The Relationship between Emotions and Motivation: A Structural Equation Model

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A B S T R A C T

The aim of our study was to investigate the effects of positive and negative emotions on students' motivated learning behavior (i.e., their intended effort) to learn English in the Hungarian context. The novelty of the study lies in the fact that we examined a number of positive and negative emotions and their effects on enjoyment as well as anxiety. The latter two emotions were linked to students' motivated learning behavior, too. Data were collected with the help of a validated questionnaire in Hungary, in the school years of 2019/2020 and 2020/2021. In order to fulfil our aim, we carried out structural equation modeling (SEM) for two groups of students, males (n = 467) and females (n = 682), as we were also interested in gender-related similarities and differences. The most important findings show that emotions like curiosity and pride can exert their influence through enjoyment while confusion and shame can do the same via anxiety. However, pride, boredom and apathy neither fed into the overarching emotions of enjoyment and anxiety, nor did they influence motivated learning behavior directly in our sample, which might signal the possible contribution of more cognitively oriented mediators. Finally, no gender differences could be identified regarding the relationships of the constructs.

Keywords: emotions; motivation; structural equation model; gender differences

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Introduction

In line with the recent developments of positive psychology (e.g., MacIntyre et al., 2016; Wang et al., 2021), it is important to investigate the ways affective variables might influence second/foreign language (L2) motivation by mapping how various emotions shape students' motivated learning behavior, that is, the amount of effort they intend to invest in learning English (Dörnyei, 2009). Taking previous studies that focused primarily on enjoyment and anxiety in L2 learning as our starting point (De Smet et al., 2018; Gregersen et al., 2014; Piniel & Csizér, 2015; Teimouri et al., 2019), we tested the hypothesis that posits enjoyment and anxiety as overarching emotions in the sense that they not only influence L2 motivation in a direct way but they also provide pathways for other positive and negative emotions to influence L2 motivation in indirect ways. Including further emotions besides anxiety and enjoyment in the model is desirable as researching a broader range of emotions is in line with calls which urge the broadening of the emotion research agenda (Dewaele & Li, 2020). Moreover, the issue whether these processes show invariance for male and female secondary school students was also investigated.

The context of our study is Hungarian secondary education, in which students are required to learn two foreign languages and take a school-leaving exam at least in one of them at the age of 18. We have decided to study English because this is the most popular L2 in Hungary, and hence, English learners are the largest population in this context (Öveges & Csizér, 2018). What makes this an important context to investigate is that the efficiency of secondary education in Hungary has often been debated when it comes to L2 education. Deficiencies in L2 instruction are also demonstrated by the fact that foreign language knowledge is low in Hungary when compared to other European countries (European Statistics, 2024).

In this article, first a short critical synthesis is provided of recent studies on emotions in order to establish our research gap while also highlighting studies that mapped gender-based differences. The literature review aims to (1) describe those emotions whose role in L2 learning was investigated in this study and summarize research in connection with them in the L2 learning context, (2) point out any gender differences in connection with the reviewed emotions, and (3) shed light on possible links between emotions and language learning motivation. For data analysis, structural equation modelling was used, as it is a statistical technique where testing the direct and indirect impact of emotions on motivated learning behavior is possible. In the discussion, the ideas of direct and indirect influences are detailed, which shape students' intended effort in a context in which L2 learning is compulsory. The conclusion includes theoretical and pedagogical implications as well as further ideas to investigate in various educational contexts.

Literature Review

In our study, L2 learning-related emotions were defined as "affective experiences that are directly tied to L2 learning activities and resulting learning outcomes, a dynamic process which is determined by appraisals of socio-culturally shaped L2 learning tasks" (Shao et al., 2019, p. 2), highlighting that our focus was the classroom context. As regards specific emotions that have been investigated in L2 learning contexts, there are two that have drawn much research attention over the years: (a) language anxiety and (b) language enjoyment. After providing a brief overview of these two widely researched emotions, boredom is discussed next as it has become prominent in L2 learning studies lately. Since achievement and epistemic emotions are also claimed to play an important role in educational contexts (Pekrun, 2014), which make them potentially important in L2 learning as well, the negative emotions of shame, apathy and confusion are reviewed next, followed by an overview of the positive emotions of hope, pride and curiosity to familiarize

readers with empirical research conducted in connection with them, while also drawing attention to any gender differences identified.

Language anxiety can be defined as "the feeling of tension and apprehension specifically associated with L2 contexts, including speaking, listening, and learning" (MacIntyre & Gardner, 1994, p. 284), and it is generally regarded as detrimental to L2 learning; a claim that has been reinforced by Teimouri et al.'s (2019) meta-analysis. Furthermore, evidence suggests a reciprocal relationship between anxiety and language performance, indicating instances where poor L2 performance may stem from anxiety (Sparks & Ganschow, 1991). Recent studies have emphasized the influence of contextual factors on learners' anxiety levels, suggesting dynamic fluctuations over both short and long time-frames (Gregersen et al., 2014; Piniel & Csizér, 2015). Accordingly, anxiety appears to be closely tied to various learning contexts. For example, a qualitative study among English major university students in Hungary identified anxiety as the most frequently mentioned emotion in classroom settings (Piniel & Albert, 2018).

