary Theory or Simple Perceptual Bias? #10 M. MARTIAL[1], N. VERMEULEN[2], D. LUNDQVIST[3], P. NIEDENTHAL[1]
[1]Université Blaise Pascal
[2]Université Catholique de Louvain
[3]Karolinska Institute

Research in social and cognitive psychology suggests that it is easier to detect angry faces than happy faces in a crowd of neutral faces (Hansen and Hansen, 1988). This phenomenon has been held to have evolved over phylogenetic development because it was adaptive to quickly and accurately detect a potential threat in the environment. However, across recent studies, a controversy has emerged about the underlying perceptual versus emotional factors responsible for this so-called anger superiority effect (Purcell, Stewart, and Skov, 1996; Juth, Lundqvist, Karlsson, and Öhman, 2005). To tease apart emotional and perceptual processes, we used neural network analyses of human faces across two different simulations. Our results show that a perceptual bias is probably acting against a faster and more accurate identification of anger faces compared to happy faces at a purely perceptual level. We suggest that a parsimonious hypothesis related to the simple perceptual properties of the stimuli might explain these behavioural results without reference to evolutionary processes.

SESSION
WORKING MEMORY I
9.00 – 10.40
Medium lecture hall A

Chaired by M. PILLING

9.00 – 9.20
Immediate memory for objects and object colour #11 M. PILLING, A. GELLATLY, Oxford Brookes University

The phenomenon of change blindness demonstrates how little awareness we have about most of the information in our field-of-vision. Wolfe et al. (2006, Why don't we see changes? Visual Cognition, 14, 749-780) suggests these failures of awareness occur because of bottlenecks in attention and visual short-term memory. In an N-Back task, Wolfe et al. found that the colour of an item at a cued location could be successfully reported only if recently attended; there was little awareness of the colour of unattended items in the display. Using a modification of this task we explore the effect of prior attention on the awareness of an object feature (colour) compared to awareness of whether or not an object was present at a cued location. We find that awareness of the presence of an object is little greater than the awareness of object colour. Further experiments using set-size manipulations corroborate this finding. It is concluded that immediate memory for the presence of an object is no better than for object features.

9.20 – 9.40

Evidence for time-based resource sharing between verbal and visuo-spatial working memory #12 E. VERGAUWE[1], P. BARROUILLET[1], V. CAMOS[2]
[1]University of Geneva
[2]Université de Bourgogne & Institut Universitaire de France

The study tested whether verbal and visuo-spatial working memory are fuelled by distinct domain-specific resources or, inversely, tap into a common pool of domain-general resources. Trading relations between processing and storage were examined in four computer-paced complex span tasks. Participants remembered either verbal or visuo-spatial information while concurrently processing verbal or visuo-spatial information. The cognitive load of concurrent processing was manipulated and results revealed that both verbal and visuo-spatial recall performance decreased as a direct, monotone function of increasing cognitive load, regardless of the nature of the information concurrently processed. The observed trade-off relations between verbal and visuo-spatial working memory activities suggest strongly that they compete for a common pool of domain-general resources, a conclusion that is inconsistent with theories proposing separate domain-specific resources for processing and storage of verbal and visuo-spatial information in working memory.

9.40 – 10.00

Visuo-spatial working memory: Identifying resources in pattern and sequence recall #13 E. NIVEN, R. LOGIE, S. DELLA SALA, University of Edinburgh

Dissociations found within Visuo-spatial working memory have previously indicated the system is not unitary. Memory for static arrays and for sequences of movements or locations is thought to be supported by two dissociable systems. In a study of 100 participants an individual differences approach was used to examine patterns of association in recall performance for simultaneously and sequentially presented visual arrays, along with performance on three other tasks. Modified versions of a sentence span task and a letter rotation task (Shah & Miyake, 1996) were used as measures of verbal and visuo-spatial working memory capacity, and a digit recall task was used to measure verbal serial recall. Differential processing of visuo-spatial information depending on format of presentation was shown. Multiple regression analyses revealed that recall of simultaneously presented information and recall of sequentially presented visuo-spatial information are best predicted by each other, and then by rather different tasks.

10.00 – 10.20

Working memory is the perception-action interface in spatial-compatibility tasks: Evidence from dual-task experiments #14 P. WÜHR, Technische Universitaet Dortmund

Spatial responses are performed more quickly (and more accurately) to spatially corresponding than to spatially noncorresponding stimuli, even when stimulus location is irrelevant for the task at hand (Simon effect). The Simon effect occurs for the horizontal and for the vertical dimension, and it indicates some degree of automaticity in the translation of spatial stimulus information into spatial response information. Four experiments investigated the role of working memory (WM) for perception-action translation in the Simon task. We varied the spatial dimension (horizontal or vertical) and the type of WM load (verbal or spatial) between experiments. Moreover, we varied spatial S-R correspondence and the amounts of WM load within each experiment. Results revealed that horizontal and vertical Simon effects were affected by different types of load. In particular, spatial load affected the horizontal Simon effect (i.e. increasing load decreased the effect), but left the vertical Simon effect unaffected. In contrast, verbal load affected the vertical Simon effect (i.e. increasing load decreased the effect), but left the horizontal Simon effect unaffected. These results stress the role of WM for seemingly "automatic" perception-action translation. Moreover, results suggest that processing horizontal stimulus-response arrangements involves different WM systems than processing vertical stimulus-response arrangements.

10.20 – 10.40

Can long duration display items be substitution masked? #15 A. GELLATLY, M. PILLING, D. GUEST, Oxford Brookes University

The capacity of visual short term memory (VSTM) is about four items. Phenomena such as change blindness indicate that knowledge of objects that have entered VSTM is rapidly lost once replaced by subsequently attended items. It follows that with a display presented for longer than the brief period typically employed in visual masking, it should still be possible to mask those items not currently represented in VSTM. Wolfe, J.M., Reinecke, A. & Brawn, P. (2006, Why don't we see changes? Visual Cognition, 14, 749-780) confirmed this prediction for display durations averaging 750 ms. We report 4 experiments in which object substitution masking (OSM) was applied to displays presented for brief (17 ms) or long (500ms) durations, with target location cued for the same duration prior to target offset (i.e. 17ms in this example). Although robust OSM was obtained for brief displays, the effect was greatly reduced or eliminated with longer displays. We offer an explanation of our results and suggest why they differ from those of Wolfe et al.

SESSION
MEMORY I
9.00 – 10.20
Medium lecture hall B

Chaired by U. OLOFFSON

9.00 – 9.20

Item-specific and relational processing in memory for frequency #16 U. OLOFSSON, Linkoping University

The contribution of item-specific and relational information to judgments of frequency of occurrence of past events was investigated in two experiments. In one experiment, action phrases (e.g., "lift the pen") were presented one to three times and either studied verbally or enacted. Enactment, which is known to enhance item-specific information in memory, was found to improve performance on a subsequent frequency judgment test. In another experiment, subjects performed either a pleasantness rating or sorting task on the phrases. Pleasantness rating (an item-specific task) produced better frequency judgments than sorting (a relational processing task). The overall results suggest that frequency judgments are based on item-specific rather than relational information, and the consequences for current theories of memory for frequency are discussed.

9.20 – 9.40

Encoding of affordance-relevant object features affects responses in future contexts #17 S. EREN, A. HOHENBERGER, Middle East Technical University

In this study we test whether object representations in LTM consisting of features encoding affordances interfere with responses in subsequent contexts. Participants were familiarized with an 'active' object hitting a 'passive object' standing on top of a hill, causing it to roll down either to the left or right. Each active object had four features (border, color, shape, pattern). In half of the slides, the active object had a 'left-pushing' affordance, in the other half a 'right-pushing' affordance, depending on the 'color' feature. In a subsequent Simon Task participants were required to give left/right button responses according to the 'pattern' feature of the presented object. In the incongruent case the affordance indicated by the object color conflicted with the response required by the pattern. After the experiment, subjects' awareness of the objects' left/right affordance during familiarization was assessed. Reaction times in the Simon-task were significantly longer in the incongruent case for unaware subjects, indicating an implicit memory encoding of affordance-relevant features during familiarization. Interestingly, the incongruent case triggered an executive process if the subject was aware of the affordance-relevant feature, inhibiting the incongruence effect and resulting in a reverse Simon effect.

9.40 – 10.00

Actions in memory – Means versus ends [#18] K. UMLA-RUNGE[1], H. ZIMMER[1], G. ASCHERSLEBEN[1], C. KRICK[2], W. REITH[2]
[1]Saarland University
[2]Saarland University Hospital

Recently, action representations have been linked with a left-hemispheric neural network consisting of inferior frontal and parietal regions. However, working and long term memory retrieval have been studied separately so far and the amount of overlap in action-specific processing is unknown. In a first fMRI study, we focused on working and long term memory processing of actions within one sample. As working memory task, we used an S1-cue-S2 paradigm. Action information was contrasted with size information. As long term memory task, a source memory task was performed. A conjunction analysis yielded action specific activation in the left inferior frontal, parietal and STS regions. The results suggest that long term and working memory share action specific representations. In a second fMRI study, we looked at the type of action representation in detail. In analogy to fMRI studies focusing on perception, we expected differential regions to be active for short term retention of means and ends information about actions. Superior and medial frontal cortex were significantly more activated for means as compared to ends information. Furthermore, the influence of motor similarity in both tasks was analyzed. The results suggest a hierarchical organization of action representations in working memory.

10.00 – 10.20

Influence of time distribution of learning sessions on memory performance [#19] E. GERBIER, O. KOENIG, Université de Lyon

We studied the influence of time distribution of learning sessions on memory performance of word/pseudoword pairs. Forty-five participants had to learn French word/pseudoword pairs repeated 3 times throughout a 13-day learning phase. Three types of distributions were used, using a within-subjects design. A third of the pairs was presented on day 1, 2 and 13; another third on day 1, 7 and 13; the last third on day 1, 12 and 13. A cued-recall, a pseudoword free recall and a frequency judgement tests were performed either on day 15 or 19. Performance did not differ according to time distribution in any of the 3 tests for the participants tested on day 15. In contrast, participants tested on day 19 exhibited the best cued-recall performance for pairs presented on day 1, 2 and 13. They also judged these pairs as more frequent during the learning phase than the other pairs. No difference appeared in the pseudoword free recall test between the 3 distribution types, neither on day 15 nor on day 19. These results were discussed within the frame of the study-phase retrieval theory and the encoding variability theory.

SESSION
TASK SWITCHING I

9.00 – 10.40
Large lecture hall A

Chaired by M. GADE

9.00 – 9.20

Inhibition of preceding task sets in task switching: Contrasting task-specific and switch-specific cuing [#20] M. GADE[1], I. KOCH[2]
[1]University of Zuerich
[2]RWTH Aachen University

This study examined the role of task-specific cues in task inhibition. Persisting inhibition of tasks can be inferred from worse performance in n-2 task repetitions (i.e., sequences such as ABA) compared to n-2 task switches (e.g., CBA). In a task-cuing paradigm, subjects switched among three judgment tasks using multivalent stimulus displays. Each display was preceded by a task-specific cue that allowed for top-down control of task set. Critically, in one fourth of the trials, a task-unspecific cue preceded a univalent stimulus display, so that the task set needed to be activated based on information in the stimulus display itself (i.e., bottom-up). The data showed clear n-2 repetition costs after trials with unspecific cues; moreover, these costs were not any smaller than those costs observed after trials with task-specific cues. These data indicate that top-down control, operationally defined as occurring with task-specific cues, is not necessary for task inhibition to occur. The data support accounts that assume conflict during actual task processing as trigger for inhibition of competing tasks.

9.20 – 9.40

Integration of action effects in a task-switching paradigm [#21] S. LUKAS, A. PHILIPP, I. KOCH, RWTH Aachen

According to the ideomotor principle, actions are controlled by the anticipation of their intended effects (e.g. James, 1890). In our study, we transferred this assumption of the ideomotor principle to theories about how switching between tasks is controlled. If action effects are indeed relevant to execute an action (i.e., a task), they should also influence task switching. We examined this hypothesis by introducing task-specific and response-specific action effects in a task-switching paradigm. Subjects experienced these task-response-effect combinations in several learning blocks. In a subsequent transfer block, the predictable action effects changed into random effects. This change led to higher reaction times and higher switch costs. Further, the interaction with switch costs disappeared with a long preparation time, due to a RT increase of repeat trials. Taken together, these results indicate that action effects can influence task switching. We discuss our findings with respect to the role of response-related effects in task-switching.

9.40 – 10.00

Central crosstalk in task switching – Evidence from manipulating input-output modality compatibility [#22] D. STEPHAN, I. KOCH, RWTH Aachen University

In our experiments, we examined the role of compatibility of input and output (I-O) modality mappings in task switching. We define I-O modality compatibility in terms of similarity of stimulus modality and modality of response-related sensory consequences. One experiment included switching between two compatible tasks (auditory-vocal vs. visual-manual) and between two incompatible tasks (auditory-manual vs. visual-vocal). The resulting switch costs were smaller in compatible tasks compared to incompatible tasks. Another experiment manipulated the response-stimulus interval (RSI) to examine the time course of the compatibility effect. The effect on switch costs was confirmed with short RSI, but it was diminished with long RSI. Together, the data suggest that task sets are modality-specific. Reduced switch costs in compatible tasks are due to special linkages between input and output modalities, whereas incompatible tasks increase crosstalk due to dissipating stimulus-based priming of incorrect response modalities.

10.00 – 10.20

Dissecting task sets [#23] B. LIEFOOGHE, A. VANDIERENDONCK, Ghent University

Although task sets are frequently referred to in theorization on task switching, there structure remains underspecified. Two views on task-set structure can be distinguished: the hierarchical task-set structure which assumes that elements of task are structure hierarchically and the flat task-set structure which assumes that each element of a task set has the same weight. Both views found empirical support by using a procedure that combines task switching with dimension switching. The present talk will discuss these different findings and introduces an alternative way to investigate task-set structures, namely by cuing the task and the dimension serially. The main question was if the cueing order had an influence on the interaction between task switching and dimension switching. Following the hierarchical view this should be the case but not according to the flat view. In two experiments the interaction between task switching and dimension switching rather suggested a flat task-set organization and cueing order had no influence. Therefore, we defend the thesis that task sets have an flat organization.

10.20 – 10.40

Partitioning task switch costs with ERP: lexical access is delayed by a switch #24

H. ELCHLEPP, S. MONSELL, A. LAVRIC, University of Exeter

Response times are prolonged by a task-switch. Although this task switch cost can be reduced by an opportunity for preparation before the stimulus, there remains a substantial "residual" cost, usually attributed to interference with response selection due to persistence or reactivation of the previous task-set. We report a task-cueing experiment using ERPs to explore which processing stages underlying RT are affected by a task switch. The stimuli were words whose letters were printed in two colours. The task was either to categorise the word semantically with one of two key presses, or to decide (go/nogo) whether the colours were distributed symmetrically across its letters. For the lexical task, both the onset and the maximum of the effect of word frequency on ERP were reliably delayed on switch trials. These results suggests that a task-switch substantially slows lexical access or earlier processes, not just response selection – a finding with implications also for the role of attention in lexical access. ERPs for the symmetry task trials also exhibited a frequency-sensitive ERP component, which was larger on switch trials , consistent with task-set competition contributing to the residual switch cost.

SESSION
SEMANTIC AND SYNTACTIC PROCESSING I
9.00 – 10.40
Large lecture hall B

Chaired by **C. CACCIARI**

9.00 – 9.20

Anticipatory processing in language comprehension: idiomatic vs. literal expressions #25

C. CACCIARI[1], F. VESPIGNANI[2], N. MOLINARO[3], F. PESCIARELLI[1], P. CANAL[1]
[1]University of Modena
[2]University of Trento
[3]Basque Center on Cognition Brain and Language

In a recent study that used idiomatic expressions (Vespignani et al., subm.) we found evidence for two predictive mechanisms in language comprehension indexed by different ERP waveforms: one related to probabilistic/distributional information, indexed by an N400; and another based on categorial, template matching information, indexed by a P3. The aim of the present study is to provide further evidence for these two types of predictive mechanisms in language processing. Multiword expressions, specifically ambiguous idiom strings (i.e., strings with a dominant idiomatic meaning and a semantically plausible literal meaning) provide an interesting test case. We selected short idiom strings (V+NP) unpredictable before offset. We had sentences biasing toward the idiomatic interpretation of the string, the literal meaning of the string, and literal sentences that contained the last constituent of the idiom string. The NP had a similarly high cloze probability value in the three sentence types. We measured the Event Related Brain Potentials associated with the visual presentation of the words in the sentences. The results are discussed in the light of current models of predictive linguistic processing.

9.20 – 9.40

The lasting benefits of double meaning in the processing of idiomatic expressions #26

M. VAN MULKEN, Radboud University Nijmegen

Commercial slogans typically invite readers to keep both the literal and the idiomatic meaning of an idiomatic expression activated, because the following context supports both meanings of the sentence (e.g., "A piece of cake! Oesters' pastry is easy to make"). In the present study, we investigated whether the literal meaning is deactivated also in these slogans, as in idiomatic expressions in general. In a series of self-paced reading experiments, participants read sentences following slogans with idioms. These sentences supported both meanings or referred only to the idiomatic meaning of the slogan (e.g., "A piece of cake! Oesters' furniture is easy to make"). Results show that readers are faster in reading the following sentence if it refers to both the idiomatic and literal meaning of the slogan. In short, readers are faster if they do not have to suppress one of the idiom's possible meanings. This is true also if the relevant word (pastry versus furniture) occurs in the fourth, rather than the second position in the sentence, indicating that readers can postpone the selection of the meaning of the slogan (idiomatic versus literal)until several words after the slogan. These results have important implications for models of idiom processing.

9.40 – 10.00

Metaphorical mapping during a decision task #27

I. BOOT, D. PECHER, Erasmus University Rotterdam

We examined whether metaphorical mappings are conceptual and automatic as claimed by the Conceptual Metaphor Theory. In Experiment 1 (QUANTITY IS VERTICALITY) participants read sentences in which the quantity was a little or a lot in the sentence context and identified the letter p or q presented at the top or bottom of the screen. Letters were identified better at the top when they read a sentence in which the quantity was a lot compared to a little, whereas performance was better on letters at the bottom when they read a sentence in which the quantity was a little compared to a lot. In Experiment 2 (CATEGORIES ARE CONTAINERS) participants decided whether two pictures were from the same category (animal or transportation) or not. Both or only one of the pictures were presented inside a square. Performance to pictures from the same category was better when both compared to only one were inside the square, whereas performance to pictures from different categories was better when only one compared to both pictures were in the square. These results show that metaphorical mappings are active during a decision task without metaphorical language. This suggests that metaphorical mappings are conceptual and automatic.

10.00 – 10.20

Embodiment and language: cross-linguistic evidence on abstract and concrete sentences #28

C. SCOROLLI, A. BORGHI, R. NICOLETTI, University of Bologna

Evidence of embodied theories on abstract words is hardly generalizable. We selected a paradigm suitable to reason on different levels of abstractness. We examined combinations of transitive verbs (abstract, concrete) and nouns (abstract, concrete), focusing on syntactically different languages (German, Italian). Compatible combinations were processed faster than mixed combinations. Processing of mixed pairs was modulated by the specific language: when concrete words preceded abstract ones responses were faster, regardless of grammatical class. Materials were rated on familiarity, imageability, age of acquisition. A strictly modal theory doesn't explain the data, as imageability didn't correlate with RTs. An amodal theory was disconfirmed since familiarity didn't explain the results. Further recent proposals, representational pluralism (Dove, in press) and LASS theory (Barsalou, 2008), don't account for the data, as for linguistic tasks they would predict faster processing for abstract compatible pairs. An alternative explanation is that linguistic modal experience plays a more relevant role for abstract than for concrete words (Borghi & Cimatti, submitted). Therefore the higher difficulty of abstract first words reflects the way they are acquired: differently from concrete words, with abstract ones we firstly learn linguistic labels, then we "tag" them with sparse sensorimotor experiences.

10.20 – 10.40

Three time-scales of influence between linguistic and conceptual processing: grammatical gender effects in Polish and Italian #29

J. RĄCZASZEK - LEONARDI[1], N. CARAMELLI[2], W. PACIOREK[1]
[1]University of Warsaw
[2]University of Bologna

An increasing number of studies show that syntactic features of language influence processing of information about objects and

events, although the issues of universality and depth of such influences continue to fuel debates. This study compares effects of grammatical gender on the description of objects in two languages, Polish and Italian, that differ in the number of grammatical gender categories and in the systematicity of mapping between grammatical gender and natural gender of human referents. Combining two methods previously employed by research on this topic, we used an adjective description task followed by an Osgood-type rating of the collected adjectives. Grammatical gender effects were found in both languages. Previous findings, suggesting that semantic effects are weaker for languages with 3 genders, were not confirmed, prompting a search for other decisive factors. Importantly, the effects of grammatical features probed by our task can be understood as acting on different time-scales: the on-line influence of the processing of linguistic material, the ontogenetic time-scale of concept formation in the presence of linguistic input, and, finally, the time-scale of cultural language evolution. Depending on the experimental task adopted, effects from different time-scales may interact which is rarely taken into account by existing explanatory models.

SYMPOSIUM
NEUROCOGNITIVE CORRELATES OF COGNITIVE CONTROL
11.00 – 12.40
Large lecture hall A

Organized and chaired by L.S. COLZATO, *University of Leiden & W.P.M. VAN DEN WILDENBERG, University of Amsterdam*
Speakers: L.S. COLZATO, University of Leiden; B.U. FORSTMANN, University of Amsterdam; B. HOMMEL, University of Leiden; W. VAN DEN WILDENBERG, University of Amsterdam; G. DREISBACH, University of Bielefeld

Frontal lobe circuits have a crucial role in the cognitive control of our thoughts and goal-directed behaviour. At least four control functions can be distinguished: "shifting" (also called "flexibility") between tasks, mental sets and "updating" (and monitoring of) working memory (WM) representations, the "inhibition" of prepotent responses and decision-making. Apart from being empirically separable, they also seem to rely on different cortical structures. To give a complete overview of this complex phenomenon, this symposium will be interdisciplinary. Cognitive control will be presented from different perspectives and using different methodologies, behavioral, pharmacological, clinical, genetic and brain-imaging studies.

(1) **Integrative Neuromodulation of cognitive control** [#30] L.S. COLZATO, B. HOMMEL

Frontal lobe circuits have a crucial role in the cognitive control of human thoughts and actions. These circuits are innervated by dopamine (DA), a neurotransmitter targeted by many drugs, such as cocaine. However, little is known about exactly how dopaminergic supply affects control functions. Here I propose a new Integrative Neuromodulation of Cognitive Control (INCC) model that distinguishes between two control circuits that are dominated by particular DA receptor types (D1 and D2): a DA/D1 system driving working memory and response execution (implying Premotor Cortex and Dorsolateral Prefrontal Cortex) and a DA/D2 system driving response inhibition, cognitive flexibility, conflict control and adaptive decision making (implying Ventrolateral Prefrontal Cortex, the Anterior Cingulate and Orbitofrontal Cortex).

(2) **The Neural Substrate of Decision Making with Prior Information: Empirical Data and a Formal Model** [#31] B.U. FORSTMANN, S. BROWN, G. DUTILH, J. NEUMANN, E-J. WAGENMAKERS

In everyday life, people often have to make decisions by assessing the relative value of each possible choice. This assessment is determined in part by prior knowledge. Surprisingly, relatively little is known about the neural mechanisms by which the brain uses prior knowledge to guide decisions. Our goal was to investigate these neural mechanisms by a combination of fMRI data collection and mathematical modeling. In a moving-dots task with two choice alternatives (i.e., left or right), we manipulated the extent of prior knowledge by presenting probability cues (i.e., 90%, 70%, and 50% valid) before each stimulus. Analysis using a mathematical model for response speed and accuracy confirmed that the effect of the manipulation was to bias the decision process. Analysis of the imaging data revealed that presentation of a cue with reliable (i.e., 90% valid) and moderate (i.e., 70% valid) information about the upcoming movement was associated with focused activation of the basal ganglia. Together, these findings suggest that the basal ganglia are the neural substrate of decision making with prior information. This conclusion is consistent with earlier work that shows the basal ganglia to be involved in the selective disinhibition of preferred actions.

(3) **The difficulty law of motivation: fMRI (noise) increases cognitive control** [#32] B. HOMMEL, L.S. COLZATO, W.P.M. VAN DEN WILDENBERG, C. CELLINI

The *difficulty law of motivation* states that people respond to increasing task demands by automatically increasing the amount of cognitive control exerted. Consistent with this law we found that participants were *more* effective in controlling episodic retrieval of previous stimulus-response bindings (Experiment 1) and in switching to a new task (Experiment 2) if they were exposed to 70 dB echo planar imaging noise sampled from an fMRI scanner. These findings have considerable theoretical implications, in questioning the widespread assumption that people are equally devoted to easy and more challenging tasks, and methodological implications, in raising the possibility that experiments carried out in fMRI scanners or under otherwise challenging conditions systematically overestimate contributions from cognitive control processes.

(4) **Online and proactive cognitive control during action selection in Parkinson's disease** [#33] **W.**P.M. VAN DEN WILDENBERG, S.A. WYLIE, K.R. RIDDERINKHOF, T.R. BASHORE

The processing of irrelevant information sometimes activates incorrect response impulses. The engagement of cognitive control mechanisms to suppress these impulses and make proactive adjustments to reduce the future impact of incorrect impulses may rely on the integrity of frontal-basal ganglia circuitry. Using a Simon task, we investigated the effects of basal ganglia dysfunction produced by Parkinson's disease (PD) on online (within-trial) and proactive (between-trial) control to reduce interference. For situations requiring online control, PD (n=52) and healthy control (n=20) groups showed similar mean interference effects on RT and accuracy, but distributional analyses uncovered a predicted pattern of poorer online suppression of response impulses among PD patients. Both groups demonstrated equivalent and effective proactive control of response interference on RT. Among PD patients, motor symptom severity was associated with difficulties in online control of response impulses, but did not relate with measures of proactive control. These results suggest that basal ganglia dysfunction produced by PD has selective effects on cognitive control mechanisms engaged to resolve response conflict. A separate study of the effects of deep-brain stimulation in the basal ganglia on interference control corroborates this conclusion.

(5) **Bidirectional priming processes in the Simon task** [#34] G. DREISBACH, M. METZKER

The Simon effect is mostly explained in terms of dual-route models, which imply *unidirectional* activation processes from stimulus features to response features. However, there is also evidence that these pre-activated response features themselves prime corresponding stimulus features so that the Simon effect might actually result from *bidirectional* priming processes between stimulus- and response features. In a series of four Simon task experiments, three stimuli were mapped to a left and a right response each. In one condition, a categorization rule allowed for a one-to-one mapping (one stimulus feature mapped to each response), in another condition no such rule

was provided (many-to-one mapping). As hypothesized from the bidirectional priming account, the Simon effect was always smaller in the many-to-one mapping than in the one-to-one mapping condition due to spreading activation from pre-activated response features to stimulus features. In a second series of two experiments, the assumed response-stimulus activation was manipulated by frequency with one stimulus being presented five times more frequently than the other 5 stimuli. As hypothesized, the Simon effect was small for all stimuli except for the frequently presented stimulus. In sum, the Simon effect was smaller whenever the response-stimulus activation was reduced. Theoretical implications of these findings will be discussed.

SYMPOSIUM
ORTHOGRAPHIC PROCESSING IN PRINTED WORD PERCEPTION IV
11.00 – 12.40
Large lecture hall B

Organized and chaired by C.J. DAVIS, Royal Holloway, University of London & J. GRAINGER, CNRS Marseille
Speakers: M. CARREIRAS, Basque Center on Cognition, Brain and Language; D. NORRIS, MRC Cognition and Brain Sciences Unit; P. GOMEZ, DePaul University; C. WHITNEY, University of Maryland; C.J. DAVIS, Royal Holloway, University of London

This symposium continues the tradition launched 8 years ago in Granada, bringing together leading experts on orthographic processing in visual word recognition. The papers presented at this symposium will highlight the latest developments in theoretical and empirical research on orthographic processing. Much of this research effort has been devoted to specifying the nature of the prelexical location-invariant, word-centered orthographic code for printed words, and how such coding connects with other forms of prelexical coding (phonology, morphology) in order to enable fast and efficient word recognition during reading. This symposium should provide a clear reflection of the growing effort invested with an aim to finally "crack the orthographic code".

(1) Consonants and vowels contribute differently to visual word recognition: ERPs of relative position priming [#35] M. CARREIRAS, J.A. DUÑABEITIA, N. MOLINARO

This paper shows that the nature of letters –consonant vs. vowel– modulates the process of letter position assignment during visual word recognition. We recorded Event Related Potentials (ERPs) while participants read words in a masked priming semantic categorization task. Half of the words included a vowel as initial, third and fifth letters (e.g., acero [steel]). The other half included a consonant as initial, third and fifth (e.g., farol, [lantern]). Targets could be preceded 1) by the initial, third and fifth letters (relative position; e.g., aeo - acero and frl - farol), 2) by three consonants or vowels that did not appear in the target word (control; e.g., iui - acero and tsb - farol), or 3) by the same words (identity: acero-acero, farol-farol). The results showed modulation in two time windows (175-250 and 350-450 ms). Relative position primes composed of consonants produced similar effects to the identity condition. These two differed from the unrelated control condition, which showed a larger negativity. In contrast, relative position primes composed of vowels produced similar effects to the unrelated control condition and these two showed larger negativities as compared to the identity condition. This finding has important consequences for cracking the orthographic code and developing computational models of visual word recognition.

(2) The hard problem of representing letter order [#36] D. NORRIS, S. KINOSHITA

Much of the recent development in modeling word recognition has focused on the problem of representing letter order. We argue that some of the proposed solutions fail because the representation of order fails to take advantage of important constraints on order or place insufficient weight on letter identity. We will report analyses that emphasise the limitations of relying on static measures, such as orthographic match scores, as a basis for model comparison.

(3) An Overlap Model account of perceptual matching and short term priming data [#37] - P. GOMEZ, M. PEREA, R. RATCLIFF

The last ten years of research has shown that letter identity and letter position are not integral perceptual dimensions (e.g., "jugde" activates JUDGE to a large degree). We have proposed the Overlap model for encoding of letter positions. The basic assumption of the model is that letters in the visual stimulus have distributions over positions so that the representation of one letter will extend into adjacent letter positions. We will present the model's account for data from perceptual identification and short term priming tasks, and we will argue that, because of the effect sizes, these experimental procedures provide a better test for a letter position encoding model than other tasks such as the masked priming technique.

(4) Perceptual Patterns in Letter-String Processing [#38] C. WHITNEY, Y. MARTON

The SERIOL model (Whitney, 2001) proposes that left-to-right lateral inhibition within retinotopic RH areas is a learned, string-specific mechanism necessary for encoding letter order (for a language read from left to right). We review the theory behind this claim and present supporting data from a trigram identification experiment, which demonstrates the predicted differential effect of within-string position across visual fields. We contrast the SERIOL account with a recent alternative model of perceptual patterns specific to string processing (Tydgat & Grainger, in press).

(5) Recent developments in the study of orthographic input coding: Further support for a spatial coding model [#39] C.J. DAVIS, S.J. LUPKER, J.S. BOWERS

The quest to crack the orthographic code underlying visual word identification has been gathering pace in recent years. Two particularly exciting advances have been a) the use of detailed computational models to simulate the results of masked priming experiments, and b) the development of new experimental methodologies for testing models of orthographic input coding. We will discuss the fit between simulation results and masked priming data, review some of the new experimental methodologies, and describe recent results that have been obtained using these methods. The available evidence provides strong support for the spatial coding scheme used in the SOLAR model of visual word recognition.

SYMPOSIUM
A PIECE OF THE ACTION: NOVEL INSIGHTS INTO THE NEUROCOGNITIVE BASES OF ACTION SELECTION
11.00 – 12.40
Medium lecture hall A

Chaired by K.R. RIDDERINKHOF, University of Amsterdam
Speakers: W. NOTEBAERT, University of Ghent; C. DANIELMEIER, MPI Cologn; B. BURLE, CNRS Marseille; B. FORSTMANN, University of Amsterdam; R. MARS, University of Oxford

Action control refers to a subset of cognitive control processes involved in the requirement to coordinate one's instantaneous urges vis-à-vis actions that concord with our intentions or instructions. Action control is exerted to suppress and overcome incorrect, inappropriate, or undesirable actions in favor of goal-driven action selection. Action control can involve a number of component processes: 1) prompting the activation of appropriate actions based on *intention-driven action selection*, 2) resisting the activation of inappropriate actions based on extraneous stimulus-action associations that are strong enough to incur *response capture*, and 3) suppressing the activation of inappropriate actions through *active response inhibition*. These online processes of action control can be modulated by proactive or pre-emptive processes of anticipatory action regulation. Anticipatory action regulation refers to those processes that either strengthen online action control

proactively, or pre-empt the need for such online action control.

This symposium brings together cognitive (neuro)scientists from across Europe presenting state-of-the-art work on how we select actions (online action control), how we modulate action control through anticipatory action regulation, how these processes of action selection are subject to experimental factors or individual differences, and how action selection is implemented in the brain.

(1) **Behavioral adaptation following error feedback** [#40] W. NOTEBAERT, E. N. CASTELLAR, W. FIAS, T. VERGUTS

Future action plans are affected by outcomes of previous ones. In this paper we focus on the adaptation after error feedback, more specifically on post-error slowing and post-error reduction of interference. In a paradigm that allows us to control for error proportions, we demonstrate that post-error slowing is not a strategic effect but caused by the fact that errors are highly infrequent. When errors become more frequent than correct trials, we observe post-correct slowing. Moreover, we observe that feedback related negativity in frontal brain regions is not predictive for post-error slowing, but the posterior P3 is. This is interpreted in terms of an orienting response towards infrequent feedback, slowing down subsequent responding. In a flanker version of this task we demonstrate that post-error reduction of interference is not observed when the congruency status of the previous trial is controlled for. Moreover, we show that after errors, the regular conflict adaptation (smaller flanker effect after incongruent trials) effect is not observed. These data demonstrate that error feedback does not result in strategic changes. The data are interpreted in terms of adaptation by binding (Verguts & Notebaert, 2008), where adaptation after errors is problematic because of incorrect activation.

(2) **Posterior medial frontal cortex modulates activity in visual areas after errors** [#41] C. DANIELMEIER, T. EICHELE, B.U. FORSTMANN, M. TITTGEMEYER, M. ULLSPERGER

After conflicting situations or errors, behavioral adaptations occur to optimize the action outcome of subsequent trials. The present project aimed at demonstrating specific modulations of task-relevant and task-irrelevant visual brain areas by posterior medial frontal cortex (pMFC) after errors. In addition, the structural relationship between pMFC and behavioral adaptation effects were investigated. To this end colored moving dots were presented, and participants were asked to respond to the color and ignore the motion direction during functional magnetic resonance imaging (fMRI). The irrelevant motion direction could either be compatible or incompatible with the side of the required response. Behavioral data revealed a post-error slowing effect (PES), indicating enhanced control processes after errors. The color-encoding area V4 (relevant dimension), showed decreased activity before an error and increased activity in post-error trials, whereas the motion-encoding area V5 showed the reverse activation pattern. In addition, pMFC activity in error trials predicted visual activations in post-error trials. Furthermore, fractional anisotropy-values beneath pMFC correlated with PES, indicating a linkage between structure and behavioral adaptations after errors. The data suggest that a dysfunctional activation pattern occurs in stimulus-processing areas before an error is committed, and that the pMFC initiates top-down control to enable task-relevant stimulus processing again.

(3) **Action selection: a necessary concept?** [#42] B. BURLE

"Classical" models of information processing dissociated at least three levels of processing: two "peripheral" (perceptual and motor) and a more "central" one (response selection) linking perception to motor action. On the other hand, current formal models of decision making state that responses are emitted as soon as the amount of evidence favoring a given stimulus reaches a predefined threshold. In such a framework, the notion of "response selection" becomes useless. We will present situations in which such an interface between perceptual decision and response execution cannot be avoided. We will then present electrophysiological data supporting an extra processing stage between perceptual decision and motor action. The implication of those findings for current models of decision making will be discussed.

(4) **The Striatum Facilitates Decision-Making under Time Pressure** [#43] - B.U. FORSTMANN, G. DUTILH, S. BROWN, J. NEUMANN, D.Y. VON CRAMON, K.R. RIDDERINKHOF, E-J. WAGENMAKERS

Functional magnetic resonance imaging (fMRI) may help us understand processes of adaptive cognitive control such as those involved in the trial-by-trial modulation of global response thresholds. However, data-driven fMRI approaches have failed to provide consistent insights. In this talk I present an experiment using a combination of mathematical modelling and fMRI to study the neural substrate of the ubiquitous speed-accuracy trade-off. In a speeded decision-making experiment, we presented participants with cues indicating different requirements for response speed. Application of the Linear Ballistic Accumulator model (LBA; Brown & Heathcote, 2008) confirmed that cueing for speed lowered the response threshold. The LBA parameters were then correlated with the functional neuroimaging analyses, and this revealed that cueing for speed activates the striatum. The striatum is known to release the motor system from inhibition, thus facilitating faster but possibly premature actions. We conclude that the combination of fMRI and modelling provides superior insights in individual differences in adaptive cognitive control processes.

(5) **Probing functional interactions between brain regions during action selection and action reprogramming** [#44] R.B. MARS

An important question in the study of the neural underpinnings of action selection is how different regions of the brain interact with one another to produce behavior. These interactions can be studied using paired-pulse transcranial magnetic stimulation (TMS). In a paired-pulse TMS protocol, a test TMS pulse is delivered over the primary motor cortex (M1) to elicit a motor-evoked potential in the EMG of the response muscle. On some trials, this test pulse is preceded by a conditioning pulse over a premotor region which is hypothesized to interact with M1. The conditioning pulse can modulate the amplitude of the motor-evoked potential elicited in the hand muscle by the M1 test pulse, providing a quantification of the influence of the premotor region on M1. We have used this technique to study the influence of a variety of premotor regions on M1 during different types of action selection. As a case in point, we have demonstrated that the pre-supplementary motor area (pre-SMA) influences M1 when participants are selecting an action in the context of an already present, but incorrect, motor plan (a process we refer to as 'action reprogramming'), but not during normal action selection.

SESSION
COGNITION AND BEHAVIORAL DISORDERS
11.00 – 12.40
Conference and lecture hall C

Chaired by G. SĘDEK

11.00 – 11.20

The influence of depression and aging on generation of mental models [#45] G. SĘDEK, A. BRZEZICKA, Warsaw School of Social Sciences and Humanities

We present evidence for the existence of a unique cognitive limitation in subclinical depression: The impairment of the construction of mental models. These limitations were found among depressed participants across various paradigms tapping into mental model construction: (a) mental models of interpersonal sentiment relations (social cliques); (b) linear order reasoning (mental arrays); (c) evaluation of categorical syllogisms (mental models of logical relations); (d) situation models (inferences about the meaning of text). These pattern of findings is distinctive from the research on cognitive limitations in aging where processes of mental model generation were also vigorously studied. Older adults were either superior in comparison

to young adults in terms of deriving meaning from written text – that is, in the generation of situation models, or the influence of aging on integrative forms of reasoning was nearly completely mediated by impairments in simpler cognitive processes, such as mental speed or working memory capacity.

11.20 – 11.40

Evaluation body representation in schizophrenic persons using semantic judgement #46 T. BELLON, F. LOWENTHAL, University of Mons

Body representation and language are two fundamental problems encountered by schizophrenic subjects. Our notion of body representation is based on a multidimentsional modal where kinaesthetic, sensorial and symbolic representations of body interact. We examined whether schizophrenic subjects can be distinguished from healthy ones in the way in which they semantically qualify people taken in pictures. Experimental design: 8 pictures were created, each depicts an identical character but in different situations. Two groups of 15 subjects were elaborated: an experimental group of general schizophrenic patients paired to a control group. Each subject had to perform two tasks for each picture: describe the character presented and perform, on an ad hoc grid, a semantic judgment of his appearance. Results: 12 pictures out of 18 are discriminating schizophrenic subjects. The grid of semantic analysis shows that 16.19 % of the schizophrenic's answers are "without opinion" while 43.16 % are extremes. This tendency is reversed in the control group. The kinaesthetic and sensorial representations are the most discriminating dimensions. Discussion: the space of connotations specific to the body is appreciably different among schizophrenes compared to the non schizophrenes.

11.40 – 12.00

Is IOR really impaired in schizophrenia? #47 F. KALOGEROPOULOU[1], A. VIVAS[2], P. WOODRUFF[3]

[1]South East European Research Centre
[2]City College
[3]University of Sheffield

Previous research (e.g. Huey & Wexler, 1994; Gouzoulis-Mayfrank et al., 2002) has shown that schizophrenia patients show prolonged facilitation or/and lack of IOR when a single-cue procedure is employed. However, the absence or delayed onset of IOR could be due to increased facilitation (that masks the inhibitory effect), and not to a problem of the inhibitory process per se. In order to test the hypothesis of IOR masking, we employed a cue more intense than the target (e.g., a green circle), in order to induce sensory masking and hence eliminate early facilitation. (Pratt et al., 2001). When the typical cue (a change of luminance of the box's outline) was employed, we replicated the lack of IOR finding even at long SOAs, in the group of schizophrenia patients relative to the controls. The second experiment was identical to the first, only that the cue (green circle) was more intense than the target (white square). Here we observed significant IOR effects for both the controls and the patients at short SOA values. These findings suggest that three effects, sensory masking, facilitation and IOR, overlap in time in these cueing paradigms. These effects though present in schizophrenia patients, are only detected when sensory masking is employed.

12.00 – 12.20

Representation of survey and route spatial texts in children with nonverbal (visuospatial) learning disabilities #48 C. CORNOLDI, I. MAMMARELLA, C. MENEGHETTI, F. PAZZAGLIA, University of Padua

This study aims to investigate the types of difficulties encountered by children with nonverbal (visuospatial) learning disabilities (NLD) during the processing of spatial information derived from descriptions. Two spatial texts - one in survey, one in route perspective - and one nonspatial text were orally presented to children aged 9-12 divided in three groups: (i) with NLD (N=12), (ii) with reading disability (RD) (N=11), and (iii) without learning disabilities who served as controls (N=16). Children performed two tasks: sentence verification and location. In the verification task, NLD performed worse in survey text than control and RD groups. Moreover, in the location task NLD were worse than controls in both survey and route texts, but significantly poorer than the RD group only in the survey text. The results are discussed considering their implications in the understanding the neuropsychological profile of NLD and the processes involved by different types of spatial text.

12.20 – 12.40

Dissociation, memory ability and self-appraisal of memory #49 R. POLCZYK, Jagiellonian University

Dissociation, defined as the „disruption in the usually integrated functions of consciousness, memory, identity, or perception of the environment" (APA, 1994) and measured by the DES (Bernstein & Putnam, 1986) is believed to be positively related to memory errors (e.g. Eisen & Carlson, 1998). However, in some experiments dissociation was positively correlated with correct memory performance (Winograd, Peluso & Glover, 1998). We hypothesized that dissociation would correlate negatively with a self-rating memory scale designed to assess failures of memory in everyday life, because dissociators tend to experience problems with memory in everyday life. On the other hand, dissociators should score higher than non-dissociators on tests measuring actual memory performance, because people prone to dissociative experiences are very motivated to prove themselves that their memory is good. As a consequence, they score higher on laboratory tests of memory performance. Both hypotheses were confirmed. The results give some insight into the relation between dissociation and various kinds of memory tests.

SESSION
WORKING MEMORY II
11.00 – 12.40
Medium lecture hall B

Chaired by G. MORA

11.00 – 11.20

A developmental investigation of maintenance mechanisms in working memory through the phonological similarity effect #50 G. MORA[1], V. CAMOS[2], P. BARROUILLET[3]

[1]Université de Bourgogne
[2]Institut Universitaire de France
[3]University of Geneva

While in Baddeley's Working Memory model (Baddeley, 1986), the maintenance of verbal information depends on the availability of an articulatory rehearsal mechanism, within the Time-Based Resource-Sharing model (Barrouillet et al., 2007), it depends on an attentional refreshing mechanism, i.e. on the amount of attention available to refresh traces. The interplay of these two mechanisms, the articulatory rehearsal and the attentional refreshing, was investigated in two experiments, one in adults and one in 7-year-old children. In both experiments, within a complex span paradigm, the phonological similarity of the words to remember (similar vs dissimilar), the articulatory suppression (AS: no suppression vs suppression) and the attentional load of concurrent processing (no load vs location judgment task) were manipulated. Results replicated the classic effects of phonological similarity, AS, attentional load, and the interaction Similarity x AS. More interestingly, similarity and AS never interacted with attentional load. Such findings are in agreement with our claim of two independent mechanisms of maintenance for verbal information, namely articulatory rehearsal and attentional refreshing, which could be separately or jointly involved in maintenance depending on situations.

11.20 – 11.40

Developmental differences in working memory: Where do they come from? #51 V. GAILLARD[1], P. BARROUILLET[1], C. JARROLD[2], V. CAMOS[3]

[1]University of Geneva

[2]University of Bristol
[3]Université de Bourgogne & Institut Universitaire de France

According to the Time-Based Resource-Sharing model (Barrouillet, Bernardin, & Camos, 2004), working memory spans depend on 1) the duration of processing during which memory traces decay and 2) on the time available to refresh and restore these degraded traces. We assessed the effect of these two factors in a series of experiments. In a first experiment, children aged 8 and 11 performed a complex addition span task in which they had to maintain series of letters while adding 1 to series of digits presented successively on screen after each letter. A strong effect of age was observed. In a second experiment, processing times were equated between ages by adapting the difficulty of the addition task (older children added 2 instead of 1 to each digit). Equating processing times resulted in a reduction of the developmental difference that remained nonetheless significant. Thus, in a third experiment, processing times were again equated and the time available to refresh memory traces was tailored to the processing speed of each age group. This last manipulation resulted in the suppression of the age effect, suggesting that time parameters play a major role in developmental differences.

11.40 – 12.00

Working memory as bipartite system: Evidence from recognition experiments and computational modeling [#52] Z. STETTNER, A. CHUDERSKI, J. ORZECHOWSKI, Jagiellonian University

Current study is based on our computational model of working memory (WM) search (Chuderski, Stettner, Orzechowski, 2007). Our model assumes two-phase search of WM and two distinct working memory structures (focus of attention and activated part of long-term memory). The first WM part is searched serially while all information in the second part of WM can be reached in parallel. The model was tested in several experiments. Herein, we present results of further experiments exploring important differences in functioning of these two WM structures in information maintenance and search. We also validated predictions based on our computational model and we obtained some interesting results confirming model's predictions (e.g. longer RT for larger search sets only if additional elements were located in the focus of attention). Moreover, we discuss some results that are not compatible with our model and we propose its modifications.

12.00 – 12.20

Refining a Model of Verbal Short-Term Memory Span [#53] S. MORRA, C. DELFANTE, Universita di Genova

A neo-Piagetian model of verbal STM span (Morra, 2000) accounted well for children's performance. That model included two parameters: M capacity (a central attentional resource, measured independently) and one materials-specific free parameter, expressing item activation decrease. However, attempts to fit that model to adults' performance were unsuccessful; its oversimplifying assumptions were tolerable for child but not adult performance. A revised model includes: (a) a fixed parameter for correct encoding, (b) M capacity, (c) a free parameter for activation decrease, (d) a fixed parameter for positional confusion at retrieval. Experiment 1 (n=49) analyzed error types by list length, word length, and presentation modality. Probability of ordering errors at any position but the last was .009 (listlength – 3). Experiment 2 tests the revised model. Adult participants perform three M capacity tests; three STM span trials for each word length (2-syll, 4-syll) and modality; and articulation rate measures. Results from the first 90 participants show that:- both M capacity and articulation rate account for independent portions of individual differences in verbal STM span,- the model can account for the means and the variances of distributions of span scores across word length, presentation modality, and individuals' M capacity.

12.20 – 12.40

The involvement of verbal working memory in novel word learning [#54] A. SZMALEC[1], W. DUYCK[2], M. PAGE[2]
[1]Ghent University
[2]University of Hertfordshire

This study tests the hypothesis that a common ordering mechanism underlies both short-term serial recall of verbal materials and the acquisition of novel long-term lexical representations. We present a series of experiments which are based on the assumption that the Hebb repetition effect, i.e. the improved recall for repeated sequences in a serial recall task, is a laboratory analogue of novel word learning. In each experiment, participants recalled visually presented nonsense syllables following a typical Hebb effect learning protocol. After this learning, the Hebb materials were presented again as novel word forms in a number of psycholinguistic tasks (e.g., lexical decision, pause detection) which allow to estimate whether lexical representations have developed during initial Hebb learning. Our results indicate that a long-term phonological lexical representation developed during Hebb learning. We further argue that these findings make the involvement of verbal working memory in novel word learning more explicit.

SESSION
WORD RECOGNITION
11.00 – 12.40
Seminar room 1

Chaired by D. PECHER

11.00 – 11.20

Enemies and friends in the neighborhood must sound similar [#55] D. PECHER, Erasmus University Rotterdam

Many models of word recognition predict that orthographic neighbors (e.g., broom) of target words (e.g., bloom) will be activated during word processing. Cascaded models predict that semantic features of neighbors get activated before the target has been uniquely identified. This prediction is supported by the semantic congruency effect (Pecher, Zeelenberg, & Wagenmakers, 2005), the finding that neighbors that require the same response (e.g., living thing) facilitate semantic decisions whereas neighbors that require the opposite response (e.g., non-living thing) interfere with semantic decisions. In the present study we investigated the role of phonology by manipulating whether orthographic neighbors had consistent (broom) or inconsistent phonology (blood). Congruency effects in animacy decision were larger when consistent neighbors had been primed than when inconsistent neighbors had been primed. In addition, semantic congruency effects were larger for targets with phonologically consistent neighbors than to targets with phonologically inconsistent neighbors. These results in line with models that assume an important role for phonology even in written word recognition (e.g., Van Orden, 1987).

11.20 – 11.40

Syllable priming depends on the frequency of the first syllable in the lexical decision task [#56] F. CHETAIL[1], N. DOIGNON-CAMUS[2], S. MATHEY[1]
[1]University of Bordeaux
[2]University of Strasbourg

Many studies have shown that syllable frequency influences word identification latencies. Several studies have also found that when a written word is primed by a stimulus sharing the first syllable, the recognition process is either slowed down or speeded up as a function of prime lexicality. To better understand syllable activation processes, this study investigated the joined influence of syllabic priming and syllable frequency in visual word recognition when prime lexicality was held constant. In Experiment 1, French words with a high-frequency first syllable were preceded by a pseudoword sharing either the first syllable (e.g., ba.riul-BA.GAGE) or the first letters (e.g., bau.tul-BA.GAGE). In Experiment 2, the same conditions were used except that the stimuli had a low-frequency first syllable. In both experiments, there were two additional control conditions wherein the primes and the targets either shared the abstract syllabic structure (mi.rien-BA.GAGE) or did not (min.von-BA.GAGE). An inhibitory syllabic priming effect was found for words with a high-frequency syllable but not for words with a low-frequency syllable. These results suggest that syllabic priming is function of syllable frequency, and cannot be attributed to abstract

syllabic matching between primes and targets. These findings are interpreted in current models of visual word recognition.

11.40 – 12.00

The influence of emotional orthographic neighbourhood in primed lexical decision tasks [#57] S. MATHEY, P. GOBIN, University of Bordeaux

This study presents two primed lexical decision tasks investigating whether the emotional valence of a word orthographic neighbour influences the word identification. Targets were French words with a neutral emotional valence (e.g., IDIOME, COCON). They all had only one higher frequency orthographic neighbour, which was either emotionally negative (e.g., idiote) or neutral (e.g., coton). The neighbour was used as a prime and compared to a control prime condition (non alphabetic characters). Masked priming was used with 66- and 166-ms prime durations (Experiments 1a-b). The method of Experiments 2a-b was similar except that the control prime was an unrelated negative word (e.g., danger) in order to ensure that the emotional orthographic effect was not merely due to affective priming. The main finding of Experiments 1a-b was the inhibitory main effect of emotional orthographic neighbourhood. In addition, an inhibitory orthographic priming effect was found to increase with prime duration. A similar pattern of results was found in Experiments 2a-b, so the data cannot be attributed to affective priming. These findings are discussed in an interactive activation framework in terms of early activation of the emotional valence of the word orthographic neighbours.

12.00 – 12.20

GR8 msg! Are these actual words? [#58] L. GANUSHCHAK, A. KROTT, A. MEYER, University of Birmingham

As the popularity of sending messages electronically via short message service (SMS) and e-mail increases, so does the necessity of conveying messages more efficiently. One way to increase efficiency is abbreviating certain words and expressions by combining letters with numbers, such as gr8 for 'great', and using acronyms, such as msg for 'message'. As such shortcuts become more wide-spread, it is important to better understand the implications of their regular use for written text comprehension. In the present study, participant read SMS shortcuts and their spelled-out equivalents embedded in semantically possible and impossible sentences, while we simultaneously recorded ERPs. All semantically impossible sentences lead to higher N400 responses when compared to semantically possible sentences, indicating interpretive problems with semantically impossible ones. This result demonstrates rapid integration of semantic knowledge for correctly spelled words as well as shortcuts and suggests that SMS shortcuts become an integral part of our everyday language.

12.20 – 12.40

Constituents of Noun-Noun Compounds in a Morphological Masked Priming task [#59] G. ARCARA, C. SEMENZA, S. MONDINI, University of Padova

The "head" of a compound noun is the constituent that determines lexical category, gender and semantic features of the whole word. In Italian, Noun-Noun compounds can be both left- and right-headed (i.e., capobanda, 'band leader'; astronave, 'spaceship'), thus offering the opportunity to study the effect of headedness isolated from the effect of position (Jarema et al., 1999). A morphological masked priming experiment was carried out in order to investigate two issues: When is decomposition operating in lexical access? When is information about the head accessed during processing? The stimuli were Italian Noun-Noun compounds. Whole compounds were used as masked primes (46 msec), while constituents were used as targets. Several psycholinguistic variables were considered as potentially influencing RTs. Data were analyzed through mixed effects models (Baayen, 2004). A significant priming effect was found only when the target was the head constituent, regardless of position. These results suggest that headedness information is early, and automatically, retrieved during lexical processing of compounds and thus that constituent status plays a role in morphological decomposition.

SESSION
ACTION CONTROL
14.00 – 16.00
Medium lecture hall A

Chaired by W. KUNDE

14.00 – 14.20
Does tool use require cognitive capacity? #60 W. KUNDE, Dortmund University of Technology

The use of tools is common for humans and several animals. Even simple tools such as levers often imply spatially incompatible transformations of body movements into tool movements, so that, for example, a leftward movement of the hand produces a rightward movement of the lever. Such incompatible transformations can substantially delay the execution of tool-based actions. The present experiments explored whether the resolving of such incompatible transformations requires central-capacity mechanisms. Participants made speeded responses to a first stimulus (S1) and another speeded response by means of a tool to a second stimulus (S2). S1 and S2 were presented at various stimulus onset asynchronies (SOA). The tool moved either spatially compatibly or incompatibly with the operating hand. The costs of a spatially incompatible transformation occurred nearly independent of SOA, suggesting that the spatially incompatible hand-tool transformations require access to capacity limited mechanism, and must therefore be performed serially with other operations requiring the same mechanism.

14.20 – 14.40
Manipulation of initial motor complexity in a reaching task #61
G. GALVEZ-GARCIA, J. LUPIÁÑEZ, University of Granada

This study investigates the motor manifestation of attentional mechanisms associated with facilitation, inhibition of return, Simon effect and foreperiod effect, using a cost-benefit paradigm (Posner and Cohen, 1984). We manipulated the initial position with three different levels (Without previous response, Initial action of press key with the fingers and Initial action of press buttons with hands). After a short or a long cue-target SOA, the target was presented either in the same or the opposite location to the cue. Participants were required to make either unimanual reaching movements towards a bull's eye. We divided the overall Reaction Time into different temporal parts: Premotor Reaction Time, Motor Reaction Time (i.e., between muscle activation and movement initiation) and Movement Time. This division provided data about temporal evolution of the studied effects. The main results showed a general delay in the movement when the participants use the same muscles for executing the initial and reaching action. The cueing effects, Simon effect and the temporal expectations (the foreperiod effect) showed an inverted pattern in the motor phases of the movement. These results are discussed attended to the nature of these effects and the influence of the initial motor demand.

14.40 – 15.00
Subjective duration of anticipated and non-anticipated action effects #62
C. HAERING, J. HOFFMANN, University of Würzburg

When an effect reliably follows a voluntary action it is, according to the ideomotor principle, anticipated before the action is initiated. Furthermore, anticipated effects are immediately compared to the real effects in order to check whether the action has been appropriately performed. The present experiment investigates whether the subjective duration of an effect differs in dependence on whether or not it matches what has been anticipated. Participants freely chose one of two actions followed by the presentation of one of two effect-stimuli lasting 400 ms. One of the effect-stimuli occurs often after one of the actions (80% valid effects) but rarely after the other (20% invalid effects) and vice versa. In each trial participants were to compare the duration of the current effect-stimulus (400 ms) with that of a subsequent tone of variable duration. The point of subjective equality was obtained as a measure of duration estimation. The results reveal that identical effect durations are estimated to last longer when they refer to valid effects compared to invalid effects. The finding is discussed in terms of the ideomotor principle: a violation of expected effects attracts attention what in turn reduces the subjective duration of the event.

15.00 – 15.20
Anticipatory Preparation and Execution of Grasping Movements #63
O. HERBORT, University of Würzburg

Objects are often grasped in a way that facilitates the anticipated interaction with the object. Here, the question is addressed, how and when the motor system integrates the requirements of an immediate movement with constraints imposed by anticipated movements. Participants had to grasp one of two control knobs and rotate it to a specified target angle. We varied the information the participants had about the upcoming grasp-and-rotate movement (knob, target angle, neither) and the direction and extent of the rotation movement (45°, 90°, 135°). Informing participants about either knob or target angle of the upcoming movement resulted in faster movement initiation after a go signal than withholding such information. The hand angle when grasping the knob was mostly determined by the direction and to a lesser degree by the extent of the subsequent knob rotation. When reaching for the knob, such anticipatory hand rotations emerged as early as after 70-100ms after movement onset. However, movement kinematics did not interact with the provided advance information. To conclude, anticipatory hand rotations seem to be prepared before movement onset. Additionally, The results show that a late component of a sequential movement may be prepared partially independent from earlier components.

15.20 – 15.40
Real life motor training modifies spatial performance: The advantage of being drummers #64 A. PELLICANO[1], C. IANI[2], S. RUBICHI[2], P. RICCIARDELLI[3], A. BORGHI[3], R. NICOLETTI[1]
[1]University of Bologna
[2]University of Modena e Reggio Emilia
[3]University of Milano-Bicocca

The present study investigated whether spatial performance to Simon and spatial SRC tasks, can be modified by motor behaviors acquired in real life. To this end, the performance of skilled drummers in both tasks was compared to that of non-drummer musicians (guitar and bass players) and non-musicians. The drummers were chosen because their efficient performance is mainly based on spatial non-corresponding actions which are performed more frequently than in other musicians or in general population. Simon effect was equivalent for the three groups, whereas spatial SRC effect was less pronounced in drummers that in non-drummer musicians and non-musicians. This was due to performance being more efficient in drummers when stimulus-response locations were on the opposite sides. The advantage was present even when feet were the responding effectors, suggesting a central locus of the effect. We reasoned that drummers' training speeds-up the intentional stimulus-response translations when stimulus and response locations are on opposite sides. These results suggest that spatial S-R translations are influenced by real life motor training.

15.40 – 16.00
Development in Action-Effect Learning, a Pupillometric/ Eyetracking Study #65 S. VERSCHOOR, M. SPAPÉ, S. BIRO, B. HOMMEL, Leiden University

To perform a goal-directed action, one needs to have knowledge about the consequences of this action. According to the two-stage model of action control (Elsner & Hommel, 2001), voluntary action is anticipatory and must depend on associations between actions and their perceivable effects. Action control is attributed to the automatic bi-directional association of movements and their sensory effects. Support for the this model was found in several adult studies (see Hommel, 2005) and recently also in a developmental study with 4- and 7-years-old children (Eenshuistra, Weidema & Hommel, 2004) and in another study in 18-month-olds (Verschoor, Weidema, Biro &

Hommel, in preparation). However, we believe that the paradigms used may not have been sensitive enough to pick up the same effect in younger age-groups. In the current study we used a modified pupillometric/ eyetracking version of the task used by Elsner & Hommel (2001) to study the acquisition and the use of bi-directional associations in infants. We will present developmental data in favour of bidirectional associations using a more sensitive method. The factors that seem to influence use of action-effect associations will be discussed.

SESSION
IMPLICIT LEARNING
14.00 – 16.00
Large lecture hall A

Chaired by M. DE VRIES

14.00 – 14.20

Increasing dopamine levels in the brain improves feedback-based procedural learning: An artificial grammar learning experiment #66
M. DE VRIES[1], C. ULTE[2], P. ZWITSERLOOD[2], S. KNECHT[2]
[1]Max Planck Institute for Psycholinguistics
[2]University of Munster

The acquisition of complex rule-based information, such as language learning, is one of the most intriguing abilities in humans. This so-called procedural learning is hypothesized to be mediated by basal ganglia structures, and particularly the parts of the frontal cortex to which they project. Dopamine levels in the brain affect this projection, and moreover have been demonstrated to mediate the reward signal that is likely to drive trial-by-trial feedback learning. We tested the effect of increasing dopamine levels in the brain on the acquisition of a complex artificial grammar. 40 Participants took part in an artificial grammar learning task in which they were forced to learn the grammar through the delivered feedback. One hour prior to the task, half of the participants were given Levodopa, a precursor of dopamine, and the other half a placebo substance. Our findings show a significant task improvement for the Levodopa group compared to the Placebo group. These findings are in line with previous literature that suggests an important role for the basal ganglia in feedback-based procedural learning. Future directions should focus on enhancing cognitive functions through dopaminergic modulation.

14.20 – 14.40

Is a visual search process required for pure perceptual sequence learning? #67 D. COOMANS, N. DEROOST, Vrije Universiteit Brussel

We examined whether a visual search process is required for pure perceptual sequence learning to occur. Participants had to respond to the identity of a target letter pair ("OX" or "XO") that was presented in one of four horizontal locations, by pressing one of two response keys. The target's identity was random, but the irrelevant target location was structured according to a probabilistic sequence. The target letter pair could be presented alone, rendering a visual search unnecessary (no search), or together with distractors, which were either easy ("MN" or "NM", easy search) or difficult to discriminate from the target letter pair ("QY" or "YQ", difficult search). Pure perceptual sequence learning was derived from a sudden increase in RTs when the irrelevant location sequence was replaced by a random sequence. Our results indicate that a visual search process is not necessary for pure perceptual sequence learning to take place. However, learning was only expressed when a visual search process had to be performed. Moreover, the expression improved when the search process was harder. These findings suggest that endogenous attention is required for the expression of pure perceptual sequence knowledge and could explain the absence of perceptual sequence learning in previous studies.

14.40 – 15.00

The Role of Transparency in Probabilistic Category Learning #68
F. KEMENY, A. LUKACS, Budapest University of Technology and Economics

Implicit Learning is usually defined as incidental learning of complex information without the ability to explicitly recall the acquired content. One approach suggests that implicit learning is a domain general, robust learning mechanism that is independent of the nature of the learned information and relies on pure statistics (Saffran et al., 1996). Another proposes that implicit learning is domain-specific: there are mechanisms specialised for learning linguistic patterns and there are mechanisms for other domains like geometric forms (Marcus et al., 1999). These theories differ in their claims about the effect of the nature of the presented stimuli on learning, but both of them agree that there should be no difference in learning within a category due to the link between the category itself and its members. Our study compared two almost identical clones of a classical implicit learning task, the Weather Prediction task. In one of the conditions the link between category members and category membership was arbitrary, while in the other condition the link was non-arbitrary and transparent. Our results show that transparency does not help learning. The same probabilistic associations are easier to learn when the category members have no transparent connection to the category.

15.00 – 15.20

Chunking in Serial Reaction Time tasks: an objective measure of conscious learning #69 A. PASQUALI[1], L. JIMENEZ[2], A. CLEEREMANS[1]
[1]Université Libre de Bruxelles
[2]Universidad de Santiago

What is the difference between learning with and without awareness? Here, we propose that while both unconscious and conscious learners may become sensitive to the statistical structure of an environment, only the conscious learner will chunk the information, that is, segment it so as to form memory representations that can be accessed and manipulated independently of any context. To address this issue, we examined performance in the Serial Reaction Time task, an implicit learning task in which people's responses to successive visual stimuli appear to be highly sensitive to the sequential structure of the material despite the fact that participants often remain unaware of that structure. Chunking in such tasks is characterized by the occurrence of groups of consecutive responses for which reaction times (RT) are successively shorter, reflecting the fact that a single representation (a chunk) drives responding to every event within the group. Crucially, by examining the manner in which RT variability changes over training, we can track the emergence of chunks over long time periods. We identified a pattern of RT variability that uniquely characterizes intentional, but not incidental learning in this situation. Such pattern can therefore be taken as an objective correlate of conscious learning.

15.20 – 15.40

Stability of Implicit Knowledge Representation #70 M. WIERZCHOŃ[1], D. ASANOWICZ[1], J. BARBASZ[2]
[1]Jagiellonian University
[2]Polish Academy of Science

The aim of the presented studies and connectionist simulation was to investigate the form of implicit knowledge representation acquired by the participants in the artificial grammar learning task. According to model of Cleeremans and Jimenez (2002), the implicit knowledge representation should be weak, unstable and indistinctive. Moreover, those features are incompatible with Reber's (1992) assumption of robustness of implicit learning. Two experiments were designed to investigate the stability of the implicit knowledge representation: one with the presentation of additional ungrammatical strings during learning phase (one or two additional exemplars) and the second in dual task paradigm. Additionally, we compared the results of the experiments with the multilayer perceptron network simulation data. The results suggest that the participants presented with additional ungrammatical strings exhibited impaired classification. However, the dual task has no influence on the classification accuracy. The multilayer perceptron model successively implements both findings, confirming that the implicit knowledge is relatively unstable both in the simulation

and in the experiment. The stability could be impaired at least as a result of interference of the acquisition and the noise.

15.40 – 16.00

Knowledge applied to new domains: The unconscious succeeds where the conscious fails #71 R. SCOTT, Z. DIENES, University of Sussex

A common view holds that consciousness is needed for knowledge acquired in one domain to be applied in a novel domain. We present evidence for the opposite; where the transfer of knowledge is achieved only in the absence of conscious awareness. Knowledge of artificial grammars was examined in a variety of transfer conditions e.g. training on note sequences and testing on symbol sequences. For each test string participants reported whether they thought the string was grammatical, how familiar it felt, and their perceived basis for that judgment i.e. random selection, intuition, familiarity, rules, or recollection. An objective measure of fluency was also obtained using a perceptual clarification task. In all conditions judgments attributed to random selection showed above chance accuracy (60%), while those attributed to conscious strategies did not (52%). Familiarity was predicted by the similarity of repetition structure to training strings and was hence related to grammaticality. Fluency, though increasing familiarity, was unrelated to grammaticality. While all judgments were predicted by familiarity ratings only those attributed to random selection showed a significant additional contribution of grammaticality, deriving primarily from chunk novelty. It appears that in knowledge transfer, as in visual perception (Marcel, 1993), the unconscious may outperform the conscious.

SESSION
VERBAL WORKING MEMORY
14.00 – 16.00
Medium lecture hall B

Chaired by V. CAMOS

14.00 – 14.20

Two Maintenance Mechanisms of Verbal Information in Working Memory #72 V. CAMOS[1], P. LAGNER[1], P. BARROUILLET[2]
[1]University of Bourgogne
[2]Université de Geneve

The present study evaluated the interplay between two mechanisms of maintenance of verbal information in working memory, namely the articulatory rehearsal as described in Baddeley's model, and an attentional refreshing as postulated in Barrouillet and Camos's Time-Based Resource-Sharing (TBRS) model. In four experiments using complex span paradigm, we manipulated the degree of articulatory suppression and the attentional load of the processing component to affect orthogonally the two mechanisms of maintenance. In line with previous neurophysiological evidence reported in the literature, behavioural results suggest that articulatory rehearsal and attentional refreshing are two independent mechanisms that operate jointly on the maintenance of verbal information. It is suggested that these two mechanisms would affect different features that result from various levels of encoding. Moreover, time parameters should be carefully considered in any study on maintenance of verbal information in working memory.

