



Revisiting control-value theory: A network analysis of parental aspirations, students' control-value appraisals, and their homework emotions

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ABSTRACT

Emotions experienced in academic settings play a crucial role in students' motivation, learning, and overall well-being. Among these, achievement emotions (such as boredom, anxiety, and enjoyment) are particularly relevant as they directly relate to students' engagement with learning tasks and academic outcomes. Achievement emotions have largely been assessed in the context of the classroom. However, there are less studies focusing on homework emotions.

In this work, we are interested in how subjective control and value are related to achievement emotions during homework. We are further interested in assessing how parental aspirations may intervene during the emergence of homework emotions.

Using a theory-informed exploratory approach, we aim to uncover the links between emotions, appraisals and parental aspirations and provide new insights for homework achievement emotions literature.

392 students from 7th and 8th grade completed self-reported questionnaires focusing on homework achievement emotions, subjective control, subjective value and parental aspirations. To capture the complexity of these interactions, we perform network analysis, an analytical approach that models the structure of interrelated psychological constructs rather than assuming unidirectional causal chains.

Results from the network analysis emphasize that enjoyment and boredom are close to each other despite being negatively related, that control is close and negatively related to anxiety, and that parental aspirations are positively related to anxiety and boredom but not to enjoyment. We discuss the relevance of including parental aspirations to better understand the emergence of achievement homework emotions.

1. Introduction

Emotions experienced in academic settings play a crucial role in students' motivation, learning, and overall well-being. Among these, achievement emotions, such as boredom, anxiety, and enjoyment, are particularly relevant as they directly relate to students' engagement with learning tasks and academic outcomes (Pekrun, 2006).

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Anchored in the appraisal theories of emotions (e.g., [Scherer, 2001](#)), the Control-Value Theory (CVT) of achievement emotions ([Pekrun, 2006](#)) posits that students' experiences of achievement-related emotions are shaped by two appraisals: subjective control and subjective value. While these appraisals have been strongly supported by empirical evidence, we suggest that parental aspirations may represent critical environmental factors that may intervene both in the development of subjective control and value but also in achievement emotions.

This study aims to investigate how subjective control, value, and parental aspirations interrelate and shape students' emotional experiences during homework, a context in which emotions remain relatively understudied. To capture the complexity of these interactions, we perform network analysis, an analytical approach that models the structure of interrelated psychological constructs rather than assuming unidirectional causal chains. By doing so, we aim to uncover the links between emotions, appraisals and parental aspirations and provide new insights for homework achievement emotions literature.

1.1. Achievement emotions and learning

Literature offers a wide array of definitions for emotions. In this study, we adopt the conceptualization proposed by [Sander \(2016\)](#), who defines emotions as a two-steps process, initiated by the perceived relevance of an event (real or imagined), that then initiates a response in multiple components. This definition is rooted in the component process model of emotions ([Scherer, 2001](#)), which posits that emotions are composed of interrelated subsystems that operate in parallel ([Sander & Scherer, 2014](#)). At the heart of this model is the idea of cognitive appraisal, where the individual rapidly evaluates an event, beginning with its relevance to their goals or concerns. According to the model, this cognitive appraisal engages a series of interconnected components: a physiological component (e.g., change in heart rate), a motor expression component (e.g., facial expressions, posture, vocalizations), a motivational component (e.g., tendencies to approach or avoid), and a subjective feeling component, which refers to the consciously accessible emotional experience or "felt" emotion. The subjective feeling thus often is what is meant by "emotion".

In the context of education, Pekrun and colleagues have largely investigated the emergence of emotions ([Pekrun, 2006](#); [Pekrun et al., 2023](#)). More specifically, they have emphasized the importance of achievement emotions. Achievement emotions are defined as "emotions tied directly to achievement activities or achievement outcomes" ([Pekrun, 2006](#), p. 317). This emphasizes two types of achievement emotions: those related to achievement-related tasks (i.e., activity emotions) and those related to outcomes (i.e., outcome emotions). In their taxonomy, Pekrun and colleagues emphasize that achievement emotions can be categorized based on 1) their valence (i.e., the agreeableness or disagreeableness of emotions) and 2) their activation ([Pekrun et al., 2023](#)). The latter dimension refers to the physiological activation related to emotions, where activating emotions get the organism ready for actions, while deactivating emotions tends to withdraw it from actions. Among these emotions, [Lichtenfeld et al. \(2012\)](#) highlight that anxiety, boredom and enjoyment are the most prominent emotions in achievement settings. These emotions represent an interesting combination of the dimensions emphasized in Pekrun's taxonomy, as they are positively- (enjoyment) and negatively-valenced as well as activating (anxiety and enjoyment) and deactivating (boredom) emotions.

[Pekrun's \(2006\)](#) Control-Value Theory (CVT) has gained significant traction in educational research. This theory aligns with componential approaches by proposing that emotions arise as a result of subjective cognitive appraisals. The model emphasizes the importance of two appraisals: subjective control and subjective value. Subjective control refers to the individual's belief in their own competence and expectations of success. Value denotes the perceived importance or usefulness of the activity or its outcomes. Value can be intrinsic (e.g., enjoyment of the task itself) or extrinsic (e.g., achieving good grades for future rewards; [Pekrun, 2006](#)).