In connection with the other extensively researched language learning-related emotion, enjoyment, Dewaele and MacIntyre (2014) asserted that "enjoyment is a central element of Csíkszentmihályi's (1990) concept of flow, a positive state where challenges and skills are well-aligned, indicative of psychological needs being met" (p. 242). They claimed that enjoyment is closely connected to the basic emotion of joy, and their research data indicated that enjoyment is a commonly experienced emotion in foreign language classrooms. Although enjoyment tended to exhibit a negative correlation with anxiety, Dewaele and MacIntyre (2014) argued against viewing the two as opposite ends of the same dimension since it is possible to experience both emotions concurrently or independently. Studies show that enjoyment levels vary depending on various background variables and contextual factors in the same way as anxiety levels do. For example, primary school students tend to enjoy L2 learning more than high school students (Albert et al., 2018; De Smet et al., 2018) and, unlike anxiety, enjoyment in L2 learning appears to be influenced by who the specific teacher is, that is, their personal qualities (Dewaele & Dewaele, 2020). Additionally, multilingualism and perceived proficiency levels positively correlate with higher enjoyment levels (Botes et al., 2020). Jin and Zhang (2021) have similarly found that increased enjoyment was associated with better performance on mid-term tests. In the Hungarian context, enjoyment was frequently reported in connection with learning English among university students, particularly in out-of-classroom contexts (Piniel & Albert, 2018).

A third emotion that has recently become a subject of increased interest among researchers is language boredom, with studies first conducted in the Polish university setting, exploring manifestations of boredom both inside and outside the classroom (e.g., Pawlak, et al., 2020, 2022). When defining boredom, researchers commonly use terms such as "disengagement, dissatisfaction, attention deficit, altered time perception, and decreased vitality" (Pawlak et al., 2020, p. 2), highlighting disengagement and disaffection as primary features of this emotion. Utilizing the Boredom in Practical English Language Classes Questionnaire, researchers identified two main factors contributing to boredom: (1) disengagement, monotony, and repetitiveness, and (2) the lack of satisfaction and challenge (Pawlak et al., 2020). They interpreted the former as a reactive and the latter as a proactive aspect of boredom. Their findings suggested that less successful learners tended to experience greater boredom, particularly in terms of the reactive factor, which was interpreted as a potential indication of high achievers' resilience to boredom. The negative correlation between boredom and performance has been observed in other studies as well (Shao et al., 2020). Moreover, in the Hungarian context, boredom levels were found to increase significantly from 7th to 11th grade (Albert et al., 2018). As far as teachers are concerned, Khajavy et al. (2018) identified learners who were not motivated and willing to collaborate as possible antecedents of boredom.

Other potentially important but less frequently investigated negative emotions in the L2 context include shame, apathy, and confusion. Shame appears to be closely linked with anxiety, particularly social anxiety, which is the anxiety experienced in social contexts (Galmiche, 2018). When describing shame, Teimouri (2018) underscored that individuals experiencing this emotion center their attention on themselves, perceiving negative judgments from others towards their entire self, which leads to feelings of worthlessness and powerlessness. Empirical evidence from Teimouri's (2017) study in connection with L2 learning supported the notion that shame is linked to others' expectations and exerts a demotivating effect on learners. Interview studies also suggested that shame is a common experience among L2 learners, although further quantitative research would be needed to validate these findings (Galmiche, 2017).

Csíkszentmihályi (1990) proposed that apathy arises when individuals with low skills encounter tasks they do not find challenging. Due to the low levels of the skills and challenges involved, this scenario represents anti-flow experiences just like boredom and anxiety do although thorough different mechanisms (Csíkszentmihályi, 1975). Liu (2021), while acknowledging the scarcity of research on apathy, defined it as a negative anticipation of one's future, rooted in negative attributional styles and experiences. Within Pekrun's (2006) control-value theory framework, apathy is characterized as a prospective outcome-oriented emotion marked by attributions of lack of control and negative valence. Shao et al. (2020), examining predictions of the control-value theory in L2 learning, found that apathy was negatively associated with both perceived control and value appraisals, as well as test performance. Their structural equation model revealed apathy as a mediator in the relationship between perceived control, value, and performance, providing evidence for its detrimental effect on language performance. In the Hungarian context, learners in the 7th and 11th grades exhibited relatively low levels of apathy although the level of apathy notably increased over time (Albert et al., 2018).