14.20 – 14.40

Forgetting in immediate serial recall: time vs. interference. When the encoding rates determine the winner #73 A. GUIDA[1], P. BARROUILLET[1], V. CAMOS[2]
[1]University of Geneva
[2]Université de Bourgogne & Institut Universitaire de France

We have confronted the Time-Based Resource-Sharing (TBRS) model to an issue surrounding forgetting in immediate serial recall: the time vs. interference debate. Oberauer and Lewandowsky (2008) data argues in favor of an interference-based view; time playing "a very small role", which is incongruent with the TBRS model. However in their experiments the encoding times of the letters to be recalled only ranged from 500ms/item to 1100ms. And recently, Campoy and Baddeley (2008) have showed that if phonological coding is common at rapid encoding rates (1s/item), at low rates (2s/item), a more elaborated coding is used. Hence if, as the TBRS model proposes, one assumes 1)that information coded phonologically is more sensitive to (feature-based peripheral)interference and 2)that information coded elaborately is more sensitive to a time-based central interference related to the capture of attention, then the corollary is that, by slowing the encoding rates used by Oberauer and Lewandowsky (2008), a reverse pattern should appear favoring the time-based view. That is exactly what we found using an immediate serial recall task adapted from Lewandowsky, Duncan, and Brown (2004). Results showed that forgetting in immediate serial recall can shift from an interference-based pattern to a time-based pattern as the encoding rate decreases.

14.40 – 15.00

Selection processes in working memory #74 E. LANGE, C. STARZYNSKI, University of Potsdam

How do we control which items are encoded into working memory and remembered in the presence of distraction? In our experiments, digits were presented sequentially on different positions on the PC screen. Verbal memory was tested by serial recall of the digits, spatial memory by serial recall of the positions of the digits. The visual distractor was presented together with the relevant stimuli. Distractor types were either verbal or non-verbal, varying on a perceptual and categorical similarity scale. Within this paradigm, we found that a single repeatedly presented distractor did not affect memory performance, demonstrating sufficient top-down control even in the face of a highly similar distractor. However, a location change of the distractor impairs spatial and verbal serial recall, particularly with a highly similar distractor. Error analysis revealed an increase of item errors in trials with a distractor change. But distractor items were less frequently intruded than other items, indicating that distractor information was efficiently suppressed at recall. Our results demonstrate that distraction at encoding affects selection processes during encoding rather than increasing competition between distractors and relevant items at recall.

15.00 – 15.20

Switch costs and focus of attention in working memory: Evidence from a word updating task #75 J. GRABOWSKI[1], M. JANCZYK[2]
[1]Heidelberg University of Education
[2]Dortmund University of Technology

Switches between working memory items call for cognitive resources. These switch costs are often interpreted in the way that cognitive processes at any moment only have access to one item. Such switch costs have, e.g., been reported from counter updating tasks (simultaneous counting of objects) or visual updating tasks (simultaneous tracking of several objects' spatial location).We report on three experiments exploring a new word updating task, operating on linguistic material (words). This task requires the simultaneous storage of words and their manipulation (i.e., replacing letters and thereby transferring the original words into new words). The results from our experiments are well in line with the predictions derived from the concentric model of working memory (Oberauer, 2002). In particular, we also observed switch costs with this new task which differentially depend on the size of word sets and on the words' number of letters. Besides, the task allows to investigate intra-word switches to different letter positions that were to be replaced during each trial. Our data suggest a possible recursive characteristic of the functionally different areas of the concentric model, i.e. the focus of attention might itself serve as a region of direct access for a higher-order focus of attention.

15.20 – 15.40

More than phonological similarity: An acoustic similarity effect with auditory and visual presentation #76 J. SCHWEPPE[1], R. RUMMER[1], M. GRICE[2]
[1]University of Erfurt

[2]University of Cologne

Phonemes are generally treated as the basic atoms of verbal working memory. We report two experiments that test whether phonemes are retained as a holistic unit or rather as an assembly of features. The key finding supporting the idea that verbal short-term memory is based on phonological information is the phonological similarity effect. We have decomposed this effect by comparing the serial recall of lists with syllables whose onsets are phonologically dissimilar (fa-na-ga) with those containing syllables with onsets that share acoustic features (pa-ta-ka, similar acoustic signal) or articulatory features (da-la-za, same active articulator, same place of articulation). If interference can take place not only at the level of the phoneme but also at a subphonemic featural level, the lists which share acoustic or articulatory features should be recalled less accurately than the dissimilar lists. Our results demonstrate no decrease in performance for the articulatorily similar lists as compared to the dissimilar lists. We are able to show, however, an effect of acoustic similarity, in that it clearly impairs list recall. Moreover, the acoustic similarity effect is not restricted to auditory list presentation (Exp.1) but it occurs even without acoustic input, that is, when items are presented visually (Exp.2).

15.40 – 16.00

Evidence for a psycholinguistic model of verbal short-term memory: The role of the task #77 R. RUMMER, J. SCHWEPPE, University of Erfurt

According to our conception of verbal working memory, short-term retention can be explained as a co-action of representations activated in language processing (e.g., phonological, morphosyntactic, and conceptual information) and a pointer mechanism which highlights specific task-relevant representations. We assume that, by default, conceptual information is highlighted. However, in working memory tasks such as list recall or verbatim sentence recall, surface information becomes more important and is therefore additionally activated. We test this hypothesis by contrasting verbatim and gist recall of sentences. In three experiments based on Potter and Lombardi's (1990) intrusion paradigm, we demonstrate that the contribution of phonological information is restricted to verbatim recall. In contrast, conceptual and morphosyntactic representations contribute to both verbatim and content-related recall. This is also the case with acoustic-sensory information, which is responsible for the modality effect in list and sentence recall. According to conceptions of echoic memory, acoustic-sensory information is either present or not and, thus, in terms of our model need not be activated or refreshed by the pointer.

SESSION
NUMBER COGNITION

14.00 – 16.00

Conference and lecture hall C

Chaired by D. GANOR-STERN

14.00 – 14.20

Exploring the Representation of Fractions and Negative Numbers #78 D. GANOR-STERN[1], M. PINHAS[2], A. KALLAI[3], J. TZELGOV[1]
[1]Achva Academic College
[2]Ben-Gurion University
[3]University of Pittsburgh

How are negative numbers and unit fractions (e.g., 1/3) represented in the mind? Is it holistically or in terms of their components? We present a series of studies investigating this issue using a numerical comparison task. A holistic representation was marked by the presence of a distance effect when comparing a positive vs. a negative number or a fraction vs. a non fraction. The results show effects of mode of representation and standard for comparison. When mixed pairs composed of positive and negative numbers were presented simultaneously no distance effect was found, thus suggesting a components representation. In contrast, when these numbers were presented sequentially, there was a distance effect, suggesting a holistic representation of negative numbers. The results on unit fractions show a distance effect when unit fractions were compared with zero, consistent with a holistic representation. Interestingly, this effect was absent when the fractions were compared with the digit 1. We summarize by discussing factors affecting the processing of complex numbers such as negative numbers and fractions.

14.20 – 14.40

Zero is Perceived in Our Minds as the "Smallest" #79 M. PINHAS, J. TZELGOV, Ben-Gurion University

Previous research suggests that complex numbers (e.g., negative numbers, two-digit numbers, fractions) are not automatically processed as such. To test whether this also applies to zero, participants performed numerical and physical size comparisons of the integers -9 to 9. Number range was manipulated to perceive zero as the start/end point of the range (i.e., 0 to 9, -9 to 0), or as its midpoint (i.e., -9 to 9). In numerical comparisons, distance effects were evident only when comparing to zero as the start/end point, thus indicating that the emerging representation reflects the task requirements. A Larger size congruity effect was found with physical size comparisons to zero, but it did not interact with numerical distance. Surprisingly, similar size congruity effects were found in comparisons to one, but not for comparisons to two, when they were both used as the smallest number in the range. These results suggest that zero (similar to one in zero's absence) is perceived in our minds as the smallest entity, and not as a number that represents "nothing". The implications of these findings are discussed with regard to the basic numerical representations in semantic memory.

14.40 – 15.00

Procedures are activated and used by adults to solve simple addition and subtraction, but not multiplication #80 C. THEVENOT[1], M. FAYOL[2]
[1]University of Geneva
[2]Université Blaise Pascal

Whether individuals still use procedural knowledge in order to solve simple arithmetic problems or rely on retrievals of results in long-term memory is of great interest in order to understand human cognition. In order to shed light on this question, we asked adults to solve one-digit additions, subtractions and multiplications. When the sign appeared before the operands, addition and subtraction were solved faster than when the sign and the operands appeared simultaneously on screen. This priming effect was not observed for multiplication problems. These results suggest that compiled procedures are pre-activated by the addition and subtraction signs and that these procedures are consequently used by adults to solve the problems. No such procedures would be pre-activated for multiplication. While obviously two different strategies were used by individuals in order to solve addition and multiplication, solution times were similar when the problems were presented in their whole. These results comfort Baroody's assumptions (1983) on the existence of compacted procedures that could be as fast as retrievals.

15.00 – 15.20

The development of numerical representation investigated with the priming paradigm #81 B. REYNVOET, B. DE SMEDT, University of Leuven

The comparison distance effect (CDE), i.e., discriminating between two numbers that are far apart is easier than between numbers that are close, is a popular indicator of developmental changes of the numerical representation. Several developmental studies have shown that the CDE decreases with increasing age, indicating a more precise numerical representation in older children. However, the underlying mechanism of this CDE is debated. We tried to shed further light on how children represent magnitudes by using implicit priming, a task not affected by intentional strategies. Studies with adults have shown a priming distance effect (PDE), i.e., numbers are processed faster when

they are preceded by a close number than by a more distant number. We will present two studies examining this effect in typically developing children. Our findings revealed that (1) the PDE already occurs in first graders and remains stable across development, (2) the PDE occurs in first grade children when the notation of both numbers differs. These studies indicate that young children's numerical representation is abstract and similar to the numerical representation of older children.

15.20 – 15.40

Repeated stimuli bias in addition: Is 15+15 smaller than 13+17? #82 P. CHARRAS, J. LUPIÁÑEZ, Universidad de Granada

Scientific knowledge about cognitive mechanisms underlying the summation of several stimuli in order to estimate the total amount remains evasive (see for nonhuman primates Beran, 2008). In a series of experiments with non-symbolic stimuli, in which participants compared the length of lines that were divided into two parts, we have observed that the sum of two identical line lengths is underestimated as compared to the sum of two different line lengths (Charras & Lupiáñez, under revision). The objective of the present study is to investigate whether this bias at summing identical vs. different stimuli is inherent to the magnitude estimation of non-symbolic stimuli or also applies to symbolic stimuli. In three experiments, participants had to perform two digit additions and to judge whether the product was smaller or greater than a comparative number. In one condition, the stimulus number was repeated (i.e. 26 26), while numbers differed in the distinct stimulus condition (i.e. 24 28). The results showed that the type of addition (repeated vs. different stimuli) interacted with the sum estimation, suggesting that the bias at summing identical vs. different stimuli occurs not only with non-symbolic but also with symbolic information. The results are interpreted in terms of representation.

15.40 – 16.00

Arabic digit number's phonology is activated fast #83 J. GARCIA-ORZA[1], A. ESTUDILLO[2]

[1]Universidad de Málaga

[2]Universidad de Granada

According to some authors number naming involves the mediation of semantic codes, however other authors claim that number naming could involve two routes, a semantic route and an asemantic one. Even between those that defend the existence of two routes there is some disagreement, for some of them the asemantic route is slow while according to others it could be fast. Two lexical decision experiments were conducted to examine phonological activation of Arabic digit numbers in Spanish. Arabic numbers were presented as primes and its phonology could be related to target word's phonology, by sharing many phonemes with it (e.g., prime: 7, /siete/ in Spanish, target: sierra), or unrelated (e.g., prime: 2, /dos/ in Spanish, target: sierra). In experiment 1 a SOA of 50 was employed; in experiment 2 a SOA of 116. Fifty participants took part in each experiment. Results showed that target words were primed by Arabic digit numbers that shared part of the target word's phonology but only when the short SOA was employed. The observed phonological priming is consistent with proposals that arabic number naming involves an early activation of phonology.

SESSION
LANGUAGE PROCESSING
14.00 – 15.40
Seminar room 1

Chaired by A. CLELAND

14.00 – 14.20

Frequency effects in word recognition and naming: Evidence from the psychological refractory period #84 A. CLELAND[1], A. HATZIDAKI[2]

[1]University of Aberdeen

[2]University of Edinburgh

The psychological refractory period (PRP) is a dual-task paradigm that can be used to distinguish between early and late stages of processing difficulty. We report three studies that use the PRP to investigate the locus of frequency effects in word recognition. In Experiment 1, a pitch discrimination task was paired with a lexical decision task to high and low frequency visual words. The results showed that frequency effects were diminished as the stimulus onset asynchrony (SOA) decreased. This replicated Cleland et al. (2006), and (according to PRP logic) suggests an early locus for frequency; however, it contradicts the findings of McCann et al. (2000). Experiment 2 replaced lexical decision with a naming task. Again, the results supported an early locus for frequency, with frequency effects eliminated at the shortest SOA. Furthermore, Experiment 3 found no evidence for any late locus of frequency using a delayed naming task. Our results stand in contrast to McCann et al., and support models of word recognition that postulate an early role for frequency.

14.20 – 14.40

The locus of frequency effect: Insights from Taiwan Sign Language #85 Y. CHIU[1], O. TZENG[2], D. HUNG[3]

[1]Fu Jen Catholic University

[2]National Yang-Ming University

[3]National Central University

This study used a picture production task to explore the role of frequency in lexical access in Taiwan Sign Language (TSL), based on the databases of Bates' et al. (2003) study. We reason that if frequency in TSL predicts reaction time (RT) not only in TSL, but also in other spoken languages, conceptual accessibility is contributing to part of the frequency effect regardless of the language modality. If frequency in TSL predicts RT better in TSL than in other languages, specific language properties are also a contributing variance to frequency. The results show that both RT and frequency of the relationships between TSL and other spoken languages are highly significant. Also, the frequency in TSL efficiently predicts RT in other languages. These results reflect that the lexical locus of frequency effects emerge from both a general conceptual level shared over languages and a specific lexical level unique to each language.

14.40 – 15.00

A Test of the Distinction between Identification and Production Priming in the Lexical Decision Task #86 P. SPATARO[1], C. ROSSI-ARNAUD[1], N. MULLIGAN[2]

[1]Sapienza University

[2]University of North Carolina

The distinction between identification and production priming predicts that implicit memory should require a greater amount of attention at encoding when there is a competition between multiple solutions at test (Gabrieli et al., 1999). This hypothesis was tested in the lexical decision task (LDT) by comparing words with high (M=4) or low (M=0) number of orthographic neighbours (N-size). When a word has no neighbour, the process of identification relies uniquely on the analysis of its perceptual properties; on the contrary, the recognition of an high N-size word implies the activation of its entire set of neighbours, and thus the selection of the correct response from an array of alternatives. Attention at encoding was divided through the flanking digits paradigm, following a 2 (study status) x 2 (N-size) x 2 (attention) mixed design. Fourty participants were tested, half in the full- and half in the divided-attention condition. Results showed that the reduction of attentional resources diminished priming for words with multiple neighbours, but had no effect on words without neighbours. These data are congruent with the distinction between identification and production processes, and qualify previous findings about the immunity of the LDT to division of attention.

15.00 – 15.20

Priming influence on typicality of objects #87 N. RADCHIKOVA, Belarussian State Pedagogical University

Typicality rating is a well-known and stable phenomenon in psychology of categorization. This rating correlates with frequency, familiarity and categorization time but it depends on the context. It may be concluded that more typical members are those that are more familiar, more frequently occurred and used in speech, i.e. those that correspond to more activated concepts. Activation could be changed not only with the help of context but also with the help of priming. The results of the proposed experiments show that priming leads to the increase in typicality of the object in question, and the increase in typicality is stronger for field-dependent than for field-independent subjects. The results obtained allow us to conclude that although without context and priming the typicality is sufficiently stable phenomenon it reflects the dynamic processes in the semantic memory and could be easily manipulated.

15.20 – 15.40

Non verbal communication devices can favor language, reading and number acquisition #88 F. LOWENTHAL, O. SIMON, A. TREMBLEZ, J. TRAPPENIERS, University of Mons

We developed a specific approach called "Non Verbal Communication Devices" (NVCD), in order to observe child language, reading and number development. Our researches show a positive impact of the use of NVCDs in these domains.In the present research we compare the influence of two NVCDs (the Pegboard and the Dynamical Mazes). Sample: 142 French speaking first graders. All the subjects were evaluated (pre- and post-test) using the following tests :N-EEL (language performance) BELEC, Batterie Orlec and Inizan's Batterie (reading capacities, pre-test: Inizan's Batterie Prédictive, post-test: Inizan's Batterie de Lecture)TEDI-MATH (number abilities). The pre-test results show that the performances of our sample were below the norms expected by the tests used.Three equivalent groups were created: a "Pegboard group", a "Dynamical Mazes group" and a control group. Subjects of the two first groups worked by pair during eleven 30 minutes sessions, during their second grade : one group used the first mentioned device and the other group used the other. The post-test evaluations show differences between the control group and both experimental groups. These results will be presented during the conference.

SESSION
EXECUTIVE CONTROL

14.00 – 16.00
Large lecture hall B

Chaired by **A. VANDIERENDONCK**

14.00 – 14.20

Modeling task selection in voluntary task switching #89
A. VANDIERENDONCK, J. DEMANET, B. LIEFOOGHE, F. VERBRUGGEN, Ghent University

Two models of task generation in voluntary task switching are described. Both models hypothesize that random task generation involves retrieval of chains of task names from long-term memory. One model assumes that the retrieved chains are used to guide task selection and task execution in voluntary task switching (task-selection model). The other model proposes that the retrieved sequences of tasks are converted into transitions which are then used to guide task selection and task execution (transition-selection model). These models were tested on the statistical features of task choice generation in a voluntary task switching experiment with task-selection and task-execution responses. The characteristics of the generated data were expressed in terms of proportions of runs, of autocorrelations and alternations. Both models provide good fits of the runs statistic, but only the transition selection model predicted all statistics of the task and transition sequences correctly. Implications of the models for our understanding of task generation are discussed.

14.20 – 14.40

Voluntary control: dissociating task selection and execution in the voluntary task switching procedure #90 J. DEMANET, F. VERBRUGGEN, B. LIEFOOGHE, A. VANDIERENDONCK, Ghent University

The ability to exert cognitive resources on a voluntary basis is a very important aspect of cognitive control. This kind of control is studied by means of the voluntary task switching procedure (VTS; Arrington and Logan, 2004). In this procedure participants are asked to select and perform two cognitive tasks in a 'voluntary' random sequence. Previous research has not only shown that participants have large switch costs, but also that they have a tendency to repeat the tasks more often than predicted by chance (repetition bias). In the present study, we tested the hypothesis that control processes are needed to overcome this repetition bias and that these control processes affect task selection but not task execution. To that end, we investigated the effect of working memory (WM) load on voluntary control in VTS. The results nicely showed the expected dissociation between task selection and task execution. While the tendency to repeat the tasks was boosted, the switch cost was even reduced with a concurrent WM load.

14.40 – 15.00

Voluntary switches are corrected repetitions #91 K. VANDAMME, A. SZMALEC, B. LIEFOOGHE, A. VANDIERENDONCK, Ghent University

While recent years have witnessed a growing interest in Voluntary Task Switching (VTS), the control mechanisms that are required in order to switch tasks on a voluntary basis have never been made explicit. Starting from the previous finding that in VTS, the proportion of task repetitions is usually higher than the proportion of task switches (i.e., the task-repetition bias), the present electrophysiological study tests and confirms the hypothesis that during VTS, one initially re-selects the previously executed task, before correcting this bias and selecting the alternative task. On the one hand, these findings allow us to describe how people switch cognitive tasks voluntarily. On the other hand, our approach underlines the usefulness of electrophysiological measures in understanding the processes by which voluntary behavior occurs.

15.00 – 15.20

Task switching based on precues versus knowledge of a task sequence #92 T. KLEINSORGE, Leibniz Research Centre for Working Environment and Human Factors

There is considerable evidence that task switching proceeds more efficiently on the basis of explicit precues than on the basis of a learned sequence of tasks. However, this evidence stems exclusively from experiments in which participants switched among only two tasks. In a series of experiments it is shown that the superiority of explicit precues disappears when participants switch among more than two tasks. In addition, the relative efficiency of explicit precues versus memory-based knowledge is modulated by the reliability of foreknowledge about the upcoming task.

15.20 – 15.40

Back in control: Executive control depends on episodic retrieval #93
M. SPAPÉ[1], G. BAND[2], B. HOMMEL[2]
[1]University of Nottingham
[2]Leiden University

People are often distracted by task-irrelevant stimulus attributes that point to a different response than the relevant attribute. The Simon effect, for example, shows that people respond faster to stimuli that spatially correspond to the response than to stimuli that do not. Like other conflict incurring phenomena, the Simon effect is known to drastically change or even reverse after non-corresponding trials, perhaps due to control mechanisms that adapt to conflict. Several authors have pointed out that executive control may work by locally adapting to conflicting stimuli/responses. We have recently suggested that control-related parameters may be stored within episodic traces

that are retrieved only if substantial overlap exists between the previously encountered source of conflict and the present. In a task in which Simon displays are rotated in between a pair of two trials, we provide behavioural and electro-physiological evidence that indeed show that measures of executive control critically depend on feature-integration and retrieval processes, indicating that current coping with conflict is a function of past and present overlap.

15.40 – 16.00

There is no "the" Heuristic System: Modes of Cognitive Control in Judgment and Decision Making #94 E. COKELY, Max Planck Institute for Human Development

In recent years research has increasingly emphasized the link between automatic cognition and heuristics processes (e.g., "System 1", sometimes called "the heuristic system"). Unfortunately, such an emphasis may obscure theoretically important cognitive control dynamics (e.g., "System 2"). In two experiments we demonstrate that even seemingly intuitive heuristic processes (e.g., a fluency heuristic) can result from controlled cognition (as measured by the cognitive reflection test). Experiment 1 examined a bias that occurs when price estimations are made in the presence of unfamiliar money (disfluency). Paradoxically, more cognitive control was related to a large judgment bias. Experiment 2 investigated the influence of the ease of company name pronunciation on stock profit estimations (fluency). More controlled processing was again paradoxically related to a greater reliance on the use of fluency for judgment. Effects did not interact with age (younger versus older adults). Results provide new evidence of early selection cognitive control in judgment: Rather than monitoring and correcting automatic intuitions, cognitive control acted to constrain and qualitatively alter automatic impressions (see also Cokely & Kelley, 2009). Theoretically, results highlight the complex and often neglected relations between heuristics and controlled cognition. Implications for dual process theories and superior judgment and decision making are discussed.

POSTER SESSION I

16.20 – 18.20

Exhibition room A & B

ACTION I

Limited conscious monitoring of one's own hand movement during sensorimotor transformation #95 J. MÜSSELER, C. SUTTER, RWTH Aachen University

When using a tool, subjects have to account for two sensorimotor control loops: a proximal loop, with which the body-related effects are controlled (typically movements of the hand), and a distal loop, with which the effects of the tool are controlled (e.g. the cursor movement on a display). The present study examined what participants perceive of their proximal movements when using a tool. In the experiments different gains for either the x- or the y-axis perturbed the relation between hand movements on a digitizer tablet and cursor movements on a display. As a consequence of the perturbation participants drew circles on the display while their covered hand movements followed either vertical or horizontal ellipses on the digitizer tablet. When asked to evaluate their hand movements, participants were extremely uncertain about their trajectories. By varying the amount of visual feedback, findings indicated that the low awareness of one's own movements originated mainly from an insufficient quality of the humans' tactile and proprioceptive system or from an insufficient spatial reconstruction of this information in memory.

Does the side of response affect yes/no response ratio? #96 K. CIPORA, M. SZPITALAK, Jagiellonian University

In many psychological experiments subjects are instructed to make decisions using both hands (one for positive response, the other for rejection). Associations for the right and left hand are usually arbitrary choice and counterbalanced across subjects. In many tasks (like Reber's AGL, or long strings in Saul Sternberg's paradigm) subjects make responses without explicit knowledge which answer is right. On the other hand, Nuerk et. al (2004) described phenomenon called MARC (linguistic markedness of response codes) effect, where in parity judgment task responses are faster when the right hand responds to an even number and the left to an odd number. It is also worth noticing that according to classical neuropsychological approach right hemisphere is associated with negative affect, and left with positive affect. The main aim of a given poster is to test the hypothesis that in situation when subject doesn't know what is the correct response, hand-response association influences the ratio of positive and negative responses and RT's. The hypothesis is rather exploratory. The experiment is still in progress, but the actual results will be reported on the poster.

The agentive concern of sensory attenuation #97 C. WEISS[1], A. HERWIG[2], S. SCHÜTZ-BOSBACH[1]

[1]Max Planck Institute for Human Cognitive and Brain Sciences

[2]Bielefeld University

It has been proposed that the prediction of sensory consequences of one's own actions made by internal forward models can be used to attenuate the sensory effects of self-produced voluntary movements and in this way allows us to distinguish them from externally produced effects. However, recent evidence challenged this assumption by showing that sensory attenuation also occurs during the mere observation of a human agent. Our studies aimed at further clarifying the relationship between sensory attenuation and action (effect) attribution. To this end, we used an auditory attenuation paradigm in which subjects had to listen to self- and other-produced tones. In contrast to previous studies, the action of each agent was associated with a specific auditory effect. Subjects were required to compare the loudness of a given self- or other-produced tone with a subsequent tone of the same frequency but of varying amplitude. The data from each condition were fitted with a logistic function to calculate the point of subjective equality as an indicator of auditory attenuation. First results will be presented and discussed with respect to forward models of action control and their implications for the role of sensory attenuation as a candidate mechanism for self/other distinction.

Priming effect on the schematic grasping and semantic decisions for drawings of objects and words: dual routes for action #98

H. CHAINAY, L. NAOURI, A. PAVEC, University Lyon

Action performance is supposed to be based on two different types of processing: one using conceptual knowledge about the object (indirect route), the other using visual information (direct route) independently of the conceptual knowledge. In order to investigate this hypothesis we tested the influence of objects' orientation priming on grasping and semantic category decisions. Two groups of 20 healthy subjects decided on preferred schematic grasping (horizontal, vertical) for drawings of objects, words (names of objects) and three-dimensional blocks. Additional group of 20 healthy subjects performed semantic decision task. Three priming conditions were used: congruent, incongruent and neutral. The facilitating effects of priming were observed for drawings of objects and blocks but not words in grasping decision task. Subjects responded faster for targets primed by congruent primes than primed by other primes. Thus congruent visual information about orientation accelerated subjects' responses. However, it had no effect on response accuracy. In addition, there was not significant effect of priming on semantic decision task. Subjects responded as fast and as accurately for drawings as for words. These data show that information about object's orientation is important for action decision even if action is not actually executed. This supports a dual-route model for action.

Eastern and western tools: How culturally acquired action expertise shapes perception-action links #99 J. TSAI, G. KNOBLICH, N. SEBANZ, Radboud University Nijmegen

This study investigated whether one's expertise in using tools affects how these tools are integrated in action planning. Participants

performed a go/no-go variant of a Simon task and pictures of two tools that could be used to press down the keys were shown. Participants experienced control over one of them. On no-go trials, the other tool hit the second key. This set-up leads to a compatibility effect, indicating that participants integrate the action that is not under their own control into their action planning. We manipulated whether the way tools were arranged was congruent or incongruent with one's acquired dining habits (western knife right, fork left; Eastern: chopsticks right, spoon left). Dutch participants showed a compatibility effect only when the knife-fork pair is congruent with their behaviour. In contrast, Chinese participants were only sensitive to the positioning of chopsticks and spoon. This suggests that individuals' action expertise, which is constrained by cultural factors, shapes perception-action links.

Probability effects in anticipation investigated with online behavioural measures (Mouse Tracking) #100 P. BRUHN, Aarhus University

Background: Anticipation of upcoming events is an adaptive mechanism that ensures quick and accurate perception and action. Consequently, lower Reaction Time (RT) and higher accuracy is found in response to events that can be adequately anticipated. However, events in the world happen with varying degrees of probability depending on context and preceding events. It is therefore of fundamental importance to investigate how knowledge of probability modulates anticipatory processes. Previous studies found effects of stimulus probability on RT and accuracy, but these are only indirect and post-hoc behavioral measures of the anticipatory processes involved. Methods: The present study investigates how knowledge of probability affects real-time anticipatory processes. Behaviour is monitored online by tracking the computer mouse trajectory leading to a required response (mouse-click on Target). The paradigm implements a probability structure that allows the participant to gain knowledge about the relative probability of the occurrence of two alternative events (target occurring on left or right side). Results: Preliminary results indicate that knowledge of probability affects both RT and mouse movements; both vary systematically over four probability conditions (100, 80, 50 and 20%), with high probability trials displaying lower RT and mouse movements with more direct trajectory towards the target.

Numbers impact on motion speed #101 G. PERRONE, E. BRICOLO, L. GIRELLI, University of Milano-Bicocca

Current cognitive models postulate a numerical spatial representation where numbers are conceived as a variable distribution of activation along a mental number line. Activation of this numerical representation has been called into question to account for the impact of numerical magnitude in motor tasks such as grip movement, eye movement and pointing. Recently, mis-estimations of length induced by numbers received an alternative interpretation in terms of a cognitive illusion, according to which processing of magnitude information brings about an illusory expansion or compression of a spatial extension. In the present study we evaluate the impact of numerical information on the perception of length. Subjects were required to connect two distinct points delimited by numbers. The kinematic analysis of movement allowed for extracting the observed variables corresponding to the mean and peak of speed. In particular, since the average and peak of speed reached by the manual connection of two distinct point were positively correlated with their physical distance (exp.1), we manipulated the magnitude of identical numbers (exp.2) and the numerical distance between the flanking numbers (exp. 3). The results indicate that numerical information was automatically accessed and modulate the kinematic parameters of the connecting movement.

ATTENTION I

Irrelevant singletons in visual search: capture of attention or filtering costs? An ERP study #102 A. WYKOWSKA, A. SCHUBÖ, Ludwig Maximilian University

With the use of the ERP methodology, we investigated temporal interaction of top-down and bottom-up mechanisms during attentional guidance in a visual search task. Participants were asked to search for a shape target. An irrelevant salient color singleton was presented in some trials. The search display was followed by a probe item with various SOAs. We hypothesized that if top-down selection can exhibit control over the activation evoked by the salient irrelevant singleton, a probe presented at the location of the salient irrelevant singleton should show only little benefit over other probe locations. At longer SOAs, a prominent benefit of the target position should be observed. ERPs locked to the search display (N2pc) showed that attention was allocated to the target and not to the irrelevant singleton. ERPs locked to probes (P1) showed a benefit of target location over other locations in the long SOA condition. No benefit of irrelevant singleton's position was observed in the ERPs. We conclude that top-down control is potent enough to guide attention to the task- relevant target in the presence of salient distraction. However, this process takes time as the target-related activation needs to win competition against signals elicited by the more salient irrelevant singleton.

Attention doesn't explain attentional focusing effects in memory for emotional stimuli #103 S. CHIPCHASE, P. CHAPMAN, University of Nottingham

Emotion can lead to an enhancement of memory for specific visual details (Kensinger, Garoff-Eaton, & Schacter, 2007). It has been suggested this enhancement of memory for negative pictures is due to focusing of attention onto central elements of a scene. In an initial study this was explored by measuring memory for details of central and peripheral elements of a scene whilst measuring eye movements. Attention focusing onto the object was found in scenes with a negative object, but not in scenes with a neutral or positive object. This is consistent with attention focusing being responsible for emotional enhancement of visual memory specificity. However, two further experiments manipulated the presentation of stimuli and found dramatic effects on attention focusing. One experiment blocked stimuli into negative, neutral or positive groups and a later experiment warned participants of the emotion of the next object to be displayed. The manipulation of stimulus presentation eradicated attention focusing onto negative objects yet in both experiments the emotional memory effects remained. In conclusion, attention focusing onto central details at the time of encoding a scene does not explain this negative emotional enhancement of memory.

Spontaneous appraisal of facial attractiveness in attention tasks #104
C. LIU[1], W. CHEN[2], J. SUI[1]
[1]University of Hull
[2]Chinese Academy of Sciences

We have recently reported that the presence of a task-irrelevant attractive face can impair a covert attention task (Sui & Liu, 2009). In this study, we provide further evidence for the influence of similar spontaneous appraisal of facial attractiveness in different attention tasks where more than one face stimuli are present. We first report a dot-probe experiment where an attractive and an unattractive faces in each trial were pit against each other for attention. We found that detection of a target was significant delayed when the target location was briefly preceded by an attractive female face. We then report two multiple-face tracking experiments, where the task was either tracking the moving target faces among distractors or specifying the exact location for a randomly probed target. The results revealed that when attractive faces were used as targets, both tracking and identity-location binding performances were superior relative to the unattractive target condition. These results suggest that spontaneous appraisal of facial attractiveness can modulate attention, which can either impair or facilitate an ongoing task depending on whether such a task-irrelevant appraisal results in more or fewer resources allocated to the task in question.

Reverse attentional biases depending on a non-motivational vs. motivational focus #105 C. BERMEITINGER, D. WENTURA, Saarland University

Recently, Rothermund et al. (2008, Emotion) presented data regarding an attentional counter-regulation effect on reaction times

(RTs) to valent stimuli: participants' RTs to targets were slower when distractors had an incongruent valence to participants' motivational focus. The focus was experimentally directed on either a positive or a negative future outcome. The present experiments varied some parameters of the experiments by Rothermund et al (2008). Now, we presented valent stimuli which were completely irrelevant for the participants' task. Furthermore, we manipulated whether participants had a specific motivational focus (positive or negative outcome) or whether participants had a motivationally less involving task including positive or negative signs within arithmetic problems. The data showed a congruency effect when the task included the non-motivational arithmetic problems: the sign of the arithmetic problem modulated whether the following negative or positive symbols were attended. Congruent symbols led to facilitation of the target's answer. This congruency effect is compared with the incongruency effect found with a motivational focus.

Salience and relevance in distinct dimension are combined and interact to orient attention #106 D. FERNANDEZ, G. MICHAEL, University Lyon

In visual search tasks, a salient item can capture attention. Knowledge about the dimension in which an attention-capturing target is salient, can further improve attentional orienting. Some models postulate combination of independently computed signals of relevance and salience. We thus sought to properly distinguish these two factors, and examine their interactions. In visual search tasks, participants had to discriminate the orientation of one target (a colored gaped circle oriented vertically) through nine distractors (similar items oriented horizontally), briefly presented. An item could be made salient (by size) and a word cue could indicate the ¬ –non-salient– color of the target to come. Salience and relevance are thus defined in separate dimensions. Results showed that the salient item captured attention. The cue dramatically improved performances (in both accuracy and speed), even for the salient item. These experiments evidence that salience and relevance can jointly influence attentional orienting, even when the salience was strong enough to capture attention and when the two signals concern distinct dimensions. These signals seem to both contribute to a master activation map, and interact there for the control of attentional orienting.

Testing the efficiency and independence of attentional networks: Evidence from the Lateralized Attention Network Test (LANT) #107 D. ASANOWICZ, P. WOLSKI, Jagiellonian University

Attention can be described as a system of anatomical areas carrying out the functions of conflict resolution, spatial orienting and alerting. Empirical evidence demonstrates convincingly that the Attentional Networks constitute three anatomically and functionally independent systems. The "thesis of hemispheric independence" (Zaidel et al., 1991) assumes that each hemisphere possesses a cognitive system of its own. Such organization would predict the existence of independent attentional systems in each cerebral hemisphere. To address this issue, the Lateralized Attention Network Test (LANT) was designed. The introductory study of Greene et al. (2008) shows that the networks can operate independently, though similarly, in each hemisphere. However, the clinical and imaging data unequivocally supports the notion of right hemisphere predominance in attention. For example, spatial neglect is known to be deeper and more persistent after the right hemisphere lesions. Thus, three experiments recruiting 170 participants were conducted in order to explain the discrepancy mentioned above. The original procedure of the LANT was employed and additional modifications were involved, which allowed differentiation of goal-directed or stimulus-driven control of attention. The results show that interhemispheric relations between the three attentional networks differ depending on whether an exogenous or endogenous control is induced in distinct experimental conditions.

Time course of attentional bias for emotional faces. Chronometric and electrophysiological explorations #108 D. ASANOWICZ, E. WRONKA, W. WALENTOWSKA, Jagiellonian University

The dot probe task is often used to examine selective attention to threat, especially in anxious individuals. A facilitated response to probes that appear at the same location as threat stimuli in comparison with responses to probes at the opposite location is interpreted as vigilance for threat. Presented studies examined a time course of the attentional bias for emotional faces in non-anxious individuals. Results of the first experiment indicate that subjects exogenously oriented to threat pictures: the initial involuntary shift of attention towards threat produced facilitation reaction to valid probe when SOA was 150ms. However, at long SOA (900ms) inhibition of return was observed. The faces were not task-relevant; therefore, when there was enough time for attention to disengage from them and move to the other location, an inhibitory after-effect occurred. In the second experiment, behavioral (reaction time) as well as electrophysiological (event-related potential) data was recorded. EEG data was analyzed using Low Resolution Brain Electromagnetic Tomography (LORETA). Besides from replicating findings from the first experiment, the aim was to indicate electrophysiological components of facilitation and inhibition processes. The processes of attentional selection as described by electrophysiological measures are beneficial to understanding the way emotional faces can attract attention.

The effect of joint attention on object processing #109 A. BÖCKLER, N. SEBANZ, G. KNOBLICH, Radboud University Nijmegen

The ability to follow other individuals' gaze has been widely studied in infants as well as in primates, birds, and other animals (Meltzoff & Brooks, 2007; Itakura et al., 2004). But what are the cognitive consequences of jointly attending to objects? Recent findings suggest that humans unintentionally adopt the emotional evaluation of another person attending to the same object (Bayliss et al., 2006) and that stimuli that used to be relevant for another, co-attending individual tend to be remembered better (Sebanz et al., in prep.). The aim of the present experiments was to investigate the effect of jointly attending to objects on the perceptual processing of those objects. For this purpose, pairs of participants were seated opposite each other while performing a mental rotation task. Tones presented ahead of rotation stimuli indicated whether both participants were to look at the screen (joint attention) or whether one of them had to perform the trial alone while the other closed the eyes (individual attention). Anchor stimuli of the sequential rotation task could either be seen from a first or from a third person perspective. First results indicate that joint attention modulates the classical rotation pattern, in addition to effects of perspective.

BILINGUALISM I

Utilizing general cognitive processes in foreign language instruction #110 M. PARADOWSKI, University of Warsaw

The target language should be taught in the framework of the learner's L1 – as in the Language Interface Model (LIM; Gozdawa-Gołębiowski 2003). This proceeds from an explication of how grammar rules operate in the learners' L1, through an explanation of relevant L2 rules and subsequent modification of the L1 rule to accommodate L2 data, with practice first expecting the learner to apply the FL rules to L1 (!) examples, to finally end with competence expansion, thus leading to multicompetence and allowing for the obliteration of the rules from the learner's conscious mind. The findings of a controlled longitudinal classroom experiment with continuous collection of data over the period of one school year across a representative range of grammar areas reveal appreciably enhanced performance and retention in the experimental group taught via the Language Interface Model over control groups not only in a follow-up test, but also in a deferred post-test. The findings corroborate the importance of explicit learning, attention, and L1 awareness in interlanguage development.

Auditory word recognition by bilinguals: Evidence for nonselective lexical access #111 E. LAGROU, W. DUYCK, R. HARTSUIKER, Ghent University

Psycholinguistic studies of bilingual language processing have shown that lexical access in visual word recognition is not language-selective. Reading in a second language (L2) is influenced by lexical knowledge of the native language (L1) and vice versa. However, most research on language-selective lexical access has been limited to the visual domain. The goal of this study was to generalize the basic finding of language-aspecific lexical access to the auditory modality. To this aim Dutch-English bilinguals completed an English (L2) auditory lexical decision task in which targets were pronounced by a native Dutch (L1) speaker. The results revealed that auditorily presented interlingual homophones (e.g., lief (sweet) – leaf [li:f]) were recognized slower than controls, and that this effect was more pronounced when the Dutch (L1) meaning was high frequent. This can be explained by competition between the no-response yielded by the activation of the L1 phonological representation of the homophone and the yes-response triggered by the activation of the L2 phonological representation of the homophone. To summarize, these results show that L1-knowledge interferes with auditory L2-processing, especially when the L1-meaning is high frequent. Future research will have to investigate if L2-knowledge also interferes with auditory L1-processing.

Grammatical Gender Inhibition in Bilinguals #112 L. MORALES, D. PAOLIERI, T. BAJO, University of Granada

Inhibitory control processes have been recently considered to be involved in interference resolution in bilinguals, at least at the phonological level (Levy, McVeigh, Marful & Anderson, 2007). In this study we explored if interference resolution is also carried out by this inhibitory mechanism at the grammatical level. Thirty-two bilingual (Italian-L1 and Spanish-L2) participated. All of them completed two tasks. In the first one they had to name pictures in L2. We manipulated gender congruency between the two languages and the number of presentations of the pictures (1 and 5). Results showed a gender congruency effect with slower naming latencies in the incongruent condition. In the second task, participants were asked to name the L1 words that were practiced during the first naming task, but now in L2 with bare noun or with L2 noun phrase (article noun). Results showed a grammatical gender congruency effect only in noun phrase production and, more interesting, only for those words practiced 5 times. This pattern suggests that grammatical gender can cause interference in bilinguals, and that inhibitory processes may be responsible for resolving the interference at the gender level.

Two-digit Arabic numbers and verbal numbers: Exploring the compatibility effect in Spanish/English bilinguals #113 M. MARTÍN[1], P. MACIZO[1], A. HERRERA[2]
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[2]University of Murcia

This study explores whether the processing of two digit numbers presented in Arabic and verbal format depends on the bilinguals' language. Spanish/English bilinguals (L1/L2, respectively) compared two digit number words presented in Arabic format, Spanish and English. The participants selected the larger of two numbers while the unit-decade compatibility effect was examined. For compatible trials the decade and unit comparisons lead to the same response (e.g., 24-67) while for incompatible trials the decade and unit comparisons lead to different responses (e.g., 27-64). We predicted that the processing of two-digit number words would be similar for Arabic numbers, Spanish number words and English number words because Spanish and English are both languages with non-inverted property (in both languages Arabic numbers and written numbers follow the decade-unit structure). The results showed some differences related to the format in which two-digit number words were presented. These differences are interpreted in terms of number processing theories and models of bilingual language processing.

Exploring bilingual lexical selection with the Retrieval-Induced Forgetting paradigm: facilitation, not inhibition #114 E. RUNNQVIST[1], A. COSTA[2]
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[2]Universitat Pompeu Fabra

One way to solve the problem of bilingual language control is postulating the existence of an inhibitory mechanism that actively suppresses the words in the non-target language during speech production (e.g. Green, 1986). We tested this hypothesis by means of three experiments with different bilingual populations (monolingual L2 learners, bilingual L3 learners and high proficient bilinguals) within the RIF paradigm. In these experiments, participants were first shown drawings along with their L2 or L3 labels. Afterwards, they were shown 75% of these drawings and they had to name them in L1 or L2/L3 according to a color cue. Finally, participants' memory of the L1 labels of all the pictures was tested through the presentation of a rhyme-cue. An impaired recall for the pictures previously named in L2/L3 compared to those that had not been named at all would have revealed inhibition of the L1 labels during L2/L3 production. Instead, we found a robust effect of facilitation in this condition for all three groups. These results contrast with those of a previous study (Levy et al., 2007). Results are discussed within theoretical frameworks of bilingual speech production.

Language, Thought and Articles or how Poles (don't) deal with English articles #115 K. HANSEN[1], J. RĄCZASZEK-LEONARDI[2]
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The research was based on the assumption that language and its structure reflect in cognition. The objective of the research was to respond the question how Poles, users of language without articles, deal with English articles the and a(n) when they study English as a foreign language. First, categories of use of articles were distinguished, then the test was constructed in order to check which categories are easier and which are more difficult for Poles. Although the character of the research was explorative, on the basis of works on other languages, some hypotheses were formulated. Independent variables were categories of use of articles and dependent variable was the score in the test. The category of uniqueness turned out to be the easiest one and the category of object as an representative of the class – the most difficult. The results were quite ambiguous, however the research shows that there are significant differences in the degree of particular article uses. On the basis of this research it can be presumed that Poles that learn English create their own system of use of articles. The base for it are rules taught during lessons and principles of their own language.

The nature and efficiency of attentional functioning in bilingual individuals - an implementation of Lateralized Attention Network Test #116 A. MARZECOVÁ[1], D. ASANOWICZ[1], L. KRIVÁ[2], Z. WODNIECKA[1]
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[2]Charles University

Bilingual individuals are characterized by specific mechanisms of language control due to the need to continually differentiate and switch between the languages. A study recruiting young adults from different language environments examined how the consecutive use of particular control mechanisms enhances a general functioning of Attentional Networks. The lateralized version of Attention Network Test (ANT) was applied to measure an efficiency of Executive, Orienting and Alerting networks in each cerebral hemisphere separately. The aim of the study was: 1) to replicate the study of Costa et al. (2008), which revealed more efficient conflict resolution and reduced switching cost between the different types of trials in bilinguals in comparison with monolinguals; 2) to examine whether the benefit is generalized to other mechanisms of cognitive control by analyzing the cost component of orienting; 3) to investigate an impact of training on the magnitude of conflict cost in between groups by implementing a longer and more difficult version of ANT 4) to explore a potentially occurring alerting effect. Furthermore, study attempted to cast light on a controversial topic of differential hemispheric asymmetries in bilinguals by indicating laterality patterns of non-verbal cognitive functions.

DISORDERS I

Cognitive dizontogenesis as a problem in clinical psychology #117
N. ZVEREVA, Moscow State University of Psychology and Education

The term «cognitive dizontogenesis» in clinical psychology is used rarely then "cognitive deficit". The authors consider "cognitive dizontogenesis" as a type of destroyed mental development that can occur at any age through all the life, starting not only in childhood. The problem of content and issue of development crisis and connected with age features dizontogenesis manifestations are discussed. It is stressed the problem of differentiating the symptoms of age norms response and pathological symptoms of the different levels of the crisis of human life. In childhood cognitive dizontogenesis constitute a violation of the cognitive development of children. Cognitive deficit is a manifestation of the defect in cognitive development, the effect of the disease.In the later age cognitive deficits may be a manifestation of normal age-related changes, as well as a consequence of the disease. Cognitive dizontogenez in the later age is always connected with the manifestation of the disease. The authors indicates the importance of developing methodological approaches and diagnostic tools to assess the contribution of different factors in the degree and features of dizontogenesis types according to the early and late stages of ontogeny.

Exploring working memory skills in children with Non-Specific Language Impairment #118 F. ZOUROU, B. LÉTÉ, J. ECALLE, A. MAGNAN, University Lyon

Several studies investigating working memory (WM) have found that children with language impairments present important difficulties holding verbal material in mind. Their performances, however, on visuospatial tasks have attracted much less attention and with less consistent results (Archibald & Gathercole, 2007). In an attempt to clarify these results we investigated both verbal and visuospatial WM in twelve school-aged children diagnosed with a certain type of language impairment, the so called Non-Specific Language Impairment (NSLI). Children with NSLI present low performances on both verbal and nonverbal tests. An extensive battery of measures was additionally used to measure children's noverbal and language skills for the purposes of this study. To test verbal storage capacities children have been asked to repeat nonwords and lists of numbers. Contrary to previous studies, visuospatial skills here were tested with an innovative experimental task that evaluates both performance and learning potential. Preliminary results have shown particularly marked deficits on the nonword repetition task. For the visuospatial task, we predict that they will present rather good performances. However, we expect to find significant differences on their learning potential when compared to normally developing children due to their general difficulty in processing information.

Subtle Executive Function impairment in HIV-infected and treated phenylketonuric children: a comparison #119 G. MENTO, V. TARANTINO, P. BISIACCHI, University of Padova

Early detection of subtle specific cognitive deficits is an important issue in both correct management of social and school achievement, and prognosis. Specifically, deficits in executive functions have been reported in a number of childhood disorders, including those with known and unknown etiology. In this study we compared the neuropsychological profile of children with two different pathologies, asymptomatic HIV infection and phenylketonuria (PKU), which do not show a clear neurologic involvement when pharmacologically or diet-treated. Thirty patients, aged between 9 and 17 years, were administered with a full neurocognitive evaluation, including both general intelligence and neuropsychological assessment. The results revealed provide evidence for more subtle and specific deficits of executive functions even in the absence of neurological, social or academic impairments. This finding supports the idea that specific neuropsychological measures may be more sensitive than global measures in monitoring executive functioning in otherwise normal patients.

Metamemory modulates the Jacoby–Whitehouse illusion in Alzheimer's disease #120 S. WILLEMS, University of Liege

Patients with Alzheimer's disease (AD) relying predominantly on familiarity for recognition, research has suggested that they may be particularly susceptible to memory illusions driven by conceptual fluency. Using the Jacoby and Whitehouse (1989) illusion paradigm, we extended these findings and found that AD patients were also sensitive to perceptually-driven false recognition. However, our results also suggest that AD patients are not more vulnerable to these memory illusions than elderly controls. Further, AD patients were equally able to disregard perceptual fluency when there was a shift in the sensory modality of the study and test stages. Overall, these findings support the notion that patients with AD can be susceptible to fluency-based memory illusions but these patients can strategically control the fluency attribution following their metamemory expectation in exactly the same way as elderly adults and young adults.

Theory of mind deficit in patients with right hemisphere impairments #121 A. PLUTA, J. SZUTKOWSKI, University of Warsaw

Theory of mind (ToM) is the ability to represent mental states of other people. ToM can be impaired as result of brain damage. ToM has often been discussed as a modular mechanism that allows the brain to attend to invisible mental states but there is also a plethora of studies that focus on cognitive skills such as selective attention, inhibitory control, executive functions, working memory, planning and various brain regions involved in ToM processing. It is still an open question what is the relation between these cognitive skills and ToM abilities. This study may contribute to the investigation of the structure of ToM mechanism in patients with brain impairments. In the present study the research questions deal with the following problems: What is the relation between ToM deficit and Executive Functions, abstract reasoning, and recognition of emotions? The participants of this study were 15 stroke patients with right hemisphere damage and 15 normal controls. Subjects were assessed with the Right Hemisphere Language Battery, Facial Affect Recognition Test, The Wisconsin Card Sorting Test and theory of mind-type tasks. RHD participants were significantly impaired on ToM tasks. The results showed also partial dissociation between ToM deficit, EF and abstract reasoning.

Beyond success and failure: what fine-grained analysis of performance reveals about cognitive stability in autism? #122
M. GYORI[1], B. BATTA[1], K. NÉMETH[2], A. BALÁZS[2], K. STEFANIK[2], I. KANIZSAI-NAGY[2]
[1]ELTE University
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Objectives. Little is known about short-term cognitive stability in autism, though it may have clinical, theoretical, methodological importance. Our aim was to yield data on stability/instability of cognitive functions related to prefrontal cortex. Methods. Repeated measures were administered on high functioning young adults with ASD (N=12) and controls, on two time-scales (hours and days). Methods included WCST, Stroop Test, tests of WM and ToM. Semi-qualitative single-case analysis was combined with group-level analysis and 'micro-analysis' of performance. Results. On the group level, ASD subjects' performance was more stable than expected, though they underperformed controls in most functions. Remarkably, even low-level performance patterns showed stability, and 'micro-analysis' revealed strategies qualitatively different from those in controls. Conclusions. Findings suggest that high functioning autism is heterogeneous in stability of cognition. Performance patterns indicate that idiosyncratic cognitive strategies are widespread and stable in autism in various domains. Acknowledgements. Research was supported by grant nr. 61615, Hungarian Research Fund (OTKA). First author was supported by a 'Bolyai' scholarship, HAS.

Similarities and differences between acquired and congenital pathologies of the Corpus callosum #123 P. DE FABRITIIS, University of Milano-Bicocca

There has been an increasing interest on the contribution of the corpus callosum (CC) to the development of cognitive functions and the concurrent hemispheric specialisation (Gazzaniga, 2000). Among the others, communicative abilities are investigated in relation to acquired damage to the corpus callosum (e.g. callosotomy), and to its congenital absence (ACC). Congenital pathologies of the CC do not show the adult's split brain damages, nevertheless impairments in communication abilities are increasingly reported (Paul, et al. 2007), while brain functions are mainly described as normally lateralised (Chiarello, 1980). Interestingly and differently from other congenital brain malformations or injuries, such communication impairments take developmental time to show up and to reach clinical salience. Indeed, children with ACC perform less well than controls in several linguistic tasks until they are 10-11 year-olds, but differences do not reach statistical significance. Only afterward, differences become clinically salient, with special regard to pragmatic abilities, which require inter-hemispheric integration. It looks like if persistently sub-optimal performances in diverse skills are likely to bring to evident deficits in the complex abilities that are based on those skills. Such a developmental profile is discussed on the background of the Dennis' and neuroconstructivist theories on brain plasticity (Bates, Roe, 2001; Dennis, 2000; Stiles, 2000).

EMOTIONS I

Positive Emotions and Inhibitory Control: The Differentiated Effect of Abstract versus Concrete Emotions #124 M. KATZIR, T. EYAL, N. MEIRAN, Y. KESSLER, Ben-Gurion University of the Negev

Inhibitory control is one of the cognitive mechanisms that enable the exertion of self-control (i.e., adherence to a long-term goal in the face of short-term interference). This research aims to explore how positive emotions influence inhibition. We propose that this depends on whether the emotion corresponds to a long-term goal (i.e., pride) or a short-term goal (i.e., happiness). In a study manipulating the type of positive emotion participants anticipate, we find that the anticipation of pride resulted in better inhibitory control in an antisaccade task than the anticipation of happiness. These results suggest a putative mediating mechanism for the role of distinct positive emotions in the pursuit of goals that require self-control.

The influence of emotional arousal on recognition of fragmented pictures #125 C. MERCURI, S. MASTROBERARDINO, F. MARUCCI, University Sapienza

Several studies found that mood and emotional content of visual stimuli influence the performance in various memory tasks (Blaney, 1986; Bradley, Greenwald, Petry and Lang, 1992; Malijkovic and Martini, 2006). Emotional arousal, in fact, has a selective influence on the recall of specific stimuli (Li Juan Lu, Graham and Zorawski,2008). An issue needing of further investigation is the relationship between emotional arousal and recognition of visual patterns. The aim of this study is to investigate the influence of emotional arousal on recognition of fragmented pictures. Specifically, participants were presented neutral or negative images taken from the IAPS (Lang, Oehman and Vaitl, 1988) and then asked to identify fragmented pictures, ranging from complete image to very fragmented image, taken from Snodgrass & Vanderwart (1980). Results showed that participants' recognition performance on the fragmented pictures was influenced by the arousal level induced by the IAPS pictures, in particular for highly activating IAPS on a medium level of fragmentation.

Awareness of Emotions in Anxious and Non-Anxious individuals #126 D. LAMY, L. RUDERMAN, Tel Aviv University

Research on threat perception in anxiety has focused on unconscious processing of threat and on attentional bias to threat, but has typically neglected direct and systematic investigation of threat-related biases in awareness. Yet, awareness of threat is central to the phenomenology of anxiety. In this study we investigated anxiety-related differences in the access of different emotional stimuli to awareness, assessed by both objective and subjective measures. We determined individual subjective and objective thresholds of backward-masked face detection as a function of stimulus emotional contents, with emotion being task irrelevant. Anxious subjects showed lower thresholds than did non-anxious subjects. Control experiments showed that these differences resulted from higher perceptual sensitivity (d') rather than from lower response criterion or higher motivation in anxious relative to non-anxious subjects. This anxiety-based effect held true for all emotions and for both subjective and objective thresholds, but not for non-emotional stimuli (non-words), suggesting that anxiety may be associated with enhanced awareness of emotional stimuli in general. These findings provide novel insights regarding the relationship between anxiety and threat perception.

Emotional or Rational? Selective Attention and Emotional Stimuli Inside and Outside the Center of Attention #127 L. LICHTENSTEIN-VIDNE[1], A. HENIK[1], Z. SAFADI[2]

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[2]Howard University

Goal directed behavior requires selective attention, namely, the ability to focus on task-relevant information and to ignore irrelevant data. This work examines whether the processing of peripheral emotional stimuli is contingent upon their relevance to the task at hand. All four experiments in the current study employed a Stroop-like task that combined a spatial factor and an emotional one. In separate experiments, participants were asked to determine whether a central stimulus, either emotional or neutral, was above or below a fixation point. In other experiments participants were asked to decide whether the emotional stimulus was positive or negative. Across all experiments participants were asked to ignore the simultaneous presentation of peripheral emotional distractors (words or pictures). Results showed that task-relevance was a significant factor in processing peripheral stimuli. Nevertheless, it seems there is a qualitative difference between emotional and non-emotional stimuli. The results also showed significant differences between the processing of emotional pictures compared with word stimuli.

Electrophysiological insights into the detection mechanism of personally significant sounds #128 A. ROYE[1], T. GRUBER[2], T. JACOBSEN[1], E. SCHRÖGER[1]

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Personally and emotionally significant sounds play an outstanding role in our acoustic environment. We notice our mobile phone ringtone apparently independent of its current relevance or our ongoing activity. The present study used electrophysiological methods to investigate whether the human brain differentiates sounds by their personal significance even if the auditory input is not relevant for the current ongoing activity and even though no physical auditory change detection mechanism could have triggered deeper semantic processing. For that purpose, we analysed the evoked gamma band activity (GBA) as well as event-related potentials (ERP) to a personally significant sound (own ringtone) compared to a non-significant sound (ringtone of another participant). Both sounds occurred rarely in an auditory sequence of 12 different randomly played ringtones. The data revealed differences due to the experimental variation in the evoked GBA starting after 40 ms. Those were followed by differences in ERPs after around 200 ms. We suggest that the evoked GBA activity reflects the first match of every incoming stimulus with memory templates. Based on that initial match, a regularity may have been extracted, that enables the auditory system to detect a deviating stimulus even solely based on features stored in long-term memory.

HIGHER ORDER COGNITION I

Unifying model of decision making #129 T. SMOLEŃ, Jagiellonian University

An unifying mathematical model of decision making is proposed. The model is based on maximization of an expected gain, by optimization of the amount of information perceived from the

environment. The mechanism of the model assumes existence of a tradeoff between maximization of a reward value and maximization of the probability of choosing the proper alternative. The former goal requires minimization of the information gained from the environment, whereas the latter one requires maximization. Experiments results are to be presented. The results confirm various hypotheses based on the model, which are: the number of revealed cues, the applied order of cues and the proportion decisions made in specific state.

Bimanual coordination skill in expert typists #130 M. RIEGER, Max Planck Institute for Human Cognitive and Brain Sciences

Motor skill expertise can lead to impressive levels of performance. Transfer of those motor skills to other related tasks occurs, e.g. expert pianists show improved performance in bimanual coordination tasks. In the present study bimanual coordination performance in skilled typists was investigated, because one is less likely to attribute typing skills to talent but rather to training. In bimanual coordination tasks performing mirror-symmetric movements is easier (e.g. RTs are slower) than performing parallel movements with both hands, an effect which is reduced in expert pianists. In Experiment 1 typists and control participants performed a spatially compatible and a verbally compatible bimanual RT task. Typists showed a reduced RT difference between symmetric and parallel reactions in the verbally compatible tasks. Whereas pianists are well trained in performing alternating movements between two hands as well as performing bimanual movements (concurrent keypresses), the task of typing only requires the former. Therefore, in Experiment 2, typists, pianists, and control participants performed tapping tasks, either alternating between fingers of the left and right hand or concurrently tapping with fingers of both hands. It is concluded that in expert typists intensive training of finger movements leads to increased efficiency in performing bimanual finger movements.

SNARC effect for size? #131 K. CIPORA, Jagiellonian University

Representations of continuous values (numbers, letters, days of the week etc.) seem to be spatially organized (see Gevers et al., 2006 for comparison). A phenomenon that relatively small values are responded faster on the left hand side, whereas relatively big values are responded faster on right hand side is called The Spatial Numerical Association of Reaction Codes (SNARC) effect (Dehaene et al., 1993). Tasks where SNARC effect emerges are i. e. parity judgment (for numbers) or magnitude comparison (with criteria value). In a presented study, we test a hypothesis that sizes of objects are spatially organized. Big objects will be classified faster on right hand side and small objects will be classified faster on left hand side in size comparison task (with criteria object). N=20. Data is just being analyzed.

On how to reduce the illusion of control: Implications for improving scientific reasoning in society #132 H. MATUTE[1], I. YARRITU[1], F. BLANCO[2], M. VADILLO[1]

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The illusion of control occurs in many situations in which desired outcomes occur frequently. A common example is the illusion that a medicine is working when it is being used for problems that involve cycles of acute crises and spontaneous recovery: the medicine may not be effective, yet people may believe it is. This type of illusion has serious consequences for people's wellbeing and has become a matter of concern for governments and policy makers, who are trying to find ways in which people could best be protected against it. Here we apply the results of a series of contingency learning experiments conducted in our laboratory to show that even when the outcome occurs at a very high rate the illusion can be reduced by simply asking people to decrease the frequency with which they perform the target action or with which they try the target cause. Our experiments also show that personal involvement of the participant is not even needed, as the mere observation of what happens when the frequency of the target cause is reduced attenuates this illusion of cause-effect correlation.

Divergent Production in the Training Situation: Analysis and Application of Result Obtained #133 E. FRANKOVA, University of Economics, Prague

A number of authors agree cognitive abilities including creative thinking can be trained. Using appropriate tasks, the creative thinking basic abilities can be found and developed. These are fluency (the ability to produce great number of ideas in a short time), flexibility (mental flexibility or the ability to produce various solutions), and originality (the ability to produce original, shrewd, unusual solutions, or solutions revealing distant connections). The paper presents the results of divergent thinking training application in the lessons of students of the University of Economics in Prague. The analysis results were used to update the lessons on basic abilities of creative thinking and provide feedback during training seminars. Another way of application is the measurement of divergent production quantity (using fluency) and quality (using flexibility and originality). As relevant studies show, repeated creative experience together with high quality feedback can result in the continuous decrease of creative abilities.

Studying metaphorical mode of thinking #134 E. DRYLL, University of Warsaw

Exploring development of ability to use non-literal speech causes difficulties – mainly methodological ones. Metaphorical mode of thinking requires, on one hand, competence on conventional phrases and, on the other, much flexibility. I wish to discuss several methods of studying non-literal speech. I would present a tool I created to study the development of ability to use metaphors that characterize humans, and first results of experiments on 6-12-year olds. The tool composes of two parts. The first activates metaphorical mode of processing. It contains a list of vehicles, diversified in originality. All of them belong to one of given domains. Subjects are asked to describe their meaning. The second part allows to measure the level of originality, adequacy and other variables of metaphors produced spontaneously. The stimuli material consists of four variants of a short story, were mood and goal of a protagonist are modified. After becoming familiar with texts, subjects answer questions that provoke either creation of metaphors, or the use of conventional ones.

Cognitive mechanisms and effects of negative ruminations in behavior regulation #135 J. BUCZNY, Warsaw School of Social Sciences and Humanities

Negative ruminations plays casual role in a range of unconstructive outcomes associated with negative affect and impair performance. They are based on lack of cognitive control (low power in irrelevant thoughts inhibition) and impair the control of action. The three basic questions were stated: (1) what type of cognitive processes are responsible for unconstructive effects of rumination? (2) Is there any way to reduce negative consequences of rumination in self-regulation? (3) Are there any positive consequences of negative ruminations in self-regulation or decision making? In the two studies students were examined in the two basic conditions: ruminating, and control. The results showed that disability to inhibit thoughts and reactions was moderately correlated with the level of ruminations. Ruminations influenced on action regulation (Stroop task; study 1) impairing persistence in action, but on the other hand, improving process of decision making (study 2). Inducing positive emotions wiped the effect of rumination only in the self-regulatory task (study 1). The data were interpreted on the ground of theory of control and data-limited and resources-limited processes.

IMPLICIT COGNITION I

Subliminal priming: low-level perceptual congruency can impede response priming #136 C. POHL[1], A. KIESEL[1], W. KUNDE[2], J. HOFFMANN[1]

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In a check detection task, participants had to decide whether a knight or a rook was giving check to a king or not. To resolve this

task it was necessary to consider the location (one of two squares on a 3x3 chessboard) and the form (knight or rook) of the attacker. Four different chess diagrams were presented in a subliminal priming experiment as prime and target. Chess experts were able to integrate the two features of the attacker unconsciously due to acquired templates (Kiesel, Kunde, Pohl, Berner, & Hoffmann, 2009).Novices, on the other hand, elicited no response priming. Instead we observed perceptual congruency effects according to the single features location and form. In further experiments we demonstrate that the form congruency effect is only evident on expected (target) locations and that the location congruency effect is independent on form congruency. In this check detection task, response-priming effects for novices emerge only when the confounding influences of location and form are absent. These findings underline that there are strong low-level influences in subliminal priming that impede response priming. Thus, even well-trained target stimuli do not reveal response priming when stimulus processing requires feature integration.

Action planning can improve object detection in a change-blindness task #137 E. SYMES, M. TUCKER, R. ELLIS, L. VAINIO, G. OTTOBONI, University of Plymouth

Change Blindness is a phenomenon of failed awareness, whereby viewers are temporarily unable to detect changes between two otherwise identical scenes. We present evidence that planning an action (a grasp), reduces this change blindness when it is compatible with the changing object's size. In Experiment 1, participants were instructed to hold (and squeeze on change-detection) one of two response devices, whose shape required a whole hand power grasp or a pinch precision grasp. Change detection improved for objects congruent with the prepared grasp (e.g. an apple with a power grasp). Experiment 2 produced similar results when participants reached for (rather than held) the instructed device, which was visually concealed. Experiment 3 replicated Experiment 1 whilst monitoring eye movements. Results indicated that the effect was not contingent upon an overt attentional strategy. These combined data suggest that the grasp plan itself was responsible for improving change detection of congruent objects.

Subliminal behavioral priming: It is all in the brain, but whose brain? #138 S. DOYEN, C. PICHON, O. KLEIN, A. CLEEREMANS, Université Libre de Bruxelles

Priming subjects may automatically and unconsciously activate a representation (e.g.: the stereotype of aged persons) that lead them to act according to it (e.g.: walking slower than usual when exiting the experiment room). In order to explain this effect, some authors suggested the existence of a direct link between perception and behavior, regulating some of the automatic part of our social life. Though this concept seems widespread in the field of social cognition on the one hand, the very idea of subliminal semantic activation remains highly controversial in the field of cognitive psychology on the other hand. In an effort to conciliate these two views, we conducted a series of experiments, all trying to replicate and improve Bargh, Chen, and Burrows' (1996) now classic experiment. In order to question their result, we introduced more accurate walking speed as well as more throughout awareness measurement. We also assessed the idea whether the effect on walking speed could be induced by the experimenter.

Help your intuition to help you #139 M. SIEDLECKA, Jagiellonian University

The aim of the experiment was to check whether forcing subjects to use their intuition could improve their efficiency in dealing with tasks. Intuition in problem solving, also called "feeling of warmth", is assumed to be the effect of monitoring progress while working on a task. Studies show that intuition is accurate in judging problem solvability and estimating progress in the process of solving. On the other hand, research demonstrates that monitoring has a generally beneficial influence on dealing with cognitive tasks. 91 students of Jagiellonian University were given 4 difficult problems to solve. Experimental groups had to simultaneously access their "feeling of warmth", but one of them could do it spontaneously and the other was forced to do it at timed intervals. The control subjects did not have to use their intuition at all. The results showed that subjects focussing spontaneously on their "feeling of warmth" solved more problems correctly than the other groups. This might mean that intuitive feelings occur at some moments in problem solving processes and can serve as cues which help, for example, in evaluating strategy.