Numerous studies support the theoretical claims of CVT. Positive associations have been found between students' perceived control, value, and enjoyment (e.g., [Putwain et al., 2018](#); [Shao et al., 2020](#)), as well as between value and anxiety ([Peixoto et al., 2017](#); [Shao et al., 2020](#)). Conversely, higher perceived value has been negatively related to anger ([Forsblom et al., 2022](#); [Luo et al., 2016](#)). Additional research has demonstrated links between subjective control and emotional experiences. For example, studies by [Forsblom et al. \(2022\)](#), [Hagenauer and Hascher \(2014\)](#) and [Luo et al. \(2016\)](#) found that greater perceived control was positively associated with enjoyment and negatively associated with anger, boredom, and anxiety. However, the link between control and boredom may be taken with caution as more recent research suggest that high perceived control may be positively related with boredom ([Goetz et al., 2023](#)).

Beyond the classroom context, emotions also play a crucial role in the context of homework ([Dettmers et al., 2010](#)). While much research has focused on emotions experienced in-class, some studies highlight that achievement emotions are also relevant in out-of-school learning situations, such as homework (e.g., [Goetz et al., 2012](#)). [Goetz et al. \(2012\)](#) emphasized that while classroom and homework emotions were positively related to each other, they were conceptually distinct. [Liu et al. \(2019\)](#) revealed that subjective control was positively related to positive homework emotions, but negatively to negative homework emotions. Several works anchored in the expectancy-value theory have also investigated achievement emotions and their links with antecedents (expectancy and value) as well as with academic outcomes. [Gou et al. \(2024\)](#) emphasized that self-esteem was positively related to positive homework emotions but negatively to negative homework emotions. [Xu \(2017\)](#) revealed that expectancy and value were negatively correlated with homework distraction, and positively to homework effort, emotion regulation, and completion.

[Dettmers and colleagues](#) further investigated the links between cognitive appraisals and homework emotions ([Dettmers et al., 2011](#)). Their results support their theoretical model, anchored in the expectancy-value theory and the CVT, as they found that perceived value of homework and students' expectancy of success – which can be related to subjective control – were significant predictors of unpleasant emotions experienced during homework. These results were supported by [Audrin & Vauthey \(2026\)](#) as well as by [Avci & Özgenel \(2025\)](#) who found a positive link between control, value and enjoyment, and a negative link between control, value and anxiety. [Avci et al. \(2025\)](#) also emphasized negative correlations between negative achievement emotions and control and value. [Dettmers et al. \(2011\)](#) further emphasized that unpleasant emotions were negatively associated with both homework effort and

academic achievement. These results are partially supported by the literature. While Audrin & Vauthey (2026) highlighted that anxiety was the only (negatively) significant predictor of academic outcomes, Avci et al. (2025) found no significant links between negative achievement emotions and homework completion or academic achievement. Finally, Valdés-Cuervo et al. (2022) showed that positive homework emotions predicted homework completion.

Most of the work presented here has focused on students from 9 to 11th grades (Audrin & Vauthey, 2026; Dettmers et al., 2011; Goetz et al., 2012). With the exception of Liu et al. (2019), no study has investigated achievement emotions in homework in younger students. In this work, we thus choose to focus on slightly younger students – grades 7 to 8th as we believe that this age group has been understudied so far. In addition, we are interested in accounting for more distal aspects that may be involved in achievement emotions in addition with control and value in the context of homework emotions. More specifically, we are interested in integrating parental aspirations.

1.2. Parental aspirations

Parental aspirations refer to the desires, hopes, or ideal outcomes parents wish for their children, such as the grades they would like their child to obtain or the level of education they hope their child will reach (Murayama et al., 2016). Aspirations can thus be phrased as “I want my child to achieve this”. They are closely intertwined, but conceptually distinct from parental expectations, which are typically defined as the realistic beliefs or judgments that parents hold regarding their children's likely future academic achievements. Parental expectations are developed in large part on the basis of children's observed ability and prior performance (Yamamoto & Holloway, 2010), and are phrased as “I believe my child can achieve this”. In that sense, while both parental aspirations and expectations focus on potential achievement, their specific foci differ : while aspirations refer to desires, wishes and goals, expectations tap into realistic judgments that are developed realistically based on children's abilities (Buchmann et al., 2022; Murayama et al., 2016; Sakaki et al., 2025). Because the two are typically positively correlated, they have sometimes been used interchangeably and operationalized as a single measure (see Murayama et al., 2016 for greater details).

Parental aspirations can be measured by asking the parents themselves or their children. In the first case, parental aspirations are operationalized by asking parents how far they want or hope their child will go in school or what grades they would like their child to earn. In the latter case, *perceived* parental aspirations is then measured (i.e., the aspirations children believe their parents hold for them), as in Curran & Hill (2022) and Liem et al. (2025). In this work we are more interested in perceived parental aspirations.

Parental aspirations have been largely investigated in relation to achievement. A substantial body of research emphasizes that higher parental aspirations are predictive of better academic outcomes in students, across culture and age group (Murayama et al., 2016). Meta-analytic evidence confirms that parental aspirations represent one of the dimensions of parental involvement most strongly associated with student achievement (Fan & Chen, 2001). Longitudinally, children whose parents held higher educational aspirations have been shown to attain more favourable educational outcomes several years later (Buchmann et al., 2022). However, this relationship is not linear : excessively high aspirations (or « overaspirations » (Murayama et al., 2016)) can be detrimental, predicting poorer achievement and lower academic self-concept (Marsh et al., 2023; Murayama et al., 2016).