Although studies focusing on confusion are rare within the field of second language acquisition (SLA) research, D'Mello and Graesser (2014) claimed that confusion is "hypothesized to be the affective signature of cognitive disequilibrium and is expected to be highly relevant to both the processes and products of learning" (p. 290). Pekrun (2014) similarly described confusion as an emotion of academic significance, categorizing it among epistemic emotions, which typically arise in the face of cognitive challenges or difficulties. The experience of confusion seems closely tied to the perception of novelty (Silvia, 2010), and it is deemed negative when the learner encounters new information incongruent with their existing knowledge structures. Although in some cases it can have a beneficial role in learning as it urges learners to resolve the incongruency, Arguel et al. (2019) cautioned against unresolved confusion since it can result in adverse outcomes such as frustration or boredom.

As regards positive emotions that might be worth investigating in the L2 learning context, hope, pride, and curiosity are those that have already been scrutinized within our field (see e.g., Derakhshan & Yin, 2024). While studies specifically focusing on hope in the field of L2 learning are scarce, a future-oriented attitude is clearly embedded in Dörnyei's (2009) L2 Motivational Self System, particularly in the notion of the ideal L2 self (see also Csizér, 2020). Pekrun (2006) categorized hope as a prospective outcome-oriented emotion with positive valence and moderate control in his control-value theory framework. As regards empirical findings, in a qualitative interview study exploring the emotional experiences of learners outside the classroom in the Australian English as a second language (ESL) context, Ross and Rivers (2018) identified hope as one of the most prevalent positive emotions alongside enjoyment. They observed that, while hope could stem from both in-class and out-of-class experiences, it was aspirations for future outcomes or goals predominantly referring to contexts beyond the classroom that were closely associated with hope, often linked to learners' future selves.

According to the control-value theory, pride is categorized as a positive, retrospective, outcome-oriented emotion with a past rather than future-focus unlike hope, wherein attributions of control are directed inward and towards the self. In this framework, pride serves as the positive counterpart or antithesis of shame (Pekrun, 2006). An examination of this emotion, often accompanying significant accomplishments, was undertaken in an interview study involving 12 English students at an Australian university, conducted by Ross and Stracke (2016). Drawing from psychological literature, the authors delineated two forms of pride: authentic and hubristic (Tracy & Robbins, 2007). Authentic pride entails satisfaction with one's achievements, focusing on actions, while hubristic pride centers on the self or the actor.

There are relatively few studies addressing curiosity as an emotion in L2 learning, which is somewhat surprising given its strong connection to interest, a concept integrated into the self-determination theory of motivation (Noels et al., 2003) and recognized as a primary driver of autotelic activities (Csíkszentmihályi et al., 2005). Given the fundamental evolutionary importance of the drive to explore the environment (Gottlieb et al., 2013), it is puzzling why the role of curiosity in L2 learning has not received more research attention. In psychology, curiosity is commonly defined as the desire for "new knowledge and new sensory experiences that motivate exploratory behavior" (Litman & Spielberger, 2003, p. 75). Within applied linguistics, Mahmoodzadeh and Khajavy (2019) developed the Language Learning Curiosity Scale to assess two facets of language learning curiosity. One dimension, *language curiosity as a feeling of interest*, focuses on curiosity related to interest, often driving communication (communicative curiosity), while the other, *language curiosity as a feeling of deprivation*, captures the desire to alleviate knowledge gaps, reflecting curiosity to acquire linguistic knowledge (linguistic curiosity). Despite these distinct origins – one stemming from the joy of discovery and the other from the discomfort of knowledge gaps – both types of curiosity can coexist in language learners. The authors reported a significant positive correlation with enjoyment and a moderate correlation with anxiety.

Regarding gender differences in emotions related to L2 learning, findings tend to be rather inconsistent. While female learners have frequently reported higher levels of both language learning anxiety and enjoyment compared to males in various questionnaire-based studies (Albert et al., 2018; Dewaele & MacIntyre, 2014), such distinctions have not been supported in others (Mierzwa-Kamińska, 2021; Piniel & Zólyomi, 2022). There are contrasting findings concerning boredom, where male learners were discovered to experience this emotion more intensely in the Hungarian context (Albert et al., 2018), whereas no gender differences were observed in a Turkish study (Coşkun & Yüksel, 2022). Mahmoodzadeh and Khajavy (2019) found no gender differences in curiosity levels between the different genders. Based on these findings, the existence of gender differences cannot be ruled out entirely, but they do not provide strong empirical basis for claiming such differences either, leaving this question open to further investigations.

The link between emotions and motivation was first proposed by MacIntyre (2002) on theoretical grounds, but it later received support from empirical studies. The first of these was conducted by MacIntyre and Vincze (2017), which examined the correlation between 19 positive and negative emotions and various language learning motivation scales among Italian learners of German. The authors found strong positive correlations between positive emotions and different motivation scales, while negative emotions correlated negatively with motivation scales, but their relationships were somewhat weaker. The same findings were reinforced by MacIntyre et al. (2020) since they also found stronger links between motivation and positive emotions than with negative ones. There was more research aiming at mapping the relationship between the two most extensively scrutinized emotions, anxiety and enjoyment, and motivation. These studies quite consistently found positive relationships between enjoyment and motivation (Saito et al., 2018; Zhang et al., 2020) besides negative links between anxiety and motivation (Alrabai, 2022; Dewaele et al., 2023; Pan & Zhang, 2023).