Unconscious semantic processing and the complexity of evaluative standards #140 K. DOBRENKO, University of Warsaw

The presented study examines the impact of individual differences on the unconscious information processing. The main research question here is: what are the differences between individuals, who are effective in using subliminal cues coming from their surrounding and those who are not.The participants were students of the Warsaw University (N=65 and N=96). They were told that the experiment examines intuition and that they will be presented some information, yet the exposures will be so short that they may not even notice them consciously. Participants' task was to guess, which of the two words presented on the computer screen fits to the preceding subliminal cue (exposure time: 35 milliseconds). Additionally, participants filled our paper-pencil techniques: (1) Social Perception Questionnaire (SPQ), which made participants to concentrate on themselves and other people, and (2) Dilemmas Questionnaire (DQ), in which they were to generate arguments regarding the discussion on patriotism. These techniques measured the complexity of evaluative standards.The obtained results show that individuals with higher complexity of evaluative standards (i.e. taking more traits into consideration when thinking about themselves and others, SPQ) and those generating more arguments in the discussion (DQ) were better in using subliminal cues.

LANGUAGE PRODUCTION I

The influence of prime lexicality on pseudoword latencies in the lexical decision task #141 C. ROBERT, S. MATHEY, University of Bordeaux 2

The aim of the study was to test whether orthographic priming for pseudowords is sensitive to prime lexicality. Simulations run with the interactive-activation model (Jacobs & Grainger, 1992; McClelland & Rumelhart, 1981) predicted an inhibitory priming effect on pseudoword rejection. More important, a prime lexicality effect was expected. The inhibitory priming effect on pseudoword targets was predicted to be more important for word primes than for pseudoword primes. A lexical-decision task was used with a masked priming procedure to test the model predictions. Pseudoword targets (e.g., GEFOU) were constructed by changing one letter in a French word (e.g., genou). Three primes were used: (1) the word neighbour, (2) a pseudoword neighbour, and (3) a control stimulus. The results showed a prime lexicality effect. As expected, word primes tended to delay pseudoword rejection. However, pseudoword primes facilitated pseudoword processing. These data are partially consistent with the interactive-activation model, and further suggest that prime lexicality can modify the response criteria used in the lexical-decision task to reject pseudowords.

An investigation of early morphological decomposition using transposed-letter priming effects #142 E. BEYERSMANN, A. CASTLES, M. COLTHEART, Macquarie University Sydney

There is uncertainty as to whether complex words are represented in the mental lexicon in a morphologically decomposed form or as whole-word representations. Do we decompose first and use decomposition as a standard method? Or do we only use it when whole-word access fails? We conducted a masked priming lexical decision task using truly suffixed (e.g. FREELY), pseudo suffixed (e.g. SANDAL), and orthographic control targets (e.g. CASHEW) being preceded by transposed-letter nonword primes. In order to compare different types of whole-word and morpheme-based theories, we manipulated target items by performing letter transpositions either

within (e.g. ferely, snadal, csahew) or across the morpheme boundary (e.g. freley, sanadl, casehw). Decomposition theories predict a different pattern of results for lexical decisions on these types of item; In contrast, whole-word processing theories make similar predictions for both within- and across- morpheme boundary transpositions, because the internal structure of words does not play a role in lexical access. We obtained significant TL-priming effects across item types for both within- and across morpheme boundary transpositions, but no significant interaction of TL-priming and item type. The results may relate to the orthographic and morphological complexity of the prime which need to be followed up in future investigations.

Balanced and Unbalanced German/English bilinguals processing two-digit number words #143 P. ROMAN[1], P. MACIZO[1], A. HERRERA[2]
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Macizo, Herrera, and Paolieri (submitted) demonstrated that bilinguals seem to process selectively two-digit number words in their two languages. It is possible that the selective/nonselective processing of number words is modulated by language proficiency and relative dominance of bilinguals in their languages. For example, it has been proposed that L2 learners are more vulnerable to cross-language activation whereas skilled bilinguals have direct semantic processing of L2 independently from their processing in L1 (e.g., Talamas, Kroll, & Dufour, 1999). In this study we explored whether the pattern of results observed by Macizo et al. depends on the bilinguals' fluency. Bilinguals decided the larger of two number words while the unit-decade compatibility effect was examined. For compatible decade and unit comparisons lead to the same response (24-67) while for incompatible decade and unit comparisons lead to different responses (27-64). Participants performed the comparison task in German (L1) and English (L2). The results showed that compatibility effect depended on bilinguals' fluency and the language in which they performed the comparison task.

Phonological activation of to-be-ignored context objects as a function of semantic relatedness in object naming #144 F. GOERGES[1], F. OPPERMANN[1], J. JESCHENIAK[1], H. SCHRIEFERS[2]
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There is an ongoing debate regarding the question of whether visually presented context objects are phonologically activated when participants name a target object. While some studies presented evidence in favour of such a view, other studies failed to do so. But which factors affect the lexical activation of context objects? In two picture-word interference experiments we demonstrate that a semantic-categorical relation between a target object and a context object (e.g., target: flute, context object: harp) promotes the phonological activation of the to-be-ignored context object (as indexed by interference from a distractor phonologically related to the context object, e.g., heart). No such activation is observed if the objects are semantically unrelated. In contrast to recent picture-picture interference experiments, the results provide direct evidence that the amount of phonological activation, which a context object receives, is dependent on its semantic processing.

The Syllabic-Bridge Hypothesis #145 D. ZAGAR[1], N. DOIGNON-CAMUS[2]
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Learning to read primarily consists in establishing connections between graphic and phonological units. Conditions to rapidly settle these connections are twofold(Treiman and Zukowski, 1996) : - linguistic units must be cognitively available, - they have to be of the same linguistic (functional) size. Syllable-size unit perfectly fits with both conditions. They were shown available not only in oral language (Liberman et al., 1974) but also with beginning readers in written language (Doignon & Zagar, 2006; Prinzmetal et al., 1991). Syllables can then be assumed as key-units to learn to read (Doignon-Camus & Zagar, in press). If this assumption is correct, pre-readers should display specific sensitivity to syllabic visual-to-sound connections (the Syllabic-Bridge Hypothesis).To test this hypothesis, three groups of pre-readers were constituted. A rapid orthographic learning was provided to the first group and a rapid written syllable-to-sound of syllable to the second group.The third group was a control group. An illusory conjunction task was run before and after the learning phase. Data shown that pre-readers who benefit of the 'syllabic' learning, made significantly more syllabic errors than pre-readers of the two other groups. These results show that a very fast syllabic training is sufficient to establish syllabic written-to-sound connections.

Is developmental dyslexia modality specific? A visual-acoustic comparison on Italian dyslexic children #146 C.V. MARINELLI[1], P. ANGELELLI[2], G. DI FILIPPO[1], P. ZOCCOLOTTI[1]
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While developmental dyslexia is expected to occur for stimuli presented visually, direct tests of the modality-specific nature of the disturbance are lacking. In the present study we wished to verify if developmental dyslexia can be described as a modality-specific disturbance or it represents a cross-modal deficit spanning across different sensory modalities (although more evident with visually presented stimuli). We compared the performances of 16 dyslexic children and 36 normal readers in reading versus repetition and in visual versus acoustic lexical decision using the same stimuli. Dyslexics were impaired compared to control readers only with stimuli in the visual modality, while they did not have any deficit in the repetition and acoustic lexical decision tasks. The application of the Rate-and-Amount model (Faust et al., 1999) allowed highlighting the presence of global influences in the experimental data. Over and above the effect of lexicality, word frequency and type of task (reading versus lexical decision), the performances with orthographic visual stimuli contributed to the same global factor, while performance on acoustic stimuli did not. We conclude that processing of linguistic stimuli in the visual and acoustic modalities rely on independent processes and that dyslexic children have a selective deficit in the visual modality.

The role of iconicity in Taiwan Sign Language lexical access #147
Y. CHIU, Fu Jen Catholic University

In this study we investigated the role of iconicity in Taiwan Sign Language (TSL) by using a production task. Some phonology of signs is to resemble the actions, objects, or characteristics they represent. We reasoned that activation of relevant physical features of a concept facilitate phonological retrieval of a sign because of the similarity between these two. Immediate and delayed picture naming were used for investigating these issues. In Experiment 1A, we investigated picture immediate and delayed signing in deaf people and immediate and delayed naming in the normal. Reaction time difference of immediate and delayed conditions was shorter for signing than for naming, suggesting a quicker access to TSL lexicon. Furthermore, only in TSL, RT difference in high iconic signs was shorter than the difference in low iconic signs, reflecting that the closer relationship of signs and object physical properties the faster deaf signers accessed their sign lexicon. In Experiment 2, sign language interpreters were included for controlling the variety of language experience. The results showed similar pattern to Experiment 1. The research reasons that iconicity might play an important role for lexical access in TSL.

Word-meaning in language comprehension process #148 L. ZASYEKINA, Volyn National University

Word-meaning is considered as cognitive processes of mental representation of the world. The author's typology of word-meaning is proposed: connotative, associative, situational, abstract meanings. Connotative meaning reflects irrational emotional feelings to different

objects. Associative meaning enhances the associative net, which is produced by object. Situational meaning comprises the most frequent situations in which the object is used. Abstract meaning expresses categorization of objects based on their important characteristics. The experimental research consists of series experiments in the computer version of E-Prime. The different kinds of priming were proposed: words with connotative, associative, situational, abstract meanings, nonwords and nonrelated words. The target words were the same in all 25 sessions. Two hypothesis were put forward: there are differences in the RT for target words after different priming word; there are differences in RT for target words in two groups – monolinguals and bilinguals. The results of experiment show the significant indexes of correlation (r=0,612, p<0,01) between RT for target word after abstract and situational word-meaning. There are some differences in reactions of monolinguals and bilinguals. Bilinguals are characterized predominantly by correct answers (89%), monolinguals – by incorrect answers (36%). It is explained by bilinguals' higher level of control in language comprehension.

LEARNING AND MEMORY I

Memory Representations of Truth and Falsity #149 L. NADAREVIC, E. ERDFELDER, University of Mannheim

The Spinozan model and the Cartesian model both propose that during information encoding a mental representation of the information is stored along with a tag indicating its truth value. However, the two models disagree on the nature of these tags. According to the Spinozan model, false information receives a 'false' tag and untagged information is accepted as true. Hence, this coding system works efficiently in situations in which truth and falsity are mutually exclusive and exhaustive categories. However, source confusion should occur if there is a third category containing information with unknown validity. In contrast, the Cartesian model claims that true information receives a 'true' tag and false information receives a 'false' tag. Consequently, when retrieving information from memory it should always be easy to discriminate between true and false information. In order to test the Spinozan model and the Cartesian model against each other, we conducted a memory experiment with trivia statements, each supposedly belonging to one of the following three categories: True, unknown validity, or false. Whereas memory for truth and falsity were good, memory for unknown validity was poor. This result clearly contradicts the Spinozan model but can be explained in terms of the Cartesian model.

On the nature of the survival-processing effect #150 M. KRONEISEN, E. ERDFELDER, University of Mannheim

Nairne et. al. (2007, 2008) discovered a strong and rather general memory advantage for word-material processed in a survival-related encoding context. They explain this survival-processing effect by arguing that nature "tuned" our memory systems to process and remember fitness-relevant information. We tested this explanation by studying whether the survival-processing effect is robust against instructional and procedural manipulations that do not affect the fitness relevance of the information. Our findings provide evidence for the plasticity of the benefits of processing survival-related information. Implications for theories of the survival-processing effect are discussed.

Exploring Specificity Effects in Compound Audio-Visual Memory #151 M. PAPESH, S. GOLDINGER, Arizona State University

In two experiments, we examined compound, audio-visual (AV) memories for spoken words and depicted objects. In Experiment 1, participants simultaneously viewed objects and heard labels, and indicated whether they matched for conceptual meaning (words and labels matched in half the trials). Across trials, words were presented in two different voices. During test, stimuli were presented as matched AV pairs: In a fully crossed design, words and objects either matched or mismatched their studied forms. Participants decided whether the lexical concepts were "old" or "new," irrespective of surface changes. Memory results showed large effects of changing visual objects, and small effects of changing voices. However, recognition RTs showed a powerful crossover interaction, with voice effects being strongly affected by the status of visual information. In Experiment 2, we used a modified process-dissociation procedure (Jacoby, 1991), with inclusion and exclusion decisions based upon visual or verbal information. These tests allowed estimation of the contributions of recollection and familiarity to memory decisions. Results indicated that repeated objects allowed people to respond using recollection, but voice effects were realized via changes in familiarity. Taken together, the results are compatible with a complementary-systems approach to episodic memory.

Level of construal moderates the specificity effect in event-based prospective memory #152 J. RUMMEL, T. MEISER, University of Mannheim

Event-based prospective memory (PM) refers to the ability to remember to perform an intended action at an appropriate point in the future which is indicated by a designated cue. One well-known phenomenon in event-based PM is the specificity effect: If the cue provided during intention formation is identical to the cue provided during fulfillment, PM performance improves compared to situations wherein the provided cue is less specific. To manipulate specificity, typically either the specific cue which will appear in the test phase (e.g. hamster) or the less specific category from which the cue is drawn (e.g. animal) is presented at intention formation. In Study 1 the specificity effect was replicated with our materials. In Study 2 psychological distance to the cue was manipulated additionally. Results showed that the specificity effect was moderated by perceived distance. In particular, the effect remained stable under perceived proximity but vanished under perceived distance. These results imply that the specificity effect is not as universal as hitherto expected. Construal level theory can account for these findings as distance is thought to go along with abstract (i.e. categorical) representations of an object whereas proximity is thought to go along with concrete (i.e. specific) representations.

Face-name associative memory across life: gender differences and role of the semantic node #153 J. STERN, N. FIORI, University of Paris Descartes

Face-name memory is a key process for social adaptation. Previous studies have shown that this type of memory is a complex mechanism which requires the use of semantic information (such as jobs) for the association to be well integrated. This socio-cognitive function is also sensitive to normal and pathological aging as it is based on cerebral structures affected by neuronal degeneration. The present study concerns a training paradigm associating faces to names and jobs during which subjects were asked to retrieve the correct association as fast as possible. We compared different age groups (20 to 80) and also studied interactions with gender. First, as expected, younger participants perform better than older ones, independently of the type of verbal information to be retrieved (name or job). Secondly, the two age groups show the same facility for retrieving jobs as compared to names, as jobs present socio-semantic weight. Finally we found a gender difference advantaging women that tends to get stronger with age. Current researches study these observations in pathological groups and explore different types of semantic nodes.

Generation effect in source memory and target predictability #154 M. NIEZNAŃSKI, University of Cardinal Stefan Wyszyński

Numerous studies have demonstrated that generated items are better recognized and recalled than the same words when they are read. However, experimental observations are mixed as whether the generation effect occurs also for source memory. Recently some researchers proposed their explanations to this ambiguity. For example, Riefer, Chien, and Reimer (2007) proposed that positive generation effects are observed in reality-monitoring studies, while negative effects occur in external source-monitoring tasks. In the current presentation, the role of item predictability from preceding semantic

context is explored. In a reality-monitoring experiment, participants were given sentences with a final word that was somewhat unexpected vs. easily predictable from the sentence frame. Half of these final words subjects just read and another half they generated by filling in missing letters. The experiment indicated that source memory was better for generated unexpected words than for generated expected words. This effect of word predictability was not observed for read words. This pattern of results was confirmed by multinomial processing tree model analysis. It is suggested that some extra cognitive operations involved in generation of an unexpected target may become an important cue for source attribution during memory test.

Valence modulates source memory for faces #155 R. BELL, Heinrich-Heine-University Duesseldorf

Two experiments show that old-new discrimination is not affected by whether a face was associated with disgusting, pleasant, or neutral contexts. In contrast, source memory for faces associated with a disgusting context is better than source memory for other types of faces. This data pattern replicates the findings obtained in previous experiments using descriptions of cheating, neutral, and trustworthy behavior. The most parsimonious explanation of these findings is that source memory is increased for faces encountered in a negative context in general.

Production of false memories in the DRM paradigm using lists with two critical items #156 H. OLIVEIRA, P. ALBUQUERQUE, A. MACHADO, University of Minho

The production of false memories has been extensively studied with the DRM paradigm. In this paradigm each list of words is associated with one critical item, which is not part of the list. A false memory occurs when the subject recalls or recognizes the critical item as a list member (Roediger & McDermott, 1995). In our experiments, we present to participants lists of words associated with two critical items (e.g., the first six words were associated to "slow", and the other six to "sweet"). The aim of these studies was to determine the limits of the false memory effect considering that in this task each list contained two themes or gists. Results showed that the amount of false recall and recognition is significantly higher for the words associated presented in the first half of the lists.

Familiar person recognition: do we remember more episodic memories from faces than from names? #157 C. BARSICS, S. BRÉDART, University of Liege

This study was aimed at investigating whether the recognition of familiar faces is more likely to be associated with an experience of Remembering than the recognition of familiar names. Using the Remember/Know paradigm the proportions of episodic memories recalled following the recognition of famous faces and names (Conditions) were assessed. Presented faces and names were previously judged by an independent group of participants as eliciting an equivalent level of familiarity. Nevertheless significant differences between the two conditions appeared in hit and false alarm rates. However, present results showed no significant difference in the recollection of personal memories (Remember responses conditionalized on the hits), following familiar faces compared with familiar names recognition. This finding contrasts with recent accounts assuming that faces are more prone to yield episodic memories than other cues to person identity. These results and their implications for current Interactive Activation and Competition person recognition models are discussed.

Investigating the cognitive processes underlying the lag effect #158 C. KÜPPER-TETZEL, E. ERDFELDER, University of Mannheim

Several studies on learning of verbatim material have revealed an overall benefit of long lags between study episodes compared to short interstudy lags. In the literature, this is referred to as the lag effect. Cepeda et al. (Psych Sci, 2008) recently investigated long-term retention by varying the interstudy lags and the retention intervals systematically. Their results suggest an optimal lag for relearning that heavily depends on the retention interval. Correct recall increases sharply and significantly from no interstudy lag to the optimal interstudy lag. For longer lags, performance decreases gradually but not significantly. Both, the benefit of long interstudy lags compared to short interstudy lags and the existence of an optimal interstudy lag are well established findings. However, a satisfactory theory of the underlying cognitive processes is still missing. In order to explore the lag effect in more detail, we conducted a series of experiments and analyzed the data using multinomial processing tree models for free recall, cued recall, and recognition paradigms (Batchelder & Riefer, PB&R, 1999). Our results provide a deeper understanding of the lag effect in terms of storage and retrieval processes and suggest more efficient learning procedures for people in real-world environments.

Memory trace strength: An integrated memory trace? #159 L. BRUNEL, M. CHERDIEU, S. LAURENT, R. VERSACE, Universite Lyon

Schacter et al. (1985) have argued that the observed parallel effects could be due to a contamination of explicit knowledge in indirect tests. However, if explicit and implicit tests "share a form" of memory, does this mean those implicit and explicit memories are not really dissociated? One possible way of resolving this problem is to think in terms of a single process with a single memory source (e.g. Inoue & Bellaza, 1998). According to this view, dissociations can be explained in terms of the concept of the strength of memory traces. The objective of this study is to demonstrate that the memory trace strength depends on the number of the sensorimotor dimension integrated into the memory trace. Participants had to performed two phases: a learning phase (categorization of geometrical shape presented with our without sound and with our without sound/movement) and a recognition task ("old" / "new" judgements of shape, associated to a confidence degree). Results showed that confidence degree is influenced by the number of sensorimotor dimension presented with the shape into the learning phase. These results are consistent with the idea that memory trace strength depends on the number of sensorimotor dimension integrated into the memory trace.

Prospective Memory Monitoring Costs Observed in a Linear Orders Task #160 R. ALBIŃSKI, A. KLESZCZEWSKA-ALBIŃSKA, Warsaw School of Social Sciences and Humanities

Prospective memory (PM) researchers observed that the presence of the prospective task may result in significant slowing of reaction times in the ongoing task (the one in which the PM task is embedded). In the presented study the linear orders task was used as an ongoing task. In the prospective task participants had to press the "q" key whenever they saw a word written in italics (eg. cat).In the first part of the procedure participants (63 young and 47 old adults) were presented with four trials in the linear orders task (phase 1), without the prospective task. After that they read the PM task instruction, filled in the BDI and GDS questionnaires and were presented with additional four trials in the linear orders task (phase 2), with 4 PM targets.Results show evidence of monitoring in the linear orders task. Participants who failed to press the "q" key improved their reaction time in the linear orders task between phase 1 and 2. Those who pressed the "q" key 1-3 times had similar reaction time between two phases. Participants who pressed "q" four times were slower in the second phase of the task compared to the first phase.

Investigating global environmental context-dependent recognition memory #161 R. GEARY-GRIFFIN, Keele University

It is widely assumed that reinstating the encoding environmental context (EC) at test increases recognition performance (Smith, 1988). Also, it has been suggested that global EC possesses more conceptual than perceptual properties (Smith, 1995). A series of experiments investigated the nature of global EC-dependent recognition memory. Each experiment employed incidental learning at encoding and an explicit two-step Remember-Know recognition test with a guess option. The recognition test data was used to calculate the recollection and familiarity retrieval measures. Also, the present

research employed a variety of experimental features including partial recognition tests, implicit conceptual tests, implicit perceptual tests, instructional manipulation and the recording of reaction times. The results obtained question earlier reports of the nature of global EC effects on recognition memory. No global EC effect with implicit conceptual testing supports the contention that previously reported effects may be due to explicit contamination (Parker, Dagnall & Coyle, 2007). However, the detection of a global EC effect on implicit perceptual test performance challenges prior assumptions (Parker, Gellatly & Waterman, 1999).

Life scripts exist for some not for all highly positive autobiographical memories: Evidence from Malaysia #162 S. HAQUE, Monash University Sunway Campus

Two studies on Malaysian sample examined the validity of a recent claim that life scripts, culturally shared representations of the timing of different life events, exist for highly positive but not for highly negative autobiographical memories. In the first study volunteers ranging in age from 50-90 years estimated the timing of eleven transitional life events, six positive and five negative, which might occur in a prototypical life course within their culture. Two weeks later, the same group retrieved the events from their lives and reported how old they were when those events occurred. The findings revealed reminiscence bumps in both life script and retrieval curves for the memories when the participants were the happiest, most important, most in love and most jealous. The second study, participated by 92 undergrads, which produced life script data also revealed similar findings. Contrary to the earlier claim, the current studies clearly failed to show any scripts for a number of highly positive memories (most proud, most surprise and most successful) and even uncovered the possibility of having scripts for highly negative memories (e.g., most jealous). The life script account, an alternative explanation of reminiscence bump, thus requires modification in order to be fitted cross-culturally.

LIFESPAN I

Age differences in the rejection of false memories: Effects of warning instructions and presentation rate #163 P. CARNEIRO[1], A. FERNANDEZ[2]

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Two experiments were conducted in order to understand whether children of different ages differ in their ability to reject associative false memories with the Deese-Roediger-McDermott (DRM) paradigm. Two different types of manipulations that are thought to facilitate false-memory rejection in adults – slowing the presentation rate and issuing warnings – were analyzed in kindergarteners and preadolescents. Together, the results suggested that preadolescents were more able than kindergarteners to reject associative false memories through warnings and by slowing the presentation rate. We conclude that, although older children are, in general, more prone to produce false memories with the DRM paradigm, they are also more able to reject them when certain conditions facilitate the monitoring process.

Exploring Animal Magnetism: modulation of closing-in behaviour in pre-school children #164 E. AMBRON[1], M. BRANDIMONTE[1], R. McINTOSH[2]

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Pre-school children often show a peculiar behaviour in graphic copying tasks known as Closing-in Behaviour (CIB). CIB, observed also in adults with dementia, is the tendency to copy abnormally close to, or even on the top of, the model. This behaviour has been postulated to reflect a primitive manual attraction toward the focus of visual attention, likely to appear under conditions of reduced attentional resources. A recent study (Ambron et al., 2009) found evidence supporting this hypothesis in 15 preschool children. The present experiments extend this earlier result by investigating the effect of the cognitive demands upon CIB in 15 pre-school children. In each experiment, children performed a straight-line drawing task concurrently with a secondary naming task. Different characteristics of the secondary task were manipulated: the perceptual salience of the stimuli (experiment 1), the memory demands (experiment 2), the requirement for response switching (experiment 3) and the requirement for response inhibition (experiment 4). Across experiments, higher-demand conditions produced stronger CIB, hence indicating that the phenomenon is sensitive to cognitive factors. Most important, the results were consistent with a special role for attentional factors in the emergence of CIB.

Relationship between intraindividual variability and level of performance in visuospatial memory: the role of task difficulty #165 P. GOLAY, T. LECERF, University of Geneva

Studies on the relationship between intra-individual variability and level of performance based on accuracy scores in visuospatial memory tasks typically show that people that are the more variable within a task generally tend to get lower mean scores as well. The aim of this study was to get further insight on the contribution of task difficulty on the magnitude of this linear relationship within the Geneva Variability Study, focusing on a visual matrix task. We assessed 201 children (9-12 years), 137 young and 122 old adults with an adaptive procedure (10 items at span level and 10 items at span +1 level). We replicated results of the extant literature with respect to the negative correlation between mean score and intra-individual standard deviation (ISD). Results further show that the average proportion of correct answers found at each level of difficulty is strongly correlated with the subsequent ISD-mean performance correlation coefficient. Results are consistent within and across the three age groups and suggest that tasks with a very high correct answers ratio can therefore lead to inflated and even artefactual results because of the large amount of variance they share in common. These findings are discussed from a methodological standpoint.

Inhibition and Rigidity - A study on the effects of age #166 J. STEINMETZ, C. HOUSSEMAND, University of Luxembourg

The aim of the present study is to investigate if differences in inhibitory functions between two different age groups are related to the personality concept of rigidity. For this purpose, we exposed two samples differing in age (group Young n=30, age range 18-32 years and group Old n = 27, age range 60-85 years) to a battery of three inhibition measures (i.e. one stop-signal task and two go/no-go tasks) and one complex neuropsychological test (i.e. Wisconsin Card Sorting Test). It was hypothesized that the between-group differences in inhibition are related to the personality concept of rigidity, with old subjects being more rigid than young subjects. The concept of rigidity is often referred as being multidimensional in nature (e.g. disposition rigidity, inertia of mental processes), characterized by an individuals' tendency not to adapt a behavioural or mental set but to persevere in established habits. Thus, the results are discussed in terms of a possible relation between the expression of individual rigidity and failures to inhibit behavioural and mental sets.

Prospective memory in children: A comparative study between 6, 8 and 10 years old #167 S. MASTROBERARDINO, V. NATALI, F. MARUCCI, University Sapienza

Prospective memory (PM) is a process supporting the realisation of delayed intentions and actions.In recent years many studies tried to assess whether age difference might influence participants' performance on a PM task (Kerns, 2000; Kvavilashvili, 2001; Jackson, Bogerts, Kerstholt,1988). The aim of the present research is to assess whether children aged 6, 8 or 10 do perform differently on a PM task. Specifically, children where required to perform a PM task (i.e., to press the space bar when presented a specific animated cartoon) while performing an ongoing task (i.e., to name pictures of animated cartoons).Results showed that children performed similarly on the ongoing task, but 6 years old performed more poorly on the PM task compared to 8 and 10 years old. The lack of difference between 8 and 10 years old might be explained as a more similar level of cognitive development between those two groups. Results support the hypothesis

that PM is an organised system of knowledge subject to the level of cognitive development of the participant.

Neurovisual profile in children with developmental impairments: Results from the ABCDEFV test battery #168 L. BARCA, F. CAPPELLI, M. STORTINI, E. CASTELLI, Children's Hospital Bambino Gesu

Children with congenital or acquired neurodevelopmental disorders (e.g., Cerebral Palsy or Traumatic Brain Injury) often present with neurovisual impairments. In clinical practice is critical the availability of tools for a quick and reliable assessment of visuoperceptual and visuospatial abilities. Here we explored functional vision in children with neurodevelopmental disorders, using the Atkinson Battery for Child Development for Examining Functional Vision developed by Atkinson et al. (2002) to evaluate it's usefulness in clinical context. Subtests of the battery relate both to ventral stream (e.g., Frostig cats, embedded animals) and dorsal stream functions (e.g., shape matching, block constructions). Thirty-five children (mean age 6 years ±4) were studied. Among this 65% had abnormal results at the ABCDEFV battery, 30% presenting difficulties on visuoperceptual tasks (28% diplegic, 72% hemiparetic), 13% on visuospatial tasks (14% diplegic, 14% tetraplegic, 50% with developmental delay), and 56% on both (51% diplegic, 86% tetraplegic, 28% hemiparetic, 50% developmental delay). Performances were consistent with data gathered with Developmental Test of Visual Perception (DTVP). The evaluation protocol allowed individuating strengths and weaknesses in patients' visual functions providing information for the definition of personalized rehabilitation programs. Results are discussed within the hypothesis of 'dorsal stream vulnerability' in children with neurodevelopmental disorders.

Working Memory and Aging: Distinction of Verbal and Visuospatial Information in a Combined Task #169 C. MAINTENANT, D. FAGOT, T. LECERF, A. DE RIBAUPIERRE, University of Geneva

Many studies have shown a larger effect of aging on visuospatial than on verbal working memory. Within the Geneva Variability Study, we investigated this effect in a combined working memory (WM) task in which participants have to memorize and recall words and their positions within a 5x5 matrix. This task was administered to young, young old and old old adults. Results showed a significant effect of Stimulus (words vs. positions), and a Stimulus x Age interaction. The proportion of positions correctly recalled decreased with age whereas the proportion of words recalled increased. These results confirm a larger age effect on visuospatial compared to verbal WM. We investigated more precisely this result. Analysis showed that a majority of young adults recalled more positions than words, whereas in older adults the proportion of participants who recalled more words than locations was equivalent to the proportion of participants who recalled more positions. Furthermore, the proportion of participants who recalled more words tended to increase with age in the elderly. Older adults seem to be able to adapt their treatment in a combined task: they memorize preferentially verbal information.

Development from childhood to adulthood of automatic and controlled processes in visual selective attention #170 M. WALKER, J. FOULIN, S. DELORD, Universite de Bordeaux

The study investigate the cognitive development of automatic and controlled processes of visual selective attention. In a visual search task in adult, when target and distractors differ in form and in color (feature condition), responses time (RT) is independent of set size as attention is parallel and automatic. When target shares color or from with distractors (conjunction condition), RT increases with set size, attention is serial and controlled. Traditionally, developmental studies show a dissociation between automatic processes that develop early in infancy and controlled processes that show a late maturation in children between 8 and 10 years-old. The results indicated that feature condition, slope of the function relating RT to set size is near null for all age groups (4-5, 7-8, 10-11, 13-14 years-old and young adults). However, there was a linear increase in RT according to set size for all age groups in conjunction condition, and the slope of the function significantly decreased from 4 to 14 years-old, but the 13-14 age group did not differ from the adult group. Altogether these results show that whereas automatic attentional processes are already efficient at 4, the duration of the developmental period in children's controlled attention extends to adolescence.

Literacy development in deaf children with cochlear implants (CI): contribution of early exposition to Cued Speech #171 S. COLIN[1], A. PENILLARD[1], J. ECALLE[1], G. LINA-GRANADE[2], E. TRUY[2], A. MAGNAN[1]

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Background: deaf children typically exhibit literacy (Chamberlain & Mayberry, 2000). The main reason is that phonological processing is critical in reading. There is now accepted that new aids such as Cochlear Implantation ("CI") and Cued Speech exposition ("CS", manual system aimed at resolving the ambiguity inherent in lipreading), can respectively improve speech perception (CI: Pisoni & Geers, 1998; CS: Charlier & Leybaert, 2000) and reading abilities (CI: Archbold et al., 2008; CS: Colin et al., 2007). Objective: The aim of this study was to observe the contribution of CI and CS in the development of reading abilities as a function of age at implantation and exposition to CS. Participants: Two groups of French-speaking participants, profoundly deaf and hearing children from 7 to 10 years old, took part in the study; the group of deaf participants was split into four sub-groups on the basis of the age at implantation (earlier vs lately) and exposition to CS (earlier vs lately). Methods: This transversal study explored the performances of the deaf children in different phonological and reading tasks. Results: the first results showed a positive effect of early exposition to CS in deaf children who had been early implanted in all tasks.

NUMBER COGNITION I

The magnitude representation of small and large symbolic numbers: an event-related fMRI study #172 K. NOTEBAERT, B. REYNVOET, Katholieke Universiteit Leuven

The present study investigates the magnitude representation of small and large symbolic magnitudes. Verguts and colleagues (2005) suggest that small and large symbolic magnitudes are represented somewhat differently: due to their high frequency of use, small numbers have a sharper tuning curve and are thus more exactly represented. The magnitude representation of large numbers is believed to be fuzzier, likely due to a decreasing distance between their magnitude representations on the number line (i.e., compressed scaling) and/or wider tuning curves (i.e., increasing variability), leading to a larger overlap of magnitude representations. This hypothesis is investigated using an fMR-adaptation paradigm with small and large symbolic magnitudes. After repeatedly presenting a habituation number, a deviant number was presented with the ratio difference between the two numbers being manipulated. The results show a linear increase of activation in the left IPS for increasing ratio differences between the habituation and deviant number. A similar observation is absent in the right IPS. The same pattern of results is found for small and large numbers, which is in line with a less precise coding of large symbolic numbers. Furthermore, the hemispheric differences support the idea that the left hemisphere is specialised in processing symbolic magnitudes.

Naming digits in a blocking paradigm #173 A. FLORES[1], A. HERRERA[1], P. MACIZO[2]

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[2]University of Granada

It is widely agreed that word numerals (e.g., one, two, three…) are processed similar to other words and thus, they can be named without semantic mediation. However, there is no consensus about Arabic digits. Digits seem to have a preferential link to magnitude representation and most of the evidence indicates that naming Arabic

numbers requires the access to semantic representation (although see Roelofs, 2006). In the present study we used a blocking paradigm to explore this question. With this paradigm it has been shown differences between pictures and words processing that have been considered as evidence of the semantic mediation for pictures naming but not for word naming. Participants were asked to name stimuli. In Experiment 1, single digits were included as a semantic category between other pictures of common objects. In Experiment 2, the same digits and objects were presented as words. For each experiment we compared the blocked condition (semantically categorized) to the mixed condition. The results indicate that digit naming was conceptually mediated.

Reading strategies and two-digit number processing: An eye-tracking study #174 O. RAMOS[1], S. PESTELLI[2], P. MACIZO[1], A. HERRERA[3]
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This study explores whether decade-unit order and unit-decade order determine the processing of two-digit Spanish number words. Spanish is a language with non-inverted number words (Arabic numbers and verbal numbers follows the decade-unit structure). In non-inverted languages, decades are more important than units (Macizo & Herrera, 2008). The reading pattern in Spanish (left-to-right) might determine the importance of decades in this language. To evaluate this factor, Spanish speakers were required to choose the larger of two-digit number words. There were trials in which numbers were presented in canonical order (decade-unit order) and trials in which numbers were presented in reverse order (unit-decade order). To evaluate the influence of left-to-right and right-to-left reading strategies, we recorded eye movement when participants performed the task. In addition, the unit-decade compatibility was manipulated. There were trials in which the decade and unit comparisons led to the same response (e.g., 53-68) while in incompatible trials the decade and unit comparisons led to different responses (e.g., 59-74). The data were analyzed depending on the word order (canonical or reverse) and eye movements (left-to-right or right-to-left). Both factors determined the processing of two digit number words. The discussion addresses the relation between number processing and language comprehension.

Visuo-spatial working memory and strategy solution in complex mental arithmetic #175 A. LUCIDI[1], A. CORTESE[2], C. ROSSI-ARNAUD[2], V. CESTARI[1]
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It has been shown that mental arithmetic relies on working memory resources (De Stefano & LeFevre, 2004, for a review). However, to date, the results of studies on the role of visuo-spatial working memory in solving complex additions (47+68) are too sparse to draw any conclusions. Further, previous research (Shanahan, Lucidi, Lefevre, Cestari, 2005) has identified several strategies for solving multi-digit mental addition problems. Some are algorithms involving a series of single-digit additions (e.g., DIGIT) and others are more holistic decomposition approaches (e.g. WHOLISTIC). In Experiments 1 and 2 a memory-load methodology was used to examine the involvement of the visuo-spatial working memory components for the two categories of strategy users. Italian adults solved 2- plus 2-digit mental addition problems, presented visually, and reported their solution procedures. Results show that Digit vs. Wholistic strategy users were differently affected by complexity and presentation format and that their performance was impaired in different ways by the visual and spatial load. These findings provide support for the role of visuo-spatial working memory when solving multi-digit problems and extend the existing work by examining individual differences in performance.

The digit repetition effect in two-digit number comparison #176 S. GAZZELLINI[1], A. LAUDANNA[2], W. FIAS[3]
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Evidence from two-digit number naming shows that when target and prime share one digit in different places (e.g., target 28 and prime 86 or 72) an inhibition effect may be observed (Ratinckx et al., 2005). Gazzellini and Laudanna (2005) reported a digit repetition effect in a number comparison task on Arabic numbers; they argued that the inhibition effect arises during the Arabic form processing, when two different syntactic values have to be assigned to the same digit. Here we evaluate two alternative hypotheses based on the phonological and the semantic origin of the effect. Experiment 1 shows that no digit repetition effect is found with number comparison of verbal written numbers. Experiment 2 confirms the effect on Arabic numerals, when the phonological transcoding is blocked by means of an articulatory suppression task. In Experiment 3, data on RTs show that the inhibition due to digit-repetition does not interact with a clear semantic-quantitative effect: the symbolic distance effect. Results are not compatible with the phonological explanation (Exp 1 and 2) and do not suggest that the effect arises at the semantic level (Exp 3). On the contrary, they are still compatible with an Arabic-syntactic explanation of the effect.

Exploring the nature of multiplication priming #177 J. GARCIA-ORZA, J. DAMAS-LÓPEZ, Universidad de Málaga

Recent experiments have shown that Arabic numerals were named faster when they were preceded by briefly presented congruent multiplications (prime: 2x3; target: 6) compared to incongruent multiplications (prime: 4x8; target: 6). These data suggest that single-digit multiplications are activated fast and without intention. The aim of the present study is to explore the properties of this priming effect. Since no neutral condition was included in the cited experiments, it was not established whether multiplication priming effects were facilitatory or inhibitory. The present study tries to identify the exact nature of this effect. Additionally, multiplication priming effects have been studied previously only with a SOA of 50 ms., in the present research the SOA was manipulated to explore the time course of the priming effect. Participants performed an Arabic number naming task. Targets (e.g., 14) were preceded by masked stimuli that could be congruent multiplications (e.g., 7x2), incongruent multiplications (e.g., 5x6) or neutral stimuli (e.g., fxr). Two SOAs (50 and 116 ms) were employed in the experiment. Results confirmed the findings of previous studies, early effects of multiplication primes, and suggested a facilitative effect of related primes compared to unrelated and neutral primes.

The Mental Representations of Fractions: Adults' Same-Different Judgements #178 F. GABRIEL, A. CONTENT, Université Libre de Bruxelles

Although fractions have interested educational psychologists for a long time, little is known about the processing and representation of fractions in normal, numerate adults. A few recent studies have investigated how adults process fractional notations using a comparison task. Bonato et al. (2007) concluded that adults process the numerator and denominator separately and do not access the magnitude of the fraction. Conversely, Meert et al. (2008) produced data suggesting that the magnitude of the fractions is used, at least in limited conditions. The aim of the present research was to examine the time course of processing by examining performance and response time in a same-different decision task with two conditions. In the nominal condition, fractions were categorized as same if their numerators and denominators were identical (e.g., 1/2 1/2). In the semantic condition, fractions were classified as same if their values was equivalent (e.g., 1/2 2/4). Eighty 1st and 2d year university students were tested. Stimuli included a large range of fractions with denominators up to 20. Overall, the results show that access to the magnitude of fractions remains slow and error-prone.

PERCEPTION I

Hemispheric Lateralization in Face Perception: A sex differences study #179 G. ORNELLA, Paris Descartes University

This research interested in sex differences in hemispheric lateralization in face perception. Generally, studies of facial information processing revealed a left-visual-field superiority, providing support for a right-hemispheric dominance for face processing in human. However, neuroimaging and electromagnetic data provide conflicting results of a right-sided brain asymmetry for decoding the structural properties of faces. A part of this inconsistency could be due to sex differences in hemispheric lateralization. Previous study showed, indeed, that men have a stronger hemispheric asymmetry. This study was designed to clarify the debate, using a priming paradigm, in 52 right-handed subjects (26 women). Overall findings are broadly consistent with previous researches in this domain, and confirm a stronger lateralization in men compared to women in face processing, particularly on reaction times. Women seem to be more bilaterally distributed with easier access to mechanisms located in each hemisphere, providing them an advantage in interhemispheric cooperation with higher speed processing. Reasons of these sex differences in the brain are still unknown despite of lots of studies in this area (especially about the link between hormones and cognition), and future researches are needed before conclusions can be drawn.

Facial Identity Processing: Hemispheric and Sex differences #180 O. GODARD, Paris Descartes University

Faces present changeable aspects, like emotional expression, and invariant aspects like facial identity. Recent studies indicate that RH is dominant for "view-dependant" processing of faces and LH is dominant for "view-invariant" processing of faces suggesting a more abstract level of representation of visual stimuli. In addition, several data provide evidence of sex differences in hemispheric lateralization during face perception, with a stronger hemispheric asymmetry in men. The specific goal of this study was to evaluate within-hemisphere (RH-RH vs. LH-LH) and across-hemisphere (RH-LH vs. LH-RH) abilities in a facial invariant aspects processing task, in order to have a better understanding of sex differences in hemispheric lateralization. Thirty-one right-handed subjects (17 women) participated to this study. Results indicate that inter-hemispheric cooperation lead to better accuracy compared to within-hemisphere conditions. This study confirm that women are more bilaterally distributed with higher speed processing. RH seem to be, in men, dominant to process faces in a "view-dependant" manner, nervertheless, LH is not a silent partner in facial information processing and seem to present both "view-dependant" and "view-independant" processing types.

The centre is not in the middle: spatial biases in the bisection of different visual stimuli #181 P. PREVITALI[1], L. GIRELLI[1], L. ARDUINO[2]

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There is evidence that the spatial extent of written words is misperceived in normal reading. The left bias frequently founded in the bisection of orthographic material has been interpreted as resulting from an attentional bias towards the beginning of words and lexical or visuo-spatial nature (pseudoneglect) of this bias is still debated. Besides, eye movements studies reported an opposite asymmetry in visual exploration of continuous (lines) and discrete (ortographical) material in left and right hemispace. In order to investigate to what extent lexical or visuo-perceptual factors (i.e. length) are responsible for this distortion, five experiments required Italian readers to identify the centre of lines, words, pseudowords, consonant strings and graphic strings. The stimulus length was confirmed as a critical factor although interacts with the nature of the stimulus: a left bias emerged for lines of any length, while discrete strings induced a left bias when they were long and a right bias when they were short. Overall, these findings suggest that visuo-spatial exploration differ for lines and orthographic strings.

Effects of stimulus-induced temporal orienting on early auditory processing #182 K. LANGE, Heinrich-Heine-University Duesseldorf

It has been shown recently, that stimulus-induced temporal orienting is associated with faster responding and with an attenuation of the auditory N1 (Lange, 2009). Temporal orienting was manipulated by presenting a temporally regular versus irregular tone sequence prior to a target tone. The timing of the target relative to the sequence was identical for regular versus irregular conditions. Target timing always fitted the temporal structure of the regular sequence, i.e. the time when the target was presented was completely certain. The present study investigated whether the N1 attenuation was modulated by the certainty of target timing. Again, a regular or irregular stimulus sequence was presented prior to a target tone. Here, target timing was not completely predictable, because the target either fitted the expectations induced by the regular sequence (expectation met) or appeared too early or too late with respect to the regular sequence (expectation violated). Faster responding in the expectation conditions confirmed that an expectation was induced. Consistent with the assumption that temporal certainty is an important factor influencing the N1 attenuation the N1 was not attenuated by temporal expectations.

The Weibull statistics and the efficiency of natural image categorization #183 R. AUKSZTULEWICZ, S. GHEBREAB, A. SMEULDERS, V. LAMME, H. SCHOLTE, University of Amsterdam

The human visual system, among other perceptual systems, has evolved to tackle with tasks posed by the environment. From this point of view, research on statistical regularities in natural images and their exploitation by the visual system is a promising way of studying visual perception. Much research has illustrated the speed and efficiency of natural image categorisation, but the underlying processes – on both image features and neuronal levels – remain largely unknown. The contrast value distributions in natural images with no apparent communality generally follow a Weibull distribution, with beta and gamma as free parameters. It was recently shown that these parameters explain 75% of the variance of early ERP responses to natural images (Scholte et al., 2009). Here we investigate the relevance of these parameters to image categorisation. Since subjects are usually very efficient at categorisation tasks, we presented images under limited visibility. Our behavioural, EEG and fMRI experiments served to assess to what extent the Weibull statistics explain the participants' performance, as well as their ERP and hemodynamic response variance, in natural image categorisation and subcategorisation. In particular we focused on whether the neural activity associated with erroneous categorisation follows the image-derived parametres or the subject responses.

Measures of synaesthetic spatial forms in the general population #184 M. PRICE, T. SOLBERG, O. BLAKSTAD, University of Bergen

Spatial forms are the experience of involuntary visuo-spatial associations between sequence members (e.g., months, week days, numbers) and locations in imaginal or peripersonal space. These locations are in turn part of an idiosyncratic spatially extended pattern. It remains unclear whether spatial forms should be considered a variety of synaesthesia, or an extreme on the continuum of individual differences in everyday mental imagery. We report findings from a new self report questionnaire (BSFQ: Bergen Spatial Form Questionnaire) that surveys the gradation of spatial form experiences for months, week days and numbers among Norwegian students. Scores on 2 separable factor analysed subscales, for spatial associations for numbers and months/days respectively, indicated a monotonic gradation of form-like experience. This was related to general mental imagery experience on the Spontaneous Use of Imagery Scale (SUIS). However the highest scorers on the number subscale almost always scored highly on the calendar subscale. Further qualitative data was obtained via an online survey for a subgroup of participants with high scores on the initial questionnaire subscales, providing converging evidence that they experienced spatial forms. Preliminary data will also be summarized that compared high versus low BSFQ scorers on a variety of behavioral tests.

Masked priming of pronounceable and unpronounceable nonwords: An ERP investigation #185 S. MASSOL[1], J. GRAINGER[1], K. MIDGLEY[2], P. HOLCOMB[2]
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[2]Tufts University

The structure of nonword targets was manipulated in an experiment combining masked priming with ERP recordings. Targets were briefly presented, pattern-masked 7-letter nonwords formed of random strings of consonants (DCMFPLR) or pronounceable strings of letters (DAMOPUR). Targets were preceded by primes that could be the same as the target composed ef seven different letters, or sharing either the first or last five letters of the target. The ERPs revealed a main effect of target type, with differences arising around 150ms post-target onset. Consonant strings produced more negative-going waveforms than pronounceable nonwords. Repetition priming significantly affected ERPs starting around 100ms post-target onset, with more positive-going waveforms to targets following related primes. These repetition priming effects were found to interact with target type, with stronger priming effects arising with pronounceable nonword targets. The differences in priming effects as a function of target type were mostly evident in a widely distributed negative-going component starting around 150ms, peaking at about 300ms, and continuing through to 450ms post-target onset. The results are un line with the proposal that orthographic and/or phonological structure starts to influence letter string processing immediately following the mapping of visual features onto letter identities at around 150ms post-stimulus onset.

Gender-based Prototype Formation in Face Recognition #186 L. DIAMESSO-MALKAUD[1], J. BAUDOUIN[1], R. BROCHARD[2]
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Objectives: The role of gender categories in prototype formation during face recognition was investigated in two experiments. Methods: The participants were asked to learn individual faces and then to recognize them. During recognition, individual faces were mixed with prototypical faces, which were blended faces of same or different genders. Results: The results of the two experiments showed that prototypical faces made with learned individual faces were recognized, despite they were never seen before. this effect was stronger when faces belonged to the same gender category (sexed prototypical faces), but also emerged across gender categories (non-sexed prototypical faces). Moreover, for sexed but not for non-sexed prototypical faces, the effect was as strong whether the faces were presented one after the other during learning or alternated. Further experiments using a priming procedure indicated that early gender categorisation influences face recognition. Conclusion: The implications for face-space properties and face encoding processes are discussed.

Interactions between number and space: further evidence for a cognitive illusion #187 M. RANZINI[1], G. PERRONE[2], L. GIRELLI[2]
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A large amount of evidence suggests that different continuous dimensions such as magnitudes and spatial extents share common cognitive mechanisms (Walsh, 2003). Recent studies showed that the numerical magnitude can bias the estimation of physical dimensions such as lengths or circles size. Overall, these studies found that the stimulus dimension is underestimated when it is associated with small numbers, and overestimated when it is associated with large numbers. The aim of the present study was to verify whether the numerical magnitude acts at the perceptual stage of processing. Participants performed a circle reproduction task and a circles matching task. The first task consisted of the reproduction of a target visual circle by means of a touch-pad devise. In the second task participants were required to judge whether a visual circle had the same dimension of a previous one. Results replicated previous findings confirming the impact of numerical magnitude on the processing of physical dimensions and suggesting that the "cognitive illusion" induced by numbers acts also at the perceptual level of processing.

SOCIAL COGNITION

Computer simulation with cellular automata as a new source of hypothesis: social cognition in mate selection #188 M. RUIZ-SOLER, Universidad de Malaga

To explain cognition progressively includes more and more explanatory variables in order to get models well fitted to real-world data. In this sense, there is nothing inusual consider time evolution and dyadic interactions which entail non-linear interdependences and makes it difficult to find closed mathematical solutions to estimate parameters. To cope with this problem, computer simulations are an adequate solution because they provides us with the methodology to model and explore the dynamic evolution. Cellular automata holds great promise in illuminating the dynamics underlying these complexities and can provide valuable insights; it is a promising approach for understanding complex social cognition dynamics because it makes quite clear how certain macro effects are dynamic results of decisions and mechanisms operating at a micro level only: order, structure, clustering and segregation can be generated by simple local rules o a micro level. Here, a new model of mate selection is introduced based in two factors: individual differences in attractiveness and expectation values. Running several simulations many hypothesis were generated about how some cognitive variables would explain new couples.

The role of emotional intelligence in course and effectiveness of cognitive processes #189 M. STOLARSKI, University of Warsaw

Despite claims that emotional intelligence (EI) facilitates cognitive processes, little research exists to support these claims. The paper examines how emotional and cognitive intelligence are associated with attention task performance. The results of recent studies suggest a possibility of EI's influence on cognitive processes, particularly attention. It proved that EI, especially the emotional control subscale, is relevant for a number of mistakes made in attention task, but only in high IQ individuals. Moreover, it turned out that more balanced reaction time characterizes high EI individuals; the finding may attest to more adequate solution of speed-accuracy trade-off in emotionally intelligent people. We presume that emotional intelligence may facilitate the regulation of arousal which, according to Nęcka's formal theory of intellect, is a key factor in cognitive tasks performance. Therefore, it is possible that EI defines the degree in which we take advantage of our intellectual potential. Other interpretations of the results and further investigation paths are also considered.

Self, others and objects: how they interact and modulate the motor system #190 L. LUGLI, G. BARONI, C. GIANELLI, A. BORGHI, R. NICOLETTI, University of Bologna

Embodied theories of cognition propose that neural systems for perception, action and emotion are engaged during language processing. Several studies demonstrate that understanding action sentences activates the motor system and that positive/negative words automatically trigger approach/avoidance actions. The present study started from these accounts, considering the social context in which the interaction with the object takes place. Participants read sentences composed by an imperative verb implying a motion toward the self or another person and by an object described as positive or negative (e.g. The object is nice/ugly, bring it to you/give it to another person). They were asked to respond whether the sentences made sense or not by moving the mouse toward/away from their body. We ran two experiments manipulating the congruency between the direction implied by the sentence and the one requested in the response movement. Results revealed that both the object's valence and the interactional frame influenced the response movements. Interestingly, participants tended to attract positive objects, but at the same time they refrained from offering negative objects to others. Results are discussed in light of social embodied cognition theories.

Executive attention, working memory and emotional intelligence [#191] D. ASANOWICZ, J. ORZECHOWSKI, M. ŚMIEJA, Jagiellonian University

Emotional Intelligence (EI) is defined as ability of cognitive processing of emotional information; hence, its relation to elementary cognitive processes should be strong. However, empirical findings in this area are disappointing. The aim of the research was to prove the relationship between EI, IQ, executive attention and working memory. In the first study we used Stroop and Flankers tasks, both of them in two versions: "neutral"' and "emotional". The results showed that neither the "neutral" nor the "emotional" indexes of executive attention were related to IQ and EI scores. In the second study, we used a modified n-back task with "neutral" and "emotional" contents. The results showed that EI score is positively correlated with performance of the emotional version of n-back task, whereas verbal intelligence level is positively correlated with performance of the neutral version of the task. Emotional intelligence seems to be related to more complex rather than elementary cognitive performance, i.e. efficiency of the process of updating information in working memory. Perhaps, elementary cognitive processing of emotions has been almost perfectly automatized during evolution and therefore is not related to EI. Even so, these processes are indispensable for processing of emotional information in complex tasks.

WORKING MEMORY I

Serial order and binding in (the so-called) visual working memory [#192] S. TREMBLAY, C. MIMEAU, K. GUÉRARD, Université Laval

The process of binding refers to the grouping of different features into an object. Binding is a powerful mechanism, ubiquitous in cognition, yet it is problematic for several models of immediate memory. There is evidence that the binding of features into objects and of features and their location is unavoidable. Treisman and Zhang (2006) showed that changes in the location of features – between the original display and probe – are detrimental to object recognition. In the current study we used a serial order version of the change detection task designed by Treisman and Zhang to test whether a change in serial order impairs object memory. Participants were sequentially presented with three objects (e.g., grey square, black dot and white triangle). After a short delay, either the same three objects or different ensembles of the same features are re-presented in the same or in a random order. Participants had to judge if the objects were the same regardless of serial order. In two experiments, serial order changes did not impair object recognition. Before concluding that serial order is not integrated to objects in the same way as spatial location, the nature of objects and task requirements should be further tested.

Interference and Visual Memory for Abstract and Pictorial Stimuli: The Effects of Articulatory Suppression and Spatial Tapping [#193] R. SHAW, Charles Sturt University

Dual task procedures were used to test the hypothesis that people use verbal labels to remember abstract visual stimuli. In Experiment one 50 university undergraduates (12 men, 38 women) aged between 18 and 53 years (M = 24.38; SD = 8.62) completed a visual memory task under articulatory suppression, spatial tapping and no secondary task (control) conditions. Results show that performance on the visual memory task was significantly affected by concurrent verbal suppression and by spatial tapping. Experiment two repeated the first experiment but also included pictorial stimuli. The results from this experiment replicated the findings from Experiment two in that memory for abstract stimuli was impaired by concurrent articulatory suppression and spatial tapping. Memory for pictorial stimuli was also impaired by articulatory suppression but not by spatial tapping. These results suggest that participants use verbal labels to remember abstract and pictorial stimuli, however, memory for abstract stimuli may also require increased central executive resources due to the abstract nature of the stimuli.

Visuo-spatial Working Memory for connections [#194] E. COLUCCIA, M. BRANDIMONTE, Suor Orsola Benincasa University at Naples

Remembering connections between locations is fundamental for route learning and planning and it has everyday implications for navigation and spatial orientation. Past research on Visuo-Spatial Working Memory (VSWM) commonly focused on memory for objects positions ("where" items are located), neglecting the study of how people remember object connections ("how" items are connected). The present study is aimed at investigating "VSWM for connections". With this term, we refer to the ability to generate, maintain, and elaborate spatial information about items interconnections. In experiment 1, participants studied a configuration of dots (locations) and lines (connections). After 5 seconds, lines disappeared and they were asked to trace a route from a starting to an arrival dot. Results showed that the longer the route the worse performance. Males were more accurate than females, who were more prone to false recall of lines. In experiment 2, participants were additionally asked to trace the shortest route between two possible solutions, under two different time learning conditions (5 vs. 10 seconds). Results showed that, with longer time, participants were more accurate but performance collapsed on routes with lines intersecting each other. Results are discussed in the light of spatial orientation theories and VSWM models.

Individual differences in working memory span and false memories in the DRM paradigm [#195] J. PARDO-VÁZQUEZ, J. FERNÁNDEZ-REY, University of Santiago de Compostela

The aim of the present research was to examine whether individual differences in working memory capacity (WMC), measured with the "operation span task" (OSPAN), are related to susceptibility to false memories in the Deese-Roediger-McDermott (DRM) experimental paradigm. In this context, participants were explicitly "warned" (before study) to avoid false recognition. False memories were assessed by quantitative accuracy and bias measurements and further information about the subjective states of awareness that accompany recognition memory was obtained through "remember-know" judgments. Although the false recognition effect was apparent in both the High and the Low Span groups, the High Span participants do not only committed less false memories than the Low Span participants, but there is also a difference in the quality of their memories. These findings provide new support for the existence of an association between WMC and false memories in the DRM paradigm, under explicit warning instructions, and indicate, for the first time, that individual differences in WMC influence susceptibility to "illusory recollection" for critical lures under such circumstances.

Refreshing and rehearsal in the maintenance of the order of verbal information [#196] P. LAGNER, V. CAMOS, University of Bourgogne

The implication of the attentional refreshing and the phonological rehearsal is well known in complex span tasks with verbal material to maintain (Baddeley, 1986 ; Barrouillet & Camos, 2007). The present study aimed at evaluating the role of these two mechanisms in the maintenance of the order of verbal information. We compared the performance of young adults when they have to maintain the item and order information vs. only the order information (i.e., maintaining always the same letters but presented in different orders), while they had to judge the parity of digits. Moreover, participants had to judge the parity either by pressing keys or to answer aloud to block the rehearsal. To vary the amount of attention available to maintenance, we also varied the pace of presentation of the digits. Indeed, we previously evidenced that such manipulation affect the attentional refreshing (Barrouillet et al., 2004, 2007). We found that both the rehearsal and the refreshing are implicated in the maintenance of order information, but independently to each other.

The interference between working memory and spatial-numerical association [#197] R. STANISZEWSKI, M. GUT, I. SZUMSKA, P. JAŚKOWSKI, University of Finance and Management, Warsaw

Despite numerous studies on the relationship between numbers and space (small and high magnitudes representations on the left and right side respectively), little is known about the role of the working memory in the spatial-numerical associations. To shed some light on this problem we performed an experiment in which the task was to memorize four digits (1,2,8,9) displayed in the corners of a square. After 500 ms this stimulus was replaced by a fixation point (1000 ms) and then by a centrally presented digit (target). Participants had to determine as fast as possible the side where the target digit was located in the "square". A condition was defined as congruent when the spatial position of the target digit in "square" corresponded to its location on the mental number line (MNL). In the incongruent condition the target in the "square" was located on the opposite side than its MNL location. The results indicated faster and more accurate reactions in the congruent than incongruent condition. What was interesting the effect was significant only for low (1, 2) digits. It can be concluded that MNL spatial organization interferes with the memory processing of numerical material, especially in case of left part of MNL.

Friday, 4th September

SYMPOSIUM
MECHANISMS UNDERLYING THE UNUSUAL ADDITIONAL EXPERIENCES IN SYNESTHESIA
9.00 – 10.40
Seminar room 1

Chaired by R. ROUW, University of Amsterdam
Speakers: J. SIMNER, University of Edinburgh; R. ROUW, University of Amsterdam; L. FUENTES, Universidad de Murcia; P.H. WEISS, Research Centre Jülich

In synesthesia, a stimulus evokes a separate additional sensory experience. For example, a certain musical tone interval induces, in addition to the auditory percept, a particular taste sensation. The synesthetic experiences are fast and seemingly effortless, consistent, and highly specific (e.g. your A might be a particular color of bright red). Research has shown that synesthesia is a 'real' phenomenon and is not a psychological, neurological or psychiatric illness. This symposium presents new insights on the cognitive and neurological mechanisms underlying synesthesia. Three topics receive particular attention. First, the relation between the extraordinary binding of sensory experiences in synesthesia and other cognitive processes, in particular normal versus extraordinary memory performances. Second, the question whether synesthesia is unidirectional, with the inducer (e.g. the grapheme) eliciting the concurrent (e.g. the color), or is bidirectional. The third topic is the current debate on the neurological mechanisms underlying synesthesia. Both VBM and DTI studies showing structural differences between the brains of synesthetes and non-synesthetes, and studies countering the notion that structural brain differences underlie synesthetic experiences are presented. Furthermore, the question is addressed which particular brain areas are relevant to synesthesia, as well as which brain areas mediate individual differences in synesthetic experiences.

(1) A foundation for Savantism? Cognitive Benefits in Time-Space Synaesthesia #199 J. SIMNER

Individuals with 'time-space' synaesthesia have conscious awareness of mappings between time and space (e.g., they may see months arranged in an ellipsis, or years as columns or spirals). These mappings exist in the 3D space around the body or in a virtual space within the mind's eye. Our study shows that these extra-ordinary mappings derive from, or give rise to, superior abilities in the two domains linked by this cross-modal phenomenon (i.e., in time, and visualised space). We tested ten time-space synaesthetes with a battery of temporal and visual/spatial tests. Our temporal battery (the Edinburgh [Public and Autobiographical] Events Battery) contained four tests that assessed both autobiographical and non-autobiographical memory for events. Our four visual/spatial tests assessed the ability to manipulate real or imagined objects in 3D space, as well as assessing visual memory recall. Synaesthetes' performance was superior to the control population in every assessment, but was not superior in a task that that does not draw upon abilities related to their mental calendars. Our paper discusses the implications of this temporal-spatial advantage as it relates to normal processing, synaesthetic processing, and to the savant-like condition of hyperthymestic syndrome (Parker et al., 2006)

(2) Neural Basis of Individual Differences in Synesthetic Color Experience #200 R. ROUW

Synesthesia is a condition in which a particular sensation evokes an extraordinary additional sensation. In grapheme-color synesthesia, letters or numbers evoke a color experience in addition to the color of the typeface. Individual differences between these synesthetes offer a unique opportunity to study the neural basis of visual experiences. Specifically, the synesthetic color can be experienced 'in the mind' (associator synesthetes) or 'in the outside world' (projector synesthetes). We examined grey matter structure and function (using VBM and BOLD-MRI) in 42 synesthetes as compared with non-synesthetes. Results indicate partly shared mechanisms for all grapheme-color synesthetes (in particular the posterior superior parietal lobe, involved in the integration of sensory information) and partly different mechanisms depending on the nature of the synesthetic experience. The 'outside world' experience is mediated by modality-specific as well as frontal brain areas, while the 'in my mind' experience is mediated by the hippocampal region, which is known for its role in memory.

(3) Examining the Neurocognitive Mechanisms in Synaesthesia #201 L. FUENTES

The term synaesthesia is used to describe a condition in which one stimulus property (e.g. grapheme) results in the experiences of an additional attribute (colour). Although the genuineness of synaesthesia has being established in a multitude of studies using behavioral and neuroimaging methods, it is unclear what the principles that cause synaesthesia are. A better understanding of the causes of synaesthesia and, in turn, of the causes of the abnormal cross-modal interactions is fundamental to our understanding of cross-modal connectivity and inter-aerial interactions in the normal brain, as well as other phenomena such as perceptual awareness, feature binding, and automaticity. In the first part of the talk I will show that under posthypnotic suggestion non-synaesthetes can be induced to have synaesthetic experiences. In the second part I will show that brain stimulation via transcranial magnetic stimulation (TMS) can trigger visual experience more easily in synaesthetes than non-synaesthetes. Together these results support the idea that synaesthesia can result from cortical disinhibition.

(4) The role of the parietal cortex in (grapheme-colour) synaesthesia #202 P.H. WEISS

Functional imaging studies on grapheme-colour synaesthesia – a condition in which stimulation of a sensory modality (seeing a letter or a number) triggers abnormal additional perceptions (colour experiences) – have revealed differential activation of the parietal cortex [Nunn et al. 2002;Weiss et al. 2005]. Furthermore, recent structural imaging studies focusing on the neural basis of synaesthesia have disclosed differences in the connectivity [Rouw and Scholte 2007] and the gray matter [Weiss and Fink 2009] of the (left) parietal cortex in grapheme-colour synaesthetes. Finally, transcranial magnetic stimulation (TMS) of the (right) parietal cortex interfered with the colour experiences of grapheme-colour synaesthetes [Esterman et al. 2006; Muggleton et al. 2007].

Based on these findings, the role of the parietal cortex in (grapheme-colour) synaesthesia will be discussed with special emphasis on the awareness of synaesthetic colour experiences (see also the two-stage model of synaesthesia by E. Hubbard, [Hubbard 2007]) and the issue of (bi-)directionality [Cohen Kadosh and Henik 2007]. Functional and structural differences of the parietal cortex in grapheme-colour synaesthesia suggest that abnormally strong binding processes may underlie synaesthetic experiences. Thus, investigations into the neural substrate of these abnormal binding mechanisms in synaesthesia may also shed light on the neural bases of neuropsychological deficits resulting from lesions of the parietal cortex after stroke, e.g. Balint's syndrome and neglect, which may - at least in part - be caused by disturbed binding [Robertson 2003].

SYMPOSIUM
TESTING THE LIMITS OF UNCONSCIOUS COGNITION
9.00 – 10.40
Medium lecture hall A

Chaired by R. FISCHER, *Technische Universität Dresden & A. KIESEL, University of Wuerzburg*
Speakers: F. WASZAK, Laboratoire Psychologie de la Perception; E. VAN DEN BUSSCHE, University of Leuven, Campus Kortrijk; R. FISCHER, Technische Universität Dresden; G. HUGHES, University of Oxford; A. KIESEL, University of Wuerzburg;

Unconsciously presented stimuli influence cognitive processes. Research using the method of subliminal priming mostly applied two-choice reaction time tasks and showed unconscious response and/or unconscious semantic activation processes from a variety of different stimulus materials (e.g., symbols, words, pictures). Thus, it seems warranted to conclude that unconscious activation processes appear to be a quite general phenomenon.

The current symposium is aimed at exploring limits of unconscious activation: Which processes can be activated by unconsciously presented stimuli? And what are the limits of unconscious cognition?

(1) **Perceptual criterion and motor threshold** [#203] F. WASZAK

A visual stimulus may affect a motor response although its visibility is hampered or prevented by a mask. I report an experiment where both the observer's perceptual state related to the presence/absence of a masked stimulus and the motor behaviour elicited by the same stimulus were jointly assessed on a trial-by-trial basis. The experiment shows that masked visual stimulation at constant visibility has two types of effect on the motor system. When the physical energy of the masked stimulus is weak, it affects the motor response only if it exceeds the observer's perceptual response criterion. It is only when the physical energy of the masked stimulus is relatively strong that its impact on the motor response is independent of the state of the perceptual system. The data indicate that the motor system has a fixed, high energy threshold, whereas the perceptual system has a variable criterion that can either be higher or lower than the motor threshold--depending on the particular conditions.

(2) **How deep can unconscious information be processed? A meta-analysis** [#204] E. VAN DEN BUSSCHE, W. VAN DEN NOORTGATE, B. REYNVOET

Nowadays, the existence of subliminal perception is largely acknowledged. However, the debate has progressed beyond existence claims. Many outstanding questions deal with the limits and possibilities of unconscious processing. One remaining issue concerns whether unconscious information can be processed up to a semantic level and which factors determine whether and to which extent unconscious processing will take place. Several semantic and non-semantic theoretical accounts have been proposed to clarify this issue, but none of them is able to explain all observed empirical results. We therefore aimed to answer this by statistically combining published and unpublished masked priming studies using meta-analytic techniques. We found significant masked priming under circumstances in which a non-semantic interpretation could not fully explain the effects, suggesting that unconsciously presented information can be processed semantically. Nonetheless, the non-semantic processing of unconscious primes is enhanced and priming effects are boosted when the experimental context allows the formation of automatic stimulus-response mappings. Our quantitative review also identified several moderators that influence the strength of priming.

(3) **Selective impairment of masked priming in dual-task performance** [#205] R. FISCHER, A. KIESEL, W. KUNDE, M. BERNER, T. SCHUBERT

Recently, evidence accumulated that masked priming depends on temporal and spatial attention. The present study investigated the impact of divided attention on different forms of masked priming, i.e., priming by target and novel primes. In a dual-task setting, novel primes did not induce priming effects irrespective of whether the masked priming task was performed as secondary task (Experiment 1) or as primary task (Experiment 2). In contrast, in both experiments we found intact priming by target primes. In a task switching setting, in which both tasks were performed consecutively, novel and target primes revealed priming effects of equal size (Experiment 3). We conclude that dual-task specific interference processes (e.g., simultaneous coordination of multiple S-R rules) selectively impair priming by novel prime stimuli.