While parental aspirations have mostly been investigated in line with achievement, relatively few studies have investigated the link between parental aspirations and achievement emotions. Results report contrasting results. The most direct evidence comes from Sakaki et al. (2025), who modelled five annual waves of data on mathematics achievement emotions and examined parental expectations and aspirations jointly. Two findings are central for the present purposes. First, once parental expectations were controlled for, parental aspirations were only weakly related to students' achievement emotions. Authors attribute this result to the high correlation between the two constructs rather than to the irrelevance of aspirations. Second parental over-aspiration predicted greater anxiety and lower pride within the same year.

Evidence on the closely related construct of parental expectations is more abundant, and likewise inconsistent. Frenzel et al. (2007) reported that parental expectations were positively related with students' enjoyment. This result was supported by Luo et al. (2016). However, while Frenzel et al. (2007) and Kiss & Vukovic (2021) found a negative correlation between parental expectations and anxiety, Goetz et al. (2006a) instead found a positive relationship between parental expectations and anxiety, anger and boredom. Sakaki et al. (2025) further suggested that the temporal dimension may have an impact on the link between parental expectation and emotions. Indeed, their results emphasized that higher parental expectations were positively related to positive emotions and negatively to negative emotions (except for boredom) during the same year. However, they found that parental expectations were positively related to negative emotions in the subsequent year (Sakaki et al., 2025).

Theoretical grounds for linking parental aspirations and achievement emotions come from the socialisation of competence beliefs and values. Parental beliefs are related to parental behaviours (i.e., promoting their child's engagement, overt and covert share of their expectations for their child, etc.), which leads to promoting the child's self-efficacy beliefs and values towards the domain, which in turn, can foster achievement (Pinguart & Ebeling, 2020). As McCoy et al. (2016) suggest, these are further internalized by the child, thus leading to their own beliefs and values. This process is also referred to as “expectancy socialiser model” (Eccles, 1983). Buchmann et al. (2022) provide direct longitudinal support for the aspirations-specific version of this pathway: in a representative Swiss sample followed from age 9 to age 15, parental educational aspirations and children's academic self-concept were positively associated at both the between- and within-person level, and parents who held higher-than-usual aspirations had children with higher-than-usual academic self-concept three years later (with a reciprocal child-to-parent effect of comparable magnitude). To summarize, children are sensitive to the aspirations their parents hold for them and internalise them into their beliefs about their own abilities.

This may echo theoretical inputs from the CVT, which also emphasized the importance of self-efficacy beliefs (control) and value dimension in the emergence of achievement emotions. Indeed, the CVT (Pekrun, 2006) posits that emotions in academic settings arise

primarily from subjective control and subjective value. However, CVT also acknowledges the role of environmental antecedents, which can influence these appraisals and emotions indirectly. In this light, parental expectations may serve as distal antecedents that shape students' beliefs about their academic competence (control) and the importance of achievement (value). For instance, children consistently exposed to high parental standards may internalize the value of academic success, but if they feel unable to meet these expectations, their sense of control may diminish—fostering negative emotions such as anxiety, shame, or hopelessness. Conversely, when expectations are appropriately calibrated, they may bolster students' control-value appraisals, promoting positive emotions.

To the best of our knowledge, no study to date has examined how parental aspirations, subjective control and subjective value, and achievement emotions are interconnected. Although homework occupies a central place in children's daily academic lives, research on achievement emotions has largely focused on classroom contexts, leaving the emotional dynamics of homework comparatively underexplored (Pekrun, 2011). Moreover, while CVT identifies parental expectations as a theoretically relevant antecedent of achievement emotions (Pekrun, 2006), parental aspirations have received little empirical attention, with existing studies tending to focus on broader constructs such as parental support or autonomy-granting rather than on expectations and demands specifically (e.g., Neuenschwander et al., 2007). By examining enjoyment, anxiety, and boredom during homework alongside cognitive appraisals and parental aspirations, the present study addresses both gaps simultaneously, offering insights regarding how parental demands are positioned within the appraisal-emotion system in a homework context.

1.3. Network analyses as an exploratory research tool

Given the nature of this work, we performed network analyses to examine the structure of interrelations between the concepts at stake (Borsboom et al., 2021). Network modelling has become exponentially used within the last decade (Borsboom et al., 2021). Its widespread adoption across disciplines stems from the assumption that phenomena observed both between and within individuals are best understood as complex systems (Barabási, 2012). Since such systems are defined by the structural interdependence of their components, investigating them as a network provides interesting insights (Barabási, 2012; Borsboom et al., 2021). Network analysis thus allows to understand how items measuring constructs are organized (Epskamp et al., 2018). In our case, network analyses seem relevant as they allow to examine the patterns of relations between parental aspirations, cognitive appraisals and emotions simultaneously. In addition, these analyses prevent troubles related to multicollinearity as they are based on partial correlations. More concretely, network analyses allow for the identification of nodes (i.e., items) with high centrality (i.e., that are strongly linked to many others in the network). High-centrality items are considered influential, as they maintain dense connections within the network, whereas items with low centrality exhibit weaker or fewer associations (Burger et al., 2022). Network analyses offer a graphical representation that not only highlights central nodes but also reveals the proximity and strength of connections between nodes (Epskamp et al., 2018). The connections between nodes are referred to “edges”, which are estimated using partial correlations and thus emphasize the unique relation between two nodes. As the estimation is made through partial correlation, this allows the controlling for the relation with other nodes (Epskamp & Fried, 2018). Network analyses further highlight the influence (or Expected Influence) of relations between nodes, and allows to emphasize nodes that have multiple, close and strong relations with other nodes (Borsboom et al., 2021). As emphasized by Putwain et al. (2024, p. 3), “network analysis offers a granular node-level representation of data accounting for the system-wide influence of other nodes”.