Hypothetical Model of the Relationships Between Emotions and Motivation

Based on the reviewed literature, it seems that both anxiety and enjoyment appear to have a distinguished role when it comes to the topic of L2 learning and emotions (Figure 1). Although their distinguished role is certainly not independent of the amount of research effort devoted to investigating them, perhaps it is not by coincidence that it was specifically these two emotions that drew so much interest from the research community. When the definition of anxiety is considered, which claims that this is a feeling of "tension and apprehension specifically associated with second language contexts, including speaking, listening, and learning" (MacIntyre & Gardner, 1994, p. 284), it seems like a construct broad enough to cover a wide range of negative feelings, possibly arising even when a learner feels bored, hopeless, confused, or ashamed. Their possible links with anxiety have also emerged in the literature, as demonstrated by the above overview (Arguel et al., 2019; Galmiche, 2018). Similarly, since enjoyment is conceptualized as "a positive state where challenges and skills are well-aligned, indicative of psychological needs being met" (Dewaele & MacIntyre, 2014, p. 242), it is easy to hypothesize that being hopeful, proud, or curious might evoke such a positive state as well.

In a sense, the anxiety/enjoyment dichotomy in applied linguistic research resembles the flow/anti-flow distinction, which was the starting point of an early flow model by Csíkszentmihályi (1975), the so-called quadrant model. In this model, the balance of skills and challenges at a high level represents the flow state, while anxiety is present if challenges are too high and boredom when they are too low relative to the skills of the individual. Apathy is experienced if both challenges and skills are at a low level, and boredom, anxiety, and apathy together represent anti-flow experiences. Although this is a rudimentary model that was later refined by Csíkszentmihályi (1990), it might serve as an approximation of the current conceptualization of emotions in our field where mostly only one broad negative (anxiety) and one broad positive (enjoyment) emotion are distinguished most of the time. Thus, we would like to propose a theoretical model in which anxiety and enjoyment serve as overarching emotions that directly impact motivated learning behavior, and where specific positive emotions like hope, pride, and curiosity directly affect enjoyment while specific negative emotions like boredom, apathy, confusion, and shame directly influence anxiety, but these only have indirect effects on motivation.
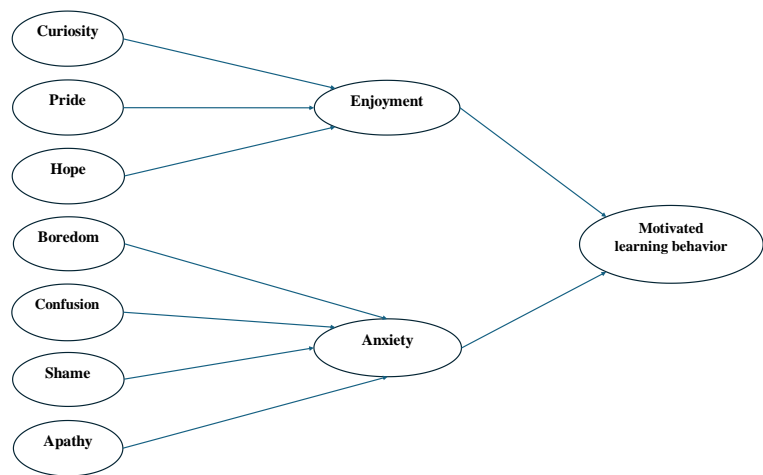

Figure 1. Schematic Representation of the Initially Tested Model

Methods

Population, Sample, Sampling

The population of our study was secondary school students studying in various parts of Hungary. Despite the fact that secondary education is not uniform in Hungary, and students can start it at the age of 10, 12 or 14, we have opted to include the most prevalent school type in our study, in which students start their general secondary education at the age of 14. In this case secondary school lasts for 4 years and ends with a school-leaving exam that includes five subjects, one of which is a foreign language. We have decided to use quota sampling (Dörnyei, 2007) and included schools from Budapest, the capital city of Hungary and towns from the Western and Eastern parts of Hungary; altogether 11 schools were selected. Our sample included 1,152 secondary school students (467 boys, 682 girls, 3 with missing data for gender). In line with the definition of our population, students' age ranged between 14 and 20 ($M = 16$, $SD = 1.22$, 3 missing); some of our participants were older than 18 because they started compulsory education later than the general population. All of our participants were L1 speakers of Hungarian, and all of them were learning English at school at the time of data collection. We collected self-reported data on their level of English, which was between A1 and C1 CEFR levels (Council of Europe, 2020) with an average starting age of learning English being 9.2 years ($SD = 3.1$) since L2 learning starts at primary schools.

Instrument

We have measured 12 constructs related to students' L2 motivation and emotions (see Csizér et al., 2025, for details) and 5-point Likert-scale statements were used in the validated instrument (Albert et al., 2022).