(4) **ERP evidence for unconscious priming of inhibitory control** [#206] G. HUGHES

Determining which processes are able to proceed without conscious awareness is a crucial step in understanding the function of consciousness. A common suggestion is that while motor acts can be prepared unconsciously, inhibitory control of behaviour can only occur consciously. I will present data from a series of experiments which show that the no-go N2 and P3 ERP components can be influenced by a subliminal prime in the go/no-go task. In addition, an early N2-like component can be directly elicited by an unconscious prime. These ERP modulations were highly correlated with the extent to which behavioural performance was affected by the prime – confirming that they truly reflect unconscious modulation of inhibitory control. These results will be discussed in light of other research which suggests a possible link between consciousness and adaptive behavioural control.

(5) **Automatic activation of executive functions: Do subliminally presented task cues activate task sets?** [#207] A. KIESEL, W. KUNDE, B. HOMMEL

Currently, there is a debate on the limits of unconscious cognition. Do subliminally presented stimuli elicit control processes (e.g. van Gaal, et al., in press)? Or is consciousness a prerequisite to invoke control processes (e.g. Kunde, 2003; Van den Busche, et al., 2008). Here, we explore whether subliminally presented stimuli activate task sets.

Mattler (2003) demonstrated that a subliminal prime-stimulus, which is presented prior to a task cue, influences task performance. Consequently, he assumed that the subliminally presented stimulus activates the corresponding task set. However, in his study prime-stimuli and task cues were identical. Thus, one might alternatively speculate that the subliminally presented prime-stimulus activated the corresponding task cue and therewith facilitated task cue identification. To rule out this alternative explanation, we presented clearly visible task cues intermixed with subliminal task cues. Participants were instructed to perform the indicated task and in case that they did not identify the task cue to freely choose between the tasks. The subliminally presented task cues influenced task choice when the task cues indicated the identity of the task (Exp. 1) and when the task cues indicated the required task transition (switch or repeat the current task, Exp. 2).

SYMPOSIUM
BILINGUALISM AS A WINDOW ON COGNITION AND LANGUAGE PROCESSING
9.00 – 10.40
Large lecture hall A

Organized and chaired by C. GERFEN, *Pennsylvania State University & J.G. VAN HELL, Radboud University of Nijmegen & Pennsylvania State University*
Speakers: L.B. FELDMAN, The University at Albany, SUNY and Haskins Labs; J.G. VAN HELL, Radboud University Nijmegen & Pennsylvania State University; G. DUSSIAS, Pennsylvania State University; P. ROMÁN, University of Granada; C. GREFEN, Pennsylvania State University;

The past decade has witnessed a rapid growth in bilingualism work, as language scientists have recognized that most of the world's population speaks more than a single language. Given this situation, models of language representation and processing must address the way in which multiple languages are represented in individual minds. At the same time, bilingualism research itself provides a window on issues ranging from the cognitive processes underlying language processing to issues such as continued brain plasticity through the lifespan that can be difficult to address with monolingual populations. In this symposium, we bring together a range of papers which exemplify the ways in which experimental work on bilingualism crucially informs

more general questions of language processing. This includes work on accentedness and speech perception by native and nonnative speakers, on the nature of the lexicon in bimodal (speech-sign) bilinguals, on the differential processing of gender within Spanish/English bilinguals depending on communication mode, and on bilingualism as a vehicle for testing issues of inhibition in both lexical retrieval and speech production.

(1) **The effect of a foreign and native accent on word recognition in L1 and L2** [#208] L.B. FELDMAN

English prime-target pairs were presented in the cross modal lexical decision task. Morphological facilitation was weaker for native English-speaking participants when the primes were pronounced in a nonnative than in a native accent. By contrast, L2 speakers of English showed comparable facilitation when primes were pronounced in their nonnative accent and in a native accent. Ongoing work examines how the lexical characteristics of words interact with accent-induced phonological variation in native speakers of English and in nonnative speakers at varying levels of proficiency in English. Results are revealing about the phonologies that underlie listening and speaking and conditions under which shared meaning can and cannot offset effects of differing form.

(2) **Co-activation of phonology in bimodal and unimodal bilinguals** [#209] J.G. VAN HELL, E. ORMEL, J. VAN DER LOOP, D. HERMANS

Research on lexical activation in word recognition and word production shows that both languages are active and influence lexical processing, even when bilinguals intend to use only one language. This suggests that the lexicon of bilinguals is fundamentally permeable across language boundaries. The vast majority of these studies involve two spoken languages, using 'unimodal' bilinguals who perceive their two languages by the same sensory system. Bimodal (speech-sign) bilinguals, however, perceive one language auditorily and one language visually. Do patterns of co-activation of languages found in 'unimodal' bilinguals extend to bilinguals who juggle two languages from different modalities, speech and sign? Is the permeability of language systems restricted to language systems from the same modality, or does it extend to languages that differ in modality? We report two experiments in which we compared cross-language activation in Dutch-Sign Language bimodal bilinguals and Dutch-English unimodal bilinguals, using sign-picture and word-picture verification tasks. The implications of bimodal bilingualism for models of language production will be discussed.

(3) **Asymmetrical use of gender information during the processing of unilingual and code-switched speech** [#210] G. DUSSIAS, C. GERFEN, J. GULLIFER, J. VALDES KROFF, R.E. GUZZARDO

Monolingual Spanish speakers exploit the gender of articles to predict the referent of subsequent nouns. Here, we investigate whether gender-marked articles are informative when Spanish-English bilinguals process spoken code-switched utterances. Corpus data containing code-switches show that whereas the masculine article **el** can precede an English noun whose Spanish translation equivalent is masculine or feminine, **la** only appears with feminine translation equivalents. Given this asymmetry, it is possible that the gender-marking of articles facilitates to a lesser extent the processing of code-switched speech. Pairs of objects were displayed on a computer screen while the eye-movements of 24 Spanish-English bilinguals were recorded. Participants listened to sentences naming one of the objects and were instructed to click on the named object. Sentences were presented in 3 blocks: English (control), Spanish, code-switched. We analyzed the proportion of looks to the objects. Results in the English-only block replicate the effects reported in previous literature with monolingual English speakers. In the Spanish-only block, bilinguals oriented their eye-movements to the referent more rapidly on different-gender trials (i.e., when the article was potentially informative). In the code-switched block, bilinguals did not use the gender of the article to predict the referent of the upcoming noun.

(4) **Retrieval Induced Forgetting in bilingual language selection** [#211] P. ROMAN, M. VAN DE VELDE, T. BAJO

Research on Retrieval Induced Forgetting (RIF) indicates that memory retrieval involves inhibitory mechanisms that suppress interfering traces (Anderson, 2003). Similarly, theories on bilingual language production propose that selection of lexical entries in the appropriate language may be achieved by inhibitory mechanisms that inhibit competing other-language lexical representations. In three experiments we used RIF (see also, Levy, McVeigh, Marful, & Anderson) to explore the nature of the inhibited representations. In the experiment native Spanish speakers named pictures once or five times in their L1 or L2 languages (English). Later they were asked to recall the name of the pictures in L1 with the help of phonological (Experiment 1a and 1b) or lexical (Experiment 2) cues. ERPs were recorded during the naming phase (Experiment 1b, 2). Results indicated that repeated naming in English reduced the accessibility of the corresponding Spanish words. In addition, EEG recording during naming showed more negative waves at 250-350 intervals to the first than the fifth L2 naming trial and for the first L2 than L1 trial. This pattern was interpreted as evidence for the controlled nature of inhibition in both monolingual retrieval and language selection.

(5) **Evidence for inhibition in native language production during immersion in the second language** [#212] C. GERFEN, J. TAM, R.R. MCCLAIN, A. SEMENOV, H. KITAJIMA, J.F. KROLL, J.A. LINCK

Recently, Linck, Kroll, and Sunderman (under review) compared performance on lexical comprehension and production for two groups of university, English-speaking students of Spanish: classroom-only versus immersed learners in Spain for a semester. Results showed reduced access to English (the L1) for immersed learners relative to classroom counterparts. The present study reports a secondary analysis of the category verbal fluency production data in Linck et al., focusing on the time course effects following the procedures of Rohrer et al. (1995), Sandoval et al. (in press), and Luo et al. (under review). In the task, participants named as many exemplars as possible of target categories over 30 seconds. The time course analysis revealed two important results. First, initial response latency data indicated that immersed learners were slower to begin naming in English than classroom learners. Second, immersed learners consistently named fewer items in L1 throughout the trial than classroom learners. Taken together with our analysis of the acoustic properties of their speech, the data suggest that the native language is suppressed both during category activation and during subsequent naming in the trial, pointing to a globally inhibitory effect on L1 during immersion in the second language.

SESSION
TASK SWITCHING II
9.00 – 10.40
Large lecture hall B

Chaired by A. MIYAKE

9.00 – 9.20
Developmental Differences in Toddlers' Behavioral Restraint Predict General Executive Function Ability 14 Years Later [#213]
N. FRIEDMAN, A. MIYAKE, University of Colorado at Boulder

We examined whether behavioral restraint in early childhood predicted individual differences in three executive functions (EFs; response inhibition, working memory updating, and task switching) in late adolescence in a sample of ~900 twins. At ages 14, 20, 24, and 36 months, the twins were shown an attractive toy and asked not to touch it for 30 seconds. Growth modeling distinguished two groups of children that differed in their probabilities of touching the toy at all 4 time points. Using confirmatory factor analysis, the three EFs (measured at age 17) were decomposed into a common EF factor that happened to be isomorphic to response inhibition ability and two

factors specific to updating and switching, respectively. The children more likely to touch the toy had significantly lower scores on the common EF factor but higher scores on the switching-specific factor than those less likely to touch the toy. Twin models indicated that these relations were primarily genetic in origin. The tendency to touch the toy, however, was not significantly related to externalizing behavior problems (e.g., conduct disorder, substance use) exhibited at age 12 or 17. These results indicate that early behavioral restraint is genetically related to later general executive control and flexibility.

9.20 – 9.40

Affect modulates switch costs: The influence of emotional cuing on switching between three tasks [#214] E. NĘCKA, M. TARADAY, J. RUSIŃSKA, Jagiellonian University

Participants had to switch between three tasks of increasing complexity. There were five conditions (between subjects manipulation) differing in the nature of cues provided to participants. The cues served to indicate which of the three tasks will be presented next. Neutral cues were either explicit (verbal instructions) or implicit (figural symbols); the latter had to be associated with a respective task through practice. Emotional cues were human faces with neutral, negative, or positive expressions. It appeared that switch costs in the explicit and implicit conditions did not differ substantially. They were also comparable to switch costs in the emotionally neutral condition. However, the emotionally negative cues resulted in increased switch costs, particularly in the case of the most complex task, whereas the emotionally positive cues resulted in reduced costs, especially in the case of the most complex task, too. The data are interpreted in terms of the dopamine hypothesis, which states that positive affect increases the level of plasticity of cognitive processes.

9.40 – 10.00

When the emotion is no longer relevant: Switch-cost asymmetries when categorizing emotional faces [#215] S. SCHUCH, I. KOCH, RWTH Aachen University

We see faces every day, sometimes attending to the emotional expression (e.g. when watching the airport security guide check our luggage), sometimes attending to other facial attributes (e.g. when trying to recognize the person who added a weapon to our luggage). Because processing the emotions of others quickly and efficiently has been highly adaptive in the history of man, it is possible that emotional expressions are processed more automatically than other facial attributes, such as age or gender. To test this idea, we presented participants with photographs of emotional faces. A color cue indicated which of three different tasks they had to perform: Categorizing the emotional expression (happy/angry), the age (young/old), or the gender (female/male). When switching between the tasks, reaction times were significantly faster when switching away from the emotion task than when switching away from any of the other tasks, suggesting that there is less persisting interference when switching away from the emotion task. This data pattern is consistent with the idea that processing the emotional expression is more automatic than processing the age or gender of a face.

10.00 – 10.20

The influence of affectively valent response-effects in task switching [#216] H. HOROUFCHIN, A. PHILIPP, I. KOCH, RWTH Aachen University

Earlier studies using the cuing-version of the task-switching paradigm found reduced switch costs with increasing response-to-cue interval (RCI). This switch-cost reduction was mainly due to a loss of repetition benefit in task repetitions, whereas task switches were hardly influenced by RCI manipulations. The present study investigated the effect of affectively valent response-effects during the RCI. The valence (positive vs. negative) of pictures, taken from the International Affective Picture System, was manipulated blockwise, with short and long RCI varying randomly. The results revealed no direct influence of valence on switch costs. However, independently of the valence of the response effects, the data pattern indicated a reduction of switch costs with increasing RCI mainly due to a performance improvement in task switches rather than due to a decreasing repetition benefit. Possible explanations are discussed.

10.20 – 10.40

Positive affect and executive control [#217] H. VAN STEENBERGEN, G. BAND, B. HOMMEL, Leiden University

Positive affect is known to influence performance in several cognitive tasks. We address the question how short- and long-term positive emotions influence performance in attention and cognitive control paradigms. We will discuss a series of experiments which provide strong indications that positive affect influences adaptive control in systematic ways. These findings are consistent with theories proposing that positive affect induces a more lenient and flexible processing style. Moreover, our data suggests that affect modulates activity in brain areas underlying conflict detection and adaptation. We propose that the mesolimbic dopamine system mediates this modulation.

SESSION
GENERAL COGNITION I
9.00 – 10.40
Conference and lecture hall C

Chaired by G. PETKOV

9.00 – 9.20

The Role of Consciousness in a Theory of Visual Attention (TVA) [#218] C. BUNDESEN, University of Copenhagen

In the theory of visual attention called TVA (Bundesen & Habekost, Principles of Visual Attention, Oxford University Press, 2008), there are three basic types of parameters: η, β, and π parameters. Parameter η(x, i) is the neurally computed strength of the sensory evidence that object x has feature i; β(i) is the perceptual bias for seeing feature i; and π(j) is the pertinence (current importance) of attending to objects with feature j. TVA describes how the current η, β, and π values determine the probability that a visual specification ('object x has feature i') corresponding to a certain η value becomes represented in VSTM—a visual short-term memory with strictly limited storage capacity. Here I argue that VSTM can be regarded as visual access consciousness (Block, 2005, TICS, 46-52). Visual phenomenal consciousness (ibid) is also a storage space, namely, the set of all those neurons that represent η values. The strength of the sensory evidence that x has feature i, η(x, i), equals the extent to which it looks as though x has feature i. By this interpretation of TVA, visual perception is selective sampling of visual specifications from phenomenal consciousness into access consciousness.

9.20 – 9.40

Frequency and Motivational State: Evolutionary Simulations Suggest an Adaptive Function for Network Oscillations [#219] B. HEEREBOUT, H. PHAF, University of Amsterdam

Evolutionary simulations of agents, controlled by artificial neural networks, unexpectedly yielded oscillating node activations in the networks. The agents had to navigate a virtual environment to collect food while avoiding predation. Between generations their neural networks were subjected to mutations and crossovers in the connection strengths. The oscillations drastically enhanced the agents' performance, which was due primarily to an increased switching efficacy from approach to avoidance behavior. An analysis of networks from the last generation revealed that winner-take-all competition was modulated by the oscillations. On average the oscillations had a much higher frequency when an agent was foraging (i.e., in an appetitive state) than when it was trying to escape from a predator (i.e., in an aversive state). We suggest that a specific oscillation frequency acts to prepare the network for a particular type of action.

9.40 – 10.00

The role of the noradrenergic system in the trade-off between exploitation and exploration: A psychopharmacological study #220

M. JEPMA[1], E. WAGENMAKERS[2], E. TE BEEK[3], J. VAN GERVEN[3], S. NIEUWENHUIS[1]
[1]Leiden University
[2]University of Amsterdam
[3]Centre for Human Drug Research

Recent studies have suggested an important role for the locus coeruleus-norepinephrine (LC-NE) system in regulating the trade-off between exploitative and explorative behavior. The evidence for this theoretical progress is largely based on cell recordings in nonhuman primates. In order to further develop theories about LC-NE function, it is important to investigate the role of the LC-NE system in human cognition. We report a study using a pharmacological manipulation of the human noradrenergic system. In a double-blind parallel-groups design, participants received 4 mg reboxetine (a selective norepinephrine reuptake inhibitor), 30 mg citalopram (a selective serotonin reuptake inhibitor) or placebo (n = 16 per group). By inhibiting the reuptake of NE, reboxetine increases the tonic NE level. We assessed the effects of reboxetine on performance in several cognitive tasks designed to examine exploitative versus explorative behavior. The results will make an important contribution to our understanding of the noradrenergic regulation of behavioral strategy.

10.00 – 10.20

Can prior strategy use affect subsequent strategy selection? #221

V. SCHILLEMANS, K. LUWEL, I. BULTÉ, P. ONGHENA, L. VERSCHAFFEL, Katholieke Universiteit Leuven

We tested the extent to which the (repeated) use of a strategy would affect a subsequent strategy choice. In three experiments, adults had to determine different numerosities of coloured cells in a rectangular grid, by either using an addition-based strategy or a subtraction-based strategy. The items were arranged in sequences of "extreme" items that all strongly elicited one of the two strategies, followed by one "neutral" item on which both strategies were applicable. Experiment 1 and 2 revealed that participants had a tendency to apply the same strategy on the neutral items as they had used on the preceding sequence of extreme items. However, this effect was restricted to a relatively narrow range of items which were about equally strongly associated with the two strategies. Experiment 3 showed that the previously observed effect is already apparent after the presentation of a single extreme item. An additional cluster analysis yielded three groups of participants who differed in their strategy choices on the neutral items: one group was strongly influenced by the previously used strategy, while the other two groups were biased towards one of the two strategies. We will discuss a number of mechanisms that can account for the observed effects.

10.20 – 10.40

DUAL Architecture: Modeling Various Cognitive Processes on the Basis of Mechanisms for Analogy-making #222

G. PETKOV, B. KOKINOV, New Bulgarian University

People usually think analogy-making as a slow, conscious process of mapping large structures from distinct domains. However, some scientists argue that some of the basic sub-processes of analogy-making can happen very fast and effortless. The DUAL-cognitive architecture explores the hypothesis that the sub-processes of associative retrieval, structural mapping, and analogical transfer lie at the core of human cognition. Relatively small set of basic mechanisms were designed explicitly for modeling analogy-making. DUAL-based models are dynamic and context-sensitive. They are able to map the relational structure of two domains in correspondence; to transfer correspondent knowledge from one domain to another; and to learn new knowledge. An attempt has been made to use these basic DUAL mechanisms to model various different cognitive processes as well. This exerts a strong restriction on the range of possible models and does not allow us to construct any possible mechanisms that will lead to the desired data. Despite this large challenge, models for recognition, cued recall, judgment on a scale, and embodied relational representations were successfully implemented and were integrated each other. Various empirical data were replicated, and novel contra-intuitive predictions, which emerged from the interaction of the models, were confirmed.

SESSION
VISUAL AND SPATIAL ATTENTION

9.00 – 10.40
Medium lecture hall B

Chaired by E. SOETENS

9.00 – 9.20

Congruency reversal in Accessory-Signal Simon tasks with auditory stimuli #223

E. SOETENS, K. MAETENS, Vrije Universiteit Brussel

In visual two-choice reaction-time tasks, a Simon-like effect occurs when a peripheral accessory signal is presented shortly before or together with the response signal. The effect reverses when the peripheral signal appears shortly after the response signal. The same pattern is observed when the peripheral signal appears relative to a go/no-go signal, with the relevant signal being presented well in advance. The reversal has been explained as the inhibition of exogenous response-code activation as soon as an action plan has been developed. In two experiments we investigate whether the inhibition also occurs with auditory stimuli and whether it concerns a cross modal or modality specific inhibitory process. A Simon effect appeared in both experiments, but the reversal only occurred when peripheral and relevant response signal were auditory, and not when the relevant signal was visual with auditory accessory signals. We suggest that planned actions are protected against exogenous interference by a modality specific inhibitory process.

9.20 – 9.40

How to measure distinct components of visual attention fast and reliably #224

S. VANGKILDE[1], S. KYLLINGSBAEK[1], T. HABEKOST[1], C. BUNDESEN[1], P. MARKLUND[2], L. NILSSON[2]
[1]University of Copenhagen
[2]Stockholm University

Measuring different attentional processes in a fast and reliable way is important in both clinical and experimental settings. However, most tests of visual attention are either lengthy or lack sensitivity, specificity, and reliability. To address this we developed a ten minute test procedure for the Swedish Betula-project, a longitudinal study investigating changes in cognitive functions over the adult life span (Nilsson et al., 2004). The test consists of a computer-based letter recognition task with stimulus displays of varied durations followed by pattern masks or a blank screen. The temporal threshold of conscious perception (t0), visual processing speed (C), and storage capacity of visual short-term memory (K) are estimated by use of Bundesen's (1990) Theory of Visual Attention, and the standard error of each estimate is calculated using a bootstrapping procedure. The results from the first sample of 100 participants (55-85 years of age) confirm that both t0, C and K are negatively affected by age and that C and K are highly correlated. Furthermore, the standard errors of the estimates are remarkably small considering the limited duration of the test. Thus, it seems possible to obtain precise and stable estimates of visual attention using only a very brief test.

9.40 – 10.00

Sidedness coding is stimulus but not response dependent #225

G. OTTOBONI[1], A. TESSARI[2], R. CUBELLI[3], C. UMILTA'[4]
[1]University of Plymouth
[2]University of Bologna
[3]Universita' di Trento
[4]Universita' di Padova

The aim of the present paper is to provide further evidence for an effect related to early hand recognition processing, i.e. the sidedness effect (Ottoboni, Tessari, Cubelli & Umiltà, 2005). Little

is known about the sidedness effect as it has only been reported in relation to a single set of stimuli and responses. For this reason, we decided to investigate the role of the posture of the hand stimulus in Experiment 1 by presenting pictures of hands rotated upside-down, and, in Experiment 2, the role of response hand posture by moving the response plane behind the participants' back. The results indicate that the sidedness effect manifests itself in an inverted form when the stimuli, but not the response plane, are rotated. We conclude that ultimately the effect must be based on a structural representation of the body and not on the body schema because of its dependence on stimulus posture but not on response posture.

10.00 – 10.20

Does power shift attention on a vertical dimension? An ERP study #226 K. ZANOLIE[1], S. VAN DANTZIG[2], I. BOOT[1], J. WIJNEN[3], D. PECHER[1]
[1]Erasmus University Rotterdam
[2]Leiden University
[3]University of Amsterdam

People often use the spatial dimension up-down metaphorically when speaking and thinking of power. Studies suggest that thinking of power activates the power is up metaphor through the spatial up-down image schema. We tested critically whether this activation is an automatic process. Furthermore, we tested whether the activation of the up-down image schema induces an attentional shift to the upper or lower visual field. One way we addressed these questions was by recording ERPs during a dual-task. Participants made power judgments to words denoting powerful or powerless people (e.g. 'king' or 'servant'), presented centrally. Following each judgment, a target letter was presented in the upper or lower visual field. Results show an enhanced P1 and N1 amplitude when the spatial position of the target is congruent with the metaphorical direction of the preceding word (powerful-up, powerless-down). These results are evidence that power words induce a spatial shift of attention corresponding to their implied direction, providing evidence that metaphors play a role in grounding abstract concepts in sensorimotor processing.

10.20 – 10.40

Object-based allocation of visual attention: Evidence from an eye-movement study #227 M. ZIESSLER, Liverpool Hope University

Egly, Driver and Rafal (1994) investigated the allocation of attention to objects versus space. In their paradigm, participants search for targets presented within one of two adjacent objects. The target appears either at the location cued in advance or at another location within the same or the other object. In invalidly cued trials, the distance to the cued location is equal, but participants detect the target faster if it appears on the object including the cued location. To investigate the genesis of this "same-object" advantage, we recorded eye-movements. Results show that the same-object advantage is already evident in the time of the first fixation. Uncued locations on the cued object were fixated earlier than those on the other object. This also applied if only first fixations after leaving the cued location were considered. Presumably, covered attention leading the eye-movements spreads first within an object and only later jumps to the other object. Analysis of pupil size indicates the increasing cognitive demand in moving attention within and between objects.

SYMPOSIUM ON MODELS OF HUMAN MEMORY

11.00 – 12.20
Conference and lecture hall C

Chaired by P. BEAMAN, University of Reading
Speakers: M.PAGE, University of Hertfordshire; E. DAVELAAR, University of London; K. OBERAUER, University of Bristol; M. LANSDALE, University of Leicester

The proposed symposium is intended to support Simon Farrell's keynote speech (on memory modelling) as Bertelson prize lecturer. The symposium topic is timely because of Dr Farrell's election to give the keynote lecture in this area and because increasingly widespread availability of software such as Matlab (and some of the more sophisticated functions of MS Excel), has made the task of modelling cognitive function more accessible and more popular than ever before. The symposium brings together researchers modelling relationships between short-term and long-term memory (Page, Davelaar) complex working memory span (Oberauer et al.) and the long-term forgetting function (Lansdale) using mathematical and connectionist modelling techniques. The symposium will show how the use of formal models casts new light on many aspects of cognition (including some old controversies) and we anticipate a lively debate concerning current and long-standing issues such as activation-based memory and the role of decay in forgetting. The four speakers all have a distinguished history of publishing formal models of human memory (each has contributed at least one such paper to Psychological Review) and, although all currently based at UK institutions, they represent several different European nationalities, as befits the speakers at an ESCoP symposium.

(1) A unified modelling framework for immediate serial recall, Hebb effects, and the learning and recognition of phonological word-forms #228 M. PAGE

There is now considerable evidence for a common ordering mechanism underlying both immediate serial recall (ISR) tasks and the learning of phonological word-forms. Recent work on the Hebb repetition effect (Hebb, 1961) is consistent with the idea that Hebb learning is itself a laboratory analogue of the sequence-learning component of phonological word-form learning (e.g., Mosse & Jarrold, 2008; Szmalec, et al., 2009). We present a unifying modelling framework that accounts for ISR, Hebb repetition effects, and word-form learning. Moreover, our modelling framework also subsumes a mechanism for word recognition from continuous speech. Although words are stored as sequences of categorically defined sublexical items, word recognition in the model is still sensitive to subcategorical mismatch, as in the data.

(2) From primary memory to short-term memory to activation-based memory: No tricks, just not like a computer #229 - E. DAVELAAR

On the same page on which William James introduced the terms primary and secondary memory, he presented his view on how they are implemented in the brain, which is not different from Hebb's view. Here I start with the view that primary memory is the activated part of long-term memory, or better yet that primary memory is the process by which temporarily activated long-term knowledge is maintained in active state beyond its expected unaided life-time (see also Norman, 1968). The current debate in the literature is whether a short-term buffer needs to be postulated in order to account for performance on free recall tasks (Brown, et al., 2007; Davelaar, et al., 2005; Howard, et al., 2007). I will briefly touch on dissociations in recency effects over the short- and long-term, on dissociations between immediate and longer-term free recall tasks, and some points of confusions. One source of confusion is the unclarity of the concept of activation-based short-term store. I will show using simulations why an activation-buffer is different from a fixed-box buffer and its association with working memory models that assume that the content of working memory is the activated part of long-term memory (Cowan, 1999; McElree, 2006; Oberauer, 2002).

(3) Modelling complex span – Implementations of the time-based resource-sharing model #230 K. OBERAUER, S. LEWANDOWSKY, S. FARRELL

The complex span task is the paradigm most frequently used to measure working memory capacity. Barrouillet and colleagues have presented the Time-Based Resource-Sharing (TBRS) model to account for performance in complex span tasks (Barrouillet, Bernardin, & Camos, 2004). Memory traces are assumed to decay unless refreshed by an attentional bottleneck. The bottleneck time must be shared between

refreshing and the distractor task. The model accounts for three key findings with the complex span task: (1) Performance in complex span is much worse than in comparable simple span tasks; (2) Performance depends on the proportion of time between items that is required for the distractor task, and (3) The length of the distractor activity has little effect on memory performance. So far, the TBRS has been presented only informally. We present the first computational implementation of the TBRS, showing that the model makes the predictions derived from it only with a very narrow set of additional assumptions. We also show a variant of TBRS in which interference replaces decay. The two versions of TBRS make different predictions for new experiments, and if time allows, we will present some tests of these predictions.

(4) Testing the stability of forgetting rates #231 M. LANSDALE

The Population Dilution (PD) Model of forgetting (Lansdale & Baguley 2008) models forgetting as the incursion over time of interfering traces into a population of traces from which recall is sampled. The model makes the strong prediction that this incursion takes place at a constant rate and argues that most forgetting can be conceived of as interference rather than decay; for which direct evidence is otherwise, in fact, marginal. This paper reports a test of this prediction in which the incursion rate is estimated in a sequence learning task at delays of 1, 2 and 4 weeks using a memory modelling technique developed by Lansdale and How (1996). The non-stationarity of these estimates, which increase with delay, is presented as strong evidence that decay processes must be present and I consider the implications for the PD Model.

SYMPOSIUM
MATHEMATICAL COGNITION FROM DIFFERENT PERSPECTIVE

11.00 – 12.40
Seminar room 1

Chaired by I. IMBO, *Ghent University*
Speakers: P. LEMAIRE, Université de Provence ; B. DE SMEDT, Centre for Parenting, Child Welfare, and Disabilities; J. DE BRAUWER, Ghent University; K.LUWEL, Centre for Instructional Psychology and Technology; I. IMBO, Ghent University;

Understanding the various processes in mathematical cognition represents an important goal in cognitive psychology. This symposium covers five empirical studies that aim at deepening our understanding of mathematical cognition and its neural correlates. It covers arithmetic fact development, the representation of these facts in long-term memory, and the implementation of numerical knowledge by the use of various strategies. The role of working memory and long-term memory in mathematical cognition is investigated in different age groups (children, young adults, and older adults) and different cultures (European, North-American, and Asian). The authors use diverse tasks – including arithmetic fact retrieval, numerosity judgment, and computational estimation; and various methodologies – including the selective interference paradigm, the choice/no-choice method, and a training paradigm. The results provide various new insights in the domain of mathematical cognition, such as (a) the importance of phonological awareness in the development of efficient fact retrieval, (b) the association between long-term memory representations for multiplication and division, (c) the role of working memory in strategy efficiency, selection, adaptivity, and transition, and (d) the nature of individual and cultural differences in mathematical cognition. Further, all papers discuss the theoretical and practical implications of their findings, and this from psychological, educational, cultural, developmental, and neuroscientific perspectives.

(1) Age-related changes in arithmetic strategy-transition effects #232 P. LEMAIRE, M. LECACHEUR

When participants solve arithmetic problems, they use several strategies. Sometimes, they use the same strategy over two consecutive trials (i.e., repeated-strategy trials). Other times, they use different strategies (unrepeated-strategy trials). In this experiment, participants accomplished computational estimation tasks. They were cued to use one of two rounding-up/-down strategies to solve two-digit multiplication problems (e.g., doing 20x40 or 30x50 to solve 23x37). Half the trials were repeated-strategy trials, the other unrepeated-strategy trials. Participants' performance shows strategy-transition effects (i.e., better performance on repeated-strategy trials than on unrepeated-strategy trials). The present project (a) compares strategy-transition effects in young and older adults, (b) examines whether these strategy-transition effects correlate with performance on tasks assessing executive functions, and (c) determines if age-related differences in strategy-transition effects are accounted for by age-related differences in executive functions. The findings have implications for further our understanding processes underlying strategy-transition effects and age-related differences in these.

(2) How is phonological processing related to individual differences in children's arithmetic skills? #233 B. DE SMEDT, J. TAYLOR, L. ARCHIBALD, D. ANSARI

While there is evidence for an association between the development of reading and arithmetic, the precise locus of this relationship remains to be determined. Findings from cognitive neuroscience research that point to shared neural correlates for phonological processing and arithmetic as well as recent behavioral evidence led to the present hypothesis that there exists a highly specific association between phonological awareness and single-digit arithmetic with relatively small problem sizes. The present study examined this association in 37 typically developing fourth and fifth grade children. Regression analyses revealed that phonological awareness was specifically and uniquely related to arithmetic problems with a small but not large problem size. The specific association between phonological awareness and arithmetic problems with a small problem size was maintained even after controlling for general reading ability and phonological short-term memory. It has been contended that arithmetic problems with small problem size are retrieved from long-term memory, while those with a large problem size require more procedural problem-solving strategies. In light of this, the present findings indicate that the quality of children's existing phonological long-term representations mediates individual differences in single-digit arithmetic, suggesting that more distinct phonological long-term representations are related to more efficient fact retrieval.

(3) The Representation of Multiplication and Division facts in Memory: Evidence for Cross-Operation Transfer without Mediation #234 J. DE BRAUWER, W. FIAS

A recent study by Campbell and Robert (2008) offers an interesting starting point to study how multiplication and division facts are represented in memory. It showed that the bidirectional association in multiplication memory (between multiplication operands and their products), underlying both multiplication and factoring performance, behaves adaptively: Interference occurred when only one operation (multiplication or factoring) was practiced, facilitation occurred when both operations were practiced. These findings lead to specific predictions concerning transfer-of-practice between multiplication and division: When both operations are practiced, use of the mediation strategy (division-by-multiplication) leads to facilitative transfer, as the reverse association underlies the mediation strategy. But when only one operation is practiced, a specialization of the reverse association is predicted and interference is expected. We investigated this account in three experiments. In Experiment 1, participants practiced both operations. As expected, facilitation occurred, both within and between operations. In Experiment 2, participants practiced only division problems. Although only one operation was practiced, facilitation of the corresponding multiplication problems was observed. In Experiment 3, only multiplication problems were practiced and again we observed facilitation for the corresponding division problems. Clearly, the mediation strategy cannot explain these results. Our results are more

in line with a shared memory representation for multiplication and division facts.

(4) The role of working memory in the use and selection of numerosity judgment strategies #235 K. LUWEL, V. CAMOS, L. VERSCHAFFEL

We investigated the role of working memory (WM) in individuals strategic performance in a numerosity judgment task. Participants had to determine different numerosities of colored cells in a matrix by either using an addition strategy (i.e., adding all colored cells) or a subtraction strategy (i.e., subtracting the number of empty cells from the total number of cells). All participants solved the task under single- and dual-task conditions. WM was loaded by having them memorize and reproduce 5-letter strings in each trial. In both WM-load conditions the choice/no-choice method (Siegler & Lemaire, 1997) was applied. Results were analyzed in terms of the four parameters of strategic competence. We found that WM load: (a) did not affect the strategic repertoire (b) had a detrimental effect on the frequency of the more complex subtraction strategy, (c) reduced the efficiency of both strategies and (d) unexpectedly improved the adaptivity of strategy choices, as assessed by two independent adaptivity measures. This last finding suggests that participants were apparently performing at a suboptimal level in the no-load condition and that an increase in WM load forced them to perform at their full potential and, thus, at a maximum level of adaptivity.

(5) Cultural differences in exact addition and approximate multiplication #236 I. IMBO, J-A. LEFEVRE

The cultural differences in arithmetic strategy use were tested in two studies. In both studies, the choice/no-choice method was used to obtain independent measures of strategy selection, strategy efficiency, and strategy adaptivity; and the selective interference paradigm was used to investigate the role of phonological and executive working-memory resources. In the first study, Belgian, Canadian, and Chinese university students solved complex addition problems. The Chinese were faster and made fewer errors than the Belgians and the Canadians. The Chinese also needed fewer working-memory resources than the Belgians and the Canadians. However, the Belgians and the Canadians chose more adaptively among the available strategies than did the Chinese. There are several possible explanations for these cultural differences, such as differences in early educational experiences (drill and training in Asian countries vs. exploration and flexibility in non-Asian countries), differences in the structure of the number language (i.e., more straightforward in Chinese), variation in emotions (anxiety vs. motivation), and the effects of cultural norms and standards. In the second study, Belgian and Chinese university students estimated complex multiplication problems. This study allowed us to test whether the cultural differences in strategy adaptivity (observed in the first study) would change under the explicit requirement to choose the best strategy on every single trial.

SESSION
BILINGUALISM I

11.00 – 12.40
Large lecture hall A

Chaired by S. SCHOONBAERT

11.00 – 11.20

Semantic and translation priming from a first language to a second and back: Making sense of the findings #237 S. SCHOONBAERT, W. DUYCK, M. BRYSBAERT, R. HARTSUIKER, Ghent University

The present study investigates cross-language priming effects with unique noncognate translation pairs. Unbalanced Dutch (L1)-English (L2) bilinguals performed a lexical decision task in a masked priming paradigm. Two experiments showed significant translation priming from L1 to L2 (meisje – GIRL) and from L2 to L1 (girl – MEISJE), using two different SOAs (250 and 100 ms). Although translation priming from L1 to L2 was significantly stronger than priming from L2 to L1, the latter was significant as well. Two further experiments with the same word targets showed significant cross-language semantic priming in both directions (jongen [boy] – GIRL; boy – MEISJE [GIRL]) and for both SOAs. These data suggest that L1 and L2 are represented by means of a similar lexico-semantic architecture, in which L2 words are also able to rapidly activate semantic information, although to a lesser extent than L1 words. This is consistent with models assuming quantitative rather than qualitative differences between L1 and L2 representations.

11.20 – 11.40

Going from one to the other: The role of lexical triggering and discourse alignment in code-switching #238 G. KOOTSTRA[1], J. VAN HELL[1 2], T. DIJKSTRA[1]

[1]Radboud University Nijmegen
[2]The Pennsylvania State University

Code-switching is the use of multiple languages within one utterance. This switching between languages can be described from different theoretical perspectives. Discourse theories (e.g., Myers-Scotton, 1993; Pickering & Garrod, 2004) explain code-switching in terms of the linguistic demands of the discourse situation and alignment with the interlocutor's speech. Theories of triggered code-switching (e.g., Broersma & de Bot, 2006) suggest that the processing of words that overlap in form across languages enhance the co-activation of these languages and can thus facilitate a switch to the other language. The present study examined these two views in a confederate-scripted dialogue experiment. Dutch-English bilinguals described pictures to each other, in which they were free to use Dutch, English, or to switch between both languages within the same picture description. One of the participants was a confederate, who was scripted to switch or not in each trial. The pictures contained words that either overlapped between Dutch and English (trigger words) or words that dit not overlap. Results indicate that the likelihood to switch languages was increased by the confederate's switching, but was also triggered by overlapping words. The implications of these results for theories of bilingual language production and discourse alignment will be discussed.

11.40 – 12.00

The influence of semantic constraints on bilingual word recognition during sentence reading #239 E. VAN ASSCHE, D. DRIEGHE, W. DUYCK, R. HARTSUIKER, Ghent University

This study investigated how a semantic sentence context influences cross-lingual interactions when reading in the second language. Studies on out-of-context word recognition already showed that cognates (translation equivalents with full or partial form overlap, e.g., Dutch-English schip-ship) were processed faster than noncognates, indicating cross-lingual activations in the bilingual language system (e.g., Dijkstra, Grainger, & van Heuven, 1999). In the current study with Dutch-English bilinguals, we investigated whether the semantic constraint of a sentence modulates these cross-lingual activations. Previous studies on this issue only found evidence for cross-lingual interactions in low-constraint sentences (e.g., Schwartz & Kroll, 2006; van Hell & de Groot, 2008). However, they used experimental tasks (naming, lexical decision) that require an active response. We first replicated the cognate facilitation effect for words out-of-context and then presented these cognates and controls in low- and high-constraint sentences in an eyetracking paradigm. The results showed cognate facilitation on early reading time measures in both low and high constraint sentences. A control experiment with English monolinguals showed no cognate facilitation. This ensured that the effects originated from the bilingual nature of the participants. The occurrence of cross-lingual activation effects in semantically constraining sentences proves that the bilingual language system is strongly language-nonselective.

12.00 – 12.20

Semantic networks in second language learners: The role of morphological family size #240 M. DE ZEEUW, R. SCHREUDER, L. VERHOEVEN, Radboud University Nijmegen

The present study investigated the role of morphological family size during word identification in first and second language learners. Morphological family size (MFS) refers to the number of compounds and derived words in which a certain word appears as a constituent. As such, it can be taken as a measure for the existence of semantic networks in the mental lexicon. Several studies have shown that morphological family size plays an important role in word recognition: Words with a large MFS are generally recognized faster than words with a small MFS (e.g., Schreuder & Baayen, 1997). Little is known, however, about the role of MFS in second language learners, who often have a smaller vocabulary size in their L2. By means of a visual lexical decision task, we tested word recognition in Turkish-Dutch bilingual children and Dutch monolingual children in second, fourth, and sixth grade. The participants were presented with Dutch nouns with varying family sizes. Results showed that, although they have a smaller vocabulary size in Dutch, the bilingual children showed the same sensitivity to MFS as the monolingual children. The implications for current views on lexical access in bilinguals will be discussed.

12.20 – 12.40

Noun-Phrase Production in Bilinguals #241 J. SADAT[1], A. COSTA[1], F. ALARIO[2]

[1]Universitat Pompeu Fabra

[2]CNRS & Aix-Marseille Université

It has been shown that bilinguals are disadvantaged on some language production tasks when compared to monolinguals. The present study investigated the effects of bilingualism on lexical retrieval in single and multi-word utterances. To this purpose, we tested three groups of 35 participants each (Spanish monolinguals, highly proficient Spanish-Catalan and Catalan-Spanish bilinguals) in two sets of picture naming experiments. In the first one, participants were asked to name black-and-white object drawings by single words. In the second one, participants had to name colored pictures with determiner adjectival noun phrases (NP) like "the red car". In both sets of experiments, bilinguals were slower than monolinguals, even when naming in their dominant language. We also examined the articulatory durations of both single word and NP productions for this bilingual disadvantage. Furthermore, response onset times and durations of all groups in both experiments were affected by lexical variables of the picture names. These results are consistent with previous studies (Ivanova & Costa, 2008, Gollan et al., 2005) showing a bilingual disadvantage in single word production and extend these findings to multiword-utterances and response durations. They also support the claim that articulatory processes are influenced by lexical variables.

SESSION
WORKING MEMORY III
11.00 – 12.40
Medium lecture hall A

Chaired by S. DAVIES

11.00 – 11.20

Perceptual completion of familiar and novel shapes in visual short-term memory #242 S. DAVIES, Liverpool Hope University

A primed matching memory task explored the nature of representations in visual short-term memory (VSTM) for the partially occluded portions of a memory prime shape. In Memory displays the possibility of completion was modulated by the presence or absence of a gap between shapes and their occluders. Test display shapes were either complete or truncated. Experiments 1 and 2 demonstrated tat VSTM maintains the completed representation of contour and surface detail for partly occluded regions. Experiment 3 masked the memory displays at 100-ms, arresting early perceptual processes, and yet completion benefits were still observed for partly occluded memory objects. To further isolate completion processes to VSTM, Experiment 4 used star-like novel shapes instead of the familiar shapes used in Experiments 1 – 3. Once more object-based completion benefits emerged. This series of experiments demonstrates that VSTM can initiate completion processes without access to an earlier complete representation, or indeed the need to access longer-term representations. Implications for the role of VSTM in developing and maintaining object-based representations is discussed.

11.20 – 11.40

Primacy and recency effects shown in bindings of visual features #243 S. JASWAL, R. LOGIE, University of Edinburgh

Colour-shape binding was tested using a change-detection paradigm, presenting sequences of six stimuli in the study phase, followed by a test-display comprising all stimuli presented simultaneously. On change trials, combinations of colour and shape were swapped between any two stimuli. Analyses of swaps correctly detected, revealed primacy as well as recency effects. This was surprising because (a) binding is normally considered to involve simultaneous processing, (b) participants were not explicitly asked to remember sequential order, (c) the change detection task with whole displays is akin to recognition which presumably tests memory for items rather than serial order. Overall, results suggest that visual memory can sustain a temporal code at a very early stage. Recency effect was smaller at the study-test interval of 0 ms than 2000 ms, due to interference from the subsequent test display. Primacy effect was larger at 0 ms than at 2000 ms, indicating that initial items lost their level of activation over time. Shifts in recency and primacy were obtained as the exposure of stimuli was changed. Results are consistent with the multistore model, and models in which order is encoded by distinct but evolving contextual signals (Burgess & Hitch, 2006; Davelaar et al., 2005).

11.40 – 12.00

Acoustical selective attention and concurrent working memory load #244 K. DITTRICH, C. STAHL, University of Freiburg

Load theory (e.g., Lavie, 2005) is a successful approach in predicting determinants of attention. Amongst others, the theory predicts that concurrent working memory load can impair selective attention. For visual stimuli, it has been found that distraction is increased when the type of working memory load overlaps with target processing (e.g., Park, Kim, & Chun, 2007). These results support the assumption that working memory load impairs target processing in selective-attention tasks only if they share the same limited-capacity processing mechanism. In a series of experiments, the effect of three different working memory loads on two different acoustical Stroop variants was examined. A specialized-load effect was observed: For a nonverbal-acoustical Stroop variant (Leboe & Mondor, 2007), interference increased significantly under concurrent nonverbal-acoustical working memory load (compared with a no-load condition). By contrast, the Stroop effect was not increased under verbal-acoustical and visual working memory load. For a verbal-acoustical Stroop variant (Green & Barber, 1981), interference increased significantly under concurrent verbal-acoustical working memory load. The verbal-acoustical Stroop effect was not increased under nonverbal-acoustical and visual working memory load.

12.00 – 12.20

To the left, to the left: A tendency to over-represent the left side of space in an auditory-driven working memory task #245 J. BROOKS, R. LOGIE, D. SERGIO, University of Edinburgh

In Experiment 1 square patterns with a clearly defined left and right side were verbally described at a moderate speed to participants. Participants were asked to rate on a certainty scale which pattern side contained the greatest number of squares. Binaurally, there was no reliable difference between certainty judgements for each side ($p > .05$). Monaurally, there was a significant main effect of pattern side (p

< .01) with participants being more certain when judging the left side of patterns: this was particularly noticeable for left ear presentation. In Experiment 2 when the same patterns were described at a very fast speed binaurally there was no reliable effect of pattern side ($p > .05$) but there was a significant main effect of starting side ($p < .01$), with participants being more certain when pattern descriptions started on the left. Monaurally, there was a significant effect of pattern side ($p < .01$) with participants being more certain when judging the left side of patterns: this was particularly evident for left ear presentation. There was also a significant interaction between starting side and pattern side ($p < .05$) with the greatest certainty for the left pattern side and start left descriptions.

12.20 – 12.40

Links between working memory capacity and gesture rates #246 A. MELINGER, M. KEEHNER, University of Dundee

When people speak, they often produce gestures that are temporally and semantically coordinated with the concurrent speech. However, rates of gesture production vary depending on the situation and on the individual. Several factors have been shown to influence within-speaker variation including the degree to which the elicitation task taxes the working memory system. This suggests that the processing capacity of individuals might also influence gesture rates, underlying between-speaker differences. In the present study, descriptions of room plan and path-like stimuli were elicited from 32 native English speakers. Speakers could not see their interlocutors; hence communicative gestures were minimal. Each speaker was additionally assessed on four aspects of working memory capacity: verbal, spatial, visual, and complex span. Stimulus descriptions were transcribed and the gestures coded and counted. Gesture rates were then correlated with performance scores for the working memory components. Initial results reveal reliable correlations between gesture rates and spatial working memory but not verbal working memory. Also, the strength of the gesture-spatial working memory correlation differed for the two types of stimuli, which relied upon spatial transformations to varying degrees. Results are discussed in light of recent models of gesture production and theories on the function of gesture.

SESSION
HIGHER ORDER COGNITION
11.00 – 12.40
Large lecture hall B

Chaired by M. BILALIC

11.00 – 11.20

Where does chess reside? The collateral sulci host cognitive expertise #247 M. BILALIC, M. ERB, L. TURELLA, R. LANGNER, W. GRODD, University of Tuebingen

Despite being faced with literally millions of possibilities, the best chess players manage to find appropriate solutions even under limited thinking time. Here we elaborate on the mechanism behind their superior performance using behavioural, physiological, and neuroimaging evidence. Expert and novice chess players solved a chess task where they had to count particular pieces, and control non-chess tasks where they had to count all pieces on the board. While experts could utilise their knowledge in the chess task which resulted in a highly focused eye movement strategies and fast reaction times, there were no differences between experts and novices in the control non-chess task. Crucially, we find that the collateral sulci were not only more activated in experts than in novices when they dealt with chess tasks, but that also they were differently sensitive to the meaningfulness of stimuli. When experts could use their knowledge in normal game positions, the collateral sulci were more activated than when the use was limited through randomization of pieces on the board. These differences were absent in a non-chess control task, which indicates that the collateral sulcus is the brain structure behind chess experts' superior performance.

11.20 – 11.40

Mental representations of traffic sign information in a response-generation task #248 J. ROCA, M. BUENO, C. CASTRO, S. MORENO-RÍOS, Universidad de Granada

Traffic users must combine the information provided by road signs with their own goals to infer an appropriate manoeuvre. A previous experiment in our lab was conducted to explore the mental representations involved in an analogous deduction task. The participants had to imagine that they were driving a car at a T-junction. Their destination goal was cued displaying an "X" over the right or the left road. The cued destination may represent either an allowed or a not-allowed manoeuvre, according to a displayed traffic sign (an obligatory/prohibitory left/right turn sign). Faster reaction times were found for obligatory signs, both for allowed and for not allowed manoeuvres. These findings using a response-generation task are different to those previously found using a judgment task, probably due to the distinct mental representations elicited by the information given in the judgment task (one premise plus a conclusion) and in the response-generation task (two premises). The current work aims to clarify the mental representations elicited by an analogous response-generation task. The new design includes additional experimental conditions of a 'negative destination' (i.e. "you do not want to go to the right/left road") that fulfill the set of possible combinations for the mental representations elicited by the premises.

11.40 – 12.00

Driving Concurrent tasks: Effects of Making decisions and performing verbal vs. spatial-imagery tasks #249 M. BUENO, C. CASTRO, S. MORENO-RIOS, J. ROCA, C. VARGAS, Universidad de Granada

The complex driving behaviour definition can be enriched by the analysis of the concurrent tasks performed. Specifically, two driving sub-tasks are analysed in this work: On the one hand, drivers constantly make decisions regarding their journey. Every traffic sign conveys a single proposition about traffic conditions. This study analyses how people decide whether a situation is allowed or not, taking into account the information provided by one sign: obligatory or prohibitory. According to previous research (Castro, et al 2008), it does not take longer to represent prohibitory than obligatory information, but each kind of information is processed in a different way. The turn right obligatory sign leads people to represent 'right is allowed' and the turn left prohibitory sign leads to represent 'left is not-allowed'. Therefore, it could be said that each traffic sign elicits an internal mental model elaboration. On the other hand, the participants performed different mental tasks: verbal or involving spatial-imagery. Given the visual and spatial character of information acquisition while driving, and the role that spatial codes play on the generation of 'mental footnotes' we expected the judgement task to be more disrupted by performing concurrent tasks that require imagery or spatial resources.

12.00 – 12.20

The role of heuristic and analytic processes in a thematic version of the Wason Selection Task #250 E. ERDFELDER[1], K. KLAUER[2], C. STAHL[2]

[1]University of Mannheim
[2]Albert-Ludwigs-University Freiburg

One of the most robust findings on deductive reasoning in the Wason Selection Task (WST) is the thematic facilitation effect: Performance in WST versions involving thematic content such as the Drinking Age rule ("If a person is drinking beer, then the person must be over 19 years of age") is often much better than performance in logically equivalent WST versions using abstract contents ("If there is an A on one side of the card, then there is a 3 on the other side of the card"). We explored the role of inferential reasoning and heuristic judgment processes in both versions of the task using the inference-guessing model (Klauer, Stahl, & Erdfelder, JEP:LMC, 2007), a probabilistic elaboration of the heuristic-analytic dual process theory recently revised by Evans (e.g., PB&R, 2006). Based on an internet study that compared three experimental groups of participants (abstract

WST, Drinking Age problem, and an "intermediate" thematic WST), we found that thematic content (a) virtually eliminates inferential reasoning processes in the WST and (b) helps to focus on the logically correct cards in judgments guided by heuristic processes. Implications for theories of the WST are discussed.

12.20 – 12.40

Developmental differences in metacognitive accuracy in different cognitive domains from adolescence to middle adulthood #251

K. BAKRACEVIC VUKMAN, University of Maribor

This study aimed to research development in different cognitive domains, especially in metacognitive accuracy from adolescence to middle age. The study involved 282 participants, drawn from four different age groups: 13-15-, 23-25-, 33-35-, and 43-45-olds. Adult groups involved persons with university and persons with low education. These participants solved tasks addressed to spatial, propositional, and social reasoning, evaluated their own performance and difficulty of the tasks. Performance in spatial and propositional reasoning stabilized in early adulthood whereas in social reasoning improved systematically throughout the age-span studied. Results showed us that metacognitive accuracy increased with age. We also found that males were more accurate than females. Qualitative analysis of these results clarified that young adults and women were mainly too strict to their performance. In general, metacognitive evaluations were very accurate in spatial domain, less accurate in propositional and quite inaccurate in social domain. Educated persons were more accurate in their metacognitive evaluations than less educated. Improvement of metacognitive accuracy with age is in tune with findings that metacognition becomes with development more effective.

SESSION
LANGUAGE PRODUCTION I
11.00 – 12.40
Medium lecture hall B

Chaired by M. BRYSBAERT

11.00 – 11.20

The activation of articulatory information in speech perception: Evidence from electropalatography #252

I. YUEN[1], K. RASTLE[1], M. BRYSBAERT[2]
[1]Royal Holloway, University of London
[2]Ghent University

Substantial neurophysiological evidence indicates that motor systems are activated during speech perception. One consequence of the overlap in neural systems supporting speech perception and speech production is that heard speech might interfere with produced speech. This study used electropalatography to test the hypothesis that motor information activated from incongruent spoken distractors would yield specific sub-categorical distortions on the articulation of target syllables. Participants produced syllables beginning with /k/ or /s/ while listening to the same syllables or to incongruent rhyming syllables beginning with /t/. Tongue-palate contact for target productions was measured during the articulatory closure of /k/ and during the frication of /s/. Results revealed the predicted subcategorical 'traces' of the incongruent distractors on target productions, with the incongruent /t/-initial distractors inducing greater alveolar contact in the articulation of /k/ and /s/ than the congruent distractors. This interference effect decreased in the later portions of the annotated regions. No interference was observed when distractors were presented visually. These findings provide strong behavioural evidence that heard speech activates the motor systems used in articulation. They also implicate a rapid control system able to adjust speech motor programs in flight, similar to that proposed in the domain of manual action.

11.20 – 11.40

Lexical storage of word-specific pronunciation variation #253

M. ERNESTUS, Radboud University Nijmegen

This study addressed the role of exemplars and of abstract lexical representations combined with abstract generalizations in speech processing by investigating which lexical representations listeners form when learning new words. Dutch participants heard new past-participles, with all tokens of a past-participle pronounced with either the unreduced (ge) or reduced (g) prefix. They then performed a lexical decision experiment including these past-participles. In Experiment 1, all words in the lexical decision experiment were reduced and participants reacted more quickly to those past-participles that they had heard as reduced also in the learning phase. This shows that participants learned the word-specific variation in the prefix, although they could easily compute the words' unreduced forms. In Experiment 2, all words were unreduced in the lexical decision task and participants were equally fast for past-participles pronounced as reduced or unreduced in the learning phase. This suggests that the presentation of reduced pronunciations leads to storage of both the reduced and unreduced pronunciations. These data support hybrid models assuming lexical representations for all pronunciation variants, but with a privileged status for unreduced forms.

11.40 – 12.00

Are taboo errors detected before they are pronounced? An ERP-study #254

E. SEVERENS, I. JANSSENS, R. HARTSUIKER, Ghent University

It has been thought that we monitor speech internally and filter errors out before they are pronounced. Only one study, using a SLIP-task, provides direct evidence for this suggestion (Motley, Camden and Baars, 1982). In this task target word pairs have to be overtly named. The phonological make up of the preceding word pairs influences naming. Either taboo errors (e.g., cool tits) or neutral errors (e.g., barn door) were elicited. Participants made less taboo errors. Additionally the Galvanic Skin Response (GSR) was measured, which was larger in the taboo condition, suggesting the taboo words were generated but corrected internally. Since te GSR is not a reliable measure of cognitive processes, we wanted to replicate these results with a mor reliable measure. The electro-encephalogram was measured while participants carried out a SLIP-task, which could elicit taboo words or neutral words in Dutch. In the taboo word condition there was a larger negativity around 600 ms after the target word pairs. This negativity has been previously described to conflict. We suggest that this conflict results from the taboo error that is detected and corrected internally. These findings provide support for a monitor that checks internal speech for errors.

12.00 – 12.20

Number of features and concreteness in speech production #255

A. HANTSCH[1], M. CARREIRAS[2]
[1]Universidad de La Laguna
[2]Basque Center on Cognition, Brain and Language

In a variety of cognitive tasks (e.g., lexical decision, word naming, recall, etc.) concrete nouns are found to be processed faster and more accurately than abstract nouns. The underlying mechanism of the so-called concreteness effect is still under debate. One aspect closely related to concreteness is the number of features associated with a given concept. We conducted a picture naming experiment to examine the role of Number of Features (NoF) with respect to the concreteness effect in picture naming. Four sets of pictures were selected that varied a) in NoF (high vs. low) and b) in concreteness (high vs. low). The four item sets were matched with respect to a number of variables (e.g., frequency, imageability, word length, familiarity). In order to disentangle the contribution of different processing levels (e.g., picture processing, lexical semantics, articulation) on the respective effects a series of control studies employing different experimental tasks (i.e., lexical decision, object decision, and word reading) was conducted. Results showed a main effect for NoF, and an Interaction of NoF and concreteness. Taken together the pattern of results indicates that Number of Features contributes significantly to concreteness effects in picture naming.

12.20 – 12.40

An electroencephalographic study of speech monitoring [#256]

S. RIES, N. JANSSEN, S. DUFAU, F. ALARIO, B. BURLE, CNRS Universités Aix-Marseille

The concept of "monitoring" refers to our ability to control our actions on-line. Monitoring involved in speech production is traditionally considered an inherent part of the language system, and hence specific to language. We probed this underlying hypothesis in two psycholinguistic experiments where we recorded electroencephalographic (EEG) activities. We looked at an electrophysiological component known as the error negativity (or error-related negativity, Ne) previously observed in linguistic and non-linguistic tasks. A component of seemingly comparable origin has been reported following correct non-linguistic responses also. This challenges the error-related theories accounting for the cognitive mechanism underlying the Ne. Here, we report the observation of a negativity following correct responses in linguistic experiments involving overt speech production and manual responses. Our results suggest that, in language production too, the Ne reflects on-line response monitoring rather than error detection specifically. This implies that at least part of the monitoring involved in speech production is subtended by a general mechanism.

SYMPOSIUM
IMPLICIT LEARNING
14.00 – 16.00
Large lecture hall A

Chaired by N. DEROOST, Vrije Universitet Brussel & E. ABRAHAMSE, University of Twente
Speakers: R. GASCHLER, Humboldt University; S. SCHWAGER, Humboldt University; N. SCHUCK, Humboldt University; F.H. POLETIEK, Leiden University; E.L. ABRAHAMSE, University of Twente; R. BALAS, Warsaw School of Social Sciences and Humanities

Implicit learning refers to the phenomenon that people are able to acquire skilled behavior or structured knowledge about their environment in a seemingly automatic and unconscious fashion. Remaining one of the fascinating and challenging topics in cognitive psychology, the research interest in implicit learning has grown exponentially over the last decades. New techniques and paradigms have been developed to enhance our understanding of it. Nevertheless, many questions concerning the nature of processes underlying implicit learning remain unanswered. In the present symposium a number of these issues will be tackled through two of the most productive implicit learning paradigms in the field, sequence learning and artificial grammar learning (AGL). Specifically, the symposium will include a set of talks on different facets that affect the nature and/or the time course of sequence learning, as well as a talk on the role of semantics as a cue for learning complex regularity in an AGL task.

(1) Implicit learning based on instructed action codes #257 R. GASCHLER, D. WENKE, P. A. FRENSCH

We investigated how response instructions determine later implicit sequence learning. To this end, we instructed participants to either use color or location (e.g. to respond with the green key vs. the outer left key to the diamond-shape; 4 gray stimuli and 4 responses total). While spatial instructions lead to sequence knowledge of response locations, participants learned a sequence of response colors when responses were instructed in terms of color. This was demonstrated by two types of transfer tasks. E.g., visual-manual color transfer consisted of a re-arrangement of the locations of the colored keys. In visual-vocal color transfer participants named the colors of centrally presented dots that followed the sequence formerly present in the color buttons. Furthermore we explored to what extent response-features not highlighted in the instructions also become part of implicit sequence learning. We suggest that the linkage between control and learning in sequence learning (e.g., Willingham, 1998) can be studied directly by varying instructions. Furthermore, sequence learning might provide a promising technique to study how task performance is influenced by a) instructions and b) other characteristics of the task.

IMPLICIT LEARNING

(2) Registration of expectancy violations and the detection of sequential regularities #258 S. SCHWAGER, D. RÜNGER, R. GASCHLER, P.A. FRENSCH

In incidental learning situations there is always some proportion of participants who can explicitly report the task-inherent sequential regularity after training. Studies show that the probability of such conscious sequence detection is closely related to the occurrence of premature responses in the course of training with the task. According to the Unexpected-Event Hypothesis (Frensch et al., 2002) we assume that the experience of an unexpected increase in task processing speed triggers a search process for a plausible explanation for this experience. In the optimal case, this search results in the detection of the regularity underlying the task, thus enabling an improved task strategy based on the acquired explicit knowledge. To trace this hypothesis we investigated a) the general effects of timing deviants on RT-performance b) their subjective registration by participants and c) the influence of rarely inserted timing deviants on the probability of sequence detection in an SRT-like color discrimination task.

(3) Time-course of acquisition of different information types in implicit sequence learning #259 N. SCHUCK, R. GASCHLER, P.A. FRENSCH

Against the background of results of a) the verbal learning tradition with humans and b) reinforced sequential learning with animals, it becomes interesting to explore the role of different information types, such as ordinal, probabilistic and chaining information, in human implicit sequence learning. In a previous study we found evidence for the coexistence of these three information types in an implicit serial visual search paradigm (Schuck, Gaschler, Keisler, & Frensch, submitted). Here, we applied a prolonged version of the same task with transfer tests in regular intervals. This allowed us to study the time course of acquisition of these information types. Results reveal differential acquisition and forgetting patterns of these different knowledge types.

(4) Learning a hierarchical embedded structure with semantics in an AGL task #260 F.H. POLETIEK, P. MONAGHAN

Center embedded hierarchical structures are a crucial property of natural languages. The learnability of such structures by mere exposure to exemplars is a core debate in theories of natural language acquisition. Recent studies have investigated the learnability of hierarchical self embedded structures in the Artificial Grammar Learning paradigm, with mixed results. Bahlmann & Friederici (2006) report learning. But de Vries et al. (2008) failed to replicate any learning of hierarchical rules in a similar AGL study.

In two AGl experiments, we explore the possibility that learning center embedded structures is facilitated when learners are not only presented examples of the artificial language but also their 'meaning'. In Experiment 1, a set up highly similar to the de Vries et al's study without semantics, no learning was found. When semantic referents (rows of shapes and colors) were added to the learning exemplars, and the test task was to 'parse' new grammatical items by choosing one of two meanings,- rather than to give grammaticality judgments- significant learning was found. We claim that semantics is one of the many cues that help learners to acquire complex structures by learning from exemplars.

(5) Sensory redundancy in perceptual-motor sequence learning #261 E.L. ABRAHAMSE, R.H.J. VAN DER LUBBE, P. JAŚKOWSKI, W.B. VERWEY

Most experimental studies on perceptual-motor sequence learning have employed button-pressing tasks in which single stimuli are presented visually on a screen. However, in daily life we often encounter multiple sources of sensory information simultaneously, and across different modalities. From the notion that sensory information has a role in sequence learning, for which support has been mounting over the last decade, we explored sequence learning in the serial reaction time task with redundant sensory information. Specifically, in Experiment 1 we employed either single visual (presented on a screen), single tactile (presented directly to the fingers), or congruent, temporally synchronized visual and tactile response cues. It was observed that combined visual and tactile response cues did not enhance sequence learning as compared to single response cue conditions. However, this may be explained by the spatial disparity between responses cues, rendering successful integration of both response cues difficult. In Experiment 2, then, we employed a similar design, but with the location and color features of a stimulus as response cues. Again, no indications were observed that sequence learning benefited from combined location and color response cues. This systematic exploration indicates that sequence learning does not benefit from redundant sensory information, even when response cues are both temporally and spatially synchronized.

(6) Implicit sequence learning depends on attentional resources #262 R. BALAS, P. SITNICKI

Implicit sequence learning is thought to be fairly automatic non-conscious process with minimum requirements on attentional

resources. The present research investigates this opinion using new paradigm that joins divided attention and sequence learning tasks. Participants were asked to respond as fast as possible to target stimuli appearing in one of the 13 possible locations within a matrix. The sequence of target appearances was fixed unbeknown to them. A number of distractors and their similarity to target stimulus was manipulated on three levels reflecting attentional load. The expected speed-up of responses with practice and slower RTs when the sequence was changed in one block were observed. This standard implicit sequence learning effect was stronger under little attentional load. However, when attentional load was increasing the learning effect diminished. Additionally, none of the participants was aware of the learned sequence. We conclude that assumed automaticity of implicit sequence learning was disconfirmed and propose alternative account of the process.

SYMPOSIUM
NEUROCOGNITIVE CONTRIBUTIONS TO UNDERSTANDING MATHEMATICAL DEFICIENCIES
14.00 – 15.40
Seminar room 1

Chaired by A. HENIK, *Ben-Gurion University of the Negev & O. RUBINSTEIN, Haifa University*
Speakers: S.M. GÖBEL, University of York; D. SZŰCS, University of Cambridge; M-P. NOËL, Université Catholique de Louvain ; O. RUBINSTEN, Haifa University; S. ASHKENAZI, Ben-Gurion University of the Negev

With the upsurge of research in numerical cognition, the study of deficiencies in arithmetic and developmental dyscalculia has gained much interest. This has been reflected in the increasing numbers of papers and special issues devoted to this and related themes. The current symposium will convene researchers with shared interests in the field and enable discussions of central issues.

Learning deficits in mathematics affect a substantial proportion of the school-age population. Moreover, mathematical disabilities, and particularly developmental dyscalculia (DD), tend to persist into adulthood and impair occupational functioning as well as decision making in personal health care. Research implicates impairment in basic numerical processes (implicit knowledge of quantities) as a core cognitive deficit in DD that is associated with biological origins. However, it should be noted that: 1) deficits in mathematics may appear in conjunction with other difficulties like developmental dyslexia and attention disorders (e.g., Attention Deficit Hyperactivity Disorder - ADHD), and 2) individuals suffering from pure DD may show additional difficulties in attention and executive functions. Hence, heterogeneity of symptoms and co-morbidity are common and may be indicative of the essential mental operations involved in numerical cognition and the brain tissue that subserve these operations.

(1) **Numerical and Mathematical Abilities in Adults with Dyslexia** #263 S.M. GÖBEL, M.J. SNOWLING

Developmental dyslexia and mathematical difficulties have often been found to co-occur. Children that display both reading and mathematical disabilities have been reported to exhibit a pattern of deficits similar to dyscalculia (Landerl, Bevan, & Butterworth, 2004). We compared numerical and related skills in adults with dyslexia to those of control participants matched on age, gender and full IQ. Participants performed exact and approximate calculation, basic numerical tasks (e.g., counting, symbolic number comparison, SNARC), visuo-spatial tasks (mental rotation and visual search tasks) and a finger agnosia test. They were also tested on general cognitive abilities, working memory and reading.

Adults with dyslexia and controls showed significant SNARC and distance effects, but adults with dyslexia were significantly slower in counting and made more mistakes in oral addition tasks. There was no significant difference in response times for approximate addition, but adults with dyslexia were significantly slower than controls in exact addition. They were also significantly slower in oral multiplication.

These findings suggest that in most adults with dyslexia basic number processing is intact. Their mathematical difficulties were most pronounced in tasks using a verbal code and could be related to their weak phonological skills or to differences in verbal memory.