1.4. Purpose of the study

The purpose of this study is to explore the relationships between students' achievement emotions, more specifically boredom, anxiety, and enjoyment, during homework and their perceptions of control, value, and parental aspirations. Drawing on the CVT, the study aims to examine how these variables co-occur in shaping emotional experiences during homework, a setting that has received comparatively little empirical attention despite its central role in children's daily academic lives.

To investigate these interrelations, we use network analyses rather than traditional variable-centered approaches such as structural equation modelling or multiple regression. These methods typically impose a priori causal structures on the data and evaluate the fit of a theoretically specified model. In contrast, network analysis is particularly suited to exploratory questions about the organization of a set of variables, as it estimates the unique pairwise associations between variables simultaneously while controlling for all remaining variables, without requiring prior specification of a causal structure (Borsboom et al., 2021; Epskamp & Fried, 2018). This is especially valuable in the present context, where CVT identifies a set of theoretically relevant constructs and their relevance for emotional experience, but there were no previous studies investigating the pattern of associations among individual items, nor the relative centrality of each variable within the system.

Beyond this, network analysis offers theoretical insights that variable-centered approaches cannot readily provide. By identifying nodes with high centrality, network analysis reveals which components are most structurally influential (Burger et al., 2022). A variable that is highly central may act as a hub connecting otherwise weakly related parts of the network, suggesting that it plays a more integrative role in the system than its bivariate correlations alone would indicate. In the present study, this approach enables us to examine not only whether control, value, and parental aspirations are associated with achievement emotions, but also how these variables are positioned relative to one another within a system of mutual dependencies.

2. Method

2.1. Participants

Participants were 392 students aged 10 to 12 years old (i.e., in 7th to 8th grade, corresponding to the last years of primary school) in 22 different classes in Switzerland (202 girls, 188 boys, and two non-answers).

This study received ethical approval from the research coordination committee, in accordance with national regulations governing research involving minors. Prior to data collection, headmasters and teachers provided institutional consent for the research to be conducted in their schools and classrooms. Parents were subsequently informed of the study through a written consent form detailing its purpose and scope, and were required to sign it to authorize both their child's participation and the use of their data for academic research purposes. All required permissions were obtained before the study commenced.

2.2. Procedure

Participants were invited to complete a self-reported questionnaire in class. A researcher came into the classroom and explained the context of the study by providing the instruction, emphasizing that anonymity was granted and that no answers were wrong. To ensure a clear understanding of the items, the researcher read the items aloud. This allowed us to avoid any missing data. Taken together, the session lasted around 30 min.

2.3. Measures

To assess emotions felt during homework, we used the Achievement Emotions Questionnaire-Elementary School (AEQ-ES; [Lichtenfeld et al., 2012](#)), which captures the most frequent achievement emotions (i.e., enjoyment, anxiety and boredom). This scale was validated in French by [Audrin & Hascoët \(2026\)](#). Although this scale was initially designed for younger children in their original version (ages 7 to 10), the French validation was done on older children (ages 10 to 12). We thus chose to use it for our sample. This scale consists in eight items ($\alpha = .76$, $\omega = .83$) measuring enjoyment (2 items), anxiety (3 items) and boredom (3 items) such as “My homework bores me to death”. Participants were invited to answer on a 5-point Likert scale ranging from “not at all” to “very much”.

To assess perceived control, participants then completed the scale proposed by [Kosovich et al. \(2015\)](#). This scale was initially designed to assess the control on a specific topic (i.e., Maths, French, ...). We adapted it so that the items assessed the control to homework. This scale consists in 3 items such as “I know that I am capable of learning the content of my homework”. A 4-point Likert scale was used, allowing participants to rate their responses from “not at all true for me” to “very much true for me”. The scale presented acceptable reliability ($\alpha = .67$, $\omega = .67$).

Subjective value was also measured using the 3-items scale designed by [Kosovich et al. \(2015\)](#). We adapted it so that the items assessed the value allowed to homework – such as “I think homework is important”. Participants were invited to answer on a scale ranging from 1 (not at all) to 4 (extremely). Internal reliability was acceptable ($\alpha = .81$; $\omega = .83$).

Finally, we measured parental aspirations using the measure used by [Curran Hill \(2022\)](#). This scale was translated in French by the authors. This measure consists in 5 items ($\alpha = .80$), such as “My parents set very high standards for me”. Participants rated their responses on a 4-point scale ranging from 1 (not at all) to 4 (extremely). Internal reliability was acceptable ($\alpha = .80$; $\omega = .82$). Importantly, the items used reflect the degree to which children perceive their parents as holding high and demanding aspirations, which aligns with the construct of perceived parental aspirations as operationalized in prior research.