1. *Motivated learning behavior* (5 items, α = 0.82): signals students' intended learning efforts (example: *I can honestly say that I do everything I can to master the English language*).

2. *Enjoyment* (6 items, α = 0.78): refers to learners' feelings of enjoyment while taking part in the activities and topics during English lessons (example: *I enjoy the topics that we discuss in English lessons*).

3. *Hope* (6 items, α = 0.78): measures how hopeful learners feel about achieving success in learning English at school (example: *I feel hopeful about overcoming challenges in the process of learning English*).

4. *Pride* (5 items, α = 0.88): taps into the extent to which learners feel proud of their achievements in English learning (example: *I am proud of my achievements in language learning).*

5. *Curiosity* (6 items, α = 0.83): measures how curious learners feel about learning English, and the topics and activities they encounter during the English lessons (example: *In English lessons, we deal with topics that arouse my curiosity*).

6. *Anxiety* (5 items, α = 0.69): taps into learners' feelings of inhibition experienced in connection with English language activities in school lessons (example: *I get frustrated if I can't understand an English-language text*).

7. *Boredom* (5 items, α = 0.79): measures the extent to which learners feel bored during the activities and topics in the English language lessons (example: *I get bored by the activities in English lessons*).

8.   *Apathy* (4 items, α = 0.77): refers to learners' feeling of hopelessness related to success in English language learning in school (example: *I feel hopeless about ever mastering English in the school*).

9.   *Confusion* (5 items, α = 0.78): measures the extent to which learners feel confused about language learning in class (example: *Sometimes I feel confused because I don't understand what is happening in the English lessons*).

10.   *Shame* (5 items, α = 0.80): taps into learners' feelings of shame about their achievement and actions during English lessons (example*: I feel ashamed if I can't answer a question during our English lessons*).

Data Collection

We started the project in 2018 with a careful development of a questionnaire, validated empirically through two rounds (Csizér et al., 2025). Data collection for the study presented here began in the fall semester of 2019 and concluded in early 2021. In response to the COVID-19 pandemic, data collection transitioned to an online format in 2020, while ensuring that both paper-and-pencil and online questionnaire versions remained identical. Ethical considerations were given due attention. Consent to involve students in the study was obtained from schools, and data were gathered anonymously, without any personally identifiable information. Students participated voluntarily and had the option to refrain from answering any questions in both paper-and-pencil and online questionnaire formats.

Data Analysis

Structural Equation Modeling (SEM) was performed to understand and identify the hypothesized causal associations between latent and observed variables. Initially, the assumptions for performing a SEM were checked: (a) multivariate normality, (b) no systematic missing data, and (c) large sample size. Next, multivariate normality was measured with the Mardia's (1970) coefficient of multivariate skewness and kurtosis. Then, missing data were inspected in MS Excel. Finally, the sufficient sample size for performing a SEM was considered, which is n > 200 (Wolf et al., 2013).

The SEM was performed in JASP (JASP Team, 2024), based on lavaan (Rosseel, 2012). The model was encoded in the SEM model using lavaan syntax. First, the latent variables (motivated learning behavior, enjoyment, anxiety, boredom, apathy, hope, pride, curiosity, confusion, and shame) were entered into the model. Second, the regressions were specified. Hope, pride, and curiosity had a direct effect on enjoyment, while boredom, apathy, confusion, and shame had a direct effect on anxiety. In addition, enjoyment and anxiety had a direct effect on motivated learning behavior. Finally, the residual covariances were entered into the model. The estimation options were also specified. The error calculation was set standard, the estimator and the model test were set as auto, while the missing data handling was set pairwise.

The evaluation of the model fit included checking multiple indices. First, the Chi-square difference test (X^2) that refers to the differences between the observed and the predicted covariance matrix was checked. A better fit is shown by a value close to 0. Second, the Comparative Fit Index (CFI) was checked that compared the model fit by analyzing the amount of departure between the data and the hypothesized model. In contrast to the Chi-square test, the CFI was not affected by sample size. Third, the Normed Fit Index (NFI) was checked that analyzed the discrepancy between the Chi-squared value of the null model and the hypothesized model. However, the NFI is usually negatively biased. The accepted NFI value ranges between

0.9 and 1. Fourth, the Tucker-Lewis Index (TLI) (Tucker & Lewis, 1973), the non-normed fit index that resolves the issues of negative bias to some extent, was checked. Fifth, the Parsimony Normed Fit Index was inspected to measure the complexity of the model. Sixth, the Incremental Fit Index (IFI), which adjusts the NFI for sample size and degrees of freedom, was checked. The acceptable IFI values range between 0.90 and 1. Seventh, the Root Mean Square Error of Approximation (RMSEA) was inspected that assessed how far the hypothesized model was from a perfect model. RMSEA is an absolute fit index, while CFI and TLI are incremental fit indices. RMSEA values between 0 and 0.08 represent a good fit.