(2) **Developmental Dyscalculia: Beyond the Magnitude Representation** #264 D. SZŰCS, F. SOLTÉSZ

A frequent view assumes that developmental dyscalculia (DD) is the deficit of magnitude representation in the brain. On the other hand, behavioral data suggest that impairment of executive functioning can also result in DD. As a test of the above hypotheses we examined adolescents with pure DD with neuropsychological tests and with event-related brain potentials (ERPs). In an ERP experiment, subjects decided whether digits were smaller or larger than 5. There was normal behavioral numerical distance effect in DD and early ERP distance effects were similar in DD and in control subjects. Hence, automatic number processing relying on the magnitude representation was normal in DD. In contrast, between 400-440 ms after target onset there was a right-parietal ERP distance effect in controls, but not in DD. This suggests that between-group processing differences arose later, during more complex controlled processing. This view was supported by signs of decelerated executive functioning in DD. DD were also markedly impaired in mental finger rotation, finger knowledge, and tactile performance. Our results suggest that at least a certain kind of DD cannot be explained by impairments of the magnitude representation. Rather, deficits of executive functioning and possibly finger knowledge should also be considered.

(3) **Magnitude Representation in Math Learning Disability** #265 M-P. NOËL

In this presentation we will try to approach the question of a possible core deficit in the representation of number magnitude in children presenting math learning disability. We will present our own research and review the research of others. We will consider simple tasks where the child has to compare two items and select the one that corresponds to the larger number or where he/she is required to estimate the cardinality of a set. In both types of tasks, we will compare conditions in which symbolic numbers have to be processed and conditions in which only collections have to be processed. We will discuss these results in terms of two possible deficits in children presenting math learning disability: (1) a core deficit at the level of the magnitude representation itself, (2) a deficit in accessing this representation from symbolic numbers.

(4) **Co-Morbidity of Mathematical Learning Disabilities with Attention Deficit/Hyperactivity Disorder (ADHD) or with Reading Disabilities** #266 O. RUBINSTEN

A substantial proportion of individuals with Attention-Deficit/Hyperactivity Disorder (ADHD) manifest unexpected problems in mathematics. However, the nature of mathematical difficulty in ADHD has received scant attention from teachers or researchers. Notwithstanding the importance of understanding the nature of underlying mathematical difficulties associated with ADHD, it is also necessary to understand the effects of methylphenidate (MPH) on mathematics, given its widespread use in the treatment of ADHD. Hence, the objective of this study was to investigate effects of MPH on arithmetic performance in children with ADHD who varied in reading and arithmetic abilities. Data were analyzed from four groups of children with ADHD, who varied in arithmetic and reading abilities, namely: ADHD, ADHD+Mathematical Disorders (MD), ADHD+Reading Disorders (RD); and ADHD+MD+RD. We

developed a novel coding system to analyze existing data derived from school-like math computation work sheets that are used routinely in our controlled trials of MPH. It was found that MPH improved children's performance of simple addition, but primarily in those with co-morbid RD. By contrast, MPH had no effects on simple subtraction. These results show that behavioral manifestations of arithmetic problems in ADHD, MD or RD may have different behavioral underpinnings and show a differential response to stimulant medication.

(5) **How Pure is Pure Developmental Dyscalculia?** #267 - S. ASHKENAZI, A. HENIK

Pure developmental dyscalculia (DD) is a disorder presumed to be due to a specific impairment in brain function (generally accepted to be in the intraparietal sulcus). We examined various aspects of attention in pure DD. Cognitive load produced a DD-like pattern in a non-deficit group of participants. We employed the ANT-I (attention network test – interactions) to examine alertness, orienting, and executive functioning. We found a larger alerting effect and a larger congruity effect in the DD group compared with controls. Finally, DD participants presented no consistent bias in a line bisection task (contrary to the expected pseudo-neglect) and a larger pseudoneglect in a mental number line bisection task. These results imply that individuals suffering from DD have difficulty in recruiting attention, in addition to the deficits in numerical processing. It is possible that DD is a non-unitary deficit with multiple cognitive disabilities and multiple brain dysfunctions.

SESSION
LANGUAGE PRODUCTION II
14.00 – 16.00
Medium lecture hall A

Chaired by M. COLTHEART

14.00 – 14.20

Computational modelling of reading #268 M. COLTHEART, Macquarie University

Computational models of cognition have been developed for many domains of cognition, but the most advanced of such models are in the domain of reading. DRC1.2, a new version of the Dual Route Cascaded (DRC) model of visual word recognition and reading aloud, will be presented. Data which the original DRC model could not simulate but which DRC1.2. can simulate – the motivation for developing the new model - will be described. Comparisons of the DRC1.2 model with another computational dual-route model, the CDP+ model, and with the connectionist "triangle model" of reading aloud, will be made, and the strengths and weaknesses of each model discussed. What we have learned so far form this body of modeling work about the architecture of the reading system will be considered: what has this work told us about how we read?

14.20 – 14.40

Effects of syllable frequency in language production and comprehension #269 J. CHOLIN[1], C. BAUS[1], M. CARREIRAS[2]
[1]La Laguna University
[2]Basque Center on Cognition, Brain and Language

Syllable-frequency has been found to evoke opposing effects in language production and language comprehension tasks. High-frequency syllables have been shown to facilitate spoken production in picture naming and syllable-production tasks. In contrast, high-frequency syllables in visual lexical decision tasks are found to inhibit word recognition. To exclude that these opposing effects are a) due to different material sets and b) due to different modalities (written vs. spoken) used across different studies, we investigated syllable-frequency effects in a series of experiments using the same materials in picture naming and auditory lexical decision in Spanish. A set of disyllabic words/picture names with high- and low-frequency first syllables and matched word-frequencies was selected. The results replicated the opposing effects in the different tasks. We found the expected facilitatory effect of high-frequency syllables in spoken production and, more interestingly, we found the opposite effect in auditory lexical decision: Words with high-frequency first syllables were responded to more slowly than those with low-frequency first syllables. German speakers naming the same pictures showed no syllable (or word) frequency effect, thus indicating that the effect was not due to the pictures themselves. The results are discussed within current models of language production and comprehension.

14.40 – 15.00

The Cumulative Within-Category Cost in Picture Processing #270
E. NAVARRETE, B. MAHON, A. CARAMAZZA, University of Trento

The time required to name a picture is affected by the context in which that picture is named. The Cumulative Within-Category Cost (CWCC) describes the phenomenon in which picture naming latencies increase linearly with each additional within-category item that is named in a sequence of pictures (Brown, Journal of Experimental Psychology: HLM, 1981; Howard et al., Cognition, 2006). This phenomenon has important implications for models of speech production. Here we report a series of experiments showing that the CWCC: 1) is not present when instead of naming pictures, participants name words preceded by gender marked determiners, 2) is driven by the sheer number, rather than by the number of different, within-category items that have previously been observed, and 3) is not present for items that are repeated inside the sequence of pictures. These findings collectively indicate that the CWCC arises prior to lexical access, and suggest that the phenomenon is mediated by processes that that are sensitive to episodically contextualized semantic knowledge.

15.00 – 15.20

Dissociation between an on-line auditory task and a speeded phoneme deletion task as a function of onset density #271
P. VENTURA[1], T. FERNANDES[1], J. MORAIS[2], R. KOLINSKY[2]
[1] Universidade de Lisboa
[2]Université Libre de Bruxelles

In the present study, we measured RTs in two tasks: on-line auditory and speeded phoneme deletion. Words varied according to onset density (Vitevitch, 2002): dense onset words, with a high proportion of neighbors sharing the onset of the target word and sparse onset words, with a low proportion of neighbors sharing the onset of the target word. Dense onset words would develop better and finer–grained phonological representations of the initial phoneme. Thus, in an initial phoneme deletion task, the more fine grained representation of the initial phoneme should have a beneficial effect. On the contrary, in an on-line auditory task an onset dense word may activate many potential candidates in memory leading these words to be responded slower, a classical inhibitory effect of competition between candidates. The expected dissociation between the results in the two tasks while manipulating the same factor was found.

15.20 – 15.40

Tasks affect dyslexic response to phonology: ERP evidence #272
N. SAVILL, G. THIERRY, Bangor University

This study uses ERPs to examine effects of attentional orientation to the phonological properties of a task on dyslexic sensitivity to phonological information present in visual pseudoword stimuli. We presented dyslexic and non-dyslexic adults with visual unmasked pseudoword primes carefully manipulated for their relative phonological and orthographic similarity to subsequently presented target words in two experiments identical except for the task instruction. A speeded semantic categorisation task (animal/non-animal decision to word targets) placed no explicit phonological demands, and was compared to a high-demand task requiring homophone judgements between the prime and target ('Do they sound the same?'). Both groups showed stimulus-specific N2 and P3 phonological priming in both tasks, suggesting intact sensitivity to the

stimuli's relative phonological content. However, analysis of later P600 modulations - a component associated with linguistic monitoring and reanalysis - showed a significant task x group interaction with respect to priming-related amplitude change. Whilst the dyslexic group showed similar P600 responses to the controls in the semantic task, they showed significantly attenuated responses to all priming in the overtly phonological task. We discuss the implication that the dyslexic phonological deficit in visual word recognition may be mediated by an inefficient strategic response to processing phonological information

15.40 – 16.00

The phonological enemy effect in Deaf learners of Spanish as an L3 #273 P. PINAR[1], C. GERFEN[2], J. KROLL[2]

[1]Gallaudet University

[2]The Pennsylvania State University

Awareness of orthography-phonology mappings is critical to acquiring decoding skills yet is poorly understood for deaf readers. Although these readers may develop such an awareness, it is unclear whether or how they use it. We examine whether written exposure to a foreign L3 enhances adult-deaf ASL/English bilinguals' sensitivity to print-to-sound mappings when reading English, their L2. We build on the fact that L1 word recognition is affected by phonological enemies, with slower RTs for word-bodies with multiple spelling-to-sound mappings (have/save). Jared and Kroll (2001) demonstrated that L1-English speakers with French knowledge were more likely to activate enemies both across and within language if recently exposed to French. We tested whether deaf readers learning Spanish exhibit increased activation of English print-to-sound correspondences following exposure to written Spanish, hypothesizing that decoding an L3 (Spanish) for which they had limited reading expertise might induce greater reliance on English orthography-phonology mappings. Using an interpolated-block design, we tested four groups (deaf & hearing Spanish learners and deaf & hearing controls without foreign language knowledge.) Strikingly, the data show sensitivity to phonology-orthography mappings across groups via the presence of the enemy effect, with foreign language learning experience, and not hearing status, modulating the pattern of results.

SESSION
COGNITIVE DEVELOPMENT AND AGING

14.00 – 16.00

Conference and lecture hall C

Chaired by D. GOPHER

14.00 – 14.20

Training cognitive control in old adults #274 D. GOPHER[1], H. BLUMEN[2], J. STEINERMAN[2], Y. STERN[2]

[1]Technion - Israel Institute of Technology

[2]Columbia University

Improving cognitive functions in old adults is a focal interest in contemporary aging research. In the present study, old adults trained a complex highly demanding computer game – called the Space Fortress game. This game was developed as an attention trainer for flight candidates and has been shown to improve their actual flight performance. It requires demanding divided attention under severe time constraints, continuous and discrete motor control, visual search, working memory, long-term memory, resource management, and decision making. Two groups of 20 participants (age 60-75) were trained for 3 one-hour weekly sessions over 12 consecutive weeks. One group was given initial instructions but practiced unguided from there on. A second group was trained under the Emphasis Change protocol, which involves systematic instructions for allocation of attention to specific aspects of the game. Both groups displayed an ability to cope with the high demands of the game and improved with practice. Participants were highly motivated (only 2 dropped out before completing 36 sessions). More importantly, the Emphasis change group successfully adopted alternative attention policies. Results will be discussed in light of theoretical claims of cognitive decline with age and in terms of implications for cognitive training of old adults.

14.20 – 14.40

Effects of reward anticipation on recognition memory in younger and older adults #275 J. SPANIOL[1], C. SCHAIN[2], H. BOWEN[1]

[1]Ryerson University

[2]Heinrich-Heine Universität Düsseldorf

Reward anticipation during learning activates the dopaminergic midbrain and has been shown to enhance recognition memory in younger adults (e.g., Wittmann et al., 2008). A question of interest, then, is whether incentives can boost memory in populations known to be vulnerable to episodic memory decline. In the current study, a monetary incentive encoding paradigm (Adcock et al., 2006) was used to compare reward effects on recognition memory in healthy younger adults (ages 18-33) and older adults (ages 60-88). At encoding, cues indicated the high or low reward value of an upcoming picture stimulus. At test, recognition hits resulted in either high or low rewards ($1 or $.01), whereas false alarms were penalized (-$.50) to discourage guessing. Data from two experiments suggested that reward effects were preserved in older adults. Furthermore, within-subjects manipulation of the lag between study and test (0 vs. 24 hrs) indicated that reward effects were present after a delay, but not immediately after study, for both age groups. These findings are consistent with a consolidation account of incentive effects on episodic memory. The results also suggest that interactions between reward and memory systems of the brain may be relatively intact in aging.

14.40 – 15.00

Task switching in normal aging: new evidences concerning the manipulation of previous response and number of repetition #276 V. POSTAL, S. LALLEMAND, University of Bordeaux 2

Task switching paradigm has often been used to assess the capacities of executive functions and more particularly the capacity of flexibility. Usually, in aging, the variation of switch cost is interpreted in terms of switching difficulties. In the present study, we show that the switch cost may be also be interpreted in terms of no benefice of repetition. In two previous experiments, we have shown that the repetition of task is more beneficial to older people (first experiment) and that a identical previous response allows a decrease of reaction time for young people but also for older people (second experiment). In a same experiment, we manipulated the previous response (identical versus different), the number of repetitions (one or two) and two more commons variables (Response-Cue Interval and Cue-Target Interval) with young and old people. The results support the hypothesis of a dual impairment of switching and retrieval processes in normal aging.

15.00 – 15.20

Balance between representational conservatism and flexibility: a developmental perspective #277 P. DE FABRITIIS, University of Milano-Bicocca

Graphic representational development can be assessed by whether children can innovate canonical drawings, attesting to their ability to depict familiar subjects in different ways. Recently, cognitive researchers have focused on paths and rates of the development of representational flexibility. According to the Karmiloff-Smith's model (RRM, 1990), representational flexibility is acquired with a marked discontinuity at 8-9 years, when routine drawings are overcome once and for all. However, van Sommers (1984). suggested that continuity models fit better flexibility development, and that pictorial conservatism coexist with flexibility instead (1983). This study focuses on the relationship between conservatism and flexibility during development, and analyses it overtly. 75 children (5, 7, 9, 11 year-olds) were asked to draw two similar and two different houses (administration order balanced). Drawings were coded with a 5 point scale for 6 aspects (e.g. house's structure and width, details). Results show that linear trends fit

flexibility development in all aspects, and that in each aspect flexibility increases at different developmental rates. Overall results seem to imply that flexibility does coexist with conservatism rather than replacing it once and for all. Implications of such results are discussed on the background of the van Sommers' and Karmiloff-Smith's models.

15.20 – 15.40

Inter- and intraindividual variability across the lifespan #278

P. GHISLETTA, D. FAGOT, T. LECERF, A. DE RIBAUPIERRE, University of Geneva

Cognitive research makes (implicitly) the assumption that the effects observed on the group level are also valid for individuals. However, individual differences can be qualitatively and quantitatively very important. We present the design and general findings of the Geneva Variability Study (GVS), a large research program aimed at furthering the understanding of lifespan cognitive development by explicitly considering intraindividual variability (IIV). The total GVS sample includes 214 children (age 9-12 years), 146 young adults (19-48 years, m=22.57), and 128 older adults (59+ years, m=69.98). Each participant was administered one simple reaction time task, two choice reaction tasks, two perceptual speed tasks, two inhibition tasks, and two working memory tasks. Control variables included fluid and crystallized intelligence and health characteristics. We first briefly show results concerning age group differences and interindividual differences, to then focus on findings about intraindividual variability. Results show that strong age differences appear at all levels of analyses. The general pattern shows children as the most variable group, followed by the older adults, and last by the young adults. Furthermore, for some tasks both level and IIV information predict fluid and crystallized intelligence. We end by discussing some methodological issues for the study of IIV.

15.40 – 16.00

Influence of aging on inhibition and suppression of irrelevant spatial information #279 C. RENAU OP T HOOG, University Lyon 2

The goal of our study was to investigate how readers update their situation model, by specifically testing the distinction between inhibition and suppression of irrelevant text information. To maintain the coherence of the representation, readers are assumed to inhibit or suppress irrelevant or inappropriate information (see Gernsbacher, 1990, 1997; Kintsch, 1988, 1998) and several empirical data supported this assumption. Thus, it is now well accepted that building a coherent representation requires activating several dimensions based on text information (Zwaan, Langston & Graesser, 1995). In a parallel way, some studies have shown that older adults encounter difficulties to establish the coherence of the representation (Cohen, 1981; Light & Albertson, 1988). Hartman and Hasher (1991) showed that a deficit in inhibitory processes may overload working memory capacities and lead to a decrease in reading comprehension performances. We assumed that inhibition of irrelevant information occurs before suppression takes place. We also assume that the occurrence of these two steps should differ depending on the age of the readers. Younger and older participants were instructed to read texts that contained relevant and irrelevant spatial information. Our main results confirmed our hypothesis and showed the influence of aging on the inhibition and suppression processes.

SESSION
COGNITIVE CONTROL

14.00 – 15.40

Large lecture hall B

Chaired by M. PAELECKE

14.00 – 14.20

Reduced dual-task costs with accessory response effects #280

M. PAELECKE[1], W. KUNDE[2]
[1]Martin-Luther-University Halle-Wittenberg
[2]Technische Universität Dortmund

In a PRP experiment, participants are required to perform two different choice reaction tasks with speeded responses to two successive stimuli. Typically, RTs of task 2 are severely prolonged with increasing temporal overlap of the two tasks. This "PRP effect" is attributed to a response selection bottleneck. By introducing accessory response effects conceptually overlapping with the stimuli and responses, we demonstrated that the response selection bottleneck encompasses the endogenous activation of effect codes (Paelecke & Kunde, 2007). Turning the argument on its head, our results implied that an endogenous activation of effect codes can only proceed serially. In the present study, we tried to experimentally test this assumption by varying the temporal overlap of endogenous effect code activation. Participants made two choice reactions in response to stimuli presented either simultaneously or serially. In both tasks we varied the temporal distance between the (otherwise identical) responses and their contingent distal effects. We found a reduced PRP effect with delayed responses effects in task 2, compared to delayed response effects in task 1 or immediate response effects in both tasks. These results suggest that dual-task costs may partially result from limitations in the simultaneous activation of representations of sensorial action effects.

14.20 – 14.40

Dorsal and ventral processing in PRP situations #281

M. JANCZYK, W. KUNDE, Dortmund University of Technology

A vast amount of converging evidence points to the existence of two anatomically and functionally distinguishable pathways for visual processing: a ventral pathway for perception and a dorsal pathway for action control, both of which with distinct features. One prominent such feature is the assumed consciousness and requirement of central resources of the ventral pathway, but not of the dorsal pathway. However, recently it was shown that both pathways are subject to the PRP effect – a well known marker of capacity limitations (Kunde et al., 2007, Psychological Science). In Experiment 1 of the present study we aimed at ruling out an alternative explanation of these results, namely that the PRP effect in the dorsal grasping task was due to the instructions to focus on the primary task. With modified instructions we replicated the previous result of a PRP effect in the dorsal grasping task. In Experiment 2 we extended the paradigm to explore the processing of movements which are transformed through tool-use. In such situations our results point to an important role of the ventral pathway in motor control.

14.40 – 15.00

Transfer of dual-task skills acquired during dual-task practice #282

T. STROBACH[1], P. FRENSCH[1], T. SCHUBERT[1 2]
[1]Humboldt-University
[2]Ludwig Maximilian University

Extensive practice leads to reduced performance costs when participants process two tasks in dual-task compared to single-task situations. Previous studies explained this reduction by the assumption that dual-task skills are acquired during practice which improves the task control. It remains, however, widely unknown whether these skills are specific for the practiced tasks or whether they are transferable to novel tasks. The present study addressed this issue and looked for near and far transfer of dual-task skills to situations of the same task type (near transfer) and to situations with different task types (far transfer). After participants conducted 8 sessions of dual-task practice, we measured performance costs in a novel dual task situation with two tasks manipulated from practice to transfer to test for near transfer. To test for far transfer, we measured the costs in situations of task switches (task switching) and of two rapidly presented target stimuli (attentional blink). The results showed reduced dual task costs in the practiced and in the novel dual-task situation. However, there were no reduced performance costs in situations of task switching and attentional blink. Therefore, these findings provided evidence of near transfer but no evidence of far transfer of dual-task skills acquired during dual-task practice.

15.00 – 15.20

The continuous mind in conflict: studying the dynamics of cognitive control #283 S. SCHERBAUM, M. DSHEMUCHADSE, R. FISCHER, T. GOSCHKE, Technische Universitaet Dresden

A central topic in the cognitive sciences is the role of cognitive control in intelligent behavior. Despite impressive progress in elucidating the mechanisms of cognitive control, the question how control processes are regulated dynamically and flexibly adapted to changing task demands is still unresolved. The study of adaptive adjustments of cognitive control (e.g. In the Stroop task) has been strongly influenced by conflict monitoring theory (Botvinick et al., Psychol. Rev. 2001), which states that after trials eliciting a response conflict, increased cognitive control is recruited to improve performance. In contrast to this view, we provide evidence that dynamic adjustments of cognitive control occur continuously within the conflict trial itself. The distinction between the two views depends on the timescale of investigation. While most previous studies focused on the time-scale across trials, we used continuous behavioural measures and frequency tagged EEG methods to show that response conflicts trigger adjustments of selective attention that occur online during target selection rather than in preparation for the next trial. Results indicate how the continuous study of ongoing processes at a fine-grained timescale provides new information about cognitive processes and how this questions assumptions of conflict monitoring theory.

15.20 – 15.40

Crossmodal Action: Evidence from Dual-Task Compatibility #284 L. HUESTEGGE, I. KOCH, RWTH Aachen University

Response-related mechanisms of multitasking were studied by analyzing simultaneous processing of responses in different modalities (i.e., crossmodal action). Subjects responded to single auditory stimuli either with a saccade, a manual response (single-task conditions), or both (dual-task condition). We used a spatially incompatible S-R mapping for one task but not for the other. Critically, inverting these mappings systematically varied temporal task overlap while keeping the overall conflict across responses at a constant level. The results revealed mutual interference, but greater dual-task costs for manual responses. Importantly, a substantial increase of temporal task overlap (i.e., similar single-task processing speed) did not affect dual-task costs, challenging the notion of serial processing due to a central response-selection bottleneck. Instead, the results suggest that crossmodal action is processed in parallel by a central mapping-selection mechanism, eventually causing response-related crosstalk.

SESSION
MEMORY II
14.00 – 16.00
Medium lecture hall B

Chaired by T. BRENNEN

14.00 – 14.20

Trauma exposure in childhood impairs the ability to recall specific autobiographical memories in late adolescence #285 T. BRENNEN[1], M. ZOTOVIC[2], N. POPOVIC[2], V. GAVRILOV-JERKOVIC[2]
[1]University of Oslo
[2]University of Novi Sad

It is well-established that exposure to trauma in adulthood is associated with a lack of specificity in recall from autobiographical memory, i.e. a tendency to recall in a general manner, rather than specific events. Williams' (1996, 2006) models of overgeneral memory predicted that exposure to potentially traumatising events at an early age should lead to reduced specificity before adulthood but not necessarily to depression, because before adulthood a nonspecific retrieval style is thought to be adaptive. This prediction was tested by measuring the specificity of retrieval from autobiographical memory in Serbian participants in late adolescence, some of whom were exposed to the bombing by NATO in 1999. The trauma-exposed group produced significantly fewer specific autobiographical memories and more extended and categorical autobiographical memories, compared to the control group. No significant correlations were found between autobiographical memory specificity and measures of depression, dissociation or impact of trauma. The present findings are discussed in relation to previous findings in adult and adolescent samples and in relation to Williams' models.

14.20 – 14.40

Impaired and enhanced memory for the same associative link following think/no-think procedure #286 M. RACSMÁNY[1], M. CONWAY[2], A. KERESZTES[1]
[1]Budapest University of Technology and Economics
[2]University of Leeds

Two experiments using the think/no-think (TNT) procedure investigated the effect of the no-think instruction on cue-item relationships. In Experiment 1 when unrelated A-B paired associates were studied and recall cued with A items then recall rates were reliably enhanced in the think condition and reliably impaired below baseline in the no-think condition. A recall pattern considered to show inhibition of no-think items. In a repetition of Experiment 1 recall was cued with B items leading to reliably higher recall rates, compared to baseline, in both the think and no-think conditions. A pattern that indicates priming of no-think items. These findings show that what is attenuated in the TNT procedure is the A-B relation but not the B-A relation. It is argued that during the no-think study trials the A-B relation becomes inhibited or in some other way marked 'not-be-used-for-recall'.

14.40 – 15.00

Retrieval inhibition of familiar names #287 A. MARFUL, C. FERREIRA, M. BAJO, University of Granada

Difficulties naming a well known person can be caused by the intrusions of names of other people sharing semantic features (e.g., the same profession). These difficulties may be solved by inhibitory control mechanisms triggered to reduce competition. This hypothesis was analyzed using the Retrieval Practiced Paradigm (e.g., Anderson, Bjork, & Borjk, 1994). Participants were shown lists of photographs and names of famous people categorized by their occupation (e.g., actors, politicians). Later, SS repeatedly retrieved the names of half of the famous of half of the categories. Finally, the photographs of all the famous people were presented for naming. Results showed retrieval induced forgetting, that is, non practiced exemplars from practiced categories had lower probabilities of being named than non practiced exemplars from non practiced categories. These data demonstrate that inhibitory mechanisms can solve difficulties caused by intrusions during face naming.

15.00 – 15.20

The relationship between retrieval-induced forgetting and personality #288 D. GROOME, R. LAW, R. POTTS, T. BUCHANAN, L. THORN, University of Westminster

Goal: the goal of this study was to investigate the relationship between retrieval-induced forgetting (RIF) and personality. RIF refers to the finding that retrieving an item from memory impairs the subsequent retrieval of related items, and it is thought to reflect the operation of an inhibitory mechanism. Cortical inhibition is believed to mediate some aspects of personality, so the present study was carried out to investigate the hypothesis that individual differences in RIF performance would correlate with these personality factors. Method116 participants were tested for their RIF performance, and they also completed the Big Five Personality Inventory, and the Spielberger State Anxiety Inventory. Results: a significant positive correlation was found between RIF scores and extraversion, and a significant inverse correlation was found between RIF scores and state anxiety. None of the other personality factors correlated significantly with RIF scores. Conclusions: as the data are correlational it is not possible to draw firm conclusions about the causal direction of the relationship between RIF and personality. However, the findings are

consistent with the hypothesis that high RIF scores would be associated with high extraversion scores and low anxiety scores.

15.20 – 15.40

The role of scripts in retrieval-induced forgetting for everyday activities #289 M. MIGUELES, E. GARCIA-BAJOS, University of the Basque Country

Research has demonstrated that the act of remembering can prompt temporal forgetting of related contents in memory. This study extends the retrieval-induced forgetting (RIF) paradigm to everyday activities. Based on a previous normative data study high and low typicality actions of two different scripts were selected. The participants listened to two stories related with script activities that contained high typicality actions and low typicality actions. Then, they practiced retrieving half of the high or low typicality actions of one activity, serving the other story as a baseline to measure facilitation and retrieval-induced forgetting effects. This strategy allowed us to study the effects of retrieval practice of high or low typicality on the later recall (Experiment 1) and recognition (Experiment 2) of the remaining actions of the script story, whether high or low typicality. The conventional retrieval-induced forgetting was found for low typicality actions exclusively when low typicality actions were practised, but a comparable forgetting effect did not emerge in the highly schematic actions. These findings suggest that the activation of scripts may protect typical information from retrieval-induced forgetting.

15.40 – 16.00

The writing superiority effect: Advantages of written knowledge recall #290 J. GRABOWSKI, Heidelberg University of Education

The writing superiority effect says that knowledge diagnosis has higher content validity in the written than in the oral recall mode, which is presumed to depend on the longer activation of orthographical representations as opposed to phonological representations during language production (Grabowski, 2007). We report on two experiments demonstrating the effect's range and strength when oral and written recall from memory is compared. In the first experiment, a group of high-performing, highly selected air-force candidates recalled the states of the U.S.A.. In the second experiment, a group of students recalled Germany's national holidays. In both studies, written recall was superior (ANOVA; $p < .05$) to oral recall, compared to a cued-recall post-test for maximal knowledge assessment. Thus, even simple memory performance crucially depends on the employed verbal mode. More generally, it is important to consider the verbal recall mode in diagnostic situations like exams or similar knowledge assessment contexts.

POSTER SESSION II

16.20 – 18.20

Exhibition room A & B

ACTION II

When colour discrimination evokes action #291 L. RIGGIO[1], C. DE STEFANO[1], D. ZAVAGNO[2], N. STUCCHI[2]

[1]University of Parma

[2]University of Milano-Bicocca

Performance is better when the position of an object's handle corresponds to the position of the response (OE, orientation effect). However when participants are asked to discriminate the colour of an object, the OE is not found. In this study we tested the OE in conditions in which colour discrimination cannot easily disjointed from the shape of an object. The lightness illusion devised by Anderson and Winawer (2005), in which the lightness of a surface depends on the average lightness of a cloudy environment, was used to this purpose. A Simon task was implemented in which participants were required to discriminate the brightness (light vs dark) of silhouettes of familiar objects with right/left handles by pressing one of two right/left response keys. The role of the location of the stimuli was also evaluated by presenting the objects in the upper or lower visual field and at two different depths. Results showed a significant OE with a larger effect (a) in the first blocks of trials and (b) at the nearest watching distance. In contrast no modulation was present with respect to the upper and lower visual field.

Processing of action-related nouns modulates motor system activity #292

B. MARINO[1], P. GOUGH[1], V. GALLESE[1], G. BUCCINO[2], L. RIGGIO[1]

[1]University of Parma

[2]University Magna Graecia of Catanzaro

Recent evidence from behavioral and neuroscience communities has shown support for the involvement of the motor system during processing of language material such as action-related verbs or sentences expressing a motor content. However, it is an open question whether the motor system is also involved during understanding of concrete nouns. To address this issue, we presented written Italian nouns referring to hand-related objects (e.g., "forchetta", "fork"), foot-related objects (e.g., "gradino", "step") and abstract objects (e.g., "gelosia", "jealousy"), using a go-no go paradigm. Right-handed participants performed a semantic decision task by pressing a key when the noun referred to a concrete object. They responded using their right or left hand. Throughout the experiment, we varied the delivery time of the go signal (150 ms or 1150 ms). We found that, at the early delivery of the go-signal, right-hand responses were faster for foot-related nouns than for hand-related nouns (i.e. interference for hand-related nouns) whereas left-hand responses were faster for hand-related nouns than for foot-related nouns (i.e. facilitation for hand-related nouns). This pattern supports the notion of a crucial involvement of the left motor cortex during processing of language material, such as concrete nouns.

The influence of perspective on action execution #293 C. SUTTER, J. MÜSSELER, L. WIRTH, RWTH Aachen University

In the present experiments participants responded to a visual stimulus, but saw their responses from different perspectives. The perspective was either top view, or consistent with looking at one's own hands through a mirror, or an additional left-right inversion was introduced which let one's own hand appear as seen from another person's point of view. The results showed that a mirrored perspective did not impede responses, but that the left-right relation and ideomotor similarity between visual and proprioceptive information played an important role in response execution. To a certain degree the predominance of the visual system seemed to overrule differences between vision and proprioception, however proprioception came to the fore and dominated action when both sources of information were contradictory.

The role of domain general mechanisms in imagined transformations of the human body #294 R. POTTS, M. GARDNER, University of Westminster

Previous research using an own-body transformation (OBT) task has suggested that imagining oneself in another's position involves a specialised mechanism for egocentric perspective transformations instantiated in the temporoparietal junction. Four experiments investigated whether the findings could be better accounted for by domain general processes such as those involved in spatial stimulus response (S-R) compatibility effects. Experiment 1 used a standard OBT task in which participants made left-right judgments about an object held by a schematic human figure (front- or back- facing), from their own or the figure's point of view. Longer reaction times for front-facing figures, and for judgments made from the figure's viewpoint, replicated previous findings. However, the same effect was found in Experiment 2 in a control task involving equivalent stimulus response mappings but no human figure. Use of vocal responses in place of key presses (Experiment 3), to diminish dimensional overlap between stimulus and response, attenuated the effect and a crossed hands manipulation (Experiment 4) reversed it. These findings demonstrate a role for domain general processes in imagined spatial transformations

of the human body, undermine evidence for a specialised mechanism for egocentric perspective transformations, and contribute to current thinking about the role of the temporoparietal junction.

Bimanual Coordination in Tool Use #295 C. SATTLER, C. MASSEN, Max Planck Institute for Human Cognitive and Brain Sciences

Response selection has recently been suggested to be a major source of constraint in bimanual coordination (e.g., Diedrichsen et al., 2003), based on evidence that bimanual reaching movements without tools are initiated faster towards targets defined by congruent rather than incongruent features. When reaching with a tool, the body movement required for a correct response depends not only on the target to be touched, but also on the tool's transformation rule. We investigated the relative importance of targets and transformation rules for coordinating bimanual tool use. In a series of experiments, participants simultaneously operated two tools with congruent versus incongruent transformation rules to touch congruent versus incongruent targets. Results show that (a) congruent transformation rules are more beneficial than congruent targets when both aspects are directly cued, and (b) the type of cueing (direct versus symbolic) modulates their impact. Implications of these findings for the representation of tool-use actions are discussed.

Grasping without vision: Neural correlates of blind actions #296
C. RENZI[1], E. RICCIARDI[2], D. BONINO[2], L. SANI[2], T. VECCHI[1], P. PIETRINI[2]
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Grasping requires visuospatial and haptic integration. We examined neural correlates of different reach-to-grasp tasks, without visual feedback. We used fMRI to examine neural activity while reaching towards and grasp polystyrene balls fixed in the absence of visual feedback. Subjects were made to touch the stimuli to learn their position: they were aurally instructed to grasp a small or large sphere with a congruent (precision grip – PG – for a small size stimulus and a whole hand grasp – WHG – for the larger stimulus) or with a constrained grasp (PG for a large sphere, WHG for a small stimulus). Overall, grasping without visual feedback elicited activity in the same cortical areas reported to be recruited during visually-guided grasping. The posterior parietal and ventral premotor cortices showed a stronger recruitment for PG than WHG. The recruitment of dorsal premotor cortex during PG, not present under visual guidance, may reflect a stronger motor control. Higher activations in postcentral gyrus and anterior intraparietal cortex during incongruent conditions can show an enhanced kinesthetic request. Grasping without visual feedback may increase motor difficulty and therefore require a constant kinesthetic feedback to update spatial maps.

ATTENTION II

Eye-Movements in Repeated Visual Search of Fixed Scenes #297
M. HOUT, S. GOLDINGER, Arizona State University

Efficient visual search is performed by ignoring distracting non-targets. Paradoxically, in repeated visual search, efficiency may be enhanced through incidental learning of distractors' identities and spatial locations. Participants repeatedly searched for new target objects embedded among repeated distractors with fixed spatial locations. Stimuli were gray-scaled photographs. We examined eye-movements during implicit learning of visual search arrays and probed explicit, incidental memory for distractor identities using a surprise, two-alternative forced-choice test with semantically matched foils. The results indicated that people become faster at search over time, even when placed under working memory load, and that participants under high load retain more visual information about distractors, relative to those under low load. Eye-movement analyses elucidate the relationship between working memory load and object learning, as mediated by viewing behavior (e.g., viewing time, number of fixations). Furthermore, time-course analyses examined search efficiency by probing the number of fixations and saccades, as well as individual object dwell times, as a function of experience with the search array, and set size. Together, the results suggest that people incidentally generate memory for the identities and locations of non-targets during search, and such memory is used to enhance search efficiency.

L-theanine and caffeine improve selective attention #298
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L-theanine and caffeine in combination have been shown to improve attention. Haskell et al. (2008) demonstrated that high doses of L-theanine (250mg) and caffeine (150mg) improved simple reaction time, rapid visual information processing accuracy and perceived alertness, compared to placebo. Owen et al. (2008) demonstrated that a combination of L-theanine (100mg) and caffeine (50mg) improved accuracy and reaction time on a switch task. The aim of the current randomized, placebo-controlled, double-blind, cross-over study was to replicate the effects found by Owen et al. (2008) with an iced tea product containing similar amounts of L-theanine and caffeine, and to extend these findings to an intersensory attention task, that requires switching between different modalities. Twenty-nine participants completed the two attention tasks and an alertness questionnaire pre-treatment and 10 and 60 minutes post-treatment. On one occasion they consumed iced tea with L-theanine (97mg) and caffeine (40mg), on the other iced tea with virtually no L-theanine/caffeine. The L-theanine/caffeine iced tea improved switch task accuracy, but not performance on the intersensory task. Self-reported alertness did not improve after the L-theanine/caffeine iced tea. Overall the data show that the L-theanine/caffeine combination also improves attention when consumed in an iced tea.

Does deeper always mean better? Relation between mnemonics based on different levels of processing and state of attention #299
D. CZAJAK, Jagiellonian University

Craik and Lockhart's (1972) levels of processing theory binds depth of processing with memory efficiency - the deeper is processing, the better is remembering of some material. Although there are some data (e.g. Baddeley, 1978) supporting the fact that sometimes the persistence of memory traces processed at the shallower level is better than predicted by original version of this theory. Depth of processing is also connected with the state of attention. Kolańczyk (1991) divided attention into extensive and intensive one. In the state of intensive attention processing is deeper, whilst in the extensive attention state processing becomes shallower. In presented research the analysis of the influence of levels of processing on the effectiveness of imagery mnemonic (imagining single image to single word, connected with shallow processing; Roediger, 1980) and link mnemonic (imagining images to the presented words and linking them together, connected with deep processing; Roediger, op.cit.) is being conducted. The hypothesis of consistency is being stated. Therefore, effectiveness of imagery mnemonic should be better in the extensive than in the intensive state of attention, whilst effectiveness of link mnemonic should be better in the intensive than in the extensive state of attention. Data are being processed (N=120).

Spatial attention and neglect: prism adaption and its effect on endogenous orienting #300
A. MARZECOVÁ, D. ASANOWICZ, P. WOLSKI, Jagiellonian University

Spatial neglect refers to a failure of attending to a left visual field resulting from right hemisphere lesions. In general, it is referred to as an attentional dysfunction. Rosetti & Rode (1998) proposed a method of ameliorating symptoms of neglect by means of prismatic lenses, which shift vision and thereby trigger changes in visuospatial mechanisms. However, it is not clear, which particular cognitive mechanisms are affected by the method. Furthermore, leftward prism adaption in healthy subjects causes an effect similar to hemispatial neglect. Similarly, cognitive and neural mechanisms underlying this

effect remain yet to be identified. The aim of presented experiment was to indicate attentional mechanisms, which are modified by prism adaptation in case of "neglect-like" effect in healthy individuals. Posner's location-cueing task was used in order to differentiate processes of voluntary disengagement, movement and engagement of attention. Participants (students recruited from UJ) performed the task before and after inducing prism adaptation effect. Prismatic lenses, which shift vision 15 to the right or left, were used in prism adaptation procedure. Reaction times from the two trials were compared. Results are discussed in light of recent theories explaining the phenomenon of neglect.

Attending to spatial location or object in space: what does prism adaptation change? #301
P. ANTOSZ, D. ASANOWICZ, P. WOLSKI, Jagiellonian University

Attention can be directed to spatial locations or to objects in space. Patients with left spatial neglect respond slowly to a left-sided target when it is preceded by a right-sided "invalid" cue. Recent findings suggest that the attentional bias in left-neglect does not concern spatial locations per se, but visual objects in space (Rastelli et al., 2008). It has been shown that a visuomotor adaptation to a prism-induced rightward displacement of the visual field effectively ameliorates clinical symptoms of neglect. Conversely, leftward prism adaptation can evoke transitory mild symptoms of neglect in normals. Recent evidence suggests that the prism adaptation affects the distribution of attention; nevertheless, the precise nature of these effects is still under debate. The changes of attention distribution after prism adaptation were examined in case of "neglect- like" effect in 40 healthy individuals. In two different conditions of Posner's cueing task, non-informative peripheral cues involved either the brightening of the contour of one lateral box (onset cue), or the complete disappearance of one lateral box (ofset cue) in order to measure disengagement of attention from object in space or space location. The data is currently under analysis.

Prismatic displacement and simple reaction times #302 aJ. PASZULEWICZ, D. ASANOWICZ, P. WOLSKI, Jagiellonian University

Since the discovery of the ameliorating effects of adaptation to rightward prismatic displacement in right brain damaged and neglect patients, researchers have used prismatic adaptation to simulate neglect-like symptoms in normal subjects in order to see which behaviors and processes are affected and to better understand the complex nature of unilateral neglect and the mechanisms of PA. Interestingly, left prismatic displacement inducing 'pseudo-neglect' in healthy subjects mainly affects the performance in space representation and motor tasks. In other 'paradigms' like the Temporal Order Judgment or the Posner Reaction Time task which mainly rely on target detection, the behavior of healthy subjects remains unaffected by prismatic adaptation, although 'disengage deficits' exhibited by neglect and RBD patients in the same tasks significantly improve after right PA. The aim of the following study was to explore whether the PA aftereffect, inducing a spatial bias, speeds up the detection of laterally presented stimuli and whether RT for stimuli in RVF and LVF depend on the direction of the prismatic displacement. Previous studies employing cuing tasks didn't find any effects of PA on RT for validly and non cued hemi-field targets but didn't focus explicitly on this aspect. The data is currently being analyzed.

Central load and change detection accuracy #303 J. PASZULEWICZ, D. ASANOWICZ, P. WOLSKI, Jagiellonian University

Many researchers and theories claim that focused spatial attention is necessary to notice and report changes in the CB paradigm. However, a significant body of research shows that focusing attention is probably necessary but not sufficient to give rise to a report of change. The aim of the present study was to systematically explore whether change detection relies on successful consolidation of the visual stimuli into the VSTM and whether this consolidation process requires central resources. Subjects were engaged in a change detection task (deciding if two displays were the same or different) and performed a speeded tone pitch discrimination. Many studies showed interference in similar dual task paradigms. However it's not clear whether such interferences occur when the ISI between the original and the modified version of the visual display is kept very short (i.e. 100 ms), thus when iconic representations relying on the recursive interactions in visual pathways can support change detection accuracy more easily. Change detection accuracy and speed/accuracy of pitch discrimination were analyzed in different SOA, ISI and set-size conditions. In a preliminary experiment without a speeded categorization task no multitasking deficits were observed across all ISI and set-size values. The data is currently being analyzed.

Influences of prism adaptation on reflexive covert attention #304
Ł. MICHALCZYK, D. ASANOWICZ, P. WOLSKI, Jagiellonian University

Hemispatial neglect refers to a failure of attending to a left visual field resulting from lesions of the right hemisphere. It is referred to as an attentional dysfunction, which involves deficits in disengagement of attention from the objects in right visual field, as well as in inhibition of return to the right visual field. Rosetti & Rode (1998) proposed a method of ameliorating symptoms of neglect by means of visuomotor adaptation to a prism-induced rightward displacement of the visual field. Conversely, in healthy subjects, leftward prism adaption causes a "neglect-like" effect. However, it is not yet clear which particular cognitive mechanisms are affected by the method. Three experiments were conducted which aimed at indicating attentional mechanisms that are modified by prism adaptation in case of "neglect- like" effect in healthy individuals. Posner's location-cuing task paradigm was used in order to differentiate processes of exogenous disengagement, movement and engagement of attention, as well as to measure the effect of inhibition of return. Participants (students recruited from Jagiellonian University) performed the task before and after inducing prism adaptation effect. Results are discussed in light of recent theories of neglect.

BILINGUALISM II

Italian-German bilinguals comparing two-digits number words #305
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The unit-decade compatibility effect found when subjects compare two-digit numbers consists of faster decisions when unit and decade lead to the same response (e.g., 47-58) than when unit and decade lead to different responses (e.g., 48-57). Previous studies with monolinguals subjects showed that when numbers are presented as numerical words the compatibility effect depends on the linguistic properties of the language in which the comparison task is performed (Nuerk, Weger, & Willmes, 2005). In German, where the two-digit numbers are inverted (e.g., 27 = siebenundzwanzig, literally, "seven and twenty") a regular compatibility effect occurs. However, in English or Italian, where there is not such inversion, the compatibility effect disappears. In the present work, we examined this linguistic difference in three groups of participants (1) Italian/German bilinguals, (2) Italian monolinguals, (3) German monolinguals. All participants performed a comparison task with number words.

The processing of syntactic ambiguities in consecutive translation and reading #306 N. PAREDES, P. MACIZO, T. BAJO, University of Granada

In this study we evaluate the vertical and horizontal views of translation at the syntactic processing level. A group of Spanish/English professional translators (L1/L2, respectively) read sentences to repeat them in Spanish or to translate them into English while the attachment preferences used to solve the syntactic ambiguity were evaluated. The participants did not show a clear attachment preference when they read and repeated sentences. However, they used the attachment strategy usually preferred in the target language (low attachment in

English) when they read and translate them. These results demonstrate that translators parse sentences according to the task they perform. Moreover, these results support the horizontal view of semi-consecutive translation during the processing of ambiguous sentences.

Competition is required to observe inhibition in bilingual language processing #307 D. PAOLIERI, P. MACIZO, T. BAJO, University of Granada

This study examines the asymmetrical language switching cost in a task that does not involve language competition (e.g., semantic categorization task) and in task where the bilinguals' two languages competed for selection (e.g., word reading task). In the semantic categorization task, Spanish/English bilinguals (L1/L2, respectively) decided whether a word visually presented in their L1 or L2 referred to an animate or to an inanimate entity. This task does not involve language competition because a word in both Spanish (gato) and English (cat) drives to the same response (animate). In the language production task, Spanish/English bilinguals read words in L1 and L2. This task involves competition because when bilinguals have to read a word in Spanish (gato) its English translation (cat) is a strong candidate that competes for selection. In both tasks a language switching paradigm was used so participants randomly alternated between their languages. The results indicated that inhibitory processes in bilingual processing as indexed by the asymmetrical language switching cost were only observed in the word reading task. These results suggest that between language competition is required to observe inhibition in bilingual language processing.

How Spanish-English bilinguals use prior knowledge in their two languages #308 M. MARTÍN[1], P. MACIZO[1], A. HERRERA[2]
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[2]University of Murcia

Spanish/English bilinguals (L1/L2, respectively) read sentences presented one word at a time while the EEG elicited by the last word of each sentence was recorded. We manipulated the language in which these sentences were presented (L1/L2). We included sentences that were biased by the bilinguals' prior knowledge. These sentences were true or false (e.g., "Alfonso consumed eighteen grams of alcohol drinking brandy and eleven grams of alcohol drinking wine, so he consumed more alcohol drinking brandy/wine"). These biased conditions were compared with true/false sentences that described situations in which the participants' world knowledge did not determined the sentence reading. Larger N400 effect in the incongruent vs. congruent biased conditions as compared to unbiased incongruent/congruent conditions would indicate that world knowledge influences the understanding of sentences. This result was expected because the biased congruent sentences would be "more true" while the incongruent sentences would be "more false" than these sentences in the unbiased condition. Overall, the results showed that biased sentences were associated to N400 effects when bilinguals read in L1 and L2. Possible differences across languages were also analyzed to explore whether the way bilinguals use their prior knowledge depends on the language they use.

Intra- and Interlingual Frequency Neighborhood Effect in L1 French Adults Low Proficient L2 English speakers #309 E. COMMISSAIRE, S. CASALIS, University Lille North of France

Monolinguals studies reported a frequency neighborhood inhibition effect (Ségui & Grainger, 1990). Bijeljac-Babic, Biardeau & Grainger (1997) found the same effect across languages in bilingual participants. This result has been interpreted as the evidence for an integrated L1-L2 lexicon associated with a non-selective access in bilingual population. Our goal was to replicate their pattern of results in low proficient L2 speakers, varying task instructions. Thirty-two students were assessed in a French lexical decision task associated with a masked priming procedure. All were native speakers of French who had learned English at school for 8 years on average. None of them reported to practise the language, nor to have been immersed in a bilingual context. French low frequency targets were used. Primes were either French or English high frequency words, orthographically related or unrelated to the target. The Stimulus Onset Asynchrony was 57 ms. The presence of English words was mentionned to the participants. Priming inhibitory effects were found in both intra- and interlingual conditions. Thus, mentionning the presence of L2 language allowed low proficient L2 speakers to show cross-language interference. These results were interpreted in the frame of the bilingual version of Interactive Activation hypothesis (Dijkstra & al, 1998).

The processing of object pronouns Spanish: A comparison of native speakers and L2 learners #310 E. ROSSI, G. DUSSIAS, Pennsylvania State University

We report a set of experiments that investigates adult second language (L2) acquisition when L1 and L2 differ with respect to their morphosyntactic parameters. English and Spanish differ with respect to their pronominal system. Spanish object (clitic) pronouns always appear before a finite verb and are marked for gender and number, while English object pronouns appear after the verb and do not encode gender. We examined the on-line processing of object pronouns in L1 Spanish speakers and in English L2 learners of Spanish. Participants performed a self-paced reading task with: 1) Sentences with correct pronoun position, and 2) wrong clitic position. L1 Spanish speakers accurately detected sentences with an incorrect pronoun position and showed significantly slower reading times at the clitic site, with spill-over at the following word. We will compare the performance of these two groups and consider the implications for claims about constraints on L2 acquisition.

Bilingualism and the Acquisition of Number Skills #311
D. GUAGNANO, E. RUSCONI, R. JOB, R. CUBELLI, University of Trento

Recent studies from the attention domain claim that early bilingualism accelerates the maturation of executive functions in childhood and retards decline in old age (Bialystok et al. 2004). If early bilinguals showed such advantage, it should be evident across cognitive domains. We tested the 'bilingual hypothesis' within the field of number cognition by comparing the performance of monolingual and bilingual children in three tasks: number Stroop, verification, dot counting. In the number Stroop task, participants compared the numerical size of two single-digit numbers, while ignoring their physical size. Unlike in the study of Bialystok (2005), no difference was found between mono and bilinguals as for the number Stroop effect. In the verification task, an associative confusion effect was found in the bilingual but not in the monolingual group. Finally, when children were asked to count, bilinguals performed equally well as their monolingual peers in counting items in the subitizing range only, whereas they were slower than their peers when they counted from 4 to 9 dots. This latter result is consistent with psycholinguistic studies claiming that bilinguals are disadvantaged in tasks requiring lexical access (Costa & Caramazza, 1999), and extend them to the number domain.

DISORDERS II

Short-form of the Spanish version of WAIS-III for use in the assessment of schizophrenic patients #312 I. FUENTES, M. ROMERO, C. DASI, J. RUIZ, M. SOLER, University of Valencia

The present research is focused in the development of a short-form of the Spanish version of the WAIS-III (Seisdedos, Corral, Cordero, de la Cruz, Hernández and Pereña, 1999) with the goal of reducing the time needed to assess IQ in schizophrenic patients. Cutting down this time is specially relevant due to the slowness that some of this patients suffer because of medication or other reasons. The sample was formed by 41 individuals diagnosed with schizophrenia. In the data analysis we have used the criteria of Rescnick and Entin (1971) to select the scales of the reduced version, that is a) significant correlation between the complete and the short form, b) no significant difference between IQ means of both forms, and c) great agreement of IQ category classification (very high, high, medium-high, medium,

medium-low, low, very low). The data showed that the best combination of scales was: Similarities, Picture Completion, Digit Span and Digit Symbol-coding. The correlation between the short and the complete form was 0.91.

Implicit and explicit memory in children after traumatic brain injury #313 M. DE MARTINO[1], M. PANASITI[2], C. NUCITA[3], D. MENGHINI[3], E. CASTELLI[3], M. SABBADINI[3], S. VICARI[3]
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Traumatic brain injury (TBI) in childhood has severe consequences on the functioning of cognitive systems, mainly, attention, memory and executive functions.Studies on implicit (IM) vs. explicit memory (EM) in children after TBI describe cognitive profiles where EM is severely impaired while IM is relatively spared. Studies on adults' TBI describe a similar pattern; furthermore, deficits in sequence implicit learning have been documented by using the Serial Reaction Time task (SRT). Our research aims at corroborating the available data and at investigating the abilities of sequence implicit learning in children with TBI. Ten children with TBI and a control group matched for age (8-14 years) and sex underwent IM (Word-Stem Completion, Fragmented Picture, iSRT) and EM tasks (visual, spatial, verbal learning and eSRT). TBI group performed worse than control group in all EM tasks but the eSRT and in two IM tasks (Word-Stem Completion and iSRT). These results suggest that even though in children with TBI IM abilities are relatively spared they show difficulties in integrate such abilities when the simultaneous processing of different kinds of information is required (iSRT). Thus, the pattern of disrupted/spared EM and IM abilities after TBI is similar for both adults and children.

To do or not to do? Memory for intentions and response inhibition in Autistic Spectrum Disorder and ADHD #314 P. FILIPPELLO[1], M. BRANDIMONTE[2], E. COLUCCIA[2], M. KLIEGEL[3], M. ALTGASSEN[3]
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[3]Dresden University of Technology

Autistic Spectrum Disorders (ASD) and Attention-Deficit/ Hyperactivity Disorders (ADHD) are common developmental disorders often characterized by opposite patterns of behaviours (i.e., inflexible and impulsive behaviours, respectively) as to the ability to execute goal-directed actions. However, the nature of the future goal may vary considerably, according to whether the goal refers to an action to be done or to an action to be inhibited.In the present research, children with ASD (Study 1), with ADHD (Study 2), and two groups of paired normal controls engaged in a categorization (ongoing) task and, concurrently, in either an event-based prospective memory task (PM) or a response inhibition task.Results showed that ASD children were impaired in the PM task but not in the inhibition task. In the ongoing task, ASD children were as accurate as but significantly slower than controls, independently of conditions. On the other hand, ADHD children were impaired in the inhibition task but not in the PM task. In the ongoing task, ADHD children did not differ from controls in the presence of a concurrent PM task, while they were less accurate than but as fast as controls in the presence of the inhibition task. Theoretical and practical implications will be discussed.

Amnestics' False Memory Following Incidental and Intentional Encoding: What About Conscious Activation of the Critical Lure? #315 I. VAN DAMME, G. D'YDEWALLE, University of Leuven

Recent studies evaluating amnesic and normal implicit false memory in the DRM paradigm have revealed opposite findings: Whereas priming for critical lures is typically the same for amnesics and controls following intentional encoding, amnesics show diminished false priming following incidental encoding. Experiment 1 tried to replicate both of these findings, by manipulating encoding type within-subjects. Implicit stem completion and recognition tests were administered to Korsakoff patients and memory-intact controls following incidental and intentional encoding of DRM word lists. In Experiment 2, participants were asked to think aloud, to investigate whether conscious activation of the lure during study occurs equally often under both types of instructions, and whether this influences the likelihood of later false memory. Surprisingly, no group differences in false priming were obtained, following both types of encoding. Amnesic patients did verbalize less critical lures than controls during intentional encoding, and showed impaired recognition performance. Lure verbalization was shown to contribute to explicit false memory, but had no clear effect on false priming. Together, results point to the conclusion that amnesic patients' encoding abilities are sufficiently well to obtain normal implicit false memory (regardless of type of encoding), and that conscious lure activation is not required to do so.

Alteration of prospective memory functions in obsessive-compulsive disorder (OCD) #316 G. DEMETER[1], M. RACSMÁNY[1], K. CSIGÓ[2], A. HARSÁNYI[2], A. NÉMETH[3]
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[3]Semmelweis University Budapest

Disorder of the executive system is generally thought to be the main underlying cognitive factor of symptoms in OCD. In our view beside the executive deficit the prospective memory is also impaired in OCD. Prospective memory is defined as the ability to formulate, retain and carry intentions, plans and promises at the appropriate time or in the appropriate context. We explored in one experiment whether prospective memory task performance is impaired in a properly diagnosed clinical sample of OCD patients. We adapted the experimental paradigm developed by Burgess et al., who demonstrated that different cortical areas are implicated in the maintenance and realization of an intention. According to our results the OCD group performed significantly slower on this event based prospective memory task than the matched healthy control group. A further aim of our study was to find different performance patterns related to the two major subgroups of OCD patients. The so-called compulsive subgroup performed significantly slower on the expectation condition relative to the baseline condition, while the obsessive subgroup produced impaired performance on the execution of the prospective task. We suggest that the overactivity of the prospective memory system it could be a major factor in OCD cognitive phenotype.

Simulation of autobiographical future episodes in patients with amnesic Mild Cognitive Impairment #317 N. GAMBOZ[1], S. DE VITO[1], S. PAPPALARDO[2], A. IAVARONE[2], S. DELLA SALA[3], M. BRANDIMONTE[1]
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[3]University of Edinburgh

Results from behavioral studies of amnesic patients and neuroimaging studies of individuals with intact memory suggest that a brain system involving direct contributions from medial temporal lobe supports both remembering the past and imagining the future (Episodic Future Thinking; EFT). In the present study, we investigated whether amnesic Mild Cognitive Impairment (aMCI) affects EFT. aMCI is a high-risk factor for Alzheimer's disease and is characterized by a selective impairment of episodic memory, likely reflecting hyppocampal malfunctioning. We assessed whether the reduction of episodic specificity for past events, evident in aMCI patients, extends also to future events. We present preliminary data on 10 aMCI and 10 healthy controls who mentally re-experienced and pre-experienced temporally close and distant autobiographical episodes. Transcriptions were segmented into distinct details that were classified as either internal (episodic) or external (semantic). Results revealed that aMCI patients generated fewer internal details than healthy controls, and importantly, this effect was also evident for future events. Furthermore, internal and external detail scores were correlated across past and future events. These results will be discussed with respect to the constructive episodic simulation hypothesis, which suggests that reminiscence and future thinking are the expression of the same neurocognitive system.

EMOTIONS II

Processing of Emotional Stimuli in Anxious and Depressive Repressors and Sensitizers #318 A. KLESZCZEWSKA-ALBIŃSKA, R. ALBIŃSKI, Warsaw School of Social Sciences and Humanities

Two studies concerning processing of emotional stimuli in anxiety and depression were conducted. Analyses were prepared for separated groups distinguished based on Weinberger, Schwartz & Davidson (1979) typology. In the first study 80 people were divided into 4 groups according to their results in State Trait Anxiety Inventory and Social Desirability Questionnaire. In the second study 74 people were divided into 4 groups according to their results in Beck Depression Inventory and Social Desirability Questionnaire. In the experimental part of the studies emotional version of Divided Attention Task was used.Results show that 4 heterogenic types can be distinguished based on the anxiety measures as well as on the depression measures. It was discovered that there are significant differences between number of false alarms in reaction to neutral stimuli in low-anxious and anxious repressors gropus. It was also discavered that there are significant differences between number of false alarms in reaction to positive stimuli in low-depressive and depressive repressors groups.Results show that there are some similarities in processing of emotional stimuli in anxious and depressive repressors and senstizers. What is more repression and sensitization may be considered universal rather than specific feature.

The dark side of the (positive) mood: how mood and encoding processing affect false memories #319 E. MENDONÇA, P. CARNEIRO, Lusófona University

The encoding processing one engages when in a specific mood has been thought to be responsible for the influence that emotional states have on false memories. In order to understand whether emotional states and encoding processes interact to explain false memories, an experiment using the DRM paradigm was conducted. Ninety seven university students were induced to different emotional states (positive, negative and neutral) and instructed to engage in relational or item-specific processing. The results indicated that relational processing increased false recall only when the participants were in a positive mood. Further, when participants were instructed to follow this type of encoding processing, positive emotional states compared to negative emotional states led to higher levels of false recall.

Emotional Valence and Executive Attention: how emotion affects executive processes #320 J. POZUELOS, M. RUEDA, A. ACOSTA, Universidad de Granada

The interaction of cognitive control and emotional regulation has started to capture the attention of cognitive science, since the same mechanism has been related between the two processes. In this study we tested how emotional stimuli affect attention by manipulating the emotional valence of irrelevant and relevant task information. We use a modify flanker task, in which facial expression photograph stimuli acts as flanker (experiment 1, irrelevant task information), or as target (experiment 2, task relevant information). The trial was considered compatible if the target was flanked by same gender items. Preliminary results (experiment 1) shown the classical flanker congruency effect ($F(1,14) = 6.375$, $p < 0.05$), a marginal valence effect ($F(1,14) = 3.416$, $p > 0.05$) and a congruency x gender interaction ($F(1,14) = 4.370$, $p = 0.05$). These results suggest that emotional information can affect performance in attentional task, even tough the information is irrelevant for the task. The experiment 2 is still getting done.

Impact of negative affect on creativity – the threat of social exclusion vs the threat of health #321 L. DRĄŻEK, University of Warsaw

The threat of social rejection produces negative affect and less intelligent functioning compare to others unpleasant situations, such as misfortune. This effect was observed in relatively difficult cognitive tasks, which require a lot of resources of the central executive system (Baumeister).We hypothesized the threat of social exclusion would produce less creative thinking compared to the threat of illness. The tense arousal would be a mediator. The aim of the study was to verify the hypothesis in two experiments. The result of Urban-Jellen test was the indicator of creativity thinking. In the first experiment we manipulated negative affect by giving false information from test and measured creative thinking before (control condition) and after (experimental condition) this event, in a time period of one week. False information included unhappy anticipation ("loneliness" vs "misfortune"). In the second experiment participants got instruction to recall and describe a unpleasant situation. Participants were randomized into three groups: "interpersonal rejection", "group rejection" and "illness". They were completely debriefed directly after these procedures. Results support the hypothesis partly: in the first experiment we obtained significant effect only within "loneliness" group, the second study showed significant difference between "interpersonal rejection" and "illness" for creative thinking and tense arousal.

HIGHER ORDER COGNITION II

Surprise as a response to unexpected events that are difficult to assimilate in the prevalent processing schema #322 A. TOUROUTOGLOU, A. EFKLIDES, Aristotle University of Thessaloniki

Surprise is thought of as an emotional response to unexpected events. But, it is not known whether such events are determined by unpredictability per se or the difficulty with which they are assimilated to the prevalent processing schema. To test this, 31 participants were required to perform an inductive reasoning task, in which they had to solve a set of numerical sequences consisting of expected and unexpected numbers that were easily, moderately difficult, and difficult to assimilate. Results showed that surprise ratings increased with the difficulty with which the unexpected numbers were integrated with the prevalent processing schema (as indexed by accuracy of response and reaction times). Surprise was also found to be closely related to feeling of difficulty, a metacognitive experience also triggered in problem solving. These findings extend current models of surprise by taking into account the difficulty of assimilating unexpected events.

How the probability of conditionals task provides a strong support to the revised mental model theory #323 C. GAUFFROY, P. BARROUILLET, University of Geneva

The probability of conditionals task consists in giving information about the frequencies of the four logical cases and asking participants to estimate how likely a given conditional is to be true or false. In line with the suppositional theory (Evans & Over, 2004), the most common response is to judge the probability of the conditional as the conditional probability, P(q/p). Reasoners would run a mental simulation in which they consider p and then evaluate the likelihood of q, disregarding not-p cases in the process. In the present study, we proposed the probability task to sixth graders, ninth graders and adults. As predicted by the revised mental model theory (Barrouillet, Gauffroy & Lecas, 2008), the developmental trend observed conforms to the construction of one, two, and then three models. For participants who are not able to construct not-p cases, those cases are not disregarded but integrated in the process of evaluation as cases making the conditional false. According to Evans et al. (2007), the probability task is claimed to distinguish the suppositional theory from the mental models account. Our results suggest that the revised mental model account is more appropriate for explaining the development of the evaluation of conditional.

Low vs. high spatial frequencies matter for higher cognitive tasks – the case of website evaluations #324 G. HIRSCHFELD, M. THIELSCH, I. PERABO, University of Muenster

The visual system is best understood as a hierarchical system of modules each tuned to different spatial frequencies (Marr, 1982). The aim of this study was to investigate whether the distinction between low vs. high spatial frequency information is also important for higher cognitive tasks scuh as evaluations of website properties. 107 Participants rated the usability and aesthetic pleasantness of 50

website screenshots from different content domains. Participants were assigned to one of three conditions, a full band pass (FBP) condition with greyscale screenshots, a low spatial frequency (LF) condition with blurred (Gaussian blur filter 7.1 pixel kernel) targets, and a high spatial frequency (HF) condition with highpass-filtered (0.3 pixel radius) targets.Usability judgments to FBP screenshots correlated higher with ratings of the HF screenshots ($r = .83$) than judgments of LF screenshots ($r = .52$). This difference was significant ($p < 0.001$) using a test for overlapping correlations. The corresponding analysis for the aesthetic judgments revealed a similar trend.This study shows that judgements of usability depend differentially on high vs. low spatial frequency information. It thus offers a new window to the neurocognitive study of website experience.

Draw a man or draw your mum: Drawing and mental representation in children #325 C. MAINTENANT, C. THEVENOT, M. DUTREVIS, University of Geneva

Children's difficulties in drawing can be explained by graphic difficulty or by limitations in their mental representations. In order to disentangle the two hypotheses, we asked 6- to 9-year-old children to draw either a man, or in other words the prototype of the human category, or their mum, an exemplar of this category. We showed that the quality of the exemplar drawing was higher than the quality of the prototype drawing on the Goodenough scale. This result shows that it is possible for children not only to construct a detailed representation of the human category, but moreover, to externalize this representation in their drawings. However, surprisingly, when the exemplar was produced after the prototype, no more difference in qualities between the two categorical levels was observed. One interpretation could be that the production of a man triggers such a highly routinized procedure that it prevents the child from moving through different levels of representation. Then, taken together these results suggest that an explanation of children's difficulties only based on graphic limitations cannot be retained.

A statistical validation of the Planning Index #326 D. BASSO, G. VIDOTTO, P. BISIACCHI, University of Padua

In the Maps task (an open version of the Travelling Salesperson Problem) participants use arrow-keys to move a silhouette, aiming to achieve many locations minimizing total travel time and distance. The achievement of the goal involves several components: to estimate the cognitive effort allocated during the execution of this task, a "Planning Index" (PI: Basso, 2005) has been created using intermediate times and movements. This study was designed for corroborating the validity of PI, aiming at disentangling the contribution of the different processes composing the index. Twenty-two young adults were presented with 30 situations of the Maps test. Intermediate times were collected for each key-pressed, thus allowing retrieving the trajectory implemented. Beside the standard Maps measures, an analysis was performed on each segment of each path: intermediate times were weighed up by attributing a dichotomic value of presence/absence for each cognitive process (visual perception, representation, planning, control, switching, motor execution). Results showed that: 1-planning continues during the execution phase, 2-PI offers a realistic measure of the ongoing high-level processing.

Expertise – Investigating Deliberate Practice #327
T. KUBIK, Jagiellonian University

Research on deliberate practice is summarized, taking into account data about various groups and various aspects of deliberate practice (cognitive, behavioral and motivational). Next, a method is proposed and utilised to assess deliberate practice of a specific target group (managers). Research links deliberate practice with effectiveness measures.

Unconscious vs. Conscious inferences in deductive reasoning #328
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The existence of unconscious processes in deductive reasoning has been explicitly acknowledged by researchers since the 'atmosphere effect' hypothesis. More recently, in order to incorporate the role unconscious inferences such as the 'matching bias' play in the explanation of the selection task, Wason & Evans (1975) proposed the first dual-process hypothesis of reasoning. Since then, an increasing number of authors have claimed that there are two different types or systems of reasoning processes: Type 1 and Type 2 processes. In this paper we present the results of a study on conditional and disjunctive inferences in which participants carried out two reasoning tasks. In the unconscious inference task, participants are forced to give very rapid responses to deductive problems, whereas in the normal conscious inference task, participants work with no time restriction; participants were also asked to rate the difficulty of the problems. The results of this study are analysed from mental model theory and illuminate some ideas about the nature of these two types of reasoning processes.