2.4. Data analyses

All the analyses were performed in R. We ran separate CFAs for each scale to examine measurement quality. Because most scales had two or three items, the corresponding models were just-identified ($df = 0$) and global fit indices were not informative ([Kline, 2015](#)). We therefore based the evaluation on standardized factor loadings (acceptable $\geq .50$; [Hair et al., 2019](#)) (see Appendix). For the five-item parental aspirations scale, we also report global fit indices: $TLI = .998$, $CFI = .999$, $RMSEA = .016$, $SRMR = .018$. All scales were acceptable. Then, items were aggregated by dimension (i.e., boredom, anxiety, enjoyment, high perceived parental aspirations, control and value) to perform descriptive analyses (i.e., mean, standard deviation and Pearson correlations). Network analyses were then performed at the item level using *bootnet* and *qqgraph* packages ([Epskamp & Fried, 2021](#)). Given the ordinal distribution of the data at stake, polychoric correlations were estimated as they provide reliable estimates without requiring the assumption of multivariate normality (e.g., [Epskamp & Fried, 2018](#)). This was done using the *cor_auto* function ([Epskamp, 2016](#)). We then selected a network using Extended Bayesian Information Criterion (EBIC; [Foygel & Drton, 2010](#)) with $\gamma = .50$. We computed centrality indices (i.e., closeness, betweenness and strength) to investigate each node's centrality. Closeness centrality indexes how efficiently a variable can be reached from any other variable in the network. Nodes with high closeness are structurally proximal to all other nodes and may therefore be particularly influential in the network. Node strength indexes how strongly a variable is directly associated with the rest of the network. Nodes with high strength can be interpreted as variables that are broadly and strongly connected to other variables in the network. Betweenness centrality reflects the proportion of shortest paths between all pairs of nodes that pass through a given node. A node with high betweenness may be considered as a bridge within the network. Together, these indices represent centrality indices. The more central the node, the stronger its influence on other nodes in the network ([Bringmann et al.,](#)

2019). In contrast, low central nodes are relatively unconnected (Burger et al., 2022). Thus, a central variable in a network has a pivotal role, and it interacts directly with numerous other nodes in the network.

We further report the stability of the network using the correlation stability coefficient (CS-C). This index is computed on the centrality indices, and it indicates the maximum percentages of cases that could be removed while maintaining a .70 correlation between the original centrality indices and a bootstrapped version of them. This was tested with a decrease of sample size from 95% to 25%. As highlighted by Epskamp and colleagues (Epskamp et al., 2018; Epskamp & Fried, 2018), CS-C values are acceptable when they are above 0.25, good if they are above .50 and excellent if above .70.

3. Results

As displayed in Table 1, descriptive statistics reveal that among emotions, participants reported boredom as the most intense emotions felt. Correlations showed that emotions are significantly related to each other. More specifically, enjoyment is negatively related to boredom but positively to anxiety, while boredom and anxiety are positively related to each other. Regarding subjective control, subjective value and perceived parental aspirations, correlations suggest that subjective control and subjective value are positively related to each other, but not significantly to perceived parental aspirations. Interestingly, correlations further suggest that control is not significantly related to enjoyment nor boredom, but negatively with anxiety. In contrast, subjective value is significantly related to enjoyment and negatively to boredom, but not to anxiety. Finally, perceived parental aspirations are positively and significantly related to negative emotions but not to enjoyment.

We now focus on results from the network analyses. Centrality measures are presented in Fig. 1 below. These reveal that one item related to subjective control and one related to anxiety are the most central nodes in the network as they have the highest values of betweenness and closeness. Interestingly, items measuring boredom also appear as having high strength centrality.

We then performed post-hoc stability analysis. This analysis revealed that betweenness (CS [$r = .70$] = .051) is far below the acceptable threshold sets by Epskamp et al. (2018), while closeness is just above the threshold of .25 (CS [$r = .70$] = .28). Finally, strength appears as stable (CS [$r = .70$] = .52), suggesting that we can make interpretations based on these centrality indices but interpret the betweenness indices with some care.

The weighted corrected network is depicted in Fig. 2. This network allows to observe the nature and the structure of the relations between the variables of the network while accounting for the weight of all the variables included. This network emphasizes that 1) subjective control is close and negatively linked to anxiety, 2) boredom and joy are close to each other despite being negatively related to each other, 3) subjective value is close and positively related to control but not to parental aspirations and 4) parental aspirations is positively related to anxiety and boredom but doesn't seem related to joy.

4. Discussion

The purpose of this work was to explore the interrelations between achievement emotions during homework, appraisals (subjective control, subjective value), and parental aspirations using network analyses. As no previous studies has investigated these concepts together, we sought to examine how these constructs interact and to identify which variables are most central in students' emotional experiences during their homework. Using self-reported questionnaires on 392 students between 7th and 8th grade, our results revealed interesting links between the constructs. Boredom was the most intense emotion reported by students when doing their homework. These results are coherent with previous research highlighting the importance of boredom in homework context (Goetz et al., 2012). As expected, boredom and enjoyment were negatively correlated, while boredom and anxiety were positively associated, consistent with prior literature (Pekrun et al., 2002). Enjoyment showed a small positive relationship with anxiety, a finding that suggests these emotions may co-occur in high-stakes academic contexts where students experience both engagement and pressure (Goetz et al., 2006a).