Then the measurement invariance of the construct was examined in a sequential order by imposing additional constraints across gender (males and females). JASP examines configural invariance by default by allowing the factor loadings to vary across the grouping variable. The configural model permitted the factor loadings to vary across gender (i.e., the baseline model). The metric model constrained the factor loadings as equal across gender. To test metric invariance, the first constrained model was compared with the baseline model. The scalar model constrained the item intercepts as equal across gender. To test scalar invariance, the second constrained model was compared with the first constrained model. Measurement invariance can be established by checking the Chi-square difference test, the CFI, and the RMSEA values (Meade et al., 2008). If the difference between the baseline and the constrained models (configural, metric, and scalar) is greater than 0.01 in the CFI and RMSEA values, measurement invariance is violated (Cheung & Rensvold, 2002).

Results

As the first step, the assumptions of running a SEM were checked. The Mardia's coefficient value was statistically significant indicating that the data were not normally distributed. In addition, no systemic data were detected, and the dataset (N = 1,152) met the sample size criterion. Second, SEM was performed after the latent variables were specified and the regressions were entered. Results showed that Model 1 had a relatively good fit to the data (X^2 (1149) = 9019.351, p < .001, CFI = 0.947, TLI =0.941, NFI = 0.940, PNFI = 0.856, IFI = 0.947, RMSEA = 0.113). It is also important to note that we should not rely on the Chi-square significance test because large sample size, as in our case (N = 1,149), might yield a significant result that implies a poor fit to the dataset (Caelon & King, 2020). However, according to Hu and Bentler (1999), the cut-off criteria for the CFI, the TLI, and the NFI indices must be 0.95. As far as the Parsimony Normed Fit Index is considered, the PNFI values must be greater than 0.5 (Williams & Holahan, 1994). In addition, the RMSEA value should not be greater than 0.08 (Hooper et al., 2008). Due to the fact that all of the additional fit indices, except for the IFI and PNFI values, failed to meet the accepted values, modification indices were entered into the model. The results showed that Model 2 (the Final Model, Figure 2) had a better fit to the data (X^2 (1149) = 10070.669, p < .001, CFI = 0.956, TLI = 0.951, NFI = 0.949, PNFI = 0.858, IFI = 0.956, RMSEA = 0.103).
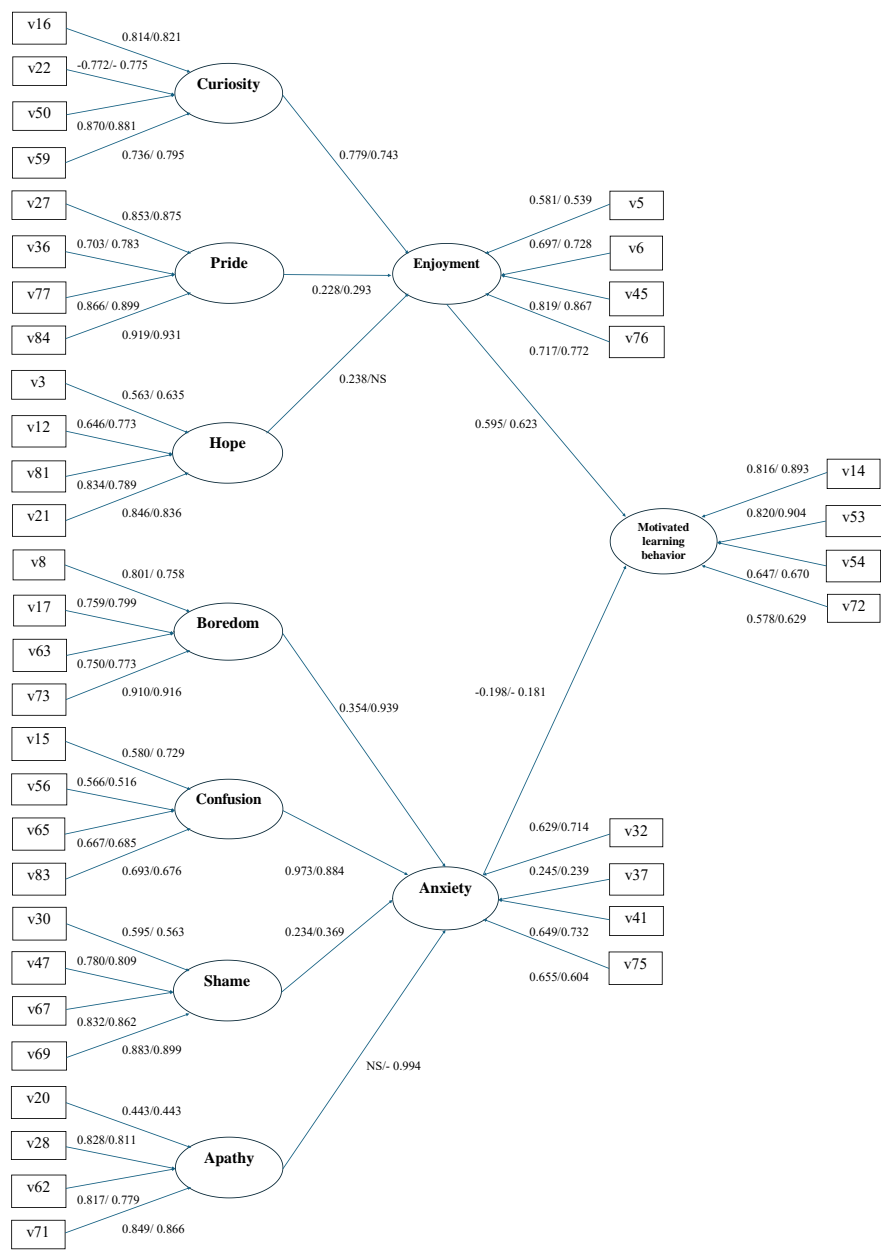
Note. The first standardized estimates refer to males, while the second standardized estimates refer to females.