IMPLICIT COGNITION II

Effect of study time on familiarity-based recognition #329
A. PITARQUE, S. ALGARABEL, University of Valencia

In a recognition experiment we manipulated study time (50, 100, 200, 500 milliseconds) and perceptual relationship between studied and unstudied words (targets and lures not sharing any letter of the alphabet, NO condition, vs targets and lures sharing at least one letter, O condition). Finally subjects made a forced-choice task in which they had to choose between two new words coming from each subset. Results from the NO condition were better than O condition at the recognition tests, while the force-choice task rate was significant higher than 0.50, in all study time conditions, showing both tasks their sensitivity to measure familiarity. Even at presentation times in which recognition by other sources was at chance, participants used perceptual familiarity in their responding. We discuss these results in the context of the automatic contributions to recognition memory.

Cognitive load influence on the implicit and explicit memory. Motivational aspects #330 M. WIERZCHOŃ, M. SZPITALAK, Jagiellonian University

The aim of the presented studies was to investigate the mechanisms of the cognitive load influence on the implicit and explicit memory. The cognitive load was induced by engaging Ss in difficult arithmetic task with varied duration (10-15-30-60 min). After that, Ss were asked to memorize the words presented on the computer's screen and than they were asked to complete word stems. The conscious and unconscious influences of memory were computed with the Process Dissociation Procedure (Jacoby, 1991). The results showed the warm-up effect as the consequence of the cognitive load in the 10 and 15 minutes conditions. The conscious influence of memory measured by the word stem completion task in those conditions was significantly higher than in the control group, whereas the unconscious influences stayed intact. Unexpectedly, the cognitive load experienced for 30 and 60 minutes has not led to the fatigue effect. The results are analyzed in with respect to Kahneman's (1973) resources theory and to the activation models.

The nature of color-induced nasal-thermal sensations #331H. GALICH, S. RELLAND, G. MICHAEL, EMC Laboratory, Universite Lyon 2

Two experiments investigated the nature of the recently reported color-induced nasal thermal sensations. Subjects were required to fixate a bottle containing a red or a green solution presented centrally (Exp1) or laterally (Exp2) and to sniff always the same bottle containing 10ml of a colorless and odorless solution presented out of sight. Each nostril was tested separately and subjects were asked to judge whether the sniffed solution induced warming or cooling sensations in the nasal cavity. The results of both experiments confirmed the recently reported warming/left nostril - cooling/right

nostril dissociation, suggesting the existence of different lateralized processes for thermal processing. However, Exp2 failed to demonstrate dominance of warming responses when the eyes were directed on the left and cooling responses when they were directed on the right side, neither did gaze direction interacted with the tested nostril. This suggests that the color-induced thermal sensations are specifically related to the nasal trigeminal system, not to a general process related to color perception. In overall, our results suggest that, even in the absence of real critical stimulus, preparing to process thermal stimuli in the nasal cavity may activate the underlying neural mechanisms, and that those mechanisms are reflected in the responses.

Implicit Spatial Perception In Unilateral Neglect #332
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According to the most influential accounts of unilateral neglect, the underlying deficit is the lack of spatial coding of contralesional stimuli, which prevents their conscious processing. To test this interpretation, a left-neglect patient, V.D., was asked to discriminate the colour of a centrally-presented square by pressing a left or right key. The target was flanked by a coloured irrelevant square. Although V.D. was not able to consciously perceive the flanker when it was presented in the left hemispace, we observed the effects of the target-flanker colour congruency and flanker-response position correspondence with both left- and right-sided flankers. In the spared hemispace, an interactive effect of the flanker colour and position was found. This effect has been already observed with normal participants and assumed to reflect the two irrelevant attributes being bound in the same object. In contrast, in the neglect hemispace, we observed additive rather than interactive effects. These findings suggest that the location of neglected stimuli, as well as their non-spatial attributes, can be coded without the intervention of attention. We conclude that in unilateral neglect the contralateral stimuli do not enter consciousness because of the critical role of attention for binding object features.

Access to implicit knowledge: feeling of warmth and post decision wagering #333
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Implicit learning is an automatic and unconscious process that leads to knowledge hardly available to introspection. There is an argument whether artificial grammar learning (AGL) is at least partially conscious and gives rise of consciously accessible knowledge. Some measures of conscious knowledge were used in AGL studies (e.g. verbal reports) but the agreement has not yet been reached. This study in artificial grammar learning paradigm was conducted to investigate whether people could have access to the implicit knowledge. The scales, based on the relation between accuracy in the AGL task and the score on the feeling of warmth, confidence ratings and post-wagering scales, were used to assess the ability of conscious availability to the information stored in the memory. Authors hypothesized no relation between accuracy and confidence rates scale. Positive relation between (2) accuracy and feeling of warmth scale, (3) accuracy and post-wagering scale. 179 subjects participated in the study (107F, 72M, mean age: 22,51). Results suggest that it is possible to get an access to implicit knowledge by guidance of intuition (feeling of warmth scale).

LANGUAGE PRODUCTION II

Phonological activation in sentence production #334
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Our study addressed the scope of phonological advance planning during sentence production. Participants first viewed line drawings of simple action scenes (e.g., a mouse eating some cheese) along with descriptive sentences ("The mouse eats the cheese"). During the main experiments, the production of the sentences was cued by presenting the agents (e.g., the mouse), in part preceded by lead-in sentence fragments to vary the structure of the target sentence. To tap the phonological activation of agent and patient nouns, auditory distractor words were presented that were either phonologically related to the agent, or to the patient, or were unrelated to both. Compared with the unrelated condition, distractors related to nouns in the utterance initial phrase facilitated the naming response, while distractors related to nouns in non-initial phrases interfered with the naming response. Because the cueing procedure rules out that some automatic phonological activation of visually perceived objects contributes to the observed interference effects for patient nouns, our results suggest that phonological advance planning exceeds a single syntactic phrase.

Sequential retrieval of lexical items during noun phrase production #335
P. AYORA, F-XAVIER ALARIO, CNRS & Université Aix Marseille

The dynamic processes of lexical retrieval were investigated in a series of noun phrase production experiments. In particular, we assessed whether speakers who produce several lexical items retrieve them sequentially or in parallel. Participants named pictures of high and low frequency names in a colour and/or numerosity context. The colour and/or number associated with each picture were predictable or unpredictable. Results show that naming latencies reflected the difficulty of retrieving each of the words. Responses were slower for low than high frequency names. Naming latencies were also delayed when the colour or number attribute could not be known in advance. Moreover, these effects were additive. This pattern suggests that the lexical items in a noun phrase are not retrieved in parallel. Rather, they appear to be retrieved sequentially, or by simultaneous processes that depend on shared capacity. This conclusion is consistent with the conclusions reached in dual-task studies investigating resource limitations in language production.

Grammatical gender effect in bare noun production: Evidence from the picture-word paradigm in Italian and Spanish #336
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In the picture-word paradigm, differential effects have been observed when two stimuli shared semantic, grammatical or phonological features, thus supporting the notion that lexical representation comprises information that are specified at different levels (Caramazza, 1997; Levelt et al., 1999). For grammatical gender, when bare noun production is required, an interference effect of gender has been found in Italian (Cubelli et al., 2005) but not in Dutch (Starreveld & La Heij, 2004). To explain the different pattern of results, Cubelli et al. (2005) assumed that the effect of gender congruency depends on the morphosyntactic properties of languages. If this account were correct, the gender effect should be observed also in Spanish, a language with a gender system quite similar to the Italian one. In two experiments we replicated the effect of gender congruency with Italian and Spanish speakers: Naming times were slower to target-distracter pairs sharing grammatical gender. The results support the notion that gender is an intrinsic lexical property and that grammatical gender selection is crucial in languages where nouns are marked for gender.

Effects of frequency, neighbourhood density and neighbourhood frequency in spoken word production in European Portuguese #337
L. OLIVEIRA, S. VICENTE, Universidade do Porto

Frequency, neighbourhood density and neighbourhood frequency are factors that interfere in speech production processes, but whose influence isn't yet totally known. In a picture naming task, 38 participants named 80 images to which were associated words

contrasting in the 3 variables in study. Besides the widely documented facilitative effect of frequency, results show that in the group of low frequency words, sparse words are produced significantly faster than dense words (p = .000; M = 1095 vs. 1166; SE = 22.3 vs. 24.4) and low neighbourhood frequency words are produced significantly faster than high neighbourhood frequency words (p = .004; M = 1111 vs. 1150; SE = 21.3 vs. 24.7). This results contrast with those generally obtained in English where it was found that frequency, density, and neighbourhood frequency have a facilitative effect in spoken word production. Thus, our results are discussed in the context of models of spoken word production and considering recent data either on English and other languages such as Spanish, allowing translinguistic comparisons.

Homograph competition in lexical processing of Italian verbal forms #338 F. POSTIGLIONE, A. MANCUSO, A. LAUDANNA, University of Salerno

This research evaluate whether information about finiteness affects the processing of verbal forms when they are homophones/homographs of nouns. Current studies on Italian claim that finiteness, among other grammatical categories, seems to be relevant during the processing of different verbal forms. We hypothesize that the past participle homophonic/homographic forms have only an orthographic representation during in the recognition phase, while at lexical level these forms have distinct representations, one for each of the grammatical roles they may play. Four visual lexical decision tasks exploiting the priming paradigm were performed. In the first two experiments 32 regular past participles having a higher frequency either as nouns (e.g. impiegato, clerk/employed) or as verbs (e.g. condannato, condemned/convict) were selected. In the last two experiments 36 finite verbal forms that are homophones/homographs of nouns were selected: 18 forms had a higher frequency as nouns (e.g. danza; dance/he-she dances) and 18 had a higher frequency as verbs (e.g. arrivi; arrivals/you arrive).The results showed that in Experiments 1 and 2 only the verbal representation of homophonic/homographic is sensitive to a Finiteness effect, while no difference was found in Experiments 3 and 4. The results are interpreted as evidence that these forms have different lexical representations.

Sublexical and lexical influences on writing during text production among 5th-to 9th grade French children #339 S. MAGGIO[1], B. LÉTÉ[2 3], F. CHENU[3], H. JISA[3], M. FAYOL[1]

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We describe a large-scale regression study that examined the influence of lexical and sublexical variables on writing processes of 139 French children aged of 10, 12 and 15 years. Word frequency, consistency of phoneme-to-grapheme mappings, syllable frequency, phonographic-neighbour frequency, word length and rank of the lexical unit in the text were the main predictor variables in stepwise-regression analyses. Predictors corresponded to grade-level-based measures extracted from French school books and compiled in the Manulex databases (Lété et al., 2004; Peereman et al., 2007). Chronometric data were collected with the Eye and Pen software of Chesnet and Alamargot (2005). The entire corpus was composed of 271 texts of about 33000 words. Four dependant variables were tested: the pause durations before each word, the writing rate of the word, the longest intra-word pause duration, and the location of the longest intra-word pause duration. To our knowledge, and at least for French, the present work is the first to make use of grade-level-based statistical characteristics of sublexical and lexical units found in child-directed printed materials to predict the chronometric variations observed in word writing in a text production context.

Processing italian regular and sub-regular verbal forms #340 V. AMORE, A. LAUDANNA, University of Salerno

The problem of how morphologically regular and irregular forms are processed is mainly addressed by two models: the dual mechanism model, which distinguishes between a rule-based mechanism for regular forms and the storage in an associative memory component for irregular forms, and the single mechanism model, which maintains that both regular and irregular verbs are processed by the same associative memory component. Italian morphology includes both idiosyncratic irregular phenomena and sub-regular inflectional patterns, shared by families of morpho-phonologically similar verbs. We report the results of two experiments based on the visual lexical decision task, in which we used experimental pseudo-past participles, formed by transforming the regular root of a 1st conjugation verb by analogy with a phonologically similar sub-regular verb of the 2nd conjugation, (e.g., ALLARGARE (to enlarge)> *ALLARSO from EMERGERE (to emerge)> EMERSO (emerged)). For each item a control pseudo-word was created, where the pseudo-participle was modified by substituting the penultimate letter, in order to create a non-suffix. The results showed longer latencies on experimental pseudo-participles than on control items. This outcome is difficult to explain within the dual mechanism approach, because it suggests that also regular 1st conjugation's verbs are sensitive to effects of phonological similarity.

Root Frequency in Visual Word Recognition of Italian Words #341 A. LAUDANNA, G. BRACCO, University of Salerno

A number of experimental data (Meunier & Segui, 1999; Baayen, Tweedie & Schreuder, 2001; Ford, Marslen Wilson & Davis, 2003) show that words with high-frequency morphologically related words are recognized slower than words with lower-frequency morphological family members. A study on Italian (Bracco & Laudanna, 2007) showed that the family frequency does not affect written word recognition, while the family size (Schreuder & Baayen, 1997) strongly facilitates it. It has also been showed that the relative frequency (Laudanna & Bracco, 2006), that is, the ratio between the word's surface frequency and the root frequency, is inversely correlated with the latencies: the higher the frequency of the morphologically related words, the slower the recognition.These effects are difficult to reconcile with facilitatory root frequency effects previously described on Italian. (Burani, Salmaso & Caramazza, 1984, Burani & Caramazza, 1987).The goal of this work is to test the reliability of the root frequency effect. The results of one experiment of lexical decision, and post hoc correlations, did not show any effect of root frequency. The inconsistency with previous results on Italian (Burani et al, 1984) is discussed in the light of the use of different frequency corpora.

The influence of misspelling exposure on word production performance #342 M. DELATTRE[1], S. PACTON[2]

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Experience with misspellings can be detrimental to subsequent spelling performance. The effect of exposure to incorrectly words on spelling performance and latencies was examined on spelling to dictation task (in French). Between two spelling tests on the same words, the subjects were exposed to misspellings. Different types of misspelling (e.g., suppression or insertion of letters ; phonogically plausible errors) were presented. Spelling accuracy and latencies were taken in account. Being exposed to incorrect spellings between two successive spelling tests interfered with subsequent spelling accuracy, as indicated by changes from correct to incorrect spelling. Moreover, latency was affected by the exposure on the second dictation task. These results suggest that exposure to incorrect spelling generates interference even if this information is known to be incorrect. And when an error does not appear after exposure, the process of word production seems affected as well.

Orthographic neighborhood effects : evidence for feedback in spelling to dictation #343 S. ROUX, LAPSCO

The participants were asked to spell aloud words for which there were either many orthographically similar words (a dense neighborhood) or few orthographically similar words (a sparse

neighborhood). Words with a dense neighborhood were spelled faster and more accurately than words with a sparse neighborhood. This finding is consistent with the hypothesis put forward by Rapp, Epstein & Tainturier (2002), namely that the cognitive spelling system has an interactive architecture that incorporates feedback between individual graphemes and orthographic lexeme representations.

LEARNING AND MEMORY II

Effect of instructions in the confidence-accuracy calibration in eyewitness memory #344 K. LUNA[1], B. MARTÍN-LUENGO[2]
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Calibration is defined as the correspondence between the objective probabilities of giving a correct answer (i.e. accuracy) and the subjective probabilities of being accurate (i.e. confidence). Previous studies with calibration analysis showed that the confidence accuracy (C-A) relationship is good in Eyewitness Memory. But most of these studies used recognition test. We studied the C-A relationship in a bank robbery, with cued recall test and with calibration analysis. We were also interested in the effect of instructions focused on either metamemory or the conditions of codification of the information. Our results showed that calibration was good in general and, when calibration is plotted with all the questions, participants were slightly underconfident with difficult questions (i.e. low accuracy) and slightly overconfident with easy questions (i.e. high accuracy). However, this pattern reverses when we plotted separately the calibration for hard and easy question (the hard-easy effect). The instructions had not the expected outcome and impaired, instead of improved, calibration. This results support the idea that the C-A relationship is good with cued recall test, and that calibration is a very informative technique to analyse this relation.

Encoding of categorical information has no effect on false memory #345 Y. LEE, National Chung Cheng University

This study examines how the encoding of higher order thematic links across list items affects false memory produced by the categorized lists. In Experiment 1, in addition to the control group who simply studied categorized lists of words from one of the two subcategories, two experimental groups were explicitly given the category or subcategory labels before studying each word list. Participants in Experiment 2 were further asked to make a typicality judgement for each studied word based on either category or subcategory labels. Another group of participants were asked to perform a meaning recognition during the test. All participants in both experiments showed that false memory of the nonstudied critical word from the studied subcategory was higher than that of the nonstudied subcategory, regardless of the encoding/retrieval conditions. These results suggest that false memory is controlled more by inter-item associations than across-item thematic associations.

Categorical perception was induced by rule-based category learning but not by information-integrated category learning #346 T. SUEGAMI, Sophia University

Previous studies (e.g., Özgen & Davies, 2002) demonstrated that learning novel categories produced categorical perception (CP: better discrimination for cross-category pair than within-category pair). Ashby, Alfonso-Reese, Turken, and Waldron (1998) argued that rule-based (RB) category and information-integrated (II) category were learned by different systems. Present study investigated whether learning RB or II category produced CP. The stimuli were 42 squares, varying their size in 6 steps and brightness in 7 steps. Ten participants learned the RB category, in which the category boundaries consisted of one value both in size and brightness. Another 10 participants learned the II category, in which the category boundary consisted of the function of size and brightness. Other 15 participants did not learn any category as control. After the category learning, the participants performed the delayed 2AFC discrimination task for the 42 squares. The results showed that the accuracy for the cross-category discrimination was significantly higher than the one for the within-category discrimination in the RB category learner but not in the control. However, such cross-category advantage was not observed in the II category learner. Our results suggest that RB category but not II category produced CP. The relation between category learning and CP was discussed.

The influence of practice and handedness on the orthogonal Simon effect #347 N. MILANESE, C. IANI, S. RUBICHI, Universita' di Modena e Reggio Emilia

When stimuli are arranged vertically and responses horizontally, right-handed participants respond faster with right responses to stimuli presented above the fixation point, while stimuli presented below the fixation point are responded to faster with left responses. This orthogonal spatial stimulus-response (S-R) compatibility effect is found even when stimulus position is a task-irrelevant attribute (orthogonal Simon effect). The aim of the present work was twofold. First, we assessed whether the orthogonal Simon effect evident in right-handed participants is present also for left-handed participants (Experiment 1). Second, we investigated whether for both groups of participants the orthogonal Simon effect is influenced by the S-R mapping used for an orthogonal spatial S-R compatibility task performed five minutes before (Experiment 2).Our results showed that the orthogonal Simon effect significantly differed in the two groups, with left-handers showing an advantage for the up-left/down-right mapping (Experiment 1). Interestingly, the orthogonal Simon effect was strongly influenced by prior practice regardless of the participants handedness (Experiment 2). These results suggest that the short-term S-R associations acquired through practice can override the long-term associations established on the bases of handedness.

Backward Blocking and Interference between cues in non-causal scenario #348 C. ORGAZ[1], D. LUQUE[2], J. MORÍS[2], H. MATUTE[1], P. COBOS[2]
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Backward blocking and interference between cues are two important effects in human associative learning which share some critical features that question whether they actually are different things. Specifically, in both cases, the pairing of a given cue, B, with an outcome, O1, hinders the expression of a previously acquired association between another cue, A, and the same outcome. The only methodological difference between them is that during the first phase backward blocking requires the simultaneous presentation of both cues. However,some studies have provided evidence of a significantly stronger backward blocking effect, which might suggest different underlying processes. We suggest that such difference could have been produced by causal reasoning processes because the instructions used for the learning task suggested a causal interpretation of the relationships between cues and outcomes. In the present study backward blocking and interference between cues were compared in an experiment in which the relationships between cues and outcomes were framed within a neutral, non-causal scenario. The use of a neutral scenario should avoid promoting one effect over the other on the basis of causal reasoning processes. The results showed significant effects of both backward blocking and interference between cues. Also, both effects were of similar magnitude

The influence of encoding style on the production of false memories #349 H. DEHON[1], F. LAROI[1], M. VAN DER LINDEN[2]
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Although often accurate, memory is sometimes imperfect and leads to the retrieval of distorted or illusory information.Recent research has revealed the existence of individual differences in how preexisting schemata (versus cues from the outside world) affect encoding processes, which can be reliably assessed with the internal and external encoding style questionnaire (ESQ, Lewicki, 2005). Because deep encoding has been found to increase the production

of false memories in the DRM paradigm (Roediger & McDermott, 1995) while item-specific encoding reduced it (see Gallo, 2006), the present study was designed to examine whether individual differences in encoding style affects the production of such false memories. To this purpose, normal participants were asked to complete the French versions of the ESQ questionnaire and were presented with a modified DRM procedure. The results showed that the more the participants were associated with the internal encoding style, the more likely they were to produce false recognitions in the DRM paradigm. These results contribute to better understand the influence of individual differences on the resistance to false memories.

Forward and backward blocking in the absence of a causal scenario #350 M. VADILLO[1], D. LUQUE[2]
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According to some models of causal learning, cue competition effects such as blocking or overshadowing should be highly dependent on the meaning of the events used as cues and outcomes. Specifically, cue competition is assumed to occur only when multiple cues, defined as potential causes, predict a single outcome, defined as the effect of those cues. A number experiments designed to test this hypothesis have observed that cue competition is indeed sensitive to the causal nature of cues and outcomes: Cue competition is readily observed when cues are defined as causes of the outcome (predictive tasks), but the effect is smaller (or even nonexistent) when the causal role of cues and outcomes is reversed, so that cues are perceived as potential effects of the outcome (diagnostic tasks). Interestingly, these theories are silent about the possibility of observing competition with causally unrelated events. The present experiment shows that forward and backward blocking can be found even in an experimental preparation that precludes the perception of a causal link between cues and outcomes. These results suggest that several mechanisms (some of them independent of the causal content) could account for cue competition under different conditions.

Learning variable inter-event contingencies in the traditional laboratory and on the Internet #351 M. VADILLO, N. ORTEGA-CASTRO, C. ORGAZ, H. MATUTE, Universidad de Deusto

Available evidence suggests that Internet-based research methods can be successfully used in a wide variety of experimental areas, including among others probabilistic reasoning and associative learning. Previous research conducted in these contexts shows that well-known phenomena, such as cue competition or the illusion of control, can be readily replicated over the Internet and that few, if any, divergences are found between the results observed in these settings and those obtained under traditional, laboratory conditions. The present series of experiments aimed at further exploring the potential differences between both experimental conditions regarding the learning rate of cue-outcome associations. In two experiments using radically different experimental preparations, participants were exposed to a learning task in which the cue-outcome contingency learned during the first half of the trial sequence was reversed during the second half of the sequence. The results show that the ability to track this contingency reversal was significantly reduced on the Internet condition: Internet participants were slower to detect the contingency reversal and did not reach asymptotic performance by the end of training. This suggests that the Internet participants might pay less attention to the task, as compared to participants in the laboratory condition.

The role of typicality, organization, and integration of category exemplars in retrieval-induced forgetting (RIF) #352 E. GARCIA-BAJOS, M. MIGUELES, University of the Basque Country

In this study the effects of typicality, organization and integration in retrieval-induced forgetting for semantic categories were analyzed. Based in a previous normative study six high and six low frequency exemplars of six semantic categories were selected. In the first experiment the participants studied 36 high or 36 low frequency elements distributed in six blocks of six elements. Each block included random presentations of six elements of the six categories, or the six elements of each category. In addition, participants had category-exemplars study instructions or were encouraged to link the category elements through a suggested story. Although organized presentation improved recall performance, selective retrieval practice produced retrieval-induced forgetting only for high-typicality elements. In the second experiment encoding mnemonics to integrate the high-typicality elements modulated retrieval-induced forgetting. The strength of the exemplars was the cause of retrieval-induced forgetting observed in the recall of semantic category items. Even so, when integration strategies broke the semantic category-exemplar associative strength, episodic retrieval of the exemplars escaped from retrieval-induced forgetting (RIF).

Learning natural objects: A cognitive artifact of the way we were? #353 A. VRANIC, I. HROMATKO, University of Zagreb

Experimental approach has proven useful in suggesting that human predisposition to learn basic aspects of hunting might be an evolutionary holdover from our pre-agricultural past. Recently, Sharps et al. (2002) showed that better recall of animal tracks is due to the human predisposition to effectively learn animal tracks due to their significance in the hunter-gatherer society. This experiment provides a further support of these findings. The rate of learning paradigm was employed to test the recall of picture-pseudoname pairs in three categories: animal tracks, berries (both due to the proposed cognitive adaptation) and feathers (natural control items). Using the repeated measures design, long-term retention was tested after 48 hours. The results showed a significant category x sex of participant interaction ($F(2, 29) = 5{,}004$, $p<.05$). Further analysis showed female participants' better retention of item-pseudonames pairs in the berries category and male participants' better retention in the category of animal tracks. The results are interpreted from the evolutionary and cognitive psychology perspective.

Learning by observation: The role of social comparison and related ability inferences #354 L. BOUNOUA[1], F. CURY[1], E. MONFARDINI[2], M. MEUNIER[3], D. BOUSSAOUD[2], A. BROVELLI[2], P. HUGUET[1]
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[2]Université de la Méditerranée
[3]Universite Lyon 1

If knowledge and skills had to be shaped by trials and errors, human development would be greatly retarded, tedious, and hazardous. Fortunately, human beings are able to learn by observing others' behaviors or actions. Here, however, we offer first evidence that observational learning (associative learning task) is strongly disrupted in normal adults when they infer very superior ability in their model, compared to themselves. In Study 1, the observation of either a neutral model or a slightly superior model facilitated learning of complex visuo-motor associations. Observational learning was eliminated in a condition where participants were faced with a model (a peer) supposedly very superior to themselves (strongly upward comparison). In Study 2, observational learning was beneficial in this critical condition, provided the model's superiority could be simply attributed to prior training on the task at hand. These findings offer direct evidence for the role of social comparison and related ability inferences in observational learning. What the individuals come to believe about their competence relative to the model makes a huge difference.

Using a multidimensional scaling approach to investigate the underlying basis of ease of learning judgments #355 F. JÖNSSON, B. LINDSTRÖM, Stockholm University

A multidimensional scaling (MDS) procedure was used to evaluate the underlying basis of ease of learning (EOL) judgments for 24 nouns. The two main MDS dimensions was interpreted as frequency and word length, indicating that people use the most readily available and salient cues in the stimulus set.

LIFESPAN II

Working memory plasticity in younger and older adults: Practice gains and transfer [#356] C. BÜRKI, C. LUDWIG, C. CHICHERIO, A. DE RIBAUPIERRE, University of Geneva

It is commonly accepted that normal aging is associated with progressive decline in different cognitive domains. However, there is evidence of remaining cognitive plasticity in old age in episodic memory. Less is known regarding working memory. The aim of the present study was to investigate age-related differences in working memory plasticity. Young and older participants (aged 19-38 and 60-84, respectively) underwent a ten sessions working memory training using an adaptive verbal n-back task. In both age groups, and compared to age-matched no-contact control groups, we found an increase in performance on the practiced task and a transfer to an untrained spatial n-back task. No evidence was found for transfer to complex span, inhibition and processing speed tasks. In the practiced verbal task, gains were more pronounced for young adults, whereas older adults improved more in the spatial task. These findings indicate that gains are observed in a structurally similar untrained task, hence pointing to certain plasticity in working memory, even in old age. Results address the potentials of practicing working memory to maintain or even enhance cognitive performance in older adults.

Generalization of the worst performance rule across the lifespan [#357] S. FERNANDEZ, J. DIRK, D. FAGOT, A. DE RIBAUPIERRE, University of Geneva

The Worst Performance Rule (WPR) states that on a multitrial cognitive task worst performance trials are better predictors of intelligence than best or even average performance trials. Many studies report evidence supporting the WPR in young adults (for a review, see Coyle, 2003). However, WPR has received little empirical support in children (Coyle, 2001) or older adults (Salthouse, 1998). With data from the Geneva Variability Study (Fagot et al, submitted) this research aims at generalizing the WPR across different age groups (201 children, 137 young adults and 122 older adults) and cognitive tasks (simple reaction time, choice reaction time, and inhibition). The Raven Progressive Matrices served as an indicator of fluid intelligence. Bivariate correlation analyses were conducted to investigate the relationship between percentiles of the RT distributions and the Raven scores for each task and age group. Results show that the WPR applies in almost all tasks and age group. Worst performance trials explain significantly more variance in fluid intelligence than best and average performance trials. Thus, this is the first study to show that the WPR generalizes across the lifespan. Implications of these findings in light of individual differences and assessment of intelligence will be discussed.

Cognitive flexibility in preschoolers. Can verbal regulation help? [#358] A. BLAYE, L. POURCIN, Université de Provence

Previous research on cognitive flexibility has revealed drastic development during the preschool years. Flexibility is assessed using a card-sort task, DCCS, in which children have to sort twice a series of bi-dimensional pictures, first following one dimension and then the other. Although, it has been acknowledged that verbal processes can help regulate behavior, the evidence is ambiguous when considering young preschoolers.Our aim was to assess the extent to which inducing 3-year-old children to verbally regulate their sorting during the post-switch phase would improve flexibility. Participants were distributed into three conditions that differed for the post-switch phase : Control group : standard version of the DCCS ; Labeling Group : Participants had to label each card by its relevant dimension ; Rules-wording Group : Participants had to verbalize the rules of the game before sorting .The data revealed that children can benefit verbal regulation. Significantly more children evidenced flexibility in the labeling group than in the two other groups. Analyses of verbalizations revealed that 80% of the participants who succeeded in rephrasing the rules actually succeeded. These findings are discussed in terms of their contribution to the theoretical debates on the factors that affect cognitive flexibility in preschoolers.

Interrogative suggestibility in children: Processing modality and cognitive factors as mediating variables [#359] A. CUNHA, P. ALBUQUERQUE, T. FREIRE, University of Minho

The analysis of the association between children's chronological age and their degree of suggestibility is a controversial debate in the domain of the research on false memories. On the other hand, vulnerability to suggestion has also been analyzed through the study of individual differences in cognition and personality, in order to understand their influence in the tendency to develop false memories. The current study tries to clarify the divergences in the relationship between children´s interrogative suggestibility, age and some cognitive factors. Considering the importance of the information acquisition modality in memory consolidation, we compare verbal and visual procedures in what concerns to their suggestive potentiality.The Gudjonsson Suggestibility Scales (GSS2) and the Video Suggestibility Scale for Children (VSSC) were used to access interrogative suggestibility in two groups of children with 6/7 and 11/12 years old. Suggestion impact is analyzed considering intelligence, memory and attention.

Children's learning about formal and functional properties of double letters: The case of French [#360] J. DANJON, S. PACTON, Université Paris Descartes

The main objectives of the present study were to investigate how children's formal and functional knowledge of French orthographic regularities develop and interact and clarify cross-linguistic discrepancies with English and Finnish. French-speaking schoolchildren in grades 1-5 participated in an "orthographic constraints" test in which they were shown pairs of nonwords such that one nonword in each pair conforms to a constraint of the French writing system while the other does not. Knowledge of four formal regularities (about doublet use and silent letters) and of two functional properties (about doublet use) was measured. Results showed that knowledge of some formal aspects of doublet use develop as early as the first school year and increases during the following grades but that sensitivity to other aspects emerges later, suggesting that formal knowledge of print is not an homogeneous component and that some formal orthographic regularities may be easier to grasp than others. Knowledge of functional aspects emerged also as early as in the first grade but with a low understanding even among older children. Interactions between formal and functional regularities and cross-linguistic divergences are considered in the discussion.

Level and Variability in Cognitive Performance across the Lifespan: Insights from Modeling Response Time Distributions [#361] J. DIRK, C. CHICHERIO, P. GHISLETTA, A. DE RIBAUPIERRE, University of Geneva

Within the Geneva Variability Study, we investigated age differences in level and variability of performance across the lifespan in two reaction time tasks (Line Comparison, Arrow Task) using response time (RT) modeling. The ex-Gaussian distribution, convolution of a normal and an exponential distribution, was applied to more precisely describe RT. Data of sixty-one young children (9/10years), 52 older children (11/12 years), 59 young adults, 51 young old, and 43 older old adults was included. Level of performance (M, mu) increased and variability (ISD, sigma, tau) decreased significantly from childhood to adulthood. Older children, young and older old adults were faster and less variable than young children and slower and more variable than young adults. Level and variability of performance were positively related indicating that faster individuals were less variable. Age differences were interpreted by relating the ex-Gaussian parameters to a theoretical information processing model (diffusion model, EZ1). Drift rate, an indicator of the quality of information accumulation, was negatively related to variability (tau). Boundary separation, a parameter reflecting response criterion, and non-decision time were positively related to level of performance (mu). Potentials and caveats of the present approach will be discussed in the light of research on cognitive intraindividual variability.

The Development of Perceptual Sensitivity to Second-Order Facial Relations in Children #362 J. BAUDOUIN[1], M. GALLAY[2], K. DURAND[1], R. FABRICE[3]
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Objectives: This study investigated children's perceptual ability to process second-order facial relations.Methods: Seventy-eight children from 6 to 12 years old in three age groups (7, 9, and 11 years) and 28 adults were asked to say if the eyes were the same distance apart in two side-by-side faces. The two faces were similar on all points except the spacing between the eyes, which was either identical or different, with various degrees of difference.Results: The results showed that the smallest spacing children were able to discriminate decreased with age. This ability was sensitive to the orientation of faces, and this inversion effect increased between the age of 6 and 12.Conclusion: It is concluded that, despite early sensitivity to holistic information, the perceptual ability to process second-order relations in faces improves with age and constrains the development of the face recognition ability.

Reading goals from minds. A child's perspective #363 G. RAPINETT[1], D. OLAH[2]
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Theory of mind presupposes the understanding of another's mental state: to achieve this it is necessary to infer mental states from intentional actions. The ability to differentiate between intentional and non-intentional actions may therefore be a prerequisite in the development of theory of mind. Moreover, infants as young as 9 months have been found to be able to dissociate between an intentional and a non-intentional action (Gergely and Csibra, 2003) which indicates an early manifestation in the development of TOM. At the same time, it is also possible to postulate a teleological understanding of actions without the need to assume the inference of mental states from goal-directed behaviour. The aim of this study is to disentangle these propositions by exploring the mechanisms that may be involved in the understanding of goal-directed actions in children (3-4 years) that have not yet developed a theory of mind. In this study, children observed different actions and were asked to predict the consequence of the action. The results show that understanding of action goals occurs also in children that have not yet developed a TOM thus putting into question the need of TOM in the understanding of goal-directed behaviour.

Understanding of 'false emotion' from the observer's perspective #364 A. MELON, University of Warsaw

Children's understanding of emotions is an important research area in the field of social cognitive development because it is very important skill, which helps people to make successful career in social life.The aim of the present study is to examine young children's ability to assess real emotion when there is a discrepancy between emotion displayed in behavior and emotion associated with situation - what can be called - children's understanding of 'false emotion'. It is examined which emotion children ascribe to story's protagonist from perspective of observer of the story.The most important result of the study is that: in the act of assessment of real emotion, 6-year old children significantly more often than 4- and 5-year olds refered to protagonist's behavior than to situation, when asked about real emotion of story's protagonist from observer's perspective and when the situation was likely to provoke negative emotion.The preliminary results are discussed and further research directions are proposed.

NUMBER COGNITION II

The impact of the mental number line on haptic line bisection: crossmodal interaction in blind and sighted individuals #365 Z. CATTANEO[1], M. FANTINO[2], J. SILVANTO[3], C. TINTI[4], T. VECCHI[2]
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The mental number line influence the representation of visual space and the allocation of visuospatial attention in a wide range of tasks. Here we investigated whether the mental number line can modulate the representation of external space crossmodally in both blind and sighted subjects. This was achieved by examining whether auditory presentation of numbers modulates performance in a haptic version of the bisection task. Congenitally blind and sighted blindfolded subjects were asked to haptically explore wooden rods of different lengths and indicate their midpoint. During each trial, a number from either the low ("2") or high ("8") end of the mental number line was auditory presented. When no numbers were presented, subjects tended to bisect the rods to the left of the actual midpoint (pseudoneglect). This bias was significantly increased when the small number was presented and significantly reduced when the large number was presented. The direction of these bias shifts is consistent with the view that the low and high ends of the mental number line shift attention to the left and right sides of external space, respectively. Our results demonstrate that the mental number line can modulate the allocation of attention crossmodally, regardless of the presence/absence of vision.

Automatic Numerical Processing in Sequential Presentation #366 N. BEN-MEIR[1], D. GANOR-STERN[2], J. TZELGOV[2]
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The size congruency paradigm has been widely used to study automaticity in numerical processing. In this paradigm, two digits are presented in different physical sizes and participants are asked to judge which of the two is physically larger in the physical comparison task, or numerically larger in the numerical comparison task, while ignoring the irrelevant dimension. Poorer performance is usually found for the incongruent condition (when the physically larger digit is numerically smaller: 1 7) than for the congruent condition (the physically larger digit is also numerically larger: 1 7) (e.g., Henik & Tzelgov, 1982; Pansky & Algom, 2002; Tzelgov, Meyer, & Henik, 1992), thus indicating automatic processing of the numerical magnitude. In the present study, instead of presenting both digits simultaneously, the digits were presented sequentially. The size congruency effect was found for both the physical comparison task and the numerical comparison task. Following the work of Müller and Schwarz (2008), Schwarz and Eiselt (2009) and Turconi, Campbell, and Seron (2006), we also looked at the effect of numerical and physical temporal order (ascending versus descending) and their relation to the congruency effect.

Word order do not determine number processing: Fifty-three and three-fifty are processed similarly #367 S. PESTELLI[1], P. MACIZO[2], A. HERRERA[3]
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This study explored the processing of two-digit number words by examining the unit-decade compatibility effect in Spanish. Participants were required to choose the larger of two-digit number words presented in verbal notation. In compatible trials the decade and unit comparisons led to the same response (e.g., 53-68) while in incompatible trials the decade and unit comparisons led to different responses (e.g., 59-74). Participants were slower in compatible trials as compared to incompatible trials. In Experiments 2 and 3, we evaluated whether the reverse compatibility effect in Spanish was only due to a pure left-to-right encoding which favours the decade processing in this language (decade-unit order). When participants processed two-digit number words presented in reverse form (unit-decade order), the same reverse compatibility effect was found. This pattern of results suggests that participants have learned a language-dependent process for analyzing written numbers which is used irrespective of the specific arrangement of units and decades in the comparison task.

The comparison of two-digit number words when the unit is more relevant #368 O. RAMOS[1], A. HERRERA[2], P. MACIZO[1]
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In previous studies (e.g., Macizo & Herrera, 2008), we have found that when Spanish participants had to choose the larger of two-digit numbers presented in Arabic format, they showed a unit-decade compatibility effect (faster responses to compatible trials – 47 vs. 58- than to incompatible trials – 47 vs. 58). However, when participants performed two-digit comparison with number words, the unit-decade compatibility effect tended to be inverted. These results indicate that the format of presentation influences number processing. When the comparison task is performed with Arabic numbers, Spanish participant process both the decade and the unit; however when the task is performed with number words, participants mainly focus on the decade. However, in all previous studies the proportion of between-decade comparisons (e.g., 47- 52) was higher than the proportion of the within-decade comparisons (e.g., 47-48). This low proportion of within-decade trials might bias to dismissing the processing of units. In this work, we manipulated the proportion of within-decade comparisons in order to explore whether it could modulate the processing of number words. We show how to make more relevant the role of the unit in the comparison task produce an effect in the processing of two-digit number words.

The operand-recognition paradigm: a study of subtraction in high and lower-skilled arithmetic problems solvers #369 C. CASTEL[1], C. THEVENOT[1], M. FAYOL[2]
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We recently conceived a new paradigm for the study of strategies in mental arithmetic (Thevenot, Fanget & Fayol, 2007). It mains advantage is that it does not rely on solution latencies or on verbal reports, which are well known to potentially bias the results. Moreover, it does not draw the attention of participants on the aim of the study. It capitalizes on the fact that algorithmic procedures degrade the memory traces of the operands. Then, greater difficulty in recognizing them is expected when calculations have been solved by reconstructive strategies rather than by retrieval of number facts in long-term memory. Our results suggest that 80% of difficult subtraction (i.e., with a minuend from 10 to 18) are solved by non-retrieval strategies, which is higher than the percentage reported usually in the literature. However, we show as well that good arithmetic problem solvers are able to retrieve the answer of such problems in long-term memory, at least of problems with a minuend up to 13.

Numerical and physical magnitude: shared representations or shared response codes? #370 S. SANTENS, T. VERGUTS, Ghent University

When comparing digits of different physical sizes, distance on the relevant dimension (numerical magnitude) interacts with distance on the irrelevant dimension (physical magnitude): people are faster to compare two digits when their numerical and physical size is congruent than when they are incongruent. Two main accounts have been put forward to explain this size congruency effect. We call these accounts the shared representation and the shared response codes views. According to the shared representation account, both numerical and physical size are mapped onto a shared magnitude representation. The shared response codes account assumes that numerical size and physical size are processed separately up to a stage where competition between response codes can take place. Divergent predictions are derived from these accounts for two tasks: a magnitude comparison and a same-different task. In two behavioural experiments, the predictions from these accounts are tested.

PERCEPTION II

Contrast- and illumination-invariant visual object recognition from active sensation #371 M. JUTTNER[1], E. OSMAN[2], I. RENTSCHLER[2]
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Reversal of contrast polarity severely disrupts visual recognition of human faces. However, for non-face objects the impact of contrast reversal on recognition is less clear and may depend on learned representations of object categories (Jüttner, Langguth, Rentschler, 2004, Visual Cognition 11, 921). Using a paradigm of cross-modal priming and learning (Jüttner, Müller, Rentschler, 2006, Behavioural Brain Research 175, 420) we explored, for a set of unfamiliar, three-dimensional objects, how prior knowledge obtained visually or haptically during priming affects subjects' ability to recognize the objects from novel (unlearned) views in a subsequent generalization test. We observed an increase of generalisation performance in priming conditions that involved active visual or haptic sensation relative to the unprimed control condition. Crucially, contrast reversal of the test views had no effect on spatial generalisation in the former two conditions, whereas it significantly impeded performance in the latter. These results suggest that invariances to viewpoint and contrast polarity have a common representational basis. Such invariances are learning-dependant and facilitated by active sensation.

Elemental and configural body representation in the extrastriate and fusiform body area #372 B. VOGT[1], N. DAVID[2], S. SCHÜTZ-BOSBACH[1]
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Previous research on visual processing of the human body has provided evidence for the qualitatively different involvement of two specific regions in the visual cortex: the extrastriate body area (EBA) and fusiform body area (FBA). The EBA showed selectivity for body parts, whereas the FBA showed more selectivity for whole body images. To further investigate the functional distinction between these two areas, participants viewed static images of a human body of varying completeness, in either intact or scrambled configuration. If the EBA indeed processes body parts rather than the body as a whole, we expected to find a gradual increase in the magnitude of fMRI response within the EBA as a function of the amount of body shown. Importantly, this increase should occur irrespective of intact or scrambled configurations of the body. If the FBA indeed processes the configuration of body parts into a holistic body representation, we expected to find increased activation of the FBA for intact versus scrambled configuration, especially when the complete body in normal spatial configuration is visible. Results will be discussed in the light of previous findings, and with respect to possible implications for the roles of the two body sensitive areas in identity discrimination.

Do we always prefer the left side of chimeric faces? #373 C. COMPARETTI, P. RICCIARDELLI, L. TOSCANI, R. DAINI, Universita' di Milano-Bicocca

Previous work using chimeric faces has found a left perceptual bias for various judgements, including emotional expression, attractiveness, age and gender. However, it is unknown whether this perceptual bias can also be extended to ethnicity judgements and whether it may depend on the time available for visual scanning of the face stimulus. In two experiments we asked participants to perform a gender judgement task (chimeric faces: female/male and male/female) and a ethnicity judgement task (chimeric faces: Caucasian/Asian and Asian/Caucasian). For each task two different presentation durations were used: 150 msec (no visual scanning) and 1500 msec. The results showed that in the gender judgement task the left side of face is what determines the occurrence of the left perceptual bias. However, in the ethnicity judgment the left perceptual bias occurs only when the left was Caucasian, suggesting an interaction with the ethnicity of participants. No effect of presentation duration was found. In conclusion the left perceptual bias is not generalized and is not affected by the time available for the visual scanning.

Sources of spontaneous sensations arising on the hands #374
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The sources of conscious perception of spontaneous sensations arising on the hands was investigated by asking seventy right-handers to focus on one hand while fixating it (convergent focusing) or while fixating a red disk, and then to map the location and extend of the sensations they perceived. It was found that: (a) sensations followed the classic proximal-distal density gradient of skin receptors, with maximal frequencies over the fingertips; (b) under convergent focusing, the spatial extend of sensations was perceived as larger; this change was produced through an expansion of some areas and restriction of others, reflecting the two mechanisms of attention, enhancement and suppression, respectively; (c) the effects of convergent focusing were more pronounced over the left hand, reflecting modulation by attention of the right-lateralized cortical somatosensory procesing. These three particular patterns suggest that spontaneous sensations arising on the hands may result upon interactions between spontaneous impulses of skin receptors, cortical somatosensory processing and attention processes. Peripheral receptor activity itself may not suffice for spontaneous sensations to reach awareness, yet orienting and sustaining spatial attention on the involved body part is likely to influence its representation in cortical somatosensory areas.

Perceptual and semantic influences of objects' properties depend on the type of change #375 S. SPOTORNO[1], S. FAURE[2]
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When transient signals are disturbed, observers are often blind to visual changes. However, change detection is modulated by bottom-up and top-down effects. This study compared the contribution of objects' perceptual salience and semantic relevance for the general meaning of a scene in case of addition and deletion of an item. In a one-shot paradigm (A/blank/A' or A/blank/A), coloured daily-life scenes were presented very briefly (120 ms) and 64 participants indicated whether a change occurred. Salience, relevance and their interaction all affected both speed and accuracy. The salience effect was greater than that of relevance in case of addition, especially considering response times, whereas in case of deletion these effects were similar. Moreover, detection was faster and more accurate for high salience/low relevance changes than for low salience/high relevance ones only when an item was added. These results suggest that highly salient and/or highly relevant objects are very rapidly integrated in the representation of a complex scene. They also indicate that perceptual properties are particularly important when a new object appears in the visual field, even if the signal of the onset is masked, and it is included in the latest representation of the scene.

The rapid extraction of gist in coherent object configurations – A gamma band study #376 F. OPPERMANN[1], T. GRUBER[2], U. HAßLER[2], M. MÜLLER[1], J. JESCHENIAK[1]
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People are able to extract the gist of visual scenes depicting coherent object configurations in a split second. For objects which are not embedded in a coherent context such processing is not feasible. In the present EEG study, participants were asked to decide whether line drawings of two objects were integrated in a coherent scene context (pairs of objects bearing a conceptual relation, e.g., a mouse and a cheese) or were completely unrelated (e.g., a crown and a mushroom). The question of this study was which early neural correlates would reflect the different processing of these object configurations. Specifically, we hypothesized that oscillatory gamma band responses (above 20 Hz) that are assumed to reflect a match of incoming sensory information to existing memory traces would be enhanced in the coherent condition. In fact, we obtained increased activation in the early evoked gamma band response (70 to 120 ms after stimulus onset) for coherent compared with unrelated object configurations. This effect was mainly localized to right temporal areas and suggests a very early influence of knowledge-based information on object processing.

Menstrual cycle related changes in laterality of line orientation task #377 I. HROMATKO, M. TADINAC, University of Zagreb

Activational effects of sex hormones on spatial ability have been well documented. It has been suggested that these effects might be related to hormonally induced changes in interhemispheric communication, i.e. changes in laterality. Lateralization of spatial processing has mostly been studied with mental rotation tasks, while other types of spatial cognitive functions have been somewhat neglected. In this study we used a line orientation task in which lines at different angles to the horizontal were presented and had to be identified on a screen showing 24 different line angles. A group of healthy young women was tested twice, in different phases of menstrual cycle: luteal (high estrogen and progesterone) and menstrual (low levels of sex hormones). The EEG was being recorded while the participants were solving the tasks. Since it has been shown that higher alpha band (11-13 Hz) is sensitive to changes in the spatial demands of a task, we calculated the laterality scores (lnR–lnL) for this part of the EEG spectrum. As predicted, the laterality scores were significantly higher in menstrual compared to luteal phase of cycle, indicating higher lateralization of this specific spatial function in menstrual phase of cycle.

Mistakes committed in perceiving visual illusions depending on a way of measurement and an age of research subjects #378
J. WOJCIECHOWSKI, J. RĄCZASZEK-LEONARDI, A. TARNOWSKI, University of Warsaw

The research considered perceiving visual illusions depending on age, gender and types of measurement. The hypothesis about differences between different types of measurement was based on the hypothesis 'action versus perception' proposed by Goodale and Milner. There were 120 participants of both genders from three age groups (children,teenagers,adults). Two types of measurement were used: manipulation of elements of visual illusions on a computer screen and showing the length of given elements with one's fingers (with and without visual control). In the research project a specially designed computer program and a mechanical device to measure the length between fingers were used. Results showed differences in perceiving visual illusions depending on a type of measurement and showed a very interesting interaction between age and gender. They did not support Goodale and Milner's hypothesis which claims there should be differences in perception if two separate visual systems are used.

SEMANTIC AND SYNTACTIC PROCESSING

Sequence learning and the development of syntactic knowledge #379
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It has been proposed that sequence learning mechanisms may underlie syntax learning (P. Lieberman, 2007). We adapted the serial reaction time (SRT) task for use with a semi-artificial language in order to examine incidental learning of novel word order patterns. Sentences were presented in German word order with English words, and screen positions/response keys corresponded to grammatical categories (subject, verb, etc). In a test phase subjects also performed grammaticality/familiarity judgements on new sentences (GJT). The SRT and GJT provided indirect and direct measures of sequence learning at the level of grammatical categories. We compared the results with a non-linguistic version in which words were replaced by 'XXX'. For many structures there was evidence of learning in the SRT and chance performance in GJT, suggesting implicit sequence knowledge. But the comparison between the linguistic and non-linguistic versions on other structures showed that the SRT and GJT were differentially sensitive to linguistic knowledge. The dissociation between the SRT and GJT suggests that they reflect different types of knowledge (possibly

procedural versus declarative) that are subject to different factors, and that sequence knowledge did not drive GJT performance. This raises the question of which forms the basis for the development of syntactic knowledge.

ERP contribution to dissociation of pre- and post-lexical processes involved in semantic priming #380 F. FAITA-AINSEBA, S. BOUAFFRE, Université Bordeaux 2

ERPs and half visual field protocol were used to examine time course and hemispheric differences of priming mechanisms between words. Primes and targets, either categorically (silk - wool) or associatively (needle - sewing) related, were displayed to the left (LVF) or right visual field (RVF). A go/no-go lexical decision task was carried out in experiment1 whereas a paired task on stimuli pairs was demanded in experiment2. Experiment1 results showed that, in the RVF/ left hemisphere, N400 and Late Positive Component (LPC) were modulated by the associative link, while only a LPC effect was in the LVF/ right hemisphere. Experiment2 revealed that priming effects were represented by differences on LPC for both relationships and both VFs, beginning earlier on frontal than posterior sites for associated words in the LVF and category members in the RVF. Surprisingly, an opposite N400 effect was obtained for category members in the RVF. In conclusion, only associated words would be automatically activated supported by N400 in the left hemisphere. This N400 would also be sensible to an inhibition in the left hemisphere for category members. A frontal strategic semantic matching and other posterior mechanisms were proposed underlining modulations of LPC in both hemispheres.

Is the ambiguity advantage due to homonymy, polysemy, or neither? #381 B. JAGER, A. CLELAND, University of Aberdeen

Early studies indicated that ambiguous words are recognised faster than non-ambiguous words (e.g., Rubenstein et al., 1970). Recent research, however, suggests an additional distinction is relevant. Rodd et al. (2002) found that polysemous words (which have many related senses) are recognised faster than non-polysemous words, whereas homonyms (with many unrelated meanings) are recognised no faster, and sometimes even slower than non-homonyms. This finding has implications for how we model the word recognition process. Typically, items for lexical decision studies are generated through the use of dictionaries. Two experiments were conducted to see whether the method of generating stimuli might have contributed to finding a distinction between polysemous and homonymous words. In Experiment 1, participants were asked to generate as many uses as possible for the words from the Rodd et al. (2002) study. The meanings generated by participants matched well with dictionary meanings for the same words. However, the number of senses produced by this method was often dramatically lower. In Experiment 2, 17 of the 92 items from the Rodd et al. (2002) study were re-assigned to opposite conditions in a lexical decision task. The results indicate that the use of dictionaries can never fully substitute for pre-testing stimuli.

Structural priming of adjective-noun structures in hearing and deaf children #382 L. VAN BEIJSTERVELDT, Radboud University Nijmegen

We examined priming of adjective-noun structures in Dutch hearing and deaf children. In three experiments, hearing 7-8-year olds, hearing 11-12-year olds, and deaf 11-12-year olds read a prenominal structure (e.g., The blue ball), a relative clause structure (e.g., The ball that is blue), or a main clause (e.g., The ball is blue). After reading each prime structure, children described a target picture in writing. Half of the target pictures contained the same noun as the prime structure, and half contained a different noun. Hearing 7-8-year olds and 11-12-year olds, as well as the deaf 11-12-year olds, showed priming effects for all three structures, in both the same noun and different noun conditions. This suggests that hearing and deaf children posses abstract representations of adjective-noun structures that are independent of particular lexical items. Moreover, deaf children's difficulty with complex syntax seems not due to limited abstract knowledge of syntactic structures.

The time course of motor resonance in the comprehension of action sentences #383 M. CASTILLO VILLAR, La Laguna University

The study explores embodied meaning of action sentences by using a modified Action-sentence Compatibility Effect (ACE) paradigm. Participants read sentences describing a transfer away (I threw the tennis ball to my rival over the…) or towards the first person (My rival threw me the tennis ball over the…), performing a double-task. First, participants were prompted to press a button placed either distant or close to them by means of a visual cue attached to the transfer verb (e.g., threw). Second, they performed a semantic task choosing the best end to the sentence. This double-task paradigm allowed to distinguish how action language biases motion (response to the visual cue), and how motion biases language comprehension (response to the semantic task). For the matching conditions there was early sentence-action interference in the range of 200-300 ms after the verb onset, which supports the idea that the meaning of action sentences involves a motor resonance processes. This interference completely dissipates after 350 ms, establishing temporal limits to this resonance.

Abstract sentences like counterfactuals may activate motoric processes #384 M. URRUTIA, La Laguna University

Counterfactual sentences like "If Mary had bough the lottery ticket, she would have won the prize", may involve a dual meaning: The real world state (Mary did not buy the ticket nor won the prize) and an alternative "as if" world state (Mary bough the ticket and won the prize). This study explores whether the "as if" meaning is an embodied representations. Participants listened to factual or counterfactual sentences describing a transfer away or towards you. The transfer verb (e.g., gave) was followed by an apparent motion away or towards the participants, that prompted them to move their finger in the same direction to press a button. Action-compatibility effects (ACE) were observed both for counterfactual and factual sentences. That is, finger motion was interfered (experiment 1), or facilitated (experiment 2) by a concurrent matching sentence (e.g., transfer away-motion away), suggesting that counterfactual meaning involves a motor simulation or "resonance".

A new tool investigating metaphorical conceptualization of some notions: May it differentiate people in the area of mood? #385 M. BARCZAK

The poster presents for the first time a new tool for investigating metaphorical conceptualization of some notions: Questionnaire of the Metaphorical Conceptualization of a Notion (QMCN). The tool probably can be also useful for differentiating people differing in the area of mood. QMCN was created for the research project studying if (and how) a variable "the intensity of depression" correlates with forming cognitive representation of the following notions: PAST, PLEASURE, FUTURE, JOY, SADNESS, HAPPINESS; and if its possible influence removes during remission (cf., Bartczak, 2008). The number of metaphors created for given notion, as well as the valence and conventionalization of metaphors are treated as indicators of metaphorical conceptualization of a notion.The proposed tool allows to infer about the valence and the degree of conventionalization of metaphors chosen by people under investigation. The task is to select all metaphorical expressions which, according to an investigated person, describe the best analyzed notions. QMCN was constructed on the solid empirical basis. Only sentences from the natural language were used: All used expressions were created by depressive and non-depressive participants of the pilot study. Each questionnaire entry has its value on the scales of valence and conventionality, ascribed by competent raters.

WORD RECOGNITION

How does interhemispheric communication in visual word recognition work? #386 L. VAN DER HAEGEN[1], M. BRYSBAERT[1], C. DAVIS[2]
[1]Ghent University
[2]University of London

It has recently been shown that interhemispheric communication is needed for the processing of foveally presented words. In this study, we examine whether the integration of information happens at an early stage, before word recognition proper starts, or whether the integration is part of the recognition process itself. Two lexical decision experiments are reported in which words were presented at different fixation positions. In Experiment 1, a masked form priming task was used with transposed letter primes. The results showed that fixation position had a substantial influence on the identification of the stimulus, but the reaction time pattern did not differ depending on whether the transposed letters were projected to different hemispheres. In Experiment 2, stimuli were presented until a response was made and were fixated in such a way that word parts of the stimuli could have hemifield competitors or lead unambiguously to the English target word. Again, fixation position strongly influenced the results, but the latency data did not vary as a function of hemifield competitors. These results are consistent with the early integration account, as presented in the SERIOL model of visual word recognition.

Effect of emotional orthographic neighbourhood in visual word recognition: An ERP study #387 P. GOBIN, F. FAÏTA-AÏNSEBA, S. BOUAFFRE, S. MATHEY, University of Bordeaux

The aim of this study is to examine the role of higher-frequency emotional orthographic neighbourhood in visual word recognition by means of behavioural and electrophysiological measures. Eighty-eight word pairs were constructed. They were composed by a neutral target word (e.g., TALON [heel]) and by its higher-frequency orthographic neighbour (e.g., salon [lounge]). This higher-frequency orthographic neighbour was neutral (e.g., salon) or negative (e.g., poison for TOISON [fleece]). Thirty students performed a lexical decision task and the Event-related brain Potentials were recorded. In each trial, the 500-ms mask was immediately followed by the prime in lowercase, which was either the higher-frequency orthographic neighbour or a sign-string control prime. Finally, the target word was presented in uppercase until the response. Emotional orthographic neighbourhood had an inhibitory effect on the RTs and early ERPs. An inhibitory orthographic priming effect, which also interacted with the emotional valence of higher-frequency orthographic neighbour, was found for the N200/250 and for the N400 windows. The data are discussed in an interactive activation model assuming connections between the orthographic lexicon and the affective system (Ferrand, Ric, & Augustinova, 2006).

The effect of the morpheme gender in word recognition #388 V. CEMBRANI[1], D. PAOLIERI[2], E. BOSELLI[1], G. GARDUMI[1], C. CACCIARI[4], R. CUBELLI[1]
[1]University of Trento
[2]Universidad de Granada
[4]University of Modena

Although it is now well established that base-morphemes are activated during morphologically complex word identification, it remains to be seen what proprieties of the morpheme are retrieved through the decomposition process. It has been recently suggested that the gender of the base-unit is activated during grammatical gender identification in derived words. Meunier, Seigneuric and Spinelli (2008) in fact showed that the gender decision is faster when the morphologically complex noun shares the gender of the base. We replicated this finding in Italian and extended this result analyzing the response to words derived from a verb (i.e. a base without a gender). Further, we found the effect of grammatical gender congruency in a lexical decision task, thus suggesting that the gender of the base-unit is retrieved also when gender is irrelevant to accomplish the task. The results can be explained in terms of matching between the gender of the base from which the complex word is derived and the gender of the morphologically complex word. However, an alternative explanation is possible based on the dominant gender of morphological neighbours. Overall, the present findings support the notion that grammatical gender is always available when a noun is retrieved.

Peripheral information effect in perceptual word identification in French third and fifth graders #389 R. KHELIFI, L. SPARROW, S. CASALIS, Université Charles de Gaulle – Lille 3

While expert reader extracts mainly foveal information, he also gains useful parafoveal information (Rayner et al., 1982). His perceptual span is asymmetric and extends from 3-4 characters to the left of fixation to about 14-15 characters to the right of fixation. Our study used a perceptual word identification task to determine whether perifoveal and parafoveal distractor word was more disturbing in fifth graders than in third graders, suggesting that older children are more likely to be influenced by parafoveal information than younger on a single fixation.60 third graders and 60 fifth graders identified high and low frequency target words. Targets were displayed alone or with distractor word presented in parafoveal or perifoveal area, in left or right visual field. The stimuli exposure duration was smaller than saccadic initiation time.Presence of distractors decreased target identification rate for both groups and both low and high frequency targets. However, position of the distractor have a significant effect only for low frequency targets : in both hemifield, parafoveal distractors are more detrimental than perifoveal distractors. Results suggest that third graders acquired parafoveal information as well as fifth graders and that asymmetry of perceptual span could be developed more late.

Age-of-acquisition and neighbourhood density effects on written word recognition in Portuguese #390 L. MEIRELES, S. VICENTE, University of Porto

The present study investigated the influence of Age-of-Acquisition (AOA) and neighbourhood density (ND) on written word recognition in European Portuguese. Thirty young adults with a mean age of 20.0 years (SD = 2.3) performed a lexical decision task. The stimuli were 60 disyllabic low frequency words varying in ND (sparse vs. dense) and AOA (early vs. late) and also 60 nonwords. The results showed that words learned early in life were named more quickly and more accurately than late-acquired words (about 92 ms and 20% errors difference between the two conditions, respectively). The neighbourhood density effect was influenced by AOA, only emerging in the subgroup of early-acquired words (M = 660 vs. 704 ms; SD = 14,1 vs. 15.9, for sparse and dense words, respectively. Results are discussed in the context of translinguistic comparisons and models of written word recognition.

WORKING MEMORY II

The advantage of small memory capacity: How individuals detect and utilize two-way correlation in a multiple-way setting #391 K. KIKUCHI, C. MICHIMATA, Sophia University

Participants were asked to predict numbers hidden in presented figures with four features (color, shape, size, and number of figures). All features were binary variables, and only color was correlated with the hidden numbers. It was assumed that individuals with small memory capacity would use a simpler strategy in which each feature is considered independently, whereas individuals with large memory capacity would use a more complex strategy in which all features are considered together. Participants were classified into two (small vs. large capacity) groups based on two different criteria. First, they were classified by the performance of a counting span task (working memory capacity grouping). Second, they were classified by the performance of a digit span task (short-term memory capacity grouping). It was found that the small working memory capacity group performed the number prediction task better than the large working memory capacity group. Such a difference was absent in the short-term memory capacity grouping. It was concluded that small working

memory capacity is advantageous for detection and utilization of two-way correlation because of their simple effective processing. This suggests that small memory capacity of human would have some adaptive values.

Phonological loop in a number comparison task #392 A. HERRERA[1], P. MACIZO[2], A. FLORES[1]
[1]University of Murcia
[2]University of Granada

It has been shown that language influences the comparison of two-digit numbers when they are presented as numerical words. This finding makes to suppose that a verbal code could be implied in the number processing in such situations. The suggestion of a verbal code leads to consider a participation of the phonological working memory subsystem (Baddeley, 2000). In this work, we examined this issue by using a dual-task paradigm. Participants performed a two-digit comparison task in a single task condition and in a dual-task condition. In two different experiments we explored the effect of the articulatory suppression (producing the syllable "bla") and the effect of maintaining phonological information (CVC triplets). We compare the effects of this kind of manipulation when numbers are presented as Arabic digits and when numbers were shown as numerical words. The pattern of results indicates a major role of the phonological working memory with verbal numbers.

Time causes forgetting in Working Memory even when Refreshing time and Post-error processes are controlled #393 S. PORTRAT[1], P. BARROUILLET[1], V. CAMOS[2]
[1]University of Geneva
[2]Universite de Bougogne

The present study aimed at disentangling two conflicting theories of working memory forgetting: time-related decay and representation-based interference. While they disagree in the forgetting phenomenon itself, both agree that the mechanism which counteracts forgetting depends on time-based parameters. The shorter the time available for refreshing, the higher the forgetting. In Experiment 1, participants performed a continuous working memory span task in which the time available to refresh traces was kept constant while the time during which traces could suffer from decay (i.e., the time dedicated to the processing task) was varied. Results revealed that, even when the refreshing time is kept constant, increasing the processing time still results in poorer recall. This supports the time-related decay hypothesis (Portrat, Barrouillet & Camos, 2008). However, as Lewandowsky & Oberauer (EWOMS, 2008) highlighted, the longer processing task was also the one inducing more errors. Since errors are known to provoke slowed post-error central processes (Jentzsch & Dudschig, 2009), one could discard the previous conclusion. Hence, Experiment 2 manipulated processing time while controlling both refreshing time and post-errors processing. Once again, poorer recall was still related to longer processing time, a result that could no longer be explain by a representation-based interference phenomenon.

Contextual cueing depends on visuospatial working memory #394 A. MANGINELLI, F. GERINGSWALD, S. POLLMANN, Otto-Von-Guericke University of Magdeburg

When distractor configurations are repeated over time in visual search, search becomes more efficient, even if participants are unaware of the repetition. This contextual cueing is a form of incidental, implicit learning. One might therefore expect that contextual cueing does not (or only minimally) rely on working memory resources. However, working memory load may slow visual search and, by this, impair contextual learning. There is indeed an initial report that contextual cueing can be disrupted by a concurrent visual working memory load (Woodman & Chun, (2003), [Abstract], http://journalofvision.org/3/9/715/, doi:10.1167/3.9.715.). We followed up on this study by investigating contextual cueing under either a visuospatial or a non-spatial (color) visual working memory load. We found that contextual cueing was disrupted by the concurrent visuospatial, but not by the color working memory load. Explicit recognition of repeated displays was at chance level. Our results show that contextual cueing depends on visuospatial working memory. Further studies are needed to investigate whether working memory resources are required for the implicit learning of contextual relations or the expression of this learning.

Working Memory Capacity: Stroop effects in processing and storage domains #395 C. OLIVEIRA, P. ALBUQUERQUE, University of Minho

Working Memory Capacity (WMC) can be defined as "multicomponent system responsible for active maintenance of information in the face of ongoing processing and/or distraction" (Conway et al, 2005, p. 770). Engle and colleagues (1999) proposed that the effectiveness of WMC relies, mainly, on a domain-general executive attention. This attention capacity would be responsible for the active maintenance of information in face of interference conditions, and individual differences in WMC would reflect differences in the ability to allocate attention to the tasks. The nature of this attention ability has been a major research topic and a theme for debate. Based on the dual task paradigm, we present a set of experiments that manipulated the use of the Stroop effect on the processing and storage components of complex working memory span tasks.Results reflect correlational and extreme-groups analysis.

Age differences in verbal and visuospatial working memory updating #396 F. FIORE, R. DE BENI, C. CORNOLDI, D. PACHER, University of Padova

Memory updating is the ability to select and update relevant information and suppress no longer relevant data; it is usually particularly demanding in terms of attentional resources since the mind is required quickly to substitute old with new information. Few studies, mainly focused on the verbal domain, have investigated the age-related decline in WM updating ability (De Beni & Palladino, 2004; Van der Linden, Bredart, & Beerten, 1994). These studies showed that older adults have difficulty in updating memory contents in working memory by excluding no longer relevant information.The present study examined the ability of young and older adults to update both verbal and visuospatial information. Three groups of participants (young, 20-30 years; middle-aged, 45-58 years; older adults, 65-75 years) were required to carry out both a verbal working memory updating task (adapted from Morris and Jones, 1990) and a visuospatial working memory updating task (developed ad hoc). Results obtained highlighted that the decline in updating performance emerged only in older participants, independently of the nature of the task; moreover, the more number of required updating processes increased, the more older adults' performance dropped in the spatial updating task.

Working memory involvement in spatial text processing: the effect of experience #397 R. DE BENI[1], C. MENEGHETTI[1], V. GYSELINCK[2], P. FRANCESCA[1]
[1]University of Padua
[2]Université René Descartes

The present study investigates the role of visuo-spatial and verbal working memory systems in relation to familiarity with environment learnt through spatial description. Familiarity was tested by manipulating text experience (number of text presentations) and recall task experience (number of times recall tasks were performed). A total of 84 students listened to a spatial description in route perspective. Six groups were created: three performed the recall tasks (verification text and map drawing) after listening once, and again after listening three times (experience with recall task condition); the other three listened to the spatial text consecutively three times and then performed the recall tasks (experience with text condition). For each of the two conditions, one group listened to the spatial text (control condition), one performed a spatial concurrent task, and one a verbal concurrent task. Results showed that the higher experience with the text improved spatial text recall in control condition, but in presence of verbal and spatial concurrent tasks recall was nevertheless damaged. On the reverse, participants who have more experience with recall tasks were less susceptible to verbal and spatial interference effects.