Appraisal variables showed more selective associations. Subjective control and subjective value were positively correlated, in line with theoretical predictions suggesting that these appraisals are interdependent (Pekrun, 2006). Interestingly, control was negatively related to anxiety, while value was positively associated with enjoyment supporting its role in promoting positive emotional engagement (Schukajlow & Rakoczy, 2016). Value was further negatively related to boredom, consistently with previous literature (Shao et al., 2020). Parental aspirations were not significantly related to subjective value and subjective control but positively associated with anxiety and boredom. These results partially support previous evidence investigating the links between parental

Table 1
Descriptive statistics (mean, standard deviation, and partial correlations).

Variable	Mean	SD	Enjoyment	Boredom	Anxiety	Control	Value
Enjoyment	1.84	0.79					
Boredom	3.38	1.20	-.52***				
Anxiety	1.84	0.90	.13**	.22***			
Control	3.36	0.56	.09	-.07	-.27***		
Value	2.57	0.84	.18***	-.21***	.09	.22***	
Parental aspirations	2.44	0.79	-.004	.12*	.10*	-.01	0.03

Note. ** $p < .01$, * $p < .05$, bilateral, SD = standard deviation.

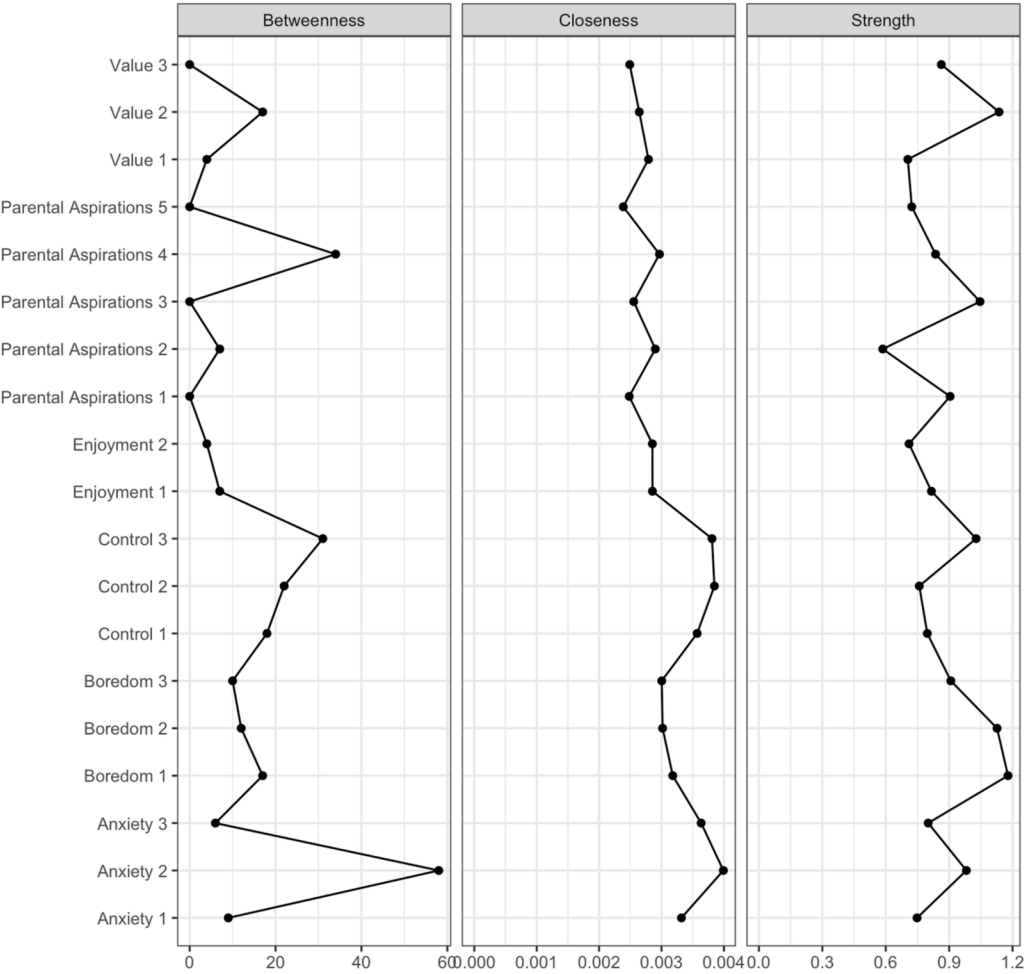


Fig. 1. Betweenness, centrality and strength of the network nodes.