Figure 2. The Final Model with Standardized Estimates

Figure 2 shows that the final model contains nine relations for both samples. Five out of the nine relations are significant positive relations (curiosity → enjoyment, pride → enjoyment, confusion → anxiety, shame → anxiety, enjoyment → motivated learning behavior), while three relations turned out to be non-significant for both samples (hope → enjoyment, boredom → anxiety, apathy → anxiety). One impact was low but significant (anxiety → motivated learning behavior), and this relationship is negative.

Measurement invariances across gender were examined (see Table 1). To evaluate measurement invariance, we inspected changes in Chi-square difference test, CFI, and RMSEA values. However, we did not rely solely on Chi-square difference test since it might be sensitive to sample size (Byrne, 2010). Therefore, measurement invariance was established as a change of less than 0.01 in CFI and RMSEA values. Table 1 shows that all changes of CFI and RMSEA from the configural model to the metric model were less than 0.01, showing that constraining the factor loadings as equal across genders did not significantly change the model fit. In addition, all changes in CFI and RMSEA values from the metric to the scalar model were less than 0.01, indicating that the model fit did not change significantly by imposing restrictions on the item intercepts. Due to the fact that full scalar invariance was found, partial scalar invariance was not tested.

Table 1
Measurement Invariance Across Gender (N= 1149)

	X²	df	X²/df	△X²	CFI	RMSEA
Configural model	10070.669	1410	7.142	-	0.956	0.103
Metric model	9112.467	1412	6.453	-984.999	0.961	0.098
Full scalar model	9112.467	1372	6.641	-109.719	0.960	0.099

Discussion

We set out to investigate (1) the extent to which positive and negative emotions exert their influence through enjoyment and anxiety in the Hungarian secondary educational context and (2) the role of gender when it comes to these emotions, so we tested a hypothetical model describing their connections. Looking at the similarities and differences between our initial and final model, it is clear that enjoyment and anxiety indeed impacted motivated learning behavior in significant ways, with anxiety having a negative role, although its impact was very small in this sample. These results are in line with the works discussed in our literature review (e.g., Teimouri et al., 2019), but as it was pointed out earlier, possible context-specific issues also need to be considered when the role of anxiety is discussed (Gregersen et al., 2014; Piniel & Csizér, 2015). It was hypothesized that the ultimate goals of classroom teaching in Hungary along with the nature of classroom instruction students experience could be relevant in this regard. Based on previous studies, it is known that the Hungarian education system, although changing and modernized continuously, is rather teacher- and exam-centered. This means that frontal teaching, where teacher-student interaction is dominant with much less emphasis on peer interaction, could be still prevalent, and teachers teach towards exams instead of aiming for communication outside the classroom (Öveges & Csizér, 2018). Especially this latter characteristic can create anxiety, while the former can contribute to the reduction of students' enjoyment in the classroom. Like anxiety, it was also pointed out that enjoyment can be contextually bound (Albert et al., 2018; De Smet et al., 2018) with teachers being an important influence (Dewaele & Dewaele, 2020).

Besides supporting the role of enjoyment and anxiety in influencing motivated learning behavior, the final SEM model also provided evidence for the indirect role of some of the other emotions measured: curiosity and pride exerted a significant impact on enjoyment while shame and confusion affected anxiety. Thus, their influence on motivated learning behavior was indirect, which lends some support to our initial hypothesis that enjoyment and anxiety might indeed be

overarching emotions that convey the effects of other positive and negative emotions. Despite the fact that their influence appeared to be indirect, our final model still indicates the need to explore the role of a range of specific emotions in L2 learning besides anxiety and enjoyment (see Csizér et al., 2025).

As regards curiosity, Mahmoodzadeh and Khajavy's (2019) Language Learning Curiosity Scale conceptualizing curiosity both as a communicative and linguistic curiosity could be a promising line of research. In line with the findings that showed curiosity's contribution to enjoyment in the SEM model, Mahmoodzadeh and Khajavy's also found positive correlations between curiosity and enjoyment in their study. It can be hypothesized that curiosity as a feeling of interest might be especially likely to contribute to enjoyment although this should be confirmed via future empirical research. Although its effect in determining enjoyment appears to be more limited compared to curiosity, it is probably also not surprising that pride based on past experiences can modify learners' enjoyment in the present. Here further investigation of authentic and hubristic pride (Tracy & Robbins, 2007), that is, pride focusing on achievements or the self respectively, might be fruitful.