Saturday, 5th September

SYMPOSIUM
CONTEXT-BASED CONTROL OF VISION AND ACTION
9.00 – 10.40
Medium lecture hall A

Organised and chaired by W.X. SCHNEIDER & G. DREISBACH,
Bielefeld University
Speakers: W.X. SCHNEIDER, Bielefeld University; J. ZWICKEL, LMU Munich; A. WYKOWSKA, LMU Munich; J. MILES, Purdue University; G. DREISBACH, Bielefeld University

One of the fundamental human abilities is to select relevant environmental information and the appropriate response and to ignore irrelevant information and suppress inappropriate responses. There is now ample evidence from different research traditions that context variables substantially modulate selectivity and distractibility in visual attention and action. Three talks investigate how different types of context modulate visual processing. The Schneider et al. study shows how the emotional expression of a fearful face modulates the Attentional Blink (AB). The results show a modulation of the AB only when the emotional face expression was task-relevant. Zwickel's talk presents evidence on how the attribution of agency influences the selection of eye movement locations as well as responses in a spatial decision task. Wykowska et al. measure selective processing in a visual search task. Their results indicate that context in the form of a movement intention biases the allocation of visual attention. Two further talks will provide evidence that context in terms of specific task instructions modulate response conflicts: Miles will show how pre-defined task situations modulate automatic response biases. And finally, Dreisbach's talk will focus on how different instruction conditions modulate response compatibility effects.

(1) The modulation of the Attentional Blink by fearful faces depends on task context #399 W.X. SCHNEIDER, J. ZWICKEL, J. RITTER, M. KITZMANTEL, T. STEIN

In a set of three rapid serial visual presentation experiments, we investigated the effect of fearful and neutral face stimuli on the report of trailing scene targets. When the emotional expression of the face stimuli had to be indicated, fearful faces induced a stronger attentional blink (AB) than did neutral faces. However, with identical physical stimulation, the enhancement of the AB by fearful faces disappeared when participants had to judge the faces' gender. If faces did not have to be reported, no AB was observed. Thus, fearful faces exhibited an effect on the AB that crucially depended on the observer's attentional set. Hence, the AB can be influenced by an emotional T1 when T1 has to be reported, but this influence is modulated by task context. This result indicates a close connection between temporal attention and emotional processing that is modulated by task context.

(2) Influence of Agency Attribution on Selection Processes #400 J. ZWICKEL

The reported experiments investigated changes in behavioral measures when attribution of agency occurs. By help of some cartoon animations of two triangles participants were led to attribute mental states to the triangles in one condition but to refrain from doing so in another condition. We tested whether selection of gaze targets was influenced by this context manipulation. The results showed that selection processes were slowed down when mental state attributions occurred and that different gaze locations were selected. Another experiment tested whether also a spatial decision task would be affected by the occurrence of mind attribution. Again the context manipulation led to slower responses. This slowing was observed when the spatial decision from the participants' perspective was in conflict with the decision from the perspective of the triangles. Together, these experiments suggest that visual context manipulations can influence eye movements and spatial decision processes via theory of mind attributions.

(3) Action intentions - another source of top-down control #401 A. WYKOWSKA, A. SCHUBÖ, B. HOMMEL

While interacting with the environment, humans need to select information for efficient behaviour. Hence, the human perceptual system has developed various means of weighting the input that is relevant in a given situation. What is relevant might be either specified by given tasks, such as "look for red" or by particular actions, e.g., "grasp this cup". As various action types require selection of different information, an efficient system might be based on direct action-perception links. Within the framework of the Theory of Event Coding (Hommel et al., 2001), a common code for perception and action is postulated. Such a common code should allow for efficient selection of action-relevant input. We conducted a series of experiments to test the idea of a common code for action and perception. The results show that processing of perceptual dimensions is influenced by the intentions to act out a particular type of movement. The influence, however, is not independent from other types of top-down control. Taken together, we conclude that perceptual dimensions are intentionally weighted so that efficient interaction with the environment is possible.

(4) Conceptual mediation of spatial stimulus-response compatibility effect #402 J. MILES

Features of the environment influence responses even when those features are irrelevant to task performance. For example, in the Simon task, participants are faster at making a response that is spatially compatible with the target stimulus than one that is spatially incompatible, even though this spatial information is irrelevant to the task. I will describe the role that context plays in mediating such influences of the environment on actions. First, I describe a top-down control strategy called implementation intention, which creates new, putatively automatic response biases specific to pre-defined task situations through task instruction. Research is described that investigates whether biases formed through this top-down control strategy influence preexisting response biases in the Simon task. Results show that multiple spatial response biases may concurrently affect performance. I then provide further evidence that spatial response biases originating from different sources are categorically different from one another. Although the spatial word "Left" or "Right" and a left or right pointing arrow both lead to stimulus-response (S-R) compatibility effects, these types of S-R relationships are represented differently and are vulnerable to different types of interference.

(5) How task instructions guide attention: The shielding function of task sets #403 G. DREISBACH, H. HAIDER

In order to pursue goal directed behavior, the cognitive system must be shielded against interference from competing response tendencies. I will show that instructed task sets (categorization rules) as compared to single (instructed) stimulus-response mappings will help to reduce interference from task set irrelevant information. Participants in our study had to react to 8 different words depicting clothes items that were presented in front of line drawings that could either be semantically related (clothes) or unrelated (animals with spatial orientation) to the target words. Participants either learned the stimulus-response (SR) mappings by heart or used one task set (TS). In the SR group, semantically related and unrelated distracters interfered with performance whereas in the TS group, only semantically related distracters interfered whereas unrelated spatially oriented distracters did not. It follows that the specific task context (here: the instructions, given to the participants) modulates interference from irrelevant information.

SESSION
SENSORY PROCESSES
9.00 – 10.40
Conference and lecture hall C

Chaired by C. FRINGS

9.00 – 9.20
Feeling, Seeing, and Hearing the Rhythm: Crossmodal Congruency Effects in Rhythm Perception #404 C. FRINGS[1], C. SPENCE[2]
[1]Saarland University
[2]University of Oxford

Two rhythms were presented to participants' eyes, ears, and\or hands in a 4-alternative rhythm discrimination task. Stimulus identity and stimulus modality were varied orthogonally. When the target and distractor rhythms were presented in different sensory modalities but were congruent with respect to stimulus identity, significant crossmodal congruency effects were observed in all conditions (i.e., performance on incongruent trials was significantly more error-prone than that seen on the congruent distractor trials). In contrast to the results of previous studies, these crossmodal distractor effects were neither based on the spatial compatibility of the stimuli nor on an abstract semantic matching of the stimuli, but instead show crossmodal processing when the same stimulus identity is presented simultaneously to two different sensory modalities. In contrast to previous studies of crossmodal congruency effects, we do not found any modality to be dominated by another modality in this task.

9.20 – 9.40
The nose tells it to the eyes: cross-modal associations between olfaction and vision #405 A. SEIGNEURIC, K. DURAND, T. JIANG, J. BAUDOUIN, B. SCHAAL, Université de Bourgogne

Cross-modal linkage between the olfactory and visual senses is still largely under-explored. In this study, we investigated cross-modal olfactory-visual integration by testing whether and how visual processing of objects was affected by the presence of olfactory cues. To this aim, we explored the influence of prior learned associations between an odor (e.g. odor of orange) and a visual stimulus naturally associated with that odor (picture of orange) on the guidance of the eyes through a complex scene. Participants were asked to freely explore a photograph containing an odor-related visual cue embedded among other objects while being exposed to the corresponding odor (subjects were unaware of the presence of the odor). Eye movements were recorded to analyse the order and distribution of fixations on each object of the scene. Our data show that the odor-related visual cue was explored sooner and for a shorter time in the presence of the congruent odor. These findings suggest that cross-modal olfactory-visual integration occurs in an automatic manner and influences identification and localization of the possible odor source.

9.40 – 10.00
Size Matters: Performance is Modulated by the Ratio of Sizes #406
T. LEIBOVICH[1], K. YONA[1], S. ASHKENAZI[1], O. RUBINSTEN[2], A. HENIK[1]
[1]Ben-Gurion University of the Negev
[2]University of Haifa

According to Weber's law, the ability to discriminate between two stimuli is a function of their relative sizes. Accordingly, previous research showed that reaction time (RT) and accuracy changed as a function of the ratio (smaller stimulus divided by larger stimulus) of the compared quantities. These effects are shared among primates, human adults and possibly even human infants. Here we show that the same phenomenon is true for sizes and occurs also with objects. Participants were presented with pairs of pictures (e.g., a violin and a cow) and asked to decide which one was larger. In separate blocks, the conceptual size (i.e., size in real life) varied but physical size was the same, or the same picture was presented in two different sizes (e.g., a large violin and a small violin). Accordingly, in separate blocks, participants were asked to compare the pictures by their conceptual or physical sizes. The ratio between the two members of the pair (smaller divided by larger) varied between 0.1 and 0.9. RT and accuracy varied as a function of this ratio and revealed the expected size and distance effects. Namely, the results fit the notion of Weber's law.

10.00 – 10.20
Multisensory Contrast Bias in Dynamic Stimuli #407 R. THOMASCHKE, M. BUTZ, University of Würzburg

Recent studies have shown that judgments about the rotation direction in an ambiguous point-based motion display are biased by a directional visual stimulus on a secondary task. We tested whether a secondary task stimulus in a different perceptual domain can also bias visual rotation direction judgments. In the primary task, participants had to decide whether a visual ambiguous point-based cyclical motion display showed a clockwise or counterclockwise rotation. In the concurrent secondary task, directional changes of a (non-illusory) cyclical hand stimulation had to be detected. We have found a contrast bias from tactile onto visual perception. In trials with no change of direction in the tactile stimulation, participants tended to judge the direction of visual motion as being opposite to the direction of the concurrent hand stimulation. The results imply that common cognitive resources are used for tracking visual and tactile dynamic stimuli. When the cognitive resources for representing clockwise motion are currently used by tracking tactile stimulation, they are less available for representing a clockwise visual motion resulting in the observed contrast bias.

10.20 – 10.40
Examining the Neurocognitive Mechanisms in Synaesthesia #408
R. COHEN KADOSH, University College London

The term synaesthesia is used to describe a condition in which one stimulus property (e.g. grapheme) results in the experiences of an additional attribute (colour). Although the genuineness of synaesthesia has being established in a multitude of studies using behavioral and neuroimaging methods, it is unclear what the principles that cause synaesthesia are. A better understanding of the causes of synaesthesia and, in turn, of the causes of the abnormal cross-modal interactions is fundamental to our understanding of cross-modal connectivity and inter-aerial interactions in the normal brain, as well as other phenomena such as perceptual awareness, feature binding, and automaticity. In the first part of the talk I will show that under posthypnotic suggestion non-synaesthetes can be induced to have synaesthetic experiences. In the second part I will show that brain stimulation via transcranial magnetic stimulation (TMS) can trigger visual experience more easily in synaesthetes than non-synaesthetes. Together these results support the idea that synaesthesia can result from cortical disinhibition.

SESSION
SEMANTIC AND SYNTACTIC PROCESSING II
9.00 – 10.40
Large lecture hall A

Chaired by S. ROUX

9.00 – 9.20

Written naming of surimposed pictures: evidence for a cascaded account #409 S. ROUX, LAPSCO

Within the field of language production, the written production has received little attention by psycholinguistics researchers. In tree experiments we have addressed the question of how the activation flows through the cognitive system when adults have to write down the name of a picture. In the two first experiments, we used the picture-picture interference paradigm and we manipulated the orthographic relatedness between target and distractor pictures labels. In Experiment 1, written naming latencies were shorter when target and distractor pictures were orthographically related compared to an unrelated condition. This orthographic facilitation effect persists in Experiment 2 when target and distractor pictures had inconsistent labels (i.e. shared orthography but not phonology). In Experiment 3, a categorisation task was used to rule out the hypothesis that this effect occur during the perception stages. Taken together, this results suggests that the activation flows in a cascaded fashion in written picture naming.

9.20 – 9.40

Children's word monitoring in Czech sentences with morphosyntactic violations: no evidence of grammatical effects #410 F. SMOLIK, Institute of Psychology AS CR

Three experiments examined whether word monitoring in Czech-speaking children was disrupted by morphosyntactic violations. The goal was to establish whether the word monitoring task could be used to test children's sensitivity to grammatical rules. The violations were chosen so that it was likely that children knew the corresponding morphosyntactic rules. Children (aged 4 through 7, total N=112) listened to short sentences in which the main verb was in an inappropriate form, such as in the 2nd person singular instead of 3rd person singular. Following previous research on word monitoring and word identification, it was hypothesized that word monitoring times would be longer in violating sentences. This was the case in the first experiment; however, the effect may have been due to problems with segmentation rather than the grammatical context itself. Using different morphosyntactic violations, the second and third experiments did not find any disruption of word monitoring in the violating sentences. The word monitoring times were influenced by age but no effect of violations was observed at any age. It appears that the occurrence of grammatical violations does not automatically result in word monitoring disruptions. Implications for the use of the word monitoring task are discussed.

9.40 – 10.00

Temporal dynamics of activating and selecting reference frames in spatial language #411 M. STRUIKSMA[1], M. NOORDZIJ[2], A. POSTMA[1]
[1]Universiteit Utrecht
[2]Universiteit Twente

Spatial sentences can be interpreted differently depending on the frame of reference. The denoted spatial relations can be understood from an abstract (based on cardinal directions) relative (seen from the viewer) or intrinsic (seen from the located object) point of view. In a verification paradigm subjects were asked to compare a sentence e.g. "the ball is left of the car" and a picture, while the inter-stimulus-interval was systematically varied. Data informed on both the activation of reference frames and their subsequent selection. Reference frame activation was found to occur after the picture and to take approximately 500ms. In experiment 2 the interval between the sentence and the picture was fixed at 500ms, including a cue at different moments indicating which reference frame was to be used. The data provide insight in the interaction and timing of the activation and selection processes. In sentence-picture both activation and selection start earlier, compared to experiment 1, while in picture-sentence only selection starts earlier and subjects seem to adopt a strategy focussing on intrinsic processing.

10.00 – 10.20

Semantic context effects in the recognition of reduced words #412
M. VAN DE VEN[1], B.V. TUCKER[2], M. ERNESTUS[3]
[1]Max Planck Institute for Psycholinguistics
[2]University of Alberta
[3]Radboud University Nijmegen

In casual speech, words are often pronounced with fewer segments than in formal speech (e.g., English 'ordinary' may be pronounced as 'onry'), which inhibits speech comprehension. Our previous research has indicated that semantic/syntactic context facilitates recognition of reduced words. The present study investigated the understanding of reduced speech, as a function of semantic context and the word's frequency of occurrence. We estimated the semantic relatedness of words using Latent Semantic Analysis (LSA), and used an auditory lexical decision task to investigate whether LSA can predict RTs in the auditory modality, and whether LSA interacts with word duration and frequency. Unsurprisingly, Experiment 1 showed that semantic context (as estimated by LSA) and word frequency facilitate recognition of unreduced speech. More importantly, we found that a high semantic relatedness marginalises the effects of word frequency, and that the effects of semantic context are smaller for shorter words. In Experiment 2, we tested whether semantic context plays an even more important role for reduced speech. The implications of these experiments for models of word comprehension will be discussed.

10.20 – 10.40

The on-line processing of person and number features in Italian subject-verb agreement #413 S. MANCINI[1], F. POSTIGLIONE[2], A. LAUDANNA[2], L. RIZZI[1]
[1]University of Siena
[2]University of Salerno

We investigated the processing of subject-verb (S-V) agreement in Italian with the aim of ascertaining whether the parser accesses person and number information separately or as a bundle. Findings from two self-paced reading studies are reported. In both experiments, S-V agreement was manipulated to create number (NM), person (PM) and number person (PNM) mismatches, as in (1) and (2): (1) Il giornalista / ha(CONTR) scritto /hanno(NM) scritto/hai scritto(PM) /avete(PNM) scritto/un articolo (The journalist3.SG has3. SG written have3.PL written have2.SG written have2.PL written an article) (2) Io / ho(CONTR) letto/ abbiamo(NM) letto/hai(PM) letto/ avete(PNM) letto / un libro (I 1.sg have1.SG read have.1.PL read have2. SG read have2.PL read a book) In both experiments the PM condition elicited longer reading times (RTs) than the NM one. In the PNM condition no additive effect was found, as RTs did not statistically differ from those in the MP condition.Such stronger processing relevance of person over number may be evidence for a functional distinction between the two features.

SESSION
TASK SWITCHING III
9.00 – 10.40
Large lecture hall B

Chaired by I. KOCH

9.00 – 9.20

Switching auditory selective attention in dichotic listening #414
I. KOCH, V. LAWO, M. VORLAENDER, RWTH Aachen University

Auditory attention enhances processing of selected

sources of stimulation. Traditional research on auditory attention uses dichotic-listening paradigms to examine shielding of attended auditory information or processing of unattended information. In contrast, the present study is focused on the mechanisms of switching auditory attention. Using an explicit cuing variant of dichotic listening, two auditory stimuli (digits between 1 and 9, spoken by a female and male speaker, respectively) were presented separately to the left and right ear. A visual cue indicated the gender of the relevant speaker in each trial, leading to switches and repetitions of task-relevant gender. The task was a magnitude categorization (smaller vs. greater than 5). Categorizations were made by key presses. The presented digits could fall into the same category and thus require the same response (congruent) or different responses (incongruent). The results indicate higher response times in trials that require a switch of gender of the task-relevant speaker. Performance was also worse on incongruent trials than on congruent trials. These results suggest that selective auditory attention can be intentionally guided, but switching selection criteria is characterized by some inertia, which increases switch costs due to processing of task-irrelevant auditory stimulation.

9.20 – 9.40

Control of interference in dual-tasking – does conflict monitoring theory can account for the control mechanism in dual-task? #415

M. OLSZANOWSKI[1], A. SZMALEC[2], Z. KŁYSZEJKO[1], T. RUTKOWSKI[1]
[1]Warsaw School of Social Sciences and Humanities
[2]Ghent University

The current study investigates the mechanisms underlying the control of interference during dual-task coordination. Partially inspired by the Conflict Monitoring Hypothesis (Botvinick et al., 2001), we test the assumption that interference during dual-tasking is resolved by a top-down adaptation mechanism which is responsible for behavioral adjustments in the prioritization of the coordinated tasks. In a series of two experiments, we provide evidence for the operation of such an adaptation mechanism by demonstrating that the amount of dual-task interference is a function of the probability of previously encountered single- versus dual-task events. In Experiment 1 we investigate if the same executive function is present in a conflict task, as a Stroop task, as in a dual task. This was done by manipulating the probability of interference in both tasks. The goal of Experiment 2 was to extend the results from Experiment 1 to a dual task with a memory task as a primary task. We want to explore if interference and probability effect are similar when participants have to be continuously processing information. We conclude that dual-task interference shows strong similarities to the so-called Stroop-like types of cognitive interference in the way suboptimal performance is dealt with by the cognitive system.

9.40 – 10.00

Testing the attention-shift hypothesis as an explanation for flanker-sequence based congruency modulations #416

P. ZEISCHKA, N. DEROOST, K. MAETENS, E. SOETENS, Vrije Universiteit Brussel

Flanker-repetition trials are associated with smaller flanker effects than flanker-alternation trials, which appears to occur only when flankers convey directional information (e.g. arrow stimuli). The attention-shift hypothesis accounts for these results by suggesting that directional flankers produce spatial attention-shifts (occurring only on flanker-repetition trials), thereby eliciting an interfering motor code. We investigated, by means of cueing tasks with flanker stimuli as spatial cues for the location of a to-be-discriminated letter, whether directional flankers produce the predicted attention-shifts. Experiment 1 showed that arrows as flankers, when presented without central target arrow, induce attention-shifts in the direction of the arrow flankers pointing at. Experiment 2 revealed similar results for complete target-flanker displays, including central target. Experiment 3, however, indicated that adding a response to the central target of the target-flanker display inverted the attention-shifts induced by the arrow flankers. This is inconsistent with the attention-shift hypothesis, but agrees with the sustained-suppression hypothesis, which explains both the inverted cueing effects in Experiment 3, and smaller flanker effects for flanker-repetition trials.

10.00 – 10.20

Cue interpretation processes in cued task switching: inferences from the Lateralized Readiness Potential (LRP) #417

B. VAN LOY, B. LIEFOOGHE, A. VANDIERENDONCK, Ghent University

The present electrophysiological study used the LRP to investigate the time course and outcome of the cue interpretation processes underlying cued task-switching. Does interpreting an external cue only result in the activation of a task-goal (Arrington, Logan & Schneider, 2007) or is there already activation of relevant response rules (Rubenstein, Meyer & Evans, 2001). To test this, we performed a cued task-switching experiment with double registration using two types of cues (i.e. explicit task cues: 'color' and transition cues: 'repeat'). In response to the cue, participants verbally indicated the task to perform or indicated the point in time they knew the task to perform. We were interested in the onset of the LRP with respect to this verbal indication response. Behaviorally, cue effects were found on the indication response while task-switching effects were observed on task-execution responses. On task-switch trials, the onset of the LRP started prior to the indication response, suggesting that the new task goal is already being translated in the relevant response rules. Our findings contribute to the understanding of the mechanisms underlying cued task switching and further underline the usefulness of electrophysiological measures to study cognitive control.

10.20 – 10.40

Task switching: Task-difficulty effects on the restart and local costs #418

C. MARTIN[1], F. BARCELO[2], M. HERNANDEZ[3], A. COSTA[1]
[1]Universitat Pompeu Fabra
[2]Universitat de les Illes Balears
[3]Universitat de Barcelona

Executive control processes have been widely studied using task switching paradigms. Slower performances (RTs) and differences in ERPs are usually observed in switch compared to repeat (non-switch) condition, and this switch cost is usually greater when switching from the hardest to the easiest task than the opposite (task-difficulty effect). Moreover, the switch cost can be split in two subcomponents, the restart cost (higher RTs after an interrupting cue) and the local cost (higher RTs after a switch-cue than after a repeat-cue). The main goal of the study was to investigate task-difficulty effects on the electrophysiological counterparts of the restart and local costs. Nineteen subjects performed the 'Madrid Card Sorting Test', a dual-task where the same feedback cue signaled unpredictable shifts to a new task set (i.e., from 'sort by colour' [easiest task] to 'sort by shape' [hardest task]). The local cost was significantly higher when switching to Colour than to Form, while the restart cost was not affected by task-difficulty. Task-difficulty influenced ERP counterparts of the local cost 150 ms after the target onset. We conclude that task-difficulty effects are explained by an increase of the local cost with no incidence on the restart cost.

SESSION
IMPLICIT PROCESSING

9.00 – 10.40
Medium lecture hall B

Chaired by A. CLEEREMANS

9.00 – 9.20

To think or not to think? Revisiting Unconscious Thought Theory #419

A. CLEEREMANS, L. WAROQUIER, D. MACHIORI, O. KLEIN, Université Libre de Bruxelles

Recent findings (i.e., Dijksterhuis et al., Science, 2006) that complex normative decisions are best made without conscious deliberation have led to the idea that "unconscious thought" not

only exists, but also often results in superior information processing, specifically when the required decisions involve the processing of many attributes. Here, we take issue both with the theoretical claims that underpin Dijksterhuis' "Unconscious Thought Theory" and with the relevant empirical findings. We report on five experiments (n = 529) inspired from the original design, in which participants were asked (1) to process information about cars by learning about their different attributes (e.g., "The Hatsun has a powerful engine"), and (2) to choose the best car after given a chance to engage in deliberate, conscious thinking about the cars ("conscious thought" condition) or after being distracted through performing an anagram solving task ("unconscious thought" condition). Taken together, our results simply suggest that conscious thinking tends to produce better decisions, a conclusion that should come as no surprise. While not denying that complex unconscious information processing exists, we conclude that it is not as powerful as previously claimed and that there is in fact no evidence for the idea that one can "think" without awareness.

9.20 – 9.40

Implicit learning of evaluative responses #420 J. SWEKLEJ, R. BALAS, Warsaw School of Social Sciences and Humanities

Evalautive conditioning (EC) is a process of changing the evaluation of initially neutral stimulus (CS) due to its repeated pairing with positive or negative stimulus (US). The present research focuses on cognitive mechanisms of learning such evaluations. In Experiments 1 and 2 we assessed relative contribution of associative mechanism or transfer of affective value between US and CS. The data showed both mechanisms impact EC depending on affective valence of the US and awareness of CS-US pairings. In Experiments 3-5 we examined whether EC occurs without perceptal and contingency awareness. We manipulated perceptual awareness of CS, US or both of them and showed that EC effect in both direct and indirect evaluations of a conditioned stimuli. Those results indicated that neither form of awareness is a necessary condition to acquire evaluative responses. Finally, Experiment 6 showed intact EC effect under cognitive load suggesting that the process is fairly independent of conscious attention. In conclusion, we argue that EC is a form of implicit learning based on both CS-US associations and transfer of affect. Also, it does not require neither conscious awareness of what is being conditioned nor attentional resources.

9.40 – 10.00

On the role of consciousness for context specific modulations of response priming effects #421 A. HEINEMANN, W. KUNDE, Dortmund University of Technology

In response priming experiments participants usually react faster and more accurate when prime and target are mapped to the same response than when they are mapped to different responses. This is known as the response congruency effect (RCE). The RCE varies depending on the context of stimulus presentation. For example, at a location where mostly congruent trials are presented the RCE is larger than at a location where mostly incongruent trials are presented (Crump et al., 2006, Wendt et al., 2008). This modulation is explained by cognitive control. Depending on context specific information (e.g. location) the impact of the prime can be increased or decreased. We investigated whether context specific modulations of the RCE can be accounted for by S-R retrieval processes (rather than cognitive control processes) and to which extent these effects depend on conscious stimulus representations. Our results suggest that context-specific modulations cannot be explained only by S-R retrieval processes and that they depend on stimulus awareness.

10.00 – 10.20

Can unconscious stimuli induce cognitive control? #422 W. GEVERS[1], E. VAN DEN BUSSCHE[2], B. REYNVOET[2]
[1]Université Libre de Bruxelles
[2]University of Leuven, Campus Kortrijk

The existence of unconscious perception is largely acknowledged. However, the limits and possibilities of unconscious processing remain unclear. Accumulating evidence shows that unconscious information is susceptible to several conscious top-down modulations directly affecting the processing of the unconscious primes. On the other hand, unconscious manipulations can not modify the processing on a trial-by-trial basis through top-down control. Here we wanted to explore whether unconscious stimuli can induce some form of control by activating metacognitive processes. For example, subjects might consciously notice the consequences of an unconscious manipulation, which will influence their responses. To examine this, we used the response eligibility effect described by Milham showing that, in a stroop-task, reaction times on incongruent and neutral trials were slower when the distractors were response eligible. In the present study, subjects had to discriminate between two numbers (1 and9) that were preceded by either response eligible (1 and 9) or ineligible (2 and 8) primes. The primes were presented either consciously or unconsciously. The results revealed a response slowing when response eligible primes were shown in both conscious and unconscious presentation conditions, indicating that unconscious stimuli can, just like conscious stimuli, induce metacognitive processes leading to indirect control.

10.20 – 10.40

Three awareness scales predict performance in a visual identification task, and suggest no performance without awareness #423 B. TIMMERMANS[1], K. SANDBERG[2], B. BIBBY[3], A. CLEEREMANS[1], M. OVERGAARD[2]
[1]Université Libre de Bruxelles
[2]Hammel Neurorehabilitation and Research Center
[3]University of Arhus

We compared three subjective measures of awareness (Perceptual Awareness Scale, Confidence Ratings, and Post-Decision Wagering), using both dichotomous and continuous scales, in order to test their correlation with subject performance in a visual identification task. We determined whether all scales reported the same amount of unconscious processing, and whether perceptual awareness can be considered gradual or dichotomous. First, dichotomous measures suggested a large degree of above chance performance without awareness, while continuous scales didn't. Second, for all measures, increased performance accuracy was followed by increased awareness (both sigmoid functions of stimulus duration), with accuracy increasing more steeply than awareness, suggesting continuous awareness and a substantial amount of unconscious information contributing to performance. Third, for difficult to perceive stimuli, PAS (participants rating clarity of visual experience) indicated a performance-awareness correlation when the other two did not, and PAS and CR indicated chance performance when participants claim not to have seen anything. This suggests both that performance in the complete absence of subjective awareness doesn't exist, and that PDW fails to be an exhaustive measure of awareness.

SESSION
EMOTION AND COGNITION II
9.00 – 10.40
Seminar room 1

Chaired by A. KRISTJANSSON

9.00 – 9.20
The effects of financial reward schedules on repetition priming in visual search #424 A. KRISTJANSSON, University of Iceland

There are many example in the literature of how the repetition of features such as color, orientation, spatial frequency or the position of stimuli in visual search tasks leads to faster visual search performance. We asked whether such effects might be affected by the financial gain from different feature values. Our observers performed visual search for a target diamond of odd colour (e.g. red) relative to distractor diamonds of another colour (e.g. green) judging the location of a notch in the diamond. For some observers one of the two colours would be rewarded highly 75% of the time while the other colour received high reward only 25% of the time. The observers were unaware of the particular reward schedule. The results showed that the size of the priming effects from repeating target color between trials was influenced by such reward schedules and also that when such schedules are unexpectedly reversed within blocks of trials reversal of these effects occurs surprisingly fast, sometimes within only a few trials. The results show how low-level priming effects such as priming of pop-out in visual search are nevertheless modulated by reward schedules.

9.20 – 9.40
When unrelated affect is a distractor? #425 R. STERCZYŃSKI, Warsaw School of Social Sciences and Humanities, Faculty in Sopot

Okon-Singer, Tzelgov and Henik show that task-unrelated affective stimuli distract letter recognition process only when peripheral cue focus attention on the distractor's location. Alternative to provided by the authors explanation of this effect is the affective process course. Affective stimulus induces arousal, previously to orienting attention. Pure arousal without source support parallel cognitive processing. Orienting attention to the source of affect inhibit parallel processing. Focusing attention on the location of the affective stimulus influence affective processing and inhibit parallel cognitive processing. In two experiments we show that affective influence on unrelated task performance without cueing is moderated by the time of affective stimuli exposition. When a presentation (30 ms) is too short to orient attention to the stimulus location, affective pictures accelerate the process of unrelated letter recognition. A sufficiently long (100 ms) presentation of affective distractor inhibits the unrelated process of letter recognition. The model of emotionally significant stimuli processing is discussed according to the results of our own and cited experiments.

9.40 – 10.00
Attempts to control threatening stimuli lead to a strong attentional bias in a visual search task #426 L. NOTEBAERT[1], S. VAN DAMME[1], G. CROMBEZ[1], J. THEEUWES[2]
[1]Ghent University
[2]Vrije Universiteit Amsterdam

In most studies investigating automatic capture by threatening information, participants are passively experiencing the threatening stimuli, and are unable to act upon the situation. In this study, we investigated whether automatic capture by threat increases when a goal is activated to control the threatening stimulus. Participants performed a visual search task with equally salient stimuli (coloured circles). One colour (CSplus) was fear-conditioned using aversive shocks (UCS). Task was responding to a target presented in one of the circles. In a second, intermixed task, participants had to press the spacebar when the CSplus was presented. In the experimental group, subjects were instructed that by pressing fast, they could avoid the UCS on these trials. In the comparison group, no such instructions were given. A repeated measures ANOVA showed faster and more efficient search responses in both groups to targets in the CSplus compared to other colours. Crucially, search slopes were more efficient in the experimental than in the comparison group. We concluded that attentional bias to threat is enhanced when individuals have a goal to control the UCS.

10.00 – 10.20
Look out for danger! Attention to threat in anxiety #427 K. MOGG, University of Southampton

It is now well established that anxious individuals show enhanced attention to threat cues. This phenomenon is important in understanding the relationship between cognition and emotion, as well as being clinically relevant, since it has been argued that this cognitive bias causes increased vulnerability to anxiety. Moreover, new cognitive treatments are being developed which aim to correct this bias in information processing. Recent cognitive and neuroimaging research is providing a better understanding of the underlying mechanisms. The talk will give an overview of this research and consider several unresolved issues concerning the precise nature of the cognitive mechanisms which are responsible for threat processing and anxiety vulnerability.

10.20 – 10.40
The role of consciousness in somatic marker mechanism #428
R. STERCZYŃSKI, Warsaw School of Social Sciences and Humanities, Faculty in Sopot

Somatic marker hypothesis is one of the most prominent ideas in recent psychology. Although it is congruent with even old psychological ideas such as James' or Lange's in general, there are more doubts about the cognitive mechanism of the affective influence on decision making process. The main stream of criticism is focused on the role of consciousness in providing decisions by somatic cues. Moreover, some authors argue that empirical evidence of somatic marker hypothesis in Iowa Gambling Task (IGT) is insufficient. Two experiments were made to verify whether the affect influence decisions in IGT, and what role in this process plays attention. The affect experimentally added to the situation, influence anticipatory SCR reactions. In the first experiment, manipulation doesn't change subject's choices nor time of decision making. In the second experiment, artificial SM influence decisions in the specific pattern. Participants took more positively marked and less negatively marked choices only in case when another conscious-available cue was given. The number of choices of affectively marked options which weren't supported by another cue doesn't change but the decisions were made more slowly. The results support the criticisms of unconscious mechanism of somatic marker and provide attentional model of using affective cues.

SESSION
ATTENTION AND INATTENTION
11.00 – 12.40
Large lecture hall A

Chaired by J. HOFFMAN

11.00 – 11.20
Change Blindness: Factors and Involved Components #429
J. HOFFMANN, A. SEBALD, University of Wuerzburg

Participants were to detect changes in alternating displays showing cards in random arrangements. The changes referred either to i) the presence/absence, ii) the location, iii) the suit (red versus black), iv) the value, and finally, v) to the suit and the value of one of the presented cards. Furthermore, display size (6, 12, 18, and 24 presented cards), presentation time of the displays (120, 240, 480, and 960 ms), and blank duration (40, 80, 160, 320 ms) were orthogonally varied. The number of alternations until change detection increased with

display size and blank duration. In contrast, participants needed the less alternations the longer the displays were presented. The different changes were hard to detect in the order: value, suit, suit and value, location, and presence/absence. Finally, the impact of presentation time and blank duration on the number of needed alternations increased with display size and with the difficulty with which the current change was to detect. The data suggest that spatial attention, feature encoding, and visual memory contribute to the appearance of change blindness. Additional experiments explore each of these components in isolation. Finally, change blindness is discussed as a necessary side effect of visual information processing.

11.20 – 11.40

Inattentional deafness: A study of the consequences of auditory inattention #430 P. DALTON, Royal Holloway, University of London

The phenomenon of inattentional blindness has attracted much research interest in recent years. However, investigators have rarely asked whether similar effects can be seen in sensory modalities other than vision. The experiments presented here demonstrate the phenomenon of 'inattentional deafness'. Participants were asked to attend and respond to spoken words presented in one ear. After several trials, an unexpected word (the 'critical stimulus') was presented to the unattended ear. Participants were asked about their awareness of the critical stimulus immediately after it had been presented. Significant numbers of people failed to detect or identify the critical stimulus, even though they could identify it successfully in a subsequent full-attention control trial. These experiments are among the first to demonstrate inattentional deafness, and could provide a new paradigm for auditory attention research.

11.40 – 12.00

Influence of colour on report of repeated items in RSVP sequences: repetition blindness and repetition benefits #431 V. COLTHEART[1], M. ZAMPINI[2], D. LOACH[1]

[1]Macquarie University

[2]University of Trento

Observers frequently miss seeing repeated items shown in rapid serial visual presentation (RSVP) sequences shown at a rate of about 10 items/sec., a difficulty termed repetition blindness. This has been found even when the repeated items differ in colour from other items (both red) or when they are different colours (one red, the other green). In these tasks there are usually only a few items per sequence, in other tasks (used to study the attentional blink) there are many items but only two coloured targets are reported. Using the dual target search task, repetition blindness has been found to diminish with practice and repetition benefits dual target report. We report experiments that studied repetition effects for colour-defined targets as a function of task type and practice. Practice does not always alter repetition effects and we consider the implications for explanations of repetition blindness.

12.00 – 12.20

The Backward Inhibition contribution to the Attentional Blink #432 F. FERLAZZO[1], S. SDOIA[2], S. FAGIOLI[1], F. DI NOCERA[1]

[1]University of Rome "La Sapienza"

[2]IRCCS Fondazione Santa Lucia, Rome

In two experiments we investigated the contribution of the Backward Inhibition (BI), previously described in task-switching paradigms, to the Attentional Blink (AB). The BI has been described as the larger switch cost found when the tasks are presented in ABA sequences than when they are presented in CBA sequences. Here, an Attentional Blink task was used with three target stimuli (T1, T2, and T3) from two (Exp.1) or three (Exp.2) categories (Letters, Digits, Symbols). In Experiment 1, targets in each stream could be presented (at different lags) in one of two different sequences: BBA (e.g., Letter, Letter, Digit) and ABA (e.g., Letter, Digit, Letter). In Experiment 2, targets in each stream could be presented (at different lags) in either the sequence CBA (e.g., Letter, Symbol, Digit) or the sequence ABA (e.g., Letter, Symbol, Letter).In both the experiments, we found that the AB effect was larger in the sequences ABA than in the sequences (BBA or CBA). Coherently with the rationale underlying studies on task-switching, this result suggests that inhibition processes, such as the backward inhibition, play a role in the genesis of Attentional Blink, and that processing limits cannot be considered as the unique cause of AB.

12.20 – 12.40

Neural correlates of the interaction between temporal attention and working memory #433 E. AKYUREK, M. LESZCZYNSKI, A. SCHÜBO, Ludwig Maximilian University

We investigated the temporal locus of the interaction between working memory and temporal attention by using electroencephalography. In a rapid serial visual presentation task, which is known to elicit the attentional blink, we replicated the behavioral interaction effect between working memory load and the attentional blink. We furthermore observed modulation of several components of the event-related potential. A short temporal lag between target stimuli and an increase of the load on working memory both reduced the amplitude of the P3. This result was consistent with current models of temporal attention and with a functional explanation of the P3 in terms of memory consolidation. The P2 component showed modulation by lag only, and not by memory load. However, the N2pc component did show modulation by both lag and load. Thus, these results demonstrated that early attentional processing as marked by the N2pc was suppressed by increased involvement of working memory, which is a phenomenon not well predicted by current theories of temporal attention.

SESSION
BILINGUALISM II
11.00 – 12.20
Large lecture hall B

Chaired by I. CHRISTOFFELS

11.00 – 11.20

When ROOM means cream and room: translation, homographs, ERPs and overt speech #434 I. CHRISTOFFELS[1], L. GANUSHCHAK[2], D. KOESTER[3]

[1]Leiden University

[2]University of Birmingham

[3]Bielefeld University

During translation one has to process input in one language while restricting production to the other language. The task seems to require a high amount of language control. Nevertheless, even unbalanced bilinguals usually perform well at word translation. In the present study Dutch (L1)/English (L2) unbalanced bilinguals translated words in both language directions. Critical words were interlingual homographs, they had the same spelling but a different meaning in both language (e.g. the English room means cream in Dutch). We found prolonged response latencies for homographs, which did not interact with translation direction. Error percentages were higher for homographs than control words, and higher for the L1- L2 translation direction. The ERP analysis showed a different effect for homographs in each translation direction (250 – 750 ms). The results show that during homograph translation participants cannot prevent accessing the meaning of the word in the other language, that the presence of homographs turns word translation into a difficult and high conflict task and that stimulus-intrinsic language information appears to be an important 'language cue' to help direct lexical selection in the target language.

11.20 – 11.40

Time course of inhibitory processes on bilingual language processing #435 M. MARTÍN, P. MACIZO, M. BAJO, University of Granada

The present work aims to evaluate the role of inhibitory mechanisms on bilingual language selection and to investigate some features of inhibition such as its time course. Spanish-English bilinguals

decided if pairs of English words were semantically related. We used Spanish-English interlexical homographs as critical stimuli (e.g., pie meaning foot in Spanish). All the participants were slower to respond to homographs than to control words (first trial). This result agrees with the non-selective view of bilingual language processing. Moreover, after responding to homographs, bilinguals slowed their responses to the English translation of the Spanish homograph meaning. This result indicates that participants needed more time to respond in the second trial because they had to overcome the inhibition of the irrelevant homograph meaning. This effect was observed with 500 ms delay between the subjects' response to the first trial and the second trial (Experiment 1), but it was not present when the interval was 750 ms (Experiment 2). These results are interpreted in terms of a language selection mechanism that inhibits competing lexical representations. This inhibition decays over time.

11.40 – 12.00

Bilingual advantage in non-linguistic task switching #436

M. HERNANDEZ[1], C. MARTIN[2], F. BARCELO[3], A. COSTA[2]
[1]Universitat de Barcelona
[2]Universitat Pompeu Fabra
[3]Universitat de les Illes Balears

This study aimed at determining if bilinguals are better than monolinguals in non-linguistic task switching because they are used to it in the language domain. In task-switching paradigms, slower performances (RTs) are observed in switch compared to repeat condition, and this switch cost is greater when switching from the hardest to the easiest task (task-difficulty effect). Moreover, the switch cost includes the restart cost (higher RTs after an interrupting cue) and the local cost (higher RTs after a switch-cue than a repeat-cue). We investigated task-difficulty effects in 50 monolinguals (Spanish) and 50 bilinguals (Spanish/Catalan). Participants performed the 'Madrid Card Sorting-Test', where the same feedback cue signaled unpredictable shifts to a new task-set (i.e., from 'sort by colour' [easiest task] to 'sort by shape' [hardest task]). The restart cost (higher when switching to Form) was smaller for bilinguals than monolinguals, while the local cost (higher when switching to Colour) was not affected by bilingualism. We concluded that task-difficulty effects are better explained by the local cost, with no bilingualism influence. Nevertheless, we observed a bilingual advantage, which is not in task-set reconfiguration (local cost) but in the evaluation of the cue and/or in the retrieval of the previous task-set (restart cost).

12.00 – 12.20

Conflict monitoring and response inhibition in bilinguals and musicians. Evidence from ERP #437 Z. WODNIECKA[1], S. MORENO[2], E. BIALYSTOK[2], C. ALAIN[3]
[1]Jagiellonian University
[2]York University
[3]Rotman Research Institute & University of Toronto

Bilinguals and musicians have been shown to perform better than monolinguals in executive function tasks involving conflict (e.g. Bialystok, 2001, Bialystok and DePape, in press). For bilinguals, the findings have been attributed to their need to negotiate cross-language activity and to inhibit interference from the other language. Frequent recruitment of these processes appears to lead to enhanced executive function skills. For musicians, the observed advantage has been related to their training requirements which involve high levels of control and memorization. In the reported study, we explored the neural correlates of executive functioning in bilinguals and musician using scalp recording of event-related brain potentials (ERPs) in young adults who were either English monolinguals, bilinguals or musician monolinguals while they performed a visual Go-Nogo task. The results showed that both bilingualism and musical training enhanced the N2 ERPs wave component related to conflict monitoring. In addition, musicians showed enhanced P3 amplitude related to response inhibition. The findings are discussed with respect to plasticity of the cognitive system and to the theories of cognitive control in bilingual language processing.

SESSION
PERCEPTION AND PATTERN RECOGNITION
11.00 – 12.20
Medium lecture hall A

Chaired by M. JUTTNER

11.00 – 11.20

Object recognition in adolescence #438 M. JUTTNER[1], D. PETTERS[1], E. WAKUI[2], J. DAVIDOFF[2]
[1]Aston University
[2]University of London

Theories of object recognition have traditionally been divided into two classes based on either structural or image-based object representations. We present data from two experiments that assessed, for school children aged 6 to 16 years, different predictions of each representational assumption concerning generalisation to changes in perspective and object shape. Experiment 1 tested spatial generalization with regard to unfamiliar objects that had been previously learned in a cross-modal priming and learning paradigm involving touch and vision. A developmental dissociation was observed, with younger children recognizing objects only from previously learnt perspectives indicative of primarily image-based representations. Only the oldest children (15-16 years) generalized object knowledge to novel viewpoints and showed strong facilitation by haptic priming, thus suggesting viewpoint-independent, structural object descriptions. Experiment 2 asked about the correct appearance of animals and artefacts that children as young as 6 could name successfully. While even the youngest children were close to adult levels for the correct recognition of a part change it was not until 15-16 years that they achieved similar level of performance with regard to altered part relations. The data obtained in these very different paradigms provide converging evidence for multiple, dissociable object formats in the developing mind.

11.20 – 11.40

Categorical Perception of Objects based on Intrinsic Object Structure #439 M. HARTENDORP[1], S. VAN DER STIGCHEL[1], H. BURNETT[2], T. JELLEMA[2], P. EILERS[1], A. POSTMA[1]
[1]Universiteit Utrecht
[2]University of Hull

People perceive a continuum changing from one percept into another not as a gradual change, but as two discrete categories. This so-called categorical perception (CP) was mainly found for biologically predisposed phenomena, such as tones, colours and basic emotions. More recently, findings of CP have been extended to learned categories, such as facial identities and objects. So far, studies on CP of objects were tested using forced-choice methods. In our study, we investigated whether CP is indeed a general process underlying perception, or whether CP of objects was due to the response method employed. Therefore, we conducted a free-naming task to examine CP of objects. Interestingly, half of the tested morph series were perceived categorically, while the other half was not. A follow-up experiment measuring the perceptual similarity between the extremes of a morph series showed that the extremes of CP-series were rated as perceptually more similar than the extremes of non-CP-series. These findings suggest that CP is a principle underlying perception, but does only occur as long as the interpolating does not violate the intrinsic object structure of the morphed figures.

11.40 – 12.00

An inverted face-inversion effect for other-race faces – ERPs show that the N170 is own-face specific #440 G. HIRSCHFELD, J. BÖLTE, University of Muenster

It has already been shown that in plane rotation of faces - but not of other objects - delay and enhance the amplitude of the N170 (Rossion, et al., 2000). This study investigates weather this inversion-effect is also specific for same race (SR) vs. other race (OR) faces. We recorded the EEG from 64 channels while Caucasian participants

monitored for repetitions of faces. 74 Caucasian, 52 Asian, and 22 Black faces from the Face-Place database were presented either upright or inverted. Presentation of pictures resulted in a P1/N170 complex at posterior ventral sites (PO8, P6, P8, CP6, and TP8). ERP analysis of mean amplitudes showed two main effects in the P1 time-window indicating that both inverted and SR faces elicit stronger neural responses. For the N170 we found an interaction between the factors for the N170 indicating a reversal of the inversion effect for other-race-faces. We also localized the sources of these components applying swLORETA to the average ERPs. We show that even though the N170 per se is not sensitive to the race of faces, the inversion effect is. This gives new insights into how two of the basic findings in face-research the inversion and other-race effect are related.

12.00 – 12.20

Visual gist of natural scenes derived from image statistics parameters #441 H. SCHOLTE, S. GHEBREAB, A. SMEULDERS, V. LAMME, University of Amsterdam

Natural images are highly structured in their spatial configuration. In the past it has been shown that the contrast distribution of natural images is almost always adequately described by a Weibull type distribution (Geuseboek & Smeulders, 2003) in which 2 free parameters are fitted. We have recently shown that these parameters explain up to 50% of the variance in the early ERP and these parameters correlate 0.84 and 0.93 with the modeled output of X and Y cells of the LGN (Scholte et al., 2009). Here we will present BOLD-MRI data that show that beta and gamma also explain single trial activity in all visual areas in the occipital and temporal cortex, as in parts of the parietal cortex and the insular cortex respectively. The parameter related to local correlations, correlates exclusively with area LO. Furthermore, the parameters order natural images along an axis of depth organization and a second axis related to amount of figure-ground segmentation (e.g. one vs. many objects). Results indicate that that visual system could use these parameters for a first estimation of the local gist of a scene.

SESSION
TIME PERCEPTION AND CONTROL
11.00 – 12.20
Medium lecture hall B

Chaired by Á. CORREA

11.00 – 11.20

The biological clock regulates human attention #442 Á. CORREA, Universidad de Granada

Do the efficiency and safety to carry out attention-demanding jobs (driving, surgery or supervision) depends on both the time of day (morning vs. evening) and the individuals' preferences for a specific time of day (chronotype)? We found that people tended to perform best in vigilance and executive control tasks when they were tested at their optimal time of day according to chronotype (10am for morning people and 9pm for evening people). The results suggest that circadian (24-h) rhythms, which are controlled by the biological clock, not only produce diurnal fluctuations in physiological variables (body temperature), but also in cognitive psychological functions such as attention. These findings are relevant for the design of work schedules, especially for those involving misalignments of circadian rhythms, such as shift work.

11.20 – 11.40

Temporal orienting induced by rhythms #443 D. SANABRIA, M. CAPIZZI, Á. CORREA, Universidad de Granada

The aim of our research is to investigate temporal orienting induced by rhythms. Recent investigations highlight our ability to orient attention in time using cues that highly predict the target onset. In our study, we used rhythms to induce temporal orienting. An auditory rhythm preceded the visual target. The rhythm could have a fast pace (400 ms between each of the stimuli that gave rise to the rhythmic pattern) or a slow pace (900 ms ITI). The visual target was presented at either 200, 400, 900, 1400, or 1600 ms after the offset of the rhythm. The results of Experiment 1 confirmed that people can use a predictive rhythm to orient their attention to a point in time, showing the typical modulation of the foreperiod effect (i.e., a reduction of the foreperiod effect on cued trials as compared to uncued trials). Experiment 2 failed to replicate the results of the first experiment when making the rhythm cues non-predictive. The addition of catch trials (banishing the foreperiod effect) in Experiment 3 finally permitted to observe a clear effect of the non-predictive rhythms on participants' performance. These results confirm the special nature of rhythms on their ability to capture temporal attention.

11.40 – 12.00

Time Perception and Impulsivity: The Case of Intertemporal Choice #444 M. DSHEMUCHDASE, S. SCHERBAUM, T. GOSCHKE, Technische Universitaet Dresden

Impulsivity is a concept referring to a variety of behaviors lacking the consideration of delayed consequences, eg. wasting money, taking health risks, engaging in distracting activities (e.g. Arce & Santisteban, 2006). A common paradigm to study impulsivity is intertemporal choice, which requires participants to make decisions between sooner smaller and later larger gains. In contrast to rational choice models (Samuelson, 1937), individuals not only discount the value of delayed reward but also weight the same time delay stronger if it is close rather than far in the future (Kirby & Herrnstein, 1995). Such impulsive behavior has been explained in different ways by a wide range of theories. Especially the differential impact of low self-control in the presence of immediacy (McClure et al., 2004) and time perception in general (Wittmann & Paulus, 2007) has been under debate. In a series of experiments we explored the interaction of time perception and self-control by investigating the different effects of time framing and time pressure on hypothetical intertemporal choices. Results indicate that intertemporal choice is influenced by these factors and will be discussed with regard to the role of time in understanding the multifaceted concept of impulsivity (Evenden, 1999).

12.00 – 12.20

Dual-task evidence for automatic and controlled mechanisms in temporal preparation #445 M. CAPIZZI, D. SANABRIA, Á. CORREA, Universidad de Granada

We used a dual-task procedure to investigate the nature of temporal preparation. In reaction time (RT) tasks that manipulate the time interval between warning and reaction stimulus (i.e., foreperiod), temporal preparation is revealed by greater response readiness to stimuli occurring at (1) long vs. short foreperiods (foreperiod effect); and (2) short foreperiods preceded by another short vs. long foreperiod (sequential effects). It is currently debated whether these temporal preparation effects are accomplished by automatic or controlled mechanisms. We addressed this question by asking participants to perform a temporal preparation task under both dual-task and single-task conditions. If temporal preparation effects are placed under voluntary control, they should be reduced by the addition of a demanding secondary task. If, in contrast, they are due to automatic processing, performing a secondary task should not interfere with temporal preparation. The analysis of behavioural and electrophysiological brain activity revealed that only foreperiod effect, but not sequential effects, was modified in dual-task conditions. This dissociation suggests the involvement of different mechanisms for temporal preparation.

SESSION
GENERAL COGNITION II
11.00 – 12.20
Conference and lecture hall C

Chaired by T. FERNANDES

11.00 – 11.20
The Metamorphosis of the Statistical Segmentation Output: Lexicalization during Artificial Language Learning #446
T. FERNANDES[1], R. KOLINSKY[2], P. VENTURA[1]
[1]Universidade de Lisboa
[2]Université Libre de Bruxelles

This study combined artificial language learning (ALL) with conventional experimental techniques for testing whether statistical segmentation outputs could be integrated in adults' mental lexicon. This was attested through the inhibitory priming effect of those novel neighbors (e.g., cathedruke) on lexical decisions to real-words (e.g., cathedral). In both experiments AL words occurred with the same frequency as AL part-words. ALL outputs were lexicalized only when the cues available during AL-familiarization suggested the same parsing (Experiment 1). With incongruent cues (Experiment 2) no lexicalization effect was observed, although ALL level differed from chance, suggesting a dissociation between AL-items' knowledge and AL-items' lexical engagement. Whereas in Experiment 1 (when the available speech segmentation cues were congruent) ALL outputs were lexicalized, in Experiment 2 (in incongruent cues condition no lexicalization of ALL outputs was found, both immediately after AL-familiarization and post-one week. Therefore, congruency of the available segmentation cues plays an important role in speech segmentation and word learning.

11.20 – 11.40
Co-representing Action Rules in a Shared Bimanual Paradigm #447
C. JAGER, A. HOLLANDER, W. PRINZ, Max Planck Institute for Cognitive and Brain Sciences

When individuals are acting in close proximity they share the same workspace. Within this workspace external stimuli and actions referring to one's own task are accessible to all other individuals in the same setting. Recent findings show that one takes the aspects of a co-actor's task into account as well. This co-representation leads to impairment of one's own actions, even when different aspects of the task are performed. The present study investigated the impact of shared representation on movement planning. Subjects shared a symbolically cued bimanual reaching task with varying movement amplitudes. A partial (individual) and a shared (joint) condition were conducted to evaluate the impact of social setting on the underlying mechanisms of co-representation. Interference in movement preparation processes emerged when a co-acting partner was required to perform a different action concurrently. When the same actions had to be executed no such interference showed up. Notably this interference effect only emerged if information about whose turn it was in a given trial (one subject or both subjects) was given in advance of the imperative cue.

11.40 – 12.00
Visual Experiences form the appreciation space of object categories #448 S.J. FAERBER[1], H. LEDER[1], C.C. CARBON[2]
[1]University of Vienna
[2]University of Bamberg

For objects categories typicality is an important predictor for the aesthetic appreciation, since more typical stimuli are preferred in comparison to more atypical ones. But how do visual experiences, which shape our visual habits, change this appreciation space? We observed the typicality and appreciation of entities of the object class "chairs" (varying on two orthogonal dimensions saturation and inflation on ten levels each). In test-retest designs we investigated the influence of the adaptation to stimuli with extreme values of these dimensions on the perceived typicality and appreciation of the stimuli. Adaptation took place in a systematic way. Perceived typicality and attractiveness were assessed in direction of the adaptation stimuli. Thus, new experiences form the appreciation space of objects.

12.00 – 12.20
The time course of perceptual processes in absolute identification #449 D. GUEST[1], J. ADELMAN[2], C. KENT[3]
[1]Oxford Brookes University
[2]University of Warwick
[3]Bristol University

Current models of absolute identification emphasise different processes as the underlying cause of observed patterns of choices and response latencies in the task. According to one model, the Extended Generalized Context Model (EGCM; Kent &Lamberts, 2005), behavioural latency patterns are directly linked to stimulus sampling processes; all other models emphasise the response selection stage. In two tasks (one using visual stimuli and one using auditory stimuli) in which stimulus exposure duration was manipulated, we demonstrate that stimulus sampling is very rapid, but time to respond is long. This is contrary to the EGCM predictions and implicates response selection processes. In addition, analysis of the speed-accuracy relationship produced by manipulations of set size, stimulus spacing and exposure duration exhibited stable individual differences in not only magnitude, but direction. Overall, the results do not support the emphasis on stimulus sampling in the EGCM, but do suggest downstream influences of stimulus sampling that are neglected in other models.

SESSION
SOCIAL ASPECTS OF ATTENTION
11.00 – 12.20
Seminar room 1

Chaired by L. COLZATO

11.00 – 11.20
Losing the big picture: How religion may control visual attention #450 L. COLZATO[1], C. SCOROLLI[2], W. VAN DEN WILDENBERG[3], A. BORGHI[2], B. HOMMEL[1]
[1]Leiden University
[2]University of Bologna
[3]University of Amsterdam

Despite the abundance of evidence that human perception is penetrated by beliefs and expectations, scientific research so far has entirely neglected the possible impact of religious background on attention. Here we show that Dutch Calvinists and atheists, brought up in the same country and culture and controlled for race, intelligence, sex, and age, differ with respect to the way they attend to and process the global and local features of complex visual stimuli: Calvinists attend less to global aspects of perceived events, which seems to fit with the idea that people's attentional processing style reflects possible biases rewarded by their religious belief system. Preliminary data about Italian Catholics and laics will be discussed as well.

11.20 – 11.40
Visual attention to social cues #451 A. PECCHINENDA, University of Hull

From the emotional expression of a face and from the direction of eye gaze we make inferences about another person's focus of interest, their mental state and intentions. This information can be complex but also ambiguous and it would make good adaptive sense for an observer to integrate these different sources of information when making inferences as to whether somebody is looking at something good or bad in the environment. Surprisingly, past research shows that this is not the case. Using the spatial cueing paradigm, we investigated whether the observed direction of eye-gaze and facial expression affect spatial attention, provided the presence of a contextual goal. Results showed evidence of a top-down modulation of visual attention to social cues under these conditions. The implications of these findings for current theories are discussed.

11.40 – 12.00

Cognitive principles of feints in sports [#452] S. SKIRDE, W. KUNDE, Dortmund University of Technology

Humans tend to spontaneously identify the intention of another person. One important clue in this respect is the persons gaze direction. In sports like boxing, handball or basketball players try to mislead the opponent about their own action intension by manipulating their direction of view. One example might be a basketball player who is looking in another direction than those he decides to pass the ball, e.g. he looks to the right but makes a pass to the left. This is a so- called feint.In a series of four experiments we examined which information processing stages were influenced by such a feint. Participants were asked to respond to the pass direction of a basketball player whose gaze was either directed in the same direction as the pass (resulting in congruent trials) or to the opposite direction (incongruent trials). When pass and gaze direction were incongruent reaction times and error rates were higher compared with congruent trials. We manipulated the spatial overlap of gaze direction and responses, as well as the stimulus quality. Moreover we studied the feint effect under dual task conditions. The results clearly show a perceptual locus of the impact of irrelevant gaze direction.

12.00 – 12.20

How social are task representations? [#453] B. HOMMEL[1], L. COLZATO[1], W. VAN DEN WILDENBERG[2]
[1]Leiden University
[2]University of Amsterdam

The classical Simon effect shows that left and right actions are carried out faster if they spatially correspond to the stimulus signaling them. Recent studies revealed that this is the case even when the two actions are carried out by different people, which has been taken to imply that task representations are socially shared. We provide evidence that the "interactive" Simon effect occurs only if actor and co-actor are involved in a positive relationship (induced by a friendly-acting, cooperative confederate) but not if they are involved in a negative relationship (induced by an intimidating, competitive confederate). This suggests that agents can represent self-generated and other-generated actions separately but tend to relate or integrate these representations if the personal relationship between self and other has a positive valence.

POSTER SESSION III
14.00 – 15.30
Exhibition room A & B

ACTION III

Influence of motor planning on action simulation #454 P. TAUSCHE, A. SPRINGER, W. PRINZ, Max Planck Institute for Human Cognitive and Brain Sciences

Recent findings in neuroscience suggest that observing temporally occluded actions evokes a mental simulation of the occluded part of the action. This action simulation may involve corresponding motor programs in the observer. It has been shown that the overt execution of an action can produce interference effects in an action simulation task. The present study aimed to further substantiate such motor interference effects. Specifically, we investigated whether motor planning (in extension to motor execution) can influence action simulation performance.
Our research participants watched transiently occluded familiar actions performed by a point-light character. They had to judge whether the continuation of the action sequence after visual occlusion (i.e., test posture) was temporally too early or too late (forced choice task). Simultaneously the participants had to plan the execution of either a simple or a complex arm movement. We predicted a decrease in simulation performance when the planning of an own movement was required, with this motor interference effect occurring more strongly for complex movements than for simple movements. The results will be critically discussed in the context of recent motor simulation theories.

Perception-Action Coupling Link? Culture Affords Different Actions in East and West #455 J. TSAI, N. SEBANZ, G. KNOBLICH, Radbound University Nijmegen

Similarity between the perceived and to-be-generated action would modulate perception-action coupling, which can be demonstrated by the modified joint action task that a single individual perceived and interacted two effectors complementarily. A Simon-like compatibility effect in situations of interacting with different effectors reflects the tightness of perception-action coupling. Our results suggests: (1) similarity in mirror matching is primarily driven by congruency of personal body schema rather than purely by perceptual symmetry. Surprisingly, controlling a tool (such as hammer, knife-fork pair) can trigger equivalent effect because human beings use tools to extend their motor capabilities and include them in the body schema, as if their own effectors. (2) Chinese and Dutch people group demonstrated double dissociations in sensitivity to their own tableware (chopstick-spoon pair vs. knife-fork pair). Perceiving tools by Asian and European may afford culture-specific using, because perceived affordance is shaped by person's previous knowledge and experience which constrained by social and cultural factors.

Motor priming with stimuli masked by crowding #456 M. CIESIELSKI, P. JAŚKOWSKI, University of Finance and Management, Warsaw

Crowding has been shown to be a very efficient method of masking. In spite of this efficiency, there is evidence that masked information is processed in the visual cortex (V1 and V5). One can therefore ask if crowded stimuli can drive motor reactions. This question has been addressed by examining if primes masked by crowding can prime motor reactions to the subsequently presented main stimuli. Priming letters (i.e., only curvilinear, like C) were displayed for 50 ms surrounded by four "angular" letters presented simultaneously on the left and on the right of the fixation point. The visibility of the prime was manipulated by varying the distance between priming and crowding letters. One hundred ms after the prime, two further letters appeared at the same locations of the priming letters. Participants were asked to indicate as fast as possible on which side the letter S was displayed in the main stimulus. We found that reactions were faster when "S" in the main stimulus was preceded by "S" at the same position in the prime. Moreover, the visibility of the prime hardly did not affect the priming effect suggesting that the direct and indirect measures (i.e. priming effect and visibility) are independent.

Cognitive determinants of efficiency of pilot's behavior in condition of visual illusion of false horizon #457 H. BEDNAREK[1], O. TRUSZCZYŃSKI[2]
[1]Warsaw School of Social Sciences and Humanities
[2]Military Institute of Aviation Medicine

This study examined efficiency of pilots' behavior in condition of visual illusion of false horizon. It has been assumed that visual illusion of false horizon tends to produce spatial disorientation. Efficiency of execution of flight's profile in conditions of spatial disorientation was analyzed in context of dependent vs independent style of perception. Additionally, efficiency of attention and working memory were analyzed. 66 pilots participated in the experiment (air-raid 1006.73 hours +/- 79.3). Efficiency of execution of flight profile has been defined on simulator HYPERION based on indicators of course (high, velocity). Cognitive processes were researched by means of computer tasks: DIVA, NAVON, SWATT, Horizon, WM, MMATT, EFT. It appears that false horizon illusion influence the efficiency of pilot's behavior. In conditions of cognitive conflict: visual field - navigational instruments, group of pilots FMix (mobile FD and fixed FI) were most strongly exposed to disorientation (lower efficiency of selective and divided attention, less resistance to distraction, weak mechanism of inhibition and higher susceptible to interference).

Representational and biomechanical efficiency in the selection of object grasps #458 R. VAN DER WEL[1], D. ROSENBAUM[2]
[1]Radboud University Nijmegen
[2]The Pennsylvania State University

The degrees of freedom problem refers to the problem of how people select their actions from infinite sets of possible actions. From a cognitive perspective, solving the degrees of freedom problem requires identifying which reference frame actors use for action control. Actors may control physical actions relative to their bodies or relative to the external world. The geometric origin of the adopted reference frames may be task-dependent. To explore these possibilities, we conducted a series of experiments on how people manipulate two objects, one with each hand. We manipulated start and target locations, timing of grasps and object transports, number of repetitions that were performed, and object weight. Participants planned object grasps in cognitively efficient ways by adopting similar solutions for the two hands. Grasp selection did not reliably change with experience or grasp timing. The results suggest that participants selected similar allocentric grasp locations to create similar dynamics for the two hands during object transport. Breaking symmetry in allocentric dynamics resulted in changes in grasp selection. The results are consistent with the notion that solving the degrees of freedom problem involves an interplay of representational and biomechanical efficiency.

Intelligence-differences in dynamical properties of 'internal clock' #459 J. DRESZER[1 2], G. OSIŃSKI[1], E. SZELĄG[2 3]
[1]Nicolaus Copernicus University
[2]Nencki Institute of Experimental Biology
[3]Warsaw School of Social Psychology

The results of some recent studies suggest that temporal resolution in information processing determined by neuronal mechanisms may be responsible for individual differences in psychometric intelligence. Some authors also claims that the best behavioral measure of 'neuronal clock' is spontaneous tempo of different human activities, so called personal tempo (PT).The present study investigated differences between dynamics of temporal control of repetitive finger movements (tapping) performed at PT in brighter and less intelligent individuals. To test this hypothesis, nonlinear elements for reconstruction of dynamical properties of timing was applied. We found in both brighter and less intelligent individuals group fractal properties of tapping performance. Additionally, intelligence effect was revealed. The study was supported by Grant N N106 109636 from Ministry of National Education and Science.

A model of complex coordination patterns #460

This study tested whether the tau-G model (Lee, 1998) can

account for how individual components within an action (in this case the head and the eyes) are coordinated to create a unified movement (a gaze shift). The tau-G model shows how actions are controlled by regulating the timing of an effector relative to its goal, but little is known about how individual action elements are coordinated. The model is a single equation; k(t(TG+t)/(TG+2t)), where TG is movement duration, k a constant, and t is any point in time during the action. The simplicity of this model lies in the fact that any movement pattern can be achieved by setting two parameters; k, which determines the shape of the velocity profile, and TG which defines movement duration. A range of head and eye movements were recorded from 10 participants, and temporal profiles computed for each head, eye and gaze rotation. The tau-G model accounted for a minimum of 95% variance in the movement data and the analyses showed that the head, eye and gaze had similar values of k, but different values of TG. It was concluded that the tau-G model provides a simple solution to understanding complex coordination patterns.

AGING

Playing against Aging [#461] G. BAND, Leiden University

The market is currently bombed with electronic games intended to improve cognitive performance in the surge of Nintendo's Brain Training. The claim is that these games prevent or remediate the effects of old age on cognitive decline. The popularity and the claims of these games stand in stark contrast with the absence of empirical data supporting these claims. In a randomized and controlled intervention study it is tested whether healthy older adults benefit from seven weeks of intensive computer game playing (30 minutes per day) focused on working memory updating and exertion of executive control. The games used in the intervention are based on existing games and are selected on the basis of cognitive requirements. Before and after the intervention, participants perform on four experiments tapping into executive control. Because these tasks do not overlap in other ways with the content of the games, they allow a test of generalized effects of game playing. This presentation discusses the extent to which control can be trained at old age, and how this beneficial effect relates to important mediating factors such as intelligence and health.