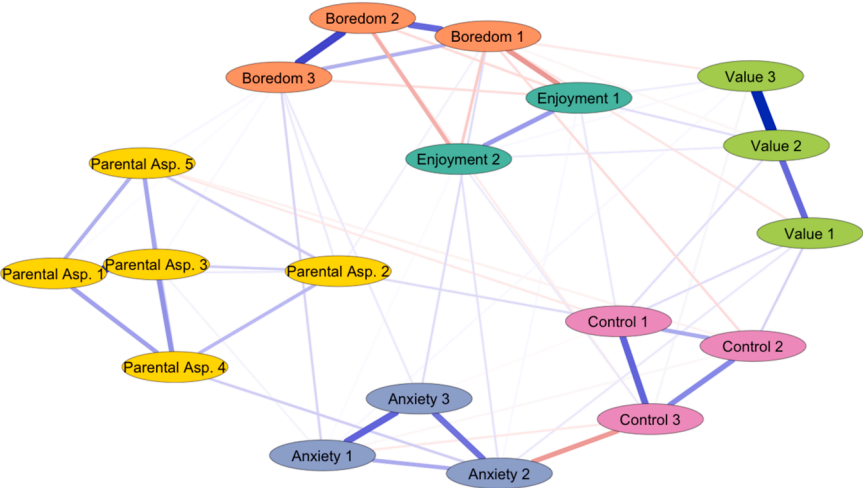


Fig. 2. Weighted network of achievement emotions, control, value and parental aspirations. Blue lines represent positive correlations; red lines represent negative correlations. Thin lines represent weak connections, and thick lines represent strong connections.

aspirations, parental expectations and achievement emotions (Frenzel et al., 2007; Luo et al., 2016; Sakaki et al., 2025). As suggested by Sakaki et al. (2025), the variability observed in the literature may be related to how the concept is measured; we discuss this aspect later in the discussion section.

The network further revealed several important structural features. Control and value were presented close to each other, as did boredom and enjoyment despite their negative correlation. These findings are aligned with the Control-Value Theory (Pekrun, 2006, 2024), although our analyses identify relational patterns rather than providing a causal test of theoretical propositions. Subjective value showed clear associations with both enjoyment and boredom, reinforcing its motivational function in promoting positive emotional engagement and reducing disengagement. The central role of subjective control in the network supports its links with achievement emotions. However, the relatively weak direct associations between control and emotions may suggest that its influence could be non-linear, more indirect or context-dependent than previously assumed. While the results of the network analysis cannot assess any indirect links, this echoes with previous studies that have emphasized an unclear – potentially non-linear – link between control appraisal and emotions (Goetz et al., 2023), and more specifically boredom. This may also indicate a need to consider additional moderating variables such as task type or student personality, as emphasized by Pekrun et al. (2023).

In this study, we posited that parental expectations may act as an external factor that is related both to students' subjective control and their emotional experiences in achievement settings and more particularly in the context of homework. Network analyses revealed that parental aspirations were related to anxiety. This goes in line with prior research has linked high parental aspirations to increased anxiety and emotional distress in children and adolescents (Soenens et al., 2008; Yap et al., 2014).

However, contrary to CVT predictions, parental aspirations showed no significant association with either control or value appraisals yet were represented closely to enjoyment and directly connected to anxiety in the network. One possible explanation is that the influence of parental aspirations on appraisals may operate through mechanisms not captured by the constructs measured in the present study. For instance, parental aspirations may affect children's appraisals of specific outcomes (such as the perceived importance of failure or the fear of disappointing significant others) rather than their general sense of control or value as measured here. As noted in the limitations section, our measure of value did not distinguish between failure importance and other value components, which may have obscured a theoretically meaningful association between parental aspirations and failure-related appraisals specifically.

From a practical perspective, our findings emphasize the importance of fostering value and to a lesser extent control to enhance students' positive emotions. Moreover, the role of parental aspirations highlights the importance of nuanced parent-child communication, balancing aspirations with support (Grolnick & Pomerantz, 2009).

5. Limitations and further research

This study entails several limitations. First, our study is limited by its cross-sectional design, which precludes causal inferences. Future research should employ longitudinal or experience sampling methods to capture the dynamic co-activation of emotions and appraisals. These would allow for analysing how student's emotions and perceptions fluctuate day to day or across tasks (Nezlek, 2017). In addition, children were recruited within classrooms, introducing potential non-independence that standard network estimation does not fully address. Given our sample size (N classrooms = 22), we could not compute networks separately accounting for between- and within-components. Network results therefore reflect individual-level associations only, leaving classroom-level network structure unresolved.

Future research should be designed with between-level sample size explicitly in mind. Beyond sample size, emerging multilevel network frameworks, such as confirmatory multilevel network modelling (Epskamp, 2020), could reveal whether associations between children's emotional experiences and parental demands are organised partly by classroom context rather than individual differences alone.

It would also be beneficial to explore person-specific networks or latent profiles to identify distinct patterns. In addition, longitudinal designs may provide interesting insights to better understand the directionality of relationships between variables such as emotions, control, value, and parental aspirations. Such study may opt for temporal network modelling or dynamic structural equation modelling to capture how changes in one construct may precede or influence changes in another. This would allow for investigating potential feedback loops, for instance, whether boredom reduces control over time or whether parental aspirations trigger emotional disengagement.

Second, broadening the sample to include diverse age groups, cultural contexts, or educational environments would increase the generalizability of findings. Emotional dynamics and perceptions of control or parental involvement are known to vary across sociocultural backgrounds (Grob, 2000), and network structures may look different in less academically selective or more collectivist settings.