The indirect effects of confusion through anxiety on motivated learning behavior should be considered in light of the quality of teaching as Silvia (2010) argues that confusion appears when the information presented is not congruent with existing knowledge. The prevalence of confusion might signal that teachers are either unaware of the incongruence created in their learners' mental representations or that they are unsuccessful at resolving these. Either scenario might easily lead to anxiety although this is a theoretical link that should also be explored empirically. Moreover, it is not surprising that we found shame influencing anxiety and thus motivated learning behavior as well, as Galmiche (2018) has argued that shame is strongly linked to social anxiety.

The lack of direct or indirect impact in the case of some of the investigated emotions fails to support our initial hypothesis which posited that enjoyment and anxiety might act as overarching emotions conveying the effect of all other emotions since there were no relationships found between hope and enjoyment or between boredom and anxiety and apathy and anxiety. The finding that hope on enjoyment were not influential in this SEM model might be linked to the fact that hope is a future oriented emotion which leaves enjoyment, which is perceived in the present, unaffected. It might also be the case that it exerts its influence on motivation through a more cognitively oriented construct like the ideal L2 self (Csizér, 2020), a possibility that seems to be supported by correlational findings (Albert et al., 2022). The lack of significant impact of boredom is surprising as previous studies showed that the level of boredom increased significantly as students progressed with their studies in the Hungarian education system (Albert et al., 2018). At this point, we can only hypothesize the way boredom exerts its influence on the English learning processes in this context. Maybe it happens through cognitive variables or beliefs about L2 learning; an example for the latter could be that students think that L2 learning is an inherently boring enterprise when it comes to preparing for language exams. The finding that apathy did not contribute significantly to anxiety in this sample might be explained by the fact that secondary students in Hungary do not experience apathy to a great extent (Albert et al., 2018) or that apathy exerts its influence through other variables as attested by the study of Shao et al. (2020) who related apathy to control and value judgements.

In this SEM model, there was no evidence that the links between emotions and motivated learning behavior would be different in the case of the two genders. Although gender-related differences in emotions have been identified in a number of previous empirical studies, with females often experiencing stronger emotions (Albert et al., 2018; Dewaele & MacIntyre, 2014), while others found no proof for that (Coşkun & Yüksel, 2022; Mahmoodzadeh & Khajavy, 2019; Mierzwa-Kamińska, 2021; Piniel & Zólyomi, 2022), our findings suggested that the ways these emotions were linked to motivation were not different for the two genders. Therefore, regardless

of the strength of emotions reported which apparently might be different, various emotions enhanced or hindered motivation the same way in the case of male and female learners. This finding is likely to lend support to the claim that emotions play a universal role in motivational processes, unanimously impacting volition regardless of the gender of the learner. Since emotions are basic processes which have been hypothesized to play a major role in adapting to the environment since Darwin (as cited in Reeve, 2009), this finding should probably not be considered surprising as basic processes of adaptation can be expected to be similar for the two genders.

Conclusion

Our study set out to investigate the role of affective scales in shaping secondary students' motivated learning behavior in the Hungarian context, and indeed we found several significant routes, including curiosity/pride→ enjoyment → motivated learning behavior and confusion/shame → anxiety → motivated learning behavior. It is important to point out that we think our results may be contextually bound, that is, in other contexts different routes might influence student motivation. Still, our study has important empirical and pedagogical implications. First, we need more empirical studies that investigate the internal structure of how emotions influence motivation and thus L2 learning processes in various geographical and educational contexts, to find additional support for the need to go beyond the dichotomy of enjoyment and anxiety and investigate a larger range of emotions. Second, we have identified emotions that have not been researched much in the L2 education context despite their apparent general importance and significant results in this study, such as curiosity and confusion. Third, it would also be important to find out why seemingly important emotions, such as boredom or hope, did not influence student motivation in the current context. Finally, in line with this, it should also be noted that although we investigated how affective variables impact other affective variables and then the way they influence motivation, it is also important to consider the relationship between affective and cognitive variables; a good example of such study is that of Shao et al. (2020). The most important pedagogical implication of our study is that teacher awareness should be raised about the way emotions influence student motivation and the role they can play in shaping these emotions.

Finally, we need to point out the obvious that our study is not without limitations. We have explored one specific population in one specific context; therefore, other studies are needed for other populations in other contexts. Moreover, we should map the role of emotions in a larger framework including cognitive variables as well to see their possible interplay. In addition, our quantitative study cannot do justice to hearing students' and teachers' voices when it comes to the way and extent they experience emotions in L2 learning and teaching, hence more qualitative investigations are needed.

Acknowledgement

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