What Race Model tells us about memory processes? [#462] M. LESOURD, L. BRUNEL, R. VERSACE, Université de Lyon

Although there is a substantial consensus on sensory processes deterioration in aging, recent studies using Race Model (Miller, 1982), have shown a better benefit of multisensory integration for elders compared to young subjects (Laurienti et al, 2006). This mathematical modelization compares distribution of audiovisual reaction time with unimodal ones, and then tests presence or absence of multisensory integration. Here, we show how increasing of multisensory benefit for elders can be modulated by memory processes involved in the task. We realized two experiments of multimodal categorization. In the first experiment (Twelve elderly adults; twelve young adults), participants had to categorize audiovisual associations, where auditory and visual components are supposed to be already integrated in a memory trace (visual square spoken word "square"). In a second experiment (Twelve elderly adults; twelve young adults), participants had to learn and maintain in memory an arbitrary audiovisual association (visual square high pitch sound).First experiment replicated Laurienti's results. In experiment two, when creation of a memory trace is required, results showed the opposite pattern in accordance with our hypothesis. Thus, using Race Model, we demonstrated how benefit due to multisensory integration depends on memory processes during the task

The effect of readers age and situational dimensions on resonance process [#463] S. FARHAT, I. TAPIERO, University Lyon 2

In our two experiments, we investigated how young adults and elderly people reactivated information while reading and understanding emotional and spatial text. Our main hypothesis was that the reactivation process, called the resonance process, had two main components: an automatic component with a passive and fast reactivation of contextual information (O'Brien & Myers, 1998) and a strategic component, where discursive pointers allow reactivation of relevant information (Sanford & Garrod, 1998). Our main results showed that these two components intervened alternatively according to a temporal course (from automatic to strategic) for emotional text but not for spatial text. No reliable differences between younger and older adults in the pattern of reading times were observed. In a second experiment in which we asked young and old participants to read spatial text only. We tried to involve the reader in what they read by making the spatial dimension crucial to understand the text. Results showed that readers only took into account this dimension when they were involved in the text. Participants were not able to use a strategic resonance process. Those results are in line with Zwaan, Magliano and Graeeser's (1995) results which showed this dimension was a more difficult dimension to process.

Learning and re-organization of neural networks in patients with Alzheimer's disease [#464] S. BERGAMASCHI[1], C. SPIRONELLI[1], A. ANGRILLI[1], A. CALZA[2], S. MONDINI[1]

[1]University of Padova

[2]Casa di Cura Figlie di San Camillo

The aim of the present study is to investigate the effects of one-month cognitive stimulation training with repetition of a cognitive task in patients with AD (NINCDS-ADRDA). Twelve AD patients performed two tasks which required visual-spatial recognition, attention, and working memory. The first was administered every day for one month (trained task), the second only once before and once after the training (control task). Reaction times (RT) and error rates (ER) served as behavioral measurements and the slow evoked potentials elicited during the execution of the two tasks were analyzed before and after training. Pre- and post-training comparisons showed: (1) faster RT after training in both tasks and significant decrease of ER (more than 50%) in the trained [$p < 0.05$], but not in the control task, which had shown high accuracy also at pre-training (ER < 2%); (2) different patterns of activation for the trained task at post-training. Patients showed greater negativity (activation) in the left than in the right anterior regions [$p < 0.05$]. Results suggest that the use of cognitive strategies developed during training activated undamaged neural networks. Intense cognitive training modulated AD patients' learning behavior as well as plastic re-organization of functioning cerebral networks.

Flexible Configural Processing is Preserved in Old Age [#465]

A. BODUROGLU[1], P. REUTER-LORENZ[2]

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Cognitive aging is characterized by declines in fluid abilities with greater losses being reported for visuospatial than verbal abilities. However, recent research demonstrated that in some visuospatial tasks that place greater emphasis on relative location rather than absolute positional information, older adults perform similarly to young. The goal of the current study was to investigate directly the preservation of configural processing in working memory in old age. In a spatial change detection task, participants studied three locations, and were then probed on one target location, presented along with two distractors. In this task, processing of the overall configuration was only sometimes advantageous because changes in the overall configuration were not predictive of whether the target had changed. When the target was displaced but the overall configuration was preserved between study and test displays, young and old adults were equally mislead to think that the changed spatial target was unchanged. However, when both groups were cued about the target location prior to encoding the study display, effects of misleading configuration was diminished. These findings suggest that both young and old adults encode global configuration information effortlessly, but configural encoding of spatial locations is not obligatory.

Memory training in aging: How promote transfer through metacognitive principles [#466] S. BOTTIROLI[1], J. DUNLOSKY[2], E. CAVALLINI[1], C. HERTZOG[3]
[1]University of Pavia
[2]Kent State University
[3]Georgia Institute of Technology

Memory training benefits rarely generalize to tasks not specifically trained (Verhaeghen et al., 1992). In Cavallini et al. (2008) we found that an instruction-based approach (strategy+instructions training) involving discussion about how strategies could be used on new materials promoted transfer partially. In the present research, we compared this approach with a new one (metacognitive principles training) based on task analysis and strategies adaptation in order to provide metacognitive knowledge being underneath transfer. To this end, 61 older adults were randomly assigned to the two training programs (metacognitive principles and strategy+instructions) or to the control group. During training sessions both metacognitive principles and strategy+instructions groups were trained to use two strategies (imagery and sentence generation) to learn word lists and paired associates. Furthermore, they differentially approached - through metacognitive principles or instructions respectively - two (map and text learning) of the four (grocery list and face and names) transfer tasks. Generalization for the metacognitive principles training occurred in all transfer tasks, showing a higher gain in respect to strategy+instruction group. These findings suggest the relevant role of metacognitive knowledge in determining the generalization of strategies to new materials.

Metamemory in aging: the role of cultural differences [#467] S. BOTTIROLI, C. FASTAME, E. CAVALLINI, C. HERTZOG, University of Pavia

The aim of the present study was to investigate the nature of both general and personal memory beliefs, together with the causal attributions, among older adults. Participants have been recruited in two different Italian contexts: the former is a metropolitan Northern reality (i.e. Milan), whereas the latter (i.e. Sassari) does have a more traditionalist connotation, where aging is thought to be the keeper of Sardinian traditions and local culture. One hundred and eighteen participants, aged between 20 and 85 years, have participated to the present research. Geographic origin, education and sex gender have been counterbalanced among participants. Three different questionnaires were administrated to assess respectively general and personal beliefs on memory abilities, as well as causal attributions for memory improvement and decline. Further tasks have been administered in order to assess verbal free recall capacity, vocabulary knowledge, the presence of depressive mood and cognitive state. Results show significant cultural differences between older adult groups from the two Italian realities, such that the Sardinian participants show a greater self efficacy and believe in a greater control of memory efficacy at present and in future in aging. The present outcomes are interpreted in the light of recent discoveries on Sardinian people longevity.

Inhibition and Ageing: More evidence against a unitary view of inhibition [#468] J. STEINMETZ, C. HOUSSEMAND, University of Luxembourg

The present study aims to investigate inhibitory functions on different inhibition tasks across two different age groups. For this purpose, a battery of three inhibition measures (i.e. one stop-signal task and two go/no-go tasks) and two complex neuropsychological tests (i.e. Wisconsin Card Sorting Test and a Cognitive Flexibility measure by Zimmermann & Fimm, 2008) has been presented to two different age groups. Group Young mainly consisted of psychology students (n = 30; age range 18-32 years), whereas Group Old mainly consisted of old adults (n = 30; age range 60-85 years). In previous research, it has been shown that aged subjects present a selective rather than a general decrease in inhibitory functions (e.g. Kramer et al., 1994). Results are discussed in terms of a selective decline in inhibitory functions, represented by a decrease of inhibition on some tasks and a resistance of inhibitory functions on the remaining tasks across age groups. Furthermore, little evidence for associations among the different measures has been observed, thus confirming a non-unitary view of inhibition.

ATTENTION III

Individual differences in spatial abilities: Evidence for different strategies in an indoor navigation task [#469] A. MELSOM, S. WIKING, University of Tromso

Spatial abilities determine our approach to a variety of everyday tasks. Previous research has mainly compared the spatial performance of different groups of participants, regardless of the underlying processes. The aim of this study was to explain individual differences by means of the different strategies employed in spatial problem solving. The performance of university students (n=256) was measured in small scale tests using the Vandenberg-Kuse Mental Rotations Test, The Paper folding Test, and The Card Rotations Test. Twenty-four of the highest and 25 of the lowest performers were selected and further tested with computerized mental rotations- and Stroop interference tests. In addition, their large scale spatial abilities were explored in an indoor navigation task. We predicted that individual performance on the small scale tests may depend on selective decoding, allowing successful performers to ignore irrelevant information in the navigation task. The task did encourage the use of a holistic spatial strategy. Nevertheless, the results revealed an additional strategy based on the detail knowledge from the route. This strategy appeared to be independent from the holistic strategy, and unrelated to successful navigation performance. The benefits of each of these strategies for different tasks will be discussed.

Can Emotion Modulate Attention or is it the Other Way Around? [#470] N. COHEN[1], A. HENIK[1], N. MOR[2]
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[2]Hebrew University of Jerusalem

Interactions between emotion and attention are shaped by evolution in order to produce adaptive behavior. However, these interactions may take a different form depending on the attentional network in question. In the current research we used a modified version of the Attention Network Test (ANT) to examine the effect of emotion on each of three attentional networks: alerting, orienting and executive functions. In a series of three experiments, we found that presentation of emotional stimuli altered task performance only in the absence of cognitive conflict. When the task required conflict resolution, emotional stimuli had no influence on performance. These results strengthen prior findings from neuro-imaging studies regarding modulation of the effects of emotion during cognitive conflict. Namely, when executive processes are needed, inhibitory mechanisms are activated to decrease the disruptive effect of emotions. The ability to inhibit emotions when we need to quickly solve a cognitive conflict is crucial for survival.

Inattentional deafness due to visual attention [#471] C. LENTINI[1], L. MORREALE[1], A. COMPAGNONI[2], R. DAINI[1]
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The influence of attention on perception is a much-discussed issue in the literature. Largely manifested in the Inattentional Blindness phenomenon (ID) (e.g. Mack and Rock 1998), it has been extensively studied with respect of visual perception, but often neglected in other sensory modalities like hearing.We investigated if IB could have an equivalent within the auditory modality: Inattentional Deafness (ID). Besides, we wonder how double-modality presentation of attended and unattended stimuli affects the presence and the extent of IB and ID. For these reasons we ran two different experiments, using the selective looking paradigm (Neisser 1979); the primary task was to count the bounces made by two teams passing two balls of different materials (making two different sounds) with wooden rackets. The unattended stimulus was a black-dressed girl making a loud noise that crossed the

visual field. Our data show that ID is possible, and it can be increased by particular conditions, such as coupling the auditory modality with the visual one (exp 1), or doing a dual-task (pressing the space-bar in correspondence to the bounces, exp2).We conclude that our results favor the existence of an multimodal attentional system, shared between and not within modalities.

Representational neglect for words and representation neglect for objects: evidence of a double dissociation #472 L. ARDUINO[1], C.V. MARINELLI[2], F. PASOTTI[3], E. FERRE[3], G. BOTTINI[3]
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[2]University of Rome La Sapienza & Neuropsychological Research Center, IRCCS Fondazione S.Lucia
[3]Universita di Pavia

Fourteen brain-damaged patients with left unilateral spatial neglect (USN) entered this study and were classified on the basis of the presence of left neglect dyslexia (ND+ and ND-) and of representational USN as pointed out by the Clock drawing test (RUSN+ and RUSN-). Lists of words and lines of the same length were presented for the following tasks: 1) Mental bisection: Patients were asked to say the letter that they think occupied the middle position of a word orally presented by the examiner; 2) visual bisection task: Patients were given the same instructions with stimuli presented visually; 3) motor bisection task: Patients were asked to manually bisect the stimuli (words and lines). The main result concerns the mental bisection task: only the group presenting both ND+ and RUSN+ showed a significant rightward bias, whereas the other three groups of patients and a group of normal controls showed a leftward bisection bias. Moreover, in both visual and motor bisections, a leftward bias (pseudoneglect) was evident. These results suggest a specific representational disorder for words partially independent from object representation.

The effect of masking in the attentional dwell time paradigm #473
A. PETERSEN, University of Copenhagen

A temporary functional blindness to the second of two spatially separated targets has been identified in numerous studies of temporal visual attention. This effect is known as attentional dwell time and is maximal 200 to 500 ms after presentation of the first target (e.g. Duncan, Ward, Shapiro, 1994).In most studies of attentional dwell time, two masked targets have been used. Moore et al. (1996) have criticised the masking of the first target when measuring the attentional dwell time, finding a shorter attentional dwell time when the first mask was omitted. In the presented work, the effect of the first mask is further investigated by including a condition where the first mask is presented without a target. The results from individual subjects show that the findings of Moore et al. can be replicated. The results also suggest that presenting the first mask without a target is enough to produce an impairment of the second target. Hence, the attentional dwell time may be a combined effect arising from attending to both the first target and its mask.

Does the spatial-numerical association interfere with orienting and executive attentional processing? #474 M. GUT, M. WASILEWSKA, I. SZUMSKA, P. JAŚKOWSKI, University of Finance and Management, Warsaw

Brain representations of numbers are spatially organized on the so-called mental number line (MNL). We investigated the relationship between this spatial-numerical association and attention processes.In the first task subjects responded to four-digit numbers (targets) preceded by a centrally presented digit. They had to indicate the side of occurrence of this previous digit in the target (left/right). The digit location in the target could be congruent with its position on MNL (e.g. "8" on the right) or incongruent (e.g. "9" on the left). In the second task subjects assessed the parity of the central digit in five-digit numbers (right key =even; left =odd). The condition was defined as congruent when the reaction side corresponded to the digit position on MNL and incongruent when there was no such correspondence. The results showed more accurate and faster reactions in congruent than incongruent conditions.We conclude that: (1) the digit magnitude representation shifts attention to the direction of its representation on MNL, what confirms the interaction between orienting attention processes and digit positions on MNL; (2) the incongruence between the correct response side (left/right) and the digit spatial location on MNL induce the conflict, which proves the involving of the executive attention system.

When is retrieval protected?: Divided attention in different memory tasks #475 A. VRANIC, University of Zagreb

Divided attention at encoding is shown to reduce memory performance significantly, whereas division of attention during retrieval of episodic memories affects memory performance only minimally. This relative immunity of episodic retrieval is offset by a cost, as measured by the concurrent secondary task. Less is known on the effects a division of attention might have on the semantic retrieval. This experiment was conducted with the aim of further exploring the relative immunity and the attentional costs associated with what seems to be obligatory retrieval processes. A componential analysis, as introduced by Naveh-Benjamin et al. (2000), was employed to assess attentional demands of four different retrieval tasks: two tapping the episodic and two tapping the semantic memory system. Furthermore, within each of these „system tasks", one task was data-driven and one was conceptually-driven, as proposed by the transfer-appropriate processing (TAP) approach. Our results show differential attentional demands of the four tasks used and further validate the pattern of 3 major retrieval types proposed by recent studies. These findings are interpreted within the TAP framework.

Spatial attention effects on the audiovisual duration illusion #476
B. SARMIENTO, D. SANABRIA LUCENA, Universidad de Granada

The aim of this research is to investigate the role of endogenous and exogenous spatial attention on a novel audiovisual illusion. Visual stimuli are presented alone or in synchrony with auditory stimuli. The duration of both the visual and auditory stimuli is manipulated giving rise to congruent or incongruent trials. Two different tasks are used: 1) Participants discriminate the duration of the visual stimulus while ignoring the duration of the auditory stimulus. 2) Participants perform a visual perceptual discrimination task where stimulus duration is irrelevant. The results show that the duration of the sound bias the perceived duration of the visual stimulus: A long sound makes a short visual stimulus be perceived longer and a short sound makes a long visual stimuli be perceived shorter. The effect of endogenous and exogenous spatial attention is investigated using a variation of the costs and benefits paradigm. Preliminary results show that endogenous spatial attention exerts a general main effect, improving performance on both unimodal, congruent and incongruent trials.

COGNITIVE CONTROL AND TASK SWITCHING

Prospective memory time-based: Effects of daylight saving time on the memory of appointments #477 M. VALAX, B. BARACAT, J. CEGARRA, A. RATTAT, University of Toulouse

The prospective time-based memory tasks involve time monitoring behavior (Mäntilä & Carelli, 2006). Some studies suggest that this monitoring requires internal clock mechanism calibrated on external clock. Thus, Ceci and Bronfenbrenner (1988) showed that a change in the speed of the external clock disturbed the monitoring strategies, and consequently affected the performance on prospective memory .The current study aims to test in everyday life the effect of daylight saving time on the compliance of medical appointment hours. During the both weeks preceding and following the switching from the winter to summer legal time, we collected the arrival hours of patients to medical appointments. In addition, participants had to fill a questionnaire accessing not only their main biographical and social features, but also some information about the appointment (for example, the delay since he/she made the appointment, or the possible use of memory aids). The results are discussed within the framework of the Jones's model of dynamic attending (Jones, 2006). Focusing on the moment of the occurrence of events rather than on the estimation

of durations, this model involves mechanism of internal oscillations connected to the varying temporal structures of events, which allows humans to attend the dynamics of environment.

Dissociating task errors from response errors #478 C. DESMET, M. BRASS, W. FIAS, Ghent University

Most studies investigating adaptive behavior have focused on conflict and errors at the response level. In contrast, little is known about adaptive processes at the task level. In the present study we tested whether task and response errors cause the same adaptation in behavior. By using a modified version of the task switching paradigm we were able to induce both types of errors. Our data show that task errors lead to a pattern of results that can be partly dissociated from response errors. After response errors participants made more errors on switch trials than on repeat trials. That is, typical switch costs emerged after trials where response errors were made. However, after task errors participants made fewer errors on switch trials than on repeat trials, indicating a switch benefit. To further support the dissociation between these two levels of processing we conducted an fMRI experiment. We tested if the same brain regions were active after the execution of a task error than after the execution of a response error.

The Development of Automaticity in Number Processing #479
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[2]University of Haifa
[3]Achva Academic College

Number processing is a developmental ability seen early on in life. Automaticity of number processing is attributed to higher levels of numeric knowledge. The current study investigated development of automaticity in number processing. We examined the effects of numerical distance and size congruity at three schooling levels—pre-school and middle and end of 1st grade. Participants were asked to decide which digit was larger numerically or physically (e.g., 2 3) in a numerical Stroop task. In addition, a possible relationship was tested between mathematical abilities and automaticity in number processing. Mathematical ability was tested by paper and pencil tests.Results showed a significant size congruity effect that did not differ between kindergarten children and first graders. An untypical reverse facilitation (i.e., slower responses to congruent than neutral trials) was found when the numerical value was irrelevant. Moreover, correlations were found between subtests of mathematical abilities and the amount of size congruity effect. Taken together, this suggests that children's numerical processing has already reached some degree of automaticity at kindergarten age. Also, numerical automaticity might have implications for the level of mathematical abilities. However, this automaticity is not fully developed as evidenced by the irrelevant numerical value not facilitating reaction times.

Transfer of learning from a spatial compatibility task to a Stroop task #480 M. MARINI[1], C. IANI[1], R. NICOLETTI[2], S. RUBICHI[1]
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Responses to a relevant stimulus dimension are faster and more accurate when the stimulus and response spatially correspond compared to when they do not, even though stimulus position is irrelevant (Simon effect). It has been demonstrated that practicing with an incompatible spatial mapping before performing a Simon task can eliminate this effect. In the present study we assessed whether a learned spatially incompatible stimulus-response mapping can be transferred to a non-spatial task. To this aim, we ran two experiments in which groups of participants performed a spatial compatibility task with either a compatible or an incompatible mapping and then transferred, after a 5 minutes delay, to a Stroop task. In Experiment 1 responses were executed by pressing one of two keys on the keyboard in both practice and transfer tasks. In Experiment 2, responses were manual in the practice task and vocal in the transfer task. The spatially incompatible practice eliminated the Stroop effect only when responses were manual in both tasks. These results suggest that transfer effects can occur even when the practice and transfer tasks do not share the same spatial nature, as long as both task require a bimanual response.

The reliability of individual differences in retrieval-induced forgetting #481 R. POTTS, R.LAW, J. GOLDING, D. GROOME, University of Westminster

Retrieval-induced forgetting (RIF) is the phenomenon whereby retrieval of an item from memory impairs the subsequent recall of related items. This is thought to be due to an inhibitory mechanism the strength of which varies between individuals. The present study is the first to investigate the reliability of individual differences in RIF performance. In a series of experiments, individuals' RIF scores were compared on two separate occasions, using either the same or different materials at each time. Different experiments used different cuing methods at final test. No significant reliability was found when different test items were used on the two occasions, regardless of cuing method. Significant reliability was found when the same materials were used at the two times. There was no correlation between the scores for the practised items on the two occasions, suggesting that the reliability coefficient was not simply due to a practice effect. However, these findings suggest that individual differences in RIF performance are reliable only when the same test materials are used for the test and re-test sessions. It remains unresolved as to whether reliability in individual differences in RIF can be found across different sets of materials, and under what conditions this might occur.

The effect of the lexical status of the distractor word in Stroop-like paradigms #482 C. MULATTI[1], F. PERESSOTTI[1], V. CEMBRANI[2], R. JOB[2]
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[2]University of Trento

According to word production models, the naming of a picture involves four processing stages through which the structural description, the conceptual node, the lemma, and the word form corresponding to the target picture are sequentially activated (see Levelt e coll., 1999; Roelofs, 2003). Within this model, a lexical unit is selected for production through a competitive mechanism. Since a lexical unit is selected only when its activation level exceeds the sum of the activation of other units by a certain critical amount, this system predicts that the more lexical units are active, the longer it will be the time required for the selection of the correct target word. This mechanism is crucial in the explanation given by the model for the picture-word interference (PWI) effect. In the present work we will provide evidence contrary to this way of modeling the PWI effect.

Simon Effect – Not Just Interference! #483 D. AISENBERG, A. HENIK, Ben-Gurion University of the Negev

The Simon task is one of the well known tasks that recruit cognitive control. The Simon effect, the reaction time gap between congruent and incongruent stimuli, has been commonly discussed as an interference-based effect. Yet, no concrete study tested the interference vs. facilitation issue. In the current research we employed two potential neutral stimuli in order to examine whether the effect is entirely interference based or involves facilitation also. In a series of three experiments we found that presentation of the Simon stimuli on the central meridian at the top or bottom of a screen is a valid neutral condition for the Simon task. In addition, we found facilitation as well as interference effects. Namely, there were significant differences between the neutral condition and congruent or incongruent conditions, and the Simon effect itself was even stronger than it was before adding the neutral condition. These results are in contrast with the common opinion regarding the Simon effect and further our understanding with respect to the mechanisms involved in performing the Simon task.

Goal neglect explained by common executive ability #484 L. ALTAMIRANO, A. MIYAKE, N. FRIEDMAN, University of Colorado

at Boulder

In goal neglect (GN), known task demands are temporarily ignored (Duncan et al., 1996). Although GN is thought to be a unitary concept, its construct validity has never been tested, nor has GN been compared to measures of specific executive functions. The current study used an individual-differences, latent variable approach to test whether GN forms a coherent construct and to determine how GN relates to well-established executive functions (task shifting and updating of working memory representations). Though some separability was observed across GN subtypes (single- versus multiple-goal tasks), results suggest that GN forms a coherent construct. While GN shared some variance with specific executive functions, the common variance across executive tasks completely overlapped with GN, suggesting that these two constructs tap the same ability. Furthermore, the established close relationship between GN and general fluid intelligence was fully mediated by this common executive ability. GN may, therefore, provide a good measure of general executive functioning, however, given evidence of some separability across GN subtypes, use of multiple measures is preferable.

Task Identity Conflict: Evidence from the Task Identity Congruency Effect (TICE) in a Spatial Task Switching Paradigm [#485] N. MEIRAN, A. BRAVERMAN, Ben-Gurion University of the Negev

Many models suppose the existence of a task decision process in goal directed behavior. This study sought a clean direct measure that could confirm the existence of such a process with the use of a spatial task switching paradigm. This was done by diminishing response conflict and manipulating task conflict. A Task Identity Congruency Effect (TICE) was consistently found in six different experiments. Participants responded more slowly and less accurately when extra unattended information was incongruent with task identity as compared to when the information was congruent with task identity. TICE was found when interference appeared solely during target appearance and when it appeared solely during pre target preparation. During the latter case, TICE was found to decrease with MORE preparation time. The results can not be explained by assuming that task decision affects performance only through top down biasing of response selection and therefore support the existence of a separate processing stage of task decision.

Retrieval induces forgetting even when only two items share a cue: A more direct method to test inhibitory models of forgetting [#486] A. KERESZTES, M. RACSMÁNY, Budapest University of Technology and Economics

Retrieval of information can lead to forgetting of related memories. This finding, called retrieval induced forgetting is held to be the result of interference resolution. It is not clear whether interference resolution involves facilitatory processes only or inhibitory processes too. The Retrieval Practice Paradigm (RPP) (Anderson, Bjork, & Bjork, 1994) tests conflicting predictions of facilitatory and inhibitory theories. In a typical RPP experiment subjects recall groups of items with which other groups of items interfere through a shared cue. Conclusions regarding processes of interference resolution are drawn from the recall performance of interfering items on a later test. Results are inconclusive partly because measuring the effect of the recall of item groups on the representation of other item groups masks effects that are averaged out across items. Circumventing this problem, we designed an RPP experiment in which with every to-be-recalled item one single item interfered. This rendered the analysis of the relationship between interference – as reflected in recall reaction times – and later forgetting of interfering items possible. Results show that the magnitude of interference affects the probability of later forgetting of the interfering item. Thus this design can directly test multiple predictions of facilitatory vs. inhibitory theories.

Possible involvement of attentional inhibition in intentional forgetting [#487] J. MENOR, University of Oviedo

The effects of divided attention (single vs. dual task) in the study phase and the type of list (categorised vs. unrelated words) are analysed on item-method directed forgetting procedure. The aim was to test the hypothesis that forget instruction engage a cognitively demanding process that stops or prevents the processing of the item. In an immediate free recall test restricted to remember items, subjects recalled less items and committed more intrusions of forget items in dual task than single task condition. Furthermore, intrusions proportion was significantly higher in lists of categorised words than unrelated word lists. In a final free recall test, subjects were instructed to recall all words previously showed. Significant effects were obtained for instruction (i.e., directed forgetting effect), divided attention, type of list and the instruction x divided attention interaction. Together, the results suggest that forget instruction put into operation a process that requires the allocation of processing resources. When these resources are remove in dual task condition, subjects find it difficult to suppress processing of items to forget, especially when these items can be integrated easily into the context of the list (categorised word lists).

The stressed prefrontal cortex: Acute psychosocial stress disturbs shifting and shielding in a task switching setting [#488] F. PLESSOW[1], A. KIESEL[2], C. KIRSCHBAUM[1]
[1]Technische Universitaet Dresden
[2]University of Wuerzburg

Currently, there is little research regarding effects of acute stress on volitional control. The aim of the present study was to investigate the influence of acute psychosocial stress on the balance between shifting and shielding in a task switching setting. For this purpose, young healthy participants were exposed to either a standardized psychosocial stress-induction protocol (Trier Social Stress Test, TSST) or a standardized control situation. Subsequently, they conducted an explicit-cuing version of the Task Switching paradigm categorizing a single-digit number as either smaller or larger than five or as odd or even. Shifting and shielding performance were quantified by switch costs and target congruency effects. Salivary cortisol, alpha amylase and heart rate were continously assessed throughout the whole experiment as biological markers to validate the induced stress level. Results reveal increased switch costs as well as increased target congruency effects for the TSST group in comparison to the control group. We conclude that acute psychosocial stress impairs both, the efficiency of shifting between tasks sets as well as shielding against competing task sets.

Developmental changes in the effects of associative learning on task-switching abilities [#489] J. KARBACH[1], J. KRAY[1], A. BLAYE[2]
[1]Saarland University
[2]Provence University

Previous work showed that in both younger and older adults the cost of switching between two tasks depends on the strength of the associations between tasks, stimuli, and responses (Kray & Eppinger, 2006). That is, with increasing time on the tasks, the reduction of switching costs is larger when the stimulus-set size is very small compared to relatively large. The aim of this study was to examine effects of associative learning on developmental changes in task switching abilities from childhood to adulthood. Since age differences in task-switching performance are usually larger when response mappings are incompatible (i.e., with currently relevant stimulus attributes mapped onto different response buttons), we also investigated interactions with response compatibility. We tested 130 participants in three age groups (4-5, 8-10, and 18-28 years of age) in a cue-based switching paradigm. Subjects either performed switching tasks under a small (n = 4) or a large (n = 96) stimulus-set size condition. Preliminary results show the typical reduction of costs with increasing age as well as larger age differences in switching costs under incompatible response mappings. These age differences were most pronounced under the small stimulus-set size condition, pointing to younger children's difficulties in separating overlapping task-set representations.

Psychometric properties of attentional control scale: preliminary

study on polish sample [#490] M. FAJKOWSKA[1], D. DERRYBERRY[2]
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[2]Oregon State University

Data from Polish sample (N=218) showed that a 20-item Attentional Control Scale was unidimensional, and with the possible exception of some items it can be used validly to assess long-term individual differences in attentional skills related to voluntary executive functions. The analysis of content, internal and construct validity as well as reliability provided evidence of the scale's significant convergent and discriminate validity when correlated with attentional tests and other personality techniques and strong and systematic relation to measures of temperament, arousal, emotionality and motivation. The results allow assuming that the executive skills, like good attentional control may protect individuals from the emotional disorders by regulating perceptual, conceptual, and response processing.

IMPLICIT LEARNING

Deficits in implicit sequence learning in dyslexic children with spared learning of explicit sequences and contextual cueing [#491]
J.M.M. VAQUERO[1], G. JIMÉNEZ-FERNÁNDEZ[1], S. DEFIOR[1], L. JIMÉNEZ[2]
[1]*Universidad de Granada*
[2]*Universidad de Santiago de Compostela*

Dyslexia is a specific learning disability to acquire fluent reading and spelling performance. The absence of other high level cognitive deficits in this population has led some authors to propose that non strategical processes like implicit learning could be impared in dislexic population. Most studies on this issue have used sequence learning tasks but so far the results have not been conclusive. In order to test this hypothesis we compare the performance of dyslexic children and good readers on implicit and explicit sequence learning tasks. The results showed that dyslexic children did not learn the sequence when participants were not informed of its presence (implicit condition). In contrast, when they were encouraged to discover the sequence in order to improve their performance (explicit condition) the dislexic group learned without significant differences in relation to the good readers group. In the second study we explore whether this implicit learning deficit involves other forms of implicit learning such as contextual cuing. In this case the implicit learning of the information provided by the contextual cues was similar in both groups. These results are discussed with the aim of clarifying how deficits in implicit sequence learning could contribute to the development of dyslexia.

Dimensional overlap and implicit learning of irrelevant sequences [#492] N. DEROOST, P. ZEISCHKA, D. COOMANS, Vrije Universiteit Brussel

Deroost and Soetens (2006) only observed implicit learning of an irrelevant spatial sequence when spatial processing of relevant information was involved. Therefore, we investigated the role of dimensional overlap between relevant and irrelevant information in implicit learning of irrelevant sequences. In Experiment 1 (colour), participants reacted to the colour (dimensional overlap) or the shape (no dimensional overlap) of a stimulus appearing against an irrelevant changing background colour. In Experiment 2 (location), responses had to be made to the direction of an arrow (dimensional overlap) or the colour of a dot (no dimensional overlap) appearing in different, irrelevant locations. Without informing the participants, the relevant and irrelevant information was presented following different second-order conditional sequences. Implicit learning of the irrelevant sequence was inferred from an increase in reaction time with the omission of the irrelevant sequence. In both experiments, learning of the irrelevant sequence took place, but only when relevant and irrelevant sequences were presented in a correlated fashion. When relevant and irrelevant sequences were uncorrelated, no implicit learning of the irrelevant sequence could be observed. These results suggest that dimensional overlap between relevant and irrelevant information does not contribute to implicit learning of irrelevant sequences.

The Impact of Starting Small: the learnablity of hierarchical structures in AGL [#493] J. LAI, F. POLETIEK, Leiden University

Much theoretical debate and empirical research in artificial language learning questions whether people can learn complex hierarchical structures. Two recent studies in artificial grammar learning (AGL) with a hierarchical grammar of the type AnBn with long-distance dependencies, came up with conflicting conclusions. Bahlmann & Friederici (2008) reported successful learning and activation in the Broca's area during learning, suggesting that this type of hierarchical structures was processed in the natural language area of the brain. Alternately, de Vries et al. (2008) could not find any learning of recursive structure with the same stimuli as used by Bahlmann & Friederici (2008). The present AGL-study investigated whether it conferred an advantage for acquisition of hierarchical structures, if the learning input was presented in a starting small fashion. 120 strings of non-words consisting of CV syllables were generated with a hierarchical recursive artificial grammar. Performances (i.e grammaticality judgments of novel strings) were compared for a staged-input ordering and a random ordering of strings in the induction phase. We propose that learning was helped by the staged input, possibly explaining divergent findings in previous research on the learnability of hierarchical structures, in AGL.

Flexible control in "implicit" learning of artificial grammars [#494]
E. NORMAN, M. PRICE, E. JONES, University of Bergen

Flexible control is a well-known operational criterion for conscious knowledge (Baars, 1988). We applied this criterion to knowledge acquired in an Artificial Grammar Learning (AGL) experiment. Participants (N=80) were trained on two different artificial grammars (Dienes et al., 1995). In a "pure" test condition, grammaticality was judged with respect to one grammar throughout the block. In a "mixed" test condition, instructions to classify with respect to either the first or second grammar varied randomly between trials, which was assumed to require a higher degree of flexible control. Stimuli were either traditional letter strings or letter strings containing random variation in colour and font to increase the perceived complexity and thus reduce the influence of explicit strategies. Classification performance was above chance in both test conditions, and confidence ratings indicated metacognitive awareness. There was evidence of flexible control in all conditions, with a relative advantage of pure blocks over mixed blocks in the simple but not the complex condition. Learning was clearly not implicit, even in a condition of increased perceived complexity. We discuss which additional measurements are needed to assess whether learning in this situation is fully explicit or associated with conscious feelings reflecting implicit learning, e.g., "fringe consciousness".

The neural substrates of implicit motor versus non motor sequence learning: an fMRI study using a serial color matching task [#495]
F. GHEYSEN, F. VAN OPSTAL, H. VAN WAELVELDE, W. FIAS, Ghent University

In the past, cognitive psychology research has convincingly demonstrated that the human brain supports a system for learning sequential regularities without intentional control. To date, it remains questioned whether neural systems of implicit sequence learning overlap when operating on motor versus non motor serial information. To distinguish perceptual from motor sequencing in a continuous and unconfounded way, we modulated the original SRT task into a serial color matching task. Behavioral results provided clear evidence for independent perceptual and motor learning of first as well as second order deterministic associations. However, the rate of learning and reflection on behavioral performance clearly benefited from assistance of the motor system. This behavioral work was related to brain function using two blocked fMRI studies. In both studies, subjects were scanned over two sessions with additional training in between, using an identical paradigm. The distinct areas, engaged in the early and advanced stages of sequence acquisition for perceptual and motor

information, are discussed.

How people make decisions in artificial grammar learning task – their declarations #496 A. POPŁAWSKA, A. KOLAŃCZYK, Warsaw School of Social Sciences and Humanities, Faculty in Sopot

The aim of the study was to compare what kind of rules participants considered in implicit learning process measured by the artificial grammar learning tasks. First study assess the role of motivation and cognitive style (global vs. analytic) in classic implicit learning process. The Navon test defined the cognitive style of participants The motivation was manipulated in one group by an instruction which suggested that results of the experiment are connected with the level of intelligence (prevention motivation), the second one - that this task improves participant's ability to learn (promotion motivation). There was also the group without motivation. Second study is the replication with one difference - participants made decisions if they like or don't like presented letter strings. In both conditions participants described what they considered in decision making process. The results indicate that participants take into account similar characteristics of letter string when they have to say if the letter string is grammatical or not and when they have to say if they like letter string or not.

Using subjective measures of awareness to investigate implicit learning of word meaning #497 A. PACIOREK, J.N. WILLIAMS, University of Cambridge

Whilst most studies of implicit language learning have concerned learning at the level of form, few have considered learning form-meaning connections. Indeed there is scepticism (based largely on the amnesic literature) whether this is possible. In this experiment 131 Polish learners of English read English sentences containing 4 target words from the same semantic field and rated the sentences for personal importance. Next they completed an unexpected test on new sentences in which they were asked to indicate whether target words were used correctly and to provide confidence and source judgements as subjective measures of awareness (following Dienes & Scott, 2005). The experimental group was compared with a control group who did not receive training. Findings include:

- majority of responses attributed to guess and intuition categories, indicating use of implicit knowledge;
- significantly above chance performance on guess/intuition responses in both groups, with an advantage in the experimental group that approached significance;
- variation between words: the learning effect was consistently strongest for one word, possibly due to its relation to the Polish translation equivalent.

We suggest that implicit learning of form-meaning connections may be possible, at least to the extent of mapping novel words onto pre-existing lexical concepts.

LANGUAGE PERCEPTION

The specific role of inhibition in reading comprehension in good and poor comprehenders #498 E. BORELLA[1], B. CARRETTI[1], S. PELEGRINA[2]
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[2]University of Jaén

Several authors have demonstrated that inhibition plays a central role in the relationship between working memory and reading comprehension. For poor comprehenders inability to suppress off-goal task information has been shown to contribute to saturation of their working memory capacity, hampering text comprehension performance. However, most often inhibitory inefficiency of poor comprehenders is assessed by the ability to suppress no longer relevant information from memory: i.e. memory intrusion errors. Two studies were carried out to analyze whether poor comprehenders, with respect to good ones, showed a general or specific inhibitory deficit considering also the ability to resist to both dominant responses and distracting stimuli. Results suggested that poor comprehenders encountered specific problems in deleting no longer relevant information from memory, thus only when the information becomes irrelevant during the task. Results are discussed with regard to the concept of inhibition and their relevance in understanding performance of children with reading comprehension difficulties

Influence of person-distinctive acoustic correlates of affective prosody on emotion comprehension in speech #499 E. DMITRIEVA[1], V. GELMAN[2], K. ZAITSEVA[1]
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[2]Baltic Academy of Tourism

Affective prosody encompasses non-verbal aspects of language necessary for recognizing and conveying emotions in speech communication. The aim of this study was to examine person-distinctive acoustic correlates of speech emotional intonation. The corpus of speech signals of happy, angry, neutral emotional intonations was created by speakers using the method of actor's emotions' simulating. Listeners were told to rate the presence of emotion(s) expressed in spoken sentences by male and female speakers of different ages (20-70 years old). The data obtained on emotions' valence estimation ratings, set of acoustic and experimental parameters were submitted to Linear Regression Analysis to reveal the main predictors influencing emotional speech prosody perception. Fundamental and first formant frequencies (F0, F1) and the speakers' age and gender were significant for comprehension of positive and neutral emotional intonation while for negative one the main predictors were F0 standard deviation, F1 and age. Hence, the emotional intonation discriminated by listeners depends on its acoustic correlates and speakers' personal features (age, gender).

The distance effect in sentence reading #500 P. MACIZO[1], A. FLORES[2], A. HERRERA[2]
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[2]University of Murcia

The distance effect is considered as evidence that participants automatically access to the mental number line (Moyer & Landuer, 1967). This effect has been demonstrated widely with numbers presented out of linguistic context. However, the accessing to the mental number line has not been explored when participants process numbers in a sentence context. This study evaluates the automatic accessing to the mental number line in sentence processing. Participants read sentences containing numbers (presented in Arabic format and verbal format) and they also performed a comparison task with numbers presented in isolation. Overall, the results showed a distance effect in the comparison task. However, this effect disappeared when numbers were embedded into sentences. The study also addresses other factors that might determine the absence of distance effect in sentences (whether number information was relevant for comprehending sentences, etc.).

Readers vs. „Illiterates": The influence of the instruction on feature integration of subliminal primes #501 H. REUSS, C. POHL, A. KIESEL, University of Wuerzburg

Participants saw two letters - os, so, es or se - both as prime and target in a subliminal priming paradigm. Half of the participants, the "readers", had to classify the target as being a German word or a non-word. The other participants, the instructed "illiterates", had to respond to an exclusive-or (XOR) combination of the features location (left/right) and identity (e/o) of the vowel with the same mapping as the "readers" (es and so vs. se and os). Although the exact same stimuli were used, response-congruency of prime and target had an effect only in the reading group. In contrast, there was no congruency effect on response time and error rates in the "illiterate" group. The congruency effect in the reading group indicates an integration of features of the prime stimulus, which probably relates to the automated processes associated with reading. Yet, the necessary explicit integration of the features by the "illiterates" prevents a response-congruency effect.The results confirm that subliminal priming is possible for stimuli for which several features have to be integrated (cf. Vorberg, 2007). There seem to be, however, additional factors like automated processes or expertise that determine feature integration of subliminal stimuli.

Pardon me? Paying attention to when people talk influences speech perception #502 B. BLANCA[1], D. SANABRIA[1], J. NAVARRA[2], Á. CORREA[1]
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[2]Hospital Sant Joan de Déu

During speech perception, the brain integrates visual (speaker's articulation) and auditory information (sounds from language). It is currently debated whether audiovisual integration requires attention or involves an automatic process. Specifically, Alsius and colleagues (2005) claimed that attention is necessary only on dual task conditions involving high mental load. We studied whether temporal orienting of attention influences speech perception as measured by the McGurk effect. Participants had to report what they heard from a speaker shown in a video. In the experimental condition, visual and auditory information were incongruent (the speaker articulated "ga" but the sound was "ba"), leading to the McGurk effect (participants perceived "da"). Before the video started, participants paid attention to a temporal cue indicating whether the speaker would appear early (after 600 ms) or late (1600 ms). The speaker then appeared at the expected or unexpected moment. The results showed a larger McGurk effect (higher audiovisual integration) on trials where the speaker spoke at the attended moment. We concluded that multisensory integration during speech perception depends on attention, even though under conditions of single task or low mental load.

Do consonant status and sonority within syllabic boundary influence reading process in French dyslexic children? #503 N. MAIONCHI-PINO[1], B. DE CARA[2], A. MAGNAN[3], J. ECALLE[3]
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[2]University of Nice Sophia Antipolis
[3]University of Lyon 2

Few studies were conducted in French about the syllable's role, and the phonotactic rules' influence on phonological processing performed by dyslexic children (DY) in reading whereas the nature of the phonological deficits is underspecified. This paper investigates how French dyslexic children compared with chronological (CA) and reading age-matched children (RA) process intervocalic clusters on sonority-based organization. We aim at assessing whether sharpened acoustic-phonetic consonant features and consonant status within the syllabic boundary are language-specific information that dyslexic children have acquired. Thus, we are interested in the sonority profile's influence on the resort to phonological syllable unit. Two visual pseudowords recognition tasks were used: the illusory conjunction paradigm and an audio-visual recognition tasks. As in CA, results are clear-cut in DY: both groups easily processed an optimal intervocalic 'sonorant coda - obstruent onset' profile whatever the task. This sonority pattern influences the use of a phonological syllable-based segmentation processing in DY and CA, not in RA. Older children are sensitive to linguistic constraints which modulate the phonological reading unit. Finally, even in cognitive constraining tasks, DY matched CA in 'speed-accuracy' performances, and outperformed RA. Results don't clearly support the degraded phonological representations hypothesis as well as the difficulties to access them.

Effect of sensory training modes with letters knowledge, reading and spelling #504 H. LABAT, J. ECALLE, A. MAGNAN, University of Lyon 2

Letter knowledge is one of the best predictor of reading and spelling acquisition (Foulin, 2005 for a review). This study evaluated the effects of multi-sensory trainings on letter-sound correspondences, letter name knowledge, pseudo-words spelling and reading with 5-years old children. Specifically, we tried to determine the efficiency of sensory visual and tactilo-kinesthesic modes to elaborate the visual representation of letter. A design pre-tests/training/post-tests was used. Phonological skills exercises were the same for each group. The presence (visual group, V) versus absence of visual exploration of letters in a haptic group (H) and in a graphomotor group (G) was the only difference between groups. The progress was assessed on each task for trained letters (TL) and untrained letters (uTL). Results showed a significantly improvement for TL between pre- and post-test in all tasks and with all trainings. Consequently, tactilo-kinesthesic modes H and G lead to efficient visual representation as the visual mode. Sound knowledge of uTL improved significantly for all groups and pseudo-words reading only improved with G group. Finally, tactilo-kinesthesic mode with G presentation facilitated the acquisition of the alphabetic principle. These results were discussed in relation to the research about multi-sensory reading and handwriting method (Bara et al., 2004).

Lexicality prime effects in poor and good French spellers in 3rd and 5th grade : A masked priming study #505 M. JANIOT, S. CASALIS, University Lille North of France

The aim of this study was to examine whether developing readers differ in the way they encode orthographic information, by investigating orthographic coding in average readers with different spelling levels (Low vs. High). The masked priming procedure (stimulus onset asynchrony = 57 ms) was used to explore developmental changes in the discrimination of lexical word recognition processes. Two categories of primes were used : words and pseudowords. Such a comparison enables us to elucidate the format through which orthographic information may be encoded Children (grade 3 and grade 5) were assessed in a lexical decision task. The material was composed of pairs of five-letter primes and targets. Each target (e.g. "POMME"; apple) was preceded by four kinds of primes: related word ("pompe"), unrelated word ("crabe"), related pseudoword ("pombe"), unrelated pseudoword ("chane"). Orthographic (N>7) and phonological neighborhoods were controlled. Results showed that priming effects differed according to age and spelling levels. Thus our study evidenced how various child group encode orthographic information. These results were interpreted in terms of activation and selection processes operating in visual word recognition.

LANGUAGE PRODUCTION III

Verb cognate similarity #506 S. BULTENA, T. DIJKSTRA, J. VAN HELL, Radboud Universiteit Nijmegen

The cognate facilitation effect is widespread in studies on bilingual language processing. Recently, it has been shown that crosslinguistic similarity between two readings of a cognate can be used as a predictor for speed of recognition (Schwartz, Kroll & Diaz, 2007; Duyck, van Assche, Drieghe & Hartsuiker, 2007; Dijkstra, Brummelhuis & Baayen, under revision). Most studies examining cognates, however, have been done with nouns. This study considers verb cognates and looks into several factors that affect the processing of these, amongst which are crosslinguistic similarity, lexical frequency of the verb and frequency of its (overlapping) noun equivalents. The results of a visual and auditory version of a lexical decision task with English verbs performed by Dutch-English bilinguals show that recognition of verbs is influenced by their cognate status and frequency. More specifically within the category of cognates, the data suggest that recognition is non-linearly related to the degree of their overlap with their Dutch equivalents: only (almost) identical cognates show a facilitation effect. In the broader framework of bilingual research, this matter provides more insight into the question of shared representations and co-activation of lemmas or lexemes in the bilingual mind.

Learning word specific spelling with multiple-choice procedures has both positive and negative consequences #507 C. CARRION[1], P. PERRUCHET[2], A. REY[3], S. PACTON[1]
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Many pedagogical approaches involve exposure to and/or production of errors. For instance, many educational softwares involve a choice between correct and incorrect spellings. We tested the hypothesis that exposure to incorrect spellings in multiple-choice procedures has a deleterious effect using a pseudoword-learning paradigm in 9- to 10 year old children. The experiment started by a

familiarization phase during which 16 pseudowords (e.g., /batyvo/ spelled batuvo) were presented one at a time. The second phase consisted in a two-alternative forced-choice test between a correct spelling (e.g., "batuvo") and an incorrect but phonologically plausible spelling (e.g., "batuvau") with an immediate feedback. In a third and final phase, orthographic learning was tested either with yes/no recognition test or multiple-choice test. Results showed that children learned the correct spellings, but also, to some extent, the misspellings presented as lures during multiple-choice learning. Indeed, the lures were more often selected (final multiple-choice test) and erroneously judged as correct (final yes/no recognition test) than not presented equally plausible misspellings. This study shows that using multiple-choice procedures (even with feedback) to teach word specific spelling knowledge would have both positive and negative consequences.

On the interpretation of semantic effects in the picture-word interference paradigm #508 A. MÄDEBACH[1], F. OPPERMANN[1], A. HANTSCH[2], J. JESCHENIAK[1]
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[2]Universidad de La Laguna

In picture-word-interference (PWI) experiments semantically related distractor words (e.g. word: goat – picture: horse) interfere more strongly with the picture naming response than unrelated words do. This semantic interference effect has thus far been interpreted as an indicator of competition between lexical representations during lexical retrieval. Recently, however, Janssen et al. (2008, JEP:LMC) challenged this interpretation based on experiments with a new version of the PWI-paradigm, in which participants either named the picture or read the word depending on the word's color. The authors reported semantic interference effects regardless of whether the word appeared simultaneously with the picture or 1000 ms later. Because picture name retrieval is usually completed within a few hundreds milliseconds, the finding from the delayed version is taken to question the lexical competition account. Using identical materials, our study contrasted semantic effects in the standard paradigm and the one used by Janssen. While we obtained sizeable semantic interference in the standard paradigm, there was no effect in either version of the Janssen paradigm. This contrasting pattern shows that results obtained with the Janssen et al. paradigm do not allow one to challenge theoretical inferences based on effects in the standard PWI task in a straightforward way.

Speech errors sometimes help and sometimes hinder the resumption: consistent evidence for phonological interference and semantic facilitation #509 I. TYDGAT[1], R. HARTSUIKER[1], M. PICKERING[2]
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When repairing speech errors, certain representations of the error might affect the repair. This was tested by asking participants to name initial pictures, which were sometimes suddenly replaced by target pictures that were related in meaning or form or were unrelated. The time courses between these initial and target pictures were varied, between 200 and 400 ms. Target picture-naming latencies were measured separately for trials in which the initial picture name was skipped, interrupted, or completed. Our results showed that for those trials in which the name of the initial picture had at least partly been uttered, it was harder to make a phonological repair than to make an unrelated repair. On the other hand, it was always easier to make a semantic repair than to make an unrelated repair. The results were similar for both SOA conditions. Although an earlier study (Hartsuiker, Pickering, & de Jong, 2005) also reported some evidence for phonological facilitation and semantic interference effects, new analyses on these data that now include an important covariate, could only statistically confirm the error to repair effects that are consistent with the present findings, namely phonological interference and semantic facilitation.

Evidence from the semantic competitor paradigm for a lexical P2 component in speech production #510 K. STRIJKERS[1], A. COSTA[2], C. MARTIN[2]
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In a previous ERP study exploring frequency and cognate effects during overt picture naming, we identified an early component (P2) which seemed to be sensitive to lexical processing (Strijkers, Costa & Thierry, submitted). In this study, converging evidence for this hypothesis was sought by investigating the modulations of the P2 in response to a different lexical paradigm; the semantic competitor paradigm (Howard et al., 2006). With this task it was shown that subject's naming latencies were slowed by 30 ms for each preceding member of the same semantic category. We adopted this paradigm while recording the EEG of 24 participants performing overtly the picture naming task. Naming latencies replicated the semantic accumulation effects reported by Howard et al. (2006). In the ERPs significant effects of semantic relatedness in the P2 range were observed, with each preceding member of the same category eliciting more positive going amplitude, hereby mimicking remarkably well the naming latencies. These amplitude modulations were similar to those previously encountered for the frequency and cognate effects. We conclude that present results support the notion that the P2 component in naming tasks is sensitive to lexical processing and offer a new way for investigating lexical access in speech production.

Dissociating Frequency from Repetition Effects in Speech Production: An ERP Study of Overt Picture Naming #511 K. STRIJKERS[1], P. HOLCOMB[2], A. COSTA[3]
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In a previous ERP study, an early component (P2) sensitive to lexical frequency of pictures' names was observed, with low frequency items eliciting more positive going amplitudes compared to high frequency items (Strijkers, Costa & Thierry, submitted). In the present study we sought to replicate these results using more pictures and explicitly exploring whether repetition could have a confounding influence with respect to the frequency effect. Nineteen subjects participated in the overt picture naming study. P2 modulations for the frequency effect were replicated. Importantly, we also observed P2 differences for repetition, but with a more centro-frontal distribution and a different direction of amplitude modulations. That is, the most positive amplitude was elicited by the fasted condition (1st presentation). These results suggest that lexical frequency effects at the P2 in picture naming are not confounded by repeating the same stimulus. We conclude that this observation could reveal the existence of two distinct, but highly interactive lexico-semantic processing systems; one low-level lexical activation system, mainly influenced by within stimuli differences such as frequency, and one higher-level lexical/semantic integration system, mainly influenced by between stimuli activation patterns such as repetition.

Do competitor acquisition effects generalize to segmentation tasks? #512 N. DUMAY, M. GASKELL, University of Kent

This study looked at whether competitor acquisition effects (Dumay & Gaskell, 2007) generalize to segmentation tasks. Participants learnt fictitious words embeddeding existing words (muck) as their second syllable (lirmucktoze), through repeated exposure in phoneme monitoring. Exposure effects were tested immediately, the next day, and after a week. Involvement of the novel words in lexical competition was indexed using pause detection (Experiment 1) or word spotting (Experiment 2); in both cases the stimuli were bisyllabic sequences compatible with the newly acquired words (lirmuckt). Explicit knowledge about the novel words was assessed using recognition and recall. In both experiments the recognition performance improved between the immediate test and the first retest, with no subsequent change, whereas free recall improved from day 1 to day 8. In line with our previous results, pause detection showed no change in lexical

activity immediately, but a clear inhibitory competitor effect after 24h, and an even stronger effect a week later. Interestingly, word spotting showed a similar time course in the emergence of these effects: whereas exposure led to an immediate facilitatory trend, it resulted in significant inhibition after 24h and after a week. In other words, post-sleep lexical consolidation effects do generalize to competition for segmentation.

Position encoding in pseudowords, nonwords and numbers: evidences from a perceptual identification task #513 J. GARCIA-ORZA[1], M. PEREA[2], S. MUNOZ[1], I. FRAGA[3]
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[2]Universitat de Valencia
[3]Universidad de Santiago

A two alternative forced-choice perceptual identification paradigm was employed in three experiments with the aim of exploring position encoding in three different types of stimuli (Experiment 1: pseudowords; Experiment 2: nonwords; Experiment 3: arabic numbers). Participants were presented with a 4 characters string stimulus for 67 ms., followed by a mask and two test strings. Participants have to decide which of the two test strings was presented. Together with the correct response, six different types of foils were used from the combination of two variables: position (initial, internal, final) and type of trial (transposition vs. replacement of two characters). Results showed main effects of both variables in the three experiments and no interaction effects. Replacing characters yielded higher discriminability values than transposing. Post-hoc analyses showed that changes in the initial position were more easily detected than changes in internal and final position. Differences between internal and final position were observed with nonwords and numbers but not with pseudowords. Results are discussed in the frame of models of position encoding in visual recognition.

Global and constituent frequency effects in the processing of Italian compound nouns #514 M. MARELLI, C. LUZZATTI, University of Milano-Bicocca

There is general debate on whether complex words, in general, and compounds, in particular, are represented as a whole in the mental lexicon or are accessed through their constituents. According to the dual-route model, the parsing and direct-access procedures are parallel processing routes, their efficiency being governed by frequency effects.

A lexical decision experiment with Italian compound nouns has been run to investigate the effect of the frequency of the whole compound and of its constituents on word processing, in relation to semantic and structural properties of compounds.

Forty-two undergraduate students participated in the experiment. Forty-eight endocentric compound nouns were selected as target words. Stimuli were either transparent or opaque and either head-final or head-initial compounds. Global frequency and frequency of both constituents were included in the experimental design. A mixed-effect analysis was conducted with response time as dependent measure and items and subjects as crossed random effects.

For both opaque and transparent compounds a significant facilitation of global frequency was found, suggesting whole-word processing of Italian compound nouns. However, transparent compounds also showed a significant interaction between head position and frequency of the second constituent, indicating a possible role of headedness during mental processing.

LEARNING AND MEMORY III

How does knowledge affect memory distortion? Empirical studies on the basis of print advertisements #515 M. ROMANOWSKA, A. GROCHOWSKA, Warsaw School of Social Sciences and Humanities

The theoretical background for the research are network models of memory and processes of categorization. It is the category remaining in relation with other categories that creates an extensive network in which the knowledge of the world is stored, including that from the mass-media. Borders between particular categories change depending on the context. Recent research showed that print advertisements constitute categories. The aim of current research is to show the role of the product knowledge, understood as the internal context, in memorizing and distorting particular elements of an advertisement. The participants were presented with pairs of advertisements from the same or different category; brand claims concerned physical attributes of both advertisements in a pair or physical attributes of one advertisement and functional attributes of the other. Advertisements of high and low involvement products were used. Participants differed in their product knowledge. The memory of brand name and brand claims was checked by two memory tests. The results reveal that the better the product knowledge, the greater the amount of recalled information, including the distorted one as well. There are more recognition distortions when advertisements belong to the same category and when it is a low involvement product.

False memory and surprise: round #3 #516 S. WILLEMS, H. DEHON, University of Liege

Whittlesea et al. (2005) have proposed that false memory obtained with the DRM procedure appears when a feeling of surprise results from a discrepancy between expected fluency and actual fluency. Although they have provided a range of evidence for this account by directly manipulating the feeling of surprise, they used a RSVP procedure and manipulations that do not unequivocally rule out alternative explanations. In contrast, Karpicke et al. (2008) used a classical DRM procedure and found that subjects were not surprised when they encountered non-presented critical words at test, however, they did not directly manipulate the feeling of surprise. In the present study, we used procedures that directly affect surprise (Whittlesea et al., 2005) within the classical DRM paradigm (Karpicke et al., 2008). Results showed that the DRM effect is decreased but not abolished when participants are prevented from being surprised by critical words, suggesting that the experience of surprise may play a role in the DRM effect, but not on its own.

Testing the limits of Retrieval-Induced Forgetting: No RIF is obtained with item-specific cues #517 M. HANCZAKOWSKI, G. MAZZONI, University of Hull

Many studies have shown that the very act of retrieving a subset of items can make related studied items less available to recall. This phenomenon is called retrieval-induced forgetting (RIF). Interference and inhibition have been proposed as possible mechanisms that could account for RIF. According to the interference account, RIF should be observed only when cues used for the partial retrieval are employed on a final test, whereas the inhibitory account predicts RIF to occur also with independent cues. In three experiments we assessed whether RIF occurs with independent cues that are item-specific. In experiment 1 standard RIF was obtained when lists of associates rather than category instances were used. In experiment 2 no RIF was observed with item-specific independent cues, replicating the result of Camp, Pecher, & Schmidt (2007). In experiment 3 the hypothesis that covert cuing is responsible for mixed results on cue-independency was tested by creating links between independent cues and cues used during practice in a pre-study session. No evidence for covert cuing was found. These results show that RIF depends on cues used at retrieval, but covert cuing may not account for the effect in studies in which RIF is found to be cue-independent.

Directed forgetting of neutral and emotional words: Forgetting \'torture\' is indeed harder than forgetting \'briefcase\' #518
S. NOERBY, J. WEGENER, A. LARSEN, University of Copenhagen

We employed the list-wise directed forgetting paradigm on neutral, positive and negative nouns and retested participants after one week. We found that forgetting depended on emotional valence and developed over time: Forgetting occurred with neutral words, was ineffective with positive words, and improved recall of negative words subjected to forgetting. Our results are at odds with Wessel and Merckelbach (2006), who reported that directed forgetting

was essentially the same for neutral and negative words, but are consonant with Payne and Corrigan (2006) who found that although directed forgetting occurred with respect to neutral pictures, memories of negative pictures resisted directed forgetting. We conjecture that the discrepant results are due to subtle differences in experimental design: Payne and Corrigan mixed emotional and neutral stimuli, making the occurrence of emotional stimuli unpredictable, as was also the case in our study. In contrast, Wessel and Merckelbach used blocked stimulus presentation which may have caused habituation, because the occurrences of emotional stimuli were expected and predictable. Our results suggest that an effort to forget emotional memories may fail and ironically lead to improved memory for negative material, especially over time.

Influences of first and second language on episodic memory retrieval #519 J. WILLANDER, F. MONIRI, Stockholm University

The present study is aimed at understanding the role of first (L1) and second language (L2) in episodic memory retrieval. In this experiment, the participants viewed two different films (emotional/neutral). Memory for the content of the films was tested by means cued recall approximatly 30 minutes after viewing. The participants responded to the questions regarding the content in a written format in either their first language (Swedish) or second language (English). Preliminary analysis based on the initial participants indicated that when responding in their second language participants tended to provide more accurate information in comparison to responses given in their first language. Since the data collection is in progress these results are only preliminary and the final results and conclusions will be presented at the conference.

Imagination inflation: The role of retention interval between imagination and memory test #520 S. GOUVEIA, P. ALBUQUERQUE, University of Minho

We can evaluate the possibility of some events having occurred in our childhood (e.g., saluting the President). We can also evaluate change in the evaluation process, when it happens immediately after imagining these specific events. Imagination inflation manifests itself by an increase on the confidence that these events had occurred, and has been studied onwards since the article of Garry, Manning, Loftus and Sherman (1996).The current work studies the impact of the time interval between imagination and the response to a list of events lived in childhood (LEI - Life Events Inventory) in memory inflation. Results showed that the immediate response to LEI increases significantly the confidence level on its occurrence. However, the effect was irrelevant when the participants answered a week after the imagination phase. These results seem to emphasize the role of familiarity in the occurrence of imagination inflation.

Vividness of autobiographical memory recollection is related to self-rated imagery capability #521 J. WILLANDER, M. LUNDSTRÖM, Stockholm University

The aim of the present study was to investigate the relation between imagery and vividness of retrieved autobiographical events. Fifty-nine participants (48 women and 11 men; age range 19-49 years) were asked to retrieve three autobiographical memories. All events were rated on vividness and dated. Also, the participants rated their visual (VVIQ) and olfactory imagery (VOIQ) capabilities. The results showed that participants with higher visual imagery capability experienced more vivid autobiographcial memory recollections. However, no relationship was evident between olfactory imagery capability and vividness. In conclusion, the present results suggest that visual imagery capability may influence the vividness of recollected events such that higher imagery capacity result in more vivid recollections.

Mental Representations of Fractions in Numerical Comparison Tasks #522 F. GABRIEL, A. CONTENT, Université Libre de Bruxelles

Complex numbers have motivated numerous studies in numerical cognition. Yet little is known about the mental representations of fractions in adults. Only two studies have investigated this issue so far. Bonato et al. (2007) showed that subjects didn't automatically access the numerical value of the fraction, but they access the magnitudes of the numerator and denominator separately. Whereas Meert et al. (2008) claim that the magnitude of the fraction can be accessed in certain conditions. In order to conciliate these two seemingly opposite views, we designed and tested a model which postulates that in a fractions comparison task, subjects extract automatically the magnitude of the components, but the activation of magnitude of the fractions is only optional or strategic. We used a discrimination task in which participants had to decide whether two fractions were same or different, following two conditions. In the nominal condition, fractions were the same if the numerator and the denominator were exactly the same. In the semantic condition, fractions were the same if their value was equivalent. Results show that even when the access to the magnitude of the whole fraction is encouraged, subjects process the magnitude of the components. These results support our theoretical model.

OTHERS

Intra-individual variability in accuracy scores: When biased coefficients always tell the same story #523 P. GOLAY, D. FAGOT, T. LECERF, University of Geneva

In order to measure intra-individual variability, studies usually used the Intra-Individual Standard Deviation (ISD) and/or the Intra-Individual Coefficient of Variation (ICV). Both coefficients are used on reaction times (RT) as well as on accuracy scores. The ISD is measuring variability on an absolute scale while the ICV can be considered as a relative measure. The aim of this study was to assess whether the assumptions underlying the usage of ICV with RT can be transposed to accuracy scores; the question is legitimate as accuracy-based variability is numerically bounded and ranges between a minimum and a maximum score, which is not the case in standard RT paradigm. Investigating the relationship between intra-individual variability and level of performance with children in a visual matrix task from the Geneva Variability Study (N = 200), we show that the ICV has a strong bias towards depicting participants with lower scores as always being more variable and argue it is a consequence of loose hypothesis about the relationship between the ISD and the mean score. In conclusion, we state that there is no valuable justification to divide the ISD by the individual mean and/or to use the ICV at all when dealing with accuracy scores.

Music Influence on Cognitive Abilities in Relation to Temperamental Characteristics #524 A. WASIELA, E. CZERNIAWSKA, University of Warsaw

The cognitive abilities of a large sample of students from Poland and Korea were tested during and after listening to Mozart, traditional Polish and Korean music and Drums. Music influence was examined in relation to the temperamental characteristics of the respondents, which were measured with the FCB—TI. The results showed a relation between the temperamental characteristics and the type of music that produced the best results. Furthermore, it turned out that listening to music did not increase test scores in a non-verbal task but just opposite appeared in case of verbal tasks (except of Koreans, who scored the highest with no music). Moreover, it turned out that people who habitually listened to music while studying achieved higher results in every task than people who did not listen to music while studying. The results also showed that people who did not attend music school scored higher in every task than people who did attend, which is in a contradiction to all current findings of other investigations.

Temporal preparation and impulsivity #525

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(1) Does temporal preparation induce or prevent impulsive responding? (2) How do impulsive people develop temporal preparation? (1) We analysed the controlled vs. impulsive nature of

temporally prepared responses by measuring whether they could be successfully inhibited or not in a go-nogo task. We compared temporal preparation guided by the temporal orienting of attention, based on predictive cues, versus temporal preparation guided by sequential effects, based on inertia from the previous trial. The results showed that temporal orienting enhanced both response speed and executive control for appropriate response inhibition. In contrast, sequential effects increased response speed but impaired response inhibition. This dissociation implies two different mechanisms for temporal preparation: temporal orienting enables controlled response preparation to temporally predictable stimuli; sequential effects elicit automatic preparation by providing organisms with fast impulsive reactions to temporally unpredictable stimuli. (2) Participants were divided into groups showing response styles with low vs. high impulsivity, and their temporal-preparation profiles were compared. We found that the highly impulsive group showed a selective deficit to use controlled temporal orienting to overcome the automatic influence of sequential effects.

Application of I-conception as a System #526 R. KALAMAZH, National University of Ostroh Academy

Integration of its structural components, and stability of its hierarchical connections serve as markers of professional I-conception as a system. Considering effect of cognitive styles makes the process of I-conception development more oriented and prognosticated. In particular, the cognitive style of dichotomy field-dependence - field-independence attracts attention. Empiric research that was conducted among the students of law department in the National University of Ostroh Academy indicates that an intellectual factor plays an important part in integration relations of individual-personal characteristics in subgroups of field-independent students. The research also shows that the factor of anxiety occupies a dominant place in subgroups of field-dependent students. It was also proved that the level of personal anxiety is more typical for field-dependent students, while the medium level of anxiety is typical for field-independent students. We come to the conclusion that cognitive-oriented I-conception dominates among field-independent students and emotional-oriented I-conception dominates among field-dependent ones. Highlighted regularities should be taken into consideration while planning forming affects on professional I-conception.

Influence of the type of program in the accuracy, source monitoring and confidence of radio advertisements #527 B. MARTÍN-LUENGO, M. MIGUELES, University of the Basque Country

The main goal was to study the influence of the type of radio program in the accuracy, errors in source monitoring and confidence of the advertisements embedded on it. Participants heard three radio programs, previously evaluated as enjoyable, interesting or boring. Each program included two ads with either high or low probability of occurrence. After a filler task, participants completed an old/new recognition test about the items of the ads, and, if identified as old, a source monitoring tests. Participants also rated their confidence on the accuracy of their answers. There were more hits with ads in the interesting program and more false alarms with the interesting and enjoyable programs. Participants attributed the source of the ads better when they presented in interesting and enjoyable programs than in the boring. In general, confidence was higher in the ads with better performance in the recognition task, and higher with high typicality items. Confidence was higher with false alarms in the ads of the enjoyable and boring programs. The context where the ads are included influence their memory and their subjective experience.

Emotional responses to music are associated with musical expertise and music-driven attention #528 J. KANTOR-MARTYNUSKA[1], J. HORABIK[2]

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Music-driven attention (MDA) is a tendency to automatically shift attention towards musical stimuli in a range of every-day contexts when music is irrelevant for the cognitive task currently performed. This paper presents the results of a study in which an original questionnaire measure of MDA, Music-Driven Attention Scale (MDAS), was a preliminary means to identify individual differences in this stimulus-specific type of attention. The study aimed to test whether MDA, formal musical expertise, music experience (responsiveness and sensitivity to music), and rumination may explain individual differences in the structure of emotional responses to music. 73 musicians and nonmusicians individually listened to 190 pairs of 20 musical excerpts matched each-with-each. While listening, they completed a task that consisted in making similarity decisions ("same" or "different") for the emotional responses to each pair of musical excerpts. The task informs about the quantitative (granularity of categorization) and qualitative (similarity of classification) aspect of individual differences in emotional musical experience. In another session participants filled out MDAS as well as rumination and musical experience questionnaires. MDA was independent of formal musical expertise but positively associated with musical experience. The granularity of emotional responses to music was found to be positively associated with formal musical expertise, MDA and musical experience but independent of rumination.

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