Third, several limitations pertain to the operationalization of key constructs in the study. The present study focused on three achievement emotions as these are consistently reported as the most frequently experienced emotions in achievement settings. However, this selection necessarily excludes other achievement emotions that may be relevant in the context of homework, such as pride or shame, which CVT also theorizes as functions of control and value appraisals (Pekrun, 2006). Future research should consider a broader emotional repertoire to capture the full range of homework-related affective experiences.

Regarding value, we used a holistic measure capturing the overall perceived importance of homework, without distinguishing between theoretically distinct components. However, the CVT (Pekrun, 2006) specifically predicts that the perceived importance of failure (rather than general task value) drives achievement anxiety. Thus, a holistic measure of value conflates this failure-related importance with other components such as intrinsic interest or utility value, which are not specifically theorized to predict anxiety

in the same way. As a result, the association between value and anxiety observed in the present network may only partially capture the theoretically predicted link. Future research should decompose value into its distinct components when examining its relationship with achievement emotions.

In addition, the present study assessed emotions and appraisals related to homework as a general activity, without differentiating between subject domains. This decision was motivated by the aim of capturing children's overall homework experience, but it may have attenuated associations between variables. Research in achievement emotion suggests that emotions and their cognitive antecedents are substantially domain-specific (Goetz et al., 2007; Pekrun et al., 2011). By not accounting for domains, domain-specific associations may have been obscured. Future studies should assess emotions and appraisals separately for each homework domain, which would also allow researchers to examine whether the network structure replicates across domains or differs in theoretically meaningful ways, for instance, whether the role of parental involvement is more prominent in domains where children perceive lower competence.

Also, the measurement of parental aspirations may have a crucial impact on our results. Indeed, we assessed parental aspirations with the intention to focus children's perception of their parental aspirations. However, the wording of our items ("my parents have very high standards for me") may refer to extremely high parental aspirations and potentially to certain aspects of parental expectations instead of their aspirations. Further studies may, as recommended by [Sakaki et al. \(2025\)](#) and done by [Goetz et al. \(2006b\)](#), more clearly distinguish parental expectations from parental aspirations and their impact on students. In addition, further studies should assess parental expectations and aspirations from the parents' perspective and contrast them with students' perceptions. This may provide further insights on the links between parental aspirations and achievement emotions.

Finally, a more detailed analysis of causal mechanisms is warranted. While network analyses help map connections, they do not specify how variables influence each other. For example, regarding the link between parental aspirations and students' achievement emotions, we referred to previous studies suggesting that parental aspirations act as antecedents of students' emotions. However, it is plausible that reverse effects also operate, whereby students' emotional experiences may in turn shape parental aspirations over time, for instance by signalling to parents that their child is struggling. The cross-sectional and exploratory nature of the present study, combined with the symmetric structure of network analysis, precludes any formal test of directionality. Future research should therefore employ longitudinal designs, such as cross-lagged panel models, to disentangle the temporal ordering of these effects and examine how parental aspirations and achievement emotions reciprocally influence one another across the school year. In addition, other types of network analyses may be promising, such as directed acyclic graphs ([Digitale et al., 2022](#)).

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Ethics approval

No ethic committee currently exist in our institution.

Consent

Parents were then presented with a written consent form explaining the purpose of the research and required to sign it to provide authorisation for their children participation and data treatment for academic purposes.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work the author(s) used ChatGPT in order to check grammatical quality. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the published article.

CRediT authorship contribution statement

Catherine Audrin: Writing – review & editing, Writing – original draft, Visualization, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Marine Hascoët:** Writing – review & editing, Software, Methodology, Investigation, Conceptualization, Data curation, Project administration.

Declaration of competing interest

The authors have no relevant financial or non-financial interests to disclose.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.ijer.2026.103149](https://doi.org/10.1016/j.ijer.2026.103149).

Appendix

Dimension	Item	Standardized estimate	Standard error	z	p	IC 95% inf	IC 95% sup
Enjoyment	enjoyment_1	0.75	0.22	3.47	< .001	0.33	1.18
	enjoyment_2	0.55	0.14	4.02	< .001	0.28	0.83
Boredom	boredom_1	0.76	0.03	22.82	< .001	0.70	0.83
	boredom_2	0.89	0.03	32.89	< .001	0.83	0.94
	boredom_3	0.77	0.03	22.49	< .001	0.70	0.84
Anxiety	anxiety_1	0.64	0.06	10.46	< .001	0.52	0.76
	anxiety_2	0.62	0.06	9.83	< .001	0.49	0.74
	anxiety_3	0.73	0.06	11.39	< .001	0.61	0.86
Control	control_1	0.65	0.06	11.33	< .001	0.54	0.77
	control_2	0.57	0.06	10.26	< .001	0.46	0.68
	control_3	0.68	0.06	11.09	< .001	0.56	0.80
Value	value_1	0.61	0.04	13.91	< .001	0.52	0.69
	value_2	0.92	0.03	30.05	< .001	0.86	0.98
	value_3	0.78	0.04	20.94	< .001	0.71	0.86
Parental aspirations	aspirations_1	0.79	0.03	26.23	< .001	0.73	0.85
	aspirations_2	0.46	0.05	9.50	< .001	0.37	0.56
	aspirations_3	0.80	0.03	29.41	< .001	0.75	0.86
	aspirations_4	0.65	0.04	17.47	< .001	0.58	0.72
	aspirations_5	0.61	0.04	14.79	< .001	0.53	0.69

Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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