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Ph.D. THESIS

THE PSYCHOLOGICAL FACTORS IN SCHOOL BURNOUT: THE ROLE OF ATTACHMENT AND EMOTION REGULATION

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Notes. _____

(1) This is to certify by Iuga Ioana Alexandra that:

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CHAPTER 1: THEORETICAL FRAMEWORK

1.1. Introduction and Research Problematic

School burnout is a growing concern that affects countless young students, undermining their energy, enthusiasm, and confidence. It extends beyond mere fatigue to encompass the emotional and psychological toll of overwhelming academic pressures, unmet expectations, and the persistent struggle to excel. This burden is far-reaching, impacting not only grades and classroom performance but also students' overall mental health, interpersonal relationships, and sense of identity. At a stage in life meant for exploration and growth, many students instead grapple with the weight of burnout, which narrows their horizons and dims their future prospects.

Current research indicates that school burnout is a significant issue affecting students across various educational levels, with prevalence rates varying by age group and educational context. According to the literature summary provided by Lacombe et al. (2023), the average prevalence of school burnout is approximately 14.36%, with variations such as 14.6% among students aged around 14.8 years and lower rates, of 4.5%, in younger students aged 11-13 years. Following the pandemic, the study of Lacombe et al. (2023) reported that between 6.9% and 16.9% of older Swiss students (15-18 years) experienced school burnout, with higher rates noted in academic streams compared to vocational ones. In a large-scale study involving over 22,000 students (Liu et al., 2023), 59.9% were found to experience academic burnout, with male students and those in higher grades showing higher burnout scores. Factors such as educational pressure, gender, and lifestyle choices significantly influence burnout levels (Liu et al., 2023). These findings underscore the urgent need for effective interventions and support systems to address the growing prevalence of school burnout among students.

1.1.1. School Burnout

School burnout (SBO) is generally characterized by three dimensions: emotional exhaustion, cynicism, and a sense of inadequacy, similar to professional burnout (Schaufeli, et al., 2002b), developing, in a similar manner to occupational burnout, in the context of significant stressors. Emotional exhaustion refers to a feeling of strain and chronic fatigue. Cynicism involves a loss of interest in schoolwork, an indifferent or distant attitude toward academic tasks, or perceiving them as meaningless. Finally, a sense of inadequacy describes reduced feelings of competence, achievement, and accomplishment in the academic domain.

The distinction between the theories of burnout emergence often centers on which dimension, emotional exhaustion or depersonalization, is thought to develop first in response to job stress (Girdano et al., 1990; Gorkin, 2004; Miller, 1993). While definitive evidence is still lacking, longitudinal studies suggest a causal relationship among the key dimensions of burnout, indicating

that high levels of emotional exhaustion can lead to increased levels of cynicism or depersonalization (Taris et al., 2005). Additionally, empirical studies highlight that exhaustion and depersonalization are core dimensions of the burnout syndrome, while lack of professional fulfillment may serve as either a precursor to burnout or a consequence of it (Schaufeli & Buunk, 2003).

The research of burnout among students is crucial for a number of reasons. Burnout has been linked to a variety of mental health conditions and difficulties adjusting. Increased depressive symptoms, lower life satisfaction, poor sleep, physical complaints, and academic pathways marked by a higher risk of dropping out of school and worse academic performance are a few of these (Gerber et al., 2015; Murberg & Bru, 2007; Tuominen-Soini & Salmela-Aro, 2014). Examining how burnout affects students' connections with classmates and professors as well as their involvement with the institution helps policy professionals better understand the behaviors of their students.

Numerous environmental (school or family-related) and personal determinants of school burnout have been studied. At the school level, burnout was positively correlated with increased school demands (e.g., authority conflict, emotional and mental demands), learning pressure, poor interpersonal relationships, and a poor learning environment; on the other hand, burnout was negatively correlated with high school resources such as teacher support, control, and autonomy (Jagodics et al., 2023; Lin & Yang, 2021). It has been discovered that parental support and acceptance, parenting style, and family economic position all have an impact on the dimensions of burnout (Kossewska et al., 2023; Lin & Yang, 2021; Macałka et al., 2022). Furthermore, in student samples, higher life stress levels are strongly correlated with academic burnout (Lin & Huang, 2014).

Individual traits that either favorably or adversely impact a student's resilience in an academic setting are referred to as personal variables. Research has shown that burnout dimensions are inversely correlated with coping and coping flexibility (Gan et al., 2007; Tomaszek & Muchacka-Cymerman, 2022a, 2022b). Furthermore, it has been found that self-esteem, temperament, and personality characteristics all predict the onset of burnout (Jacobs & Dodd, 2003; Lin & Yang, 2021; Tomaszek & Muchacka-Cymerman, 2022c).

1.1.2. Emotion Regulation

The concept of emotion regulation (ER) is fraught with terminological confusion, as highlighted by Buck (1990), who referred to it as “conceptual and definitional chaos”. According to Gross (2015), this complexity arises from the diverse and often inconsistent ways that scholars and practitioners define and utilize these terms. To navigate this landscape, it is essential to clarify how these terms will be used in discussions about emotion regulation.

In his article, Gross (1998b) outlines five critical aspects of emotion regulation. First, he emphasizes that individuals can actively increase, maintain, or decrease both negative and positive

emotions, encompassing a broad range of emotional processes. Second, he notes that neural circuits associated with different emotions do not overlap entirely, implying that the regulatory mechanisms for these emotions may also differ significantly. This suggests that emotion regulation is not a one-size-fits-all process but varies across different emotional contexts. Third, Gross clarifies that his definition focuses on self-regulation rather than attempts to influence others' emotions, which he believes conflates distinct motives and processes. Fourth, he distinguishes between conscious and unconscious emotion regulation, proposing a continuum where regulatory activities can range from effortful and controlled to automatic and effortless. Lastly, he refrains from labeling emotion regulation as inherently good or bad, arguing that this avoids the confusion seen in stress and coping literature, where certain strategies are prematurely categorized as maladaptive or adaptive. This perspective allows for a more nuanced understanding of how emotion regulation can serve different purposes in various contexts.

The process model identifies each step in the emotion-generation process as a potential target for regulation, resulting in five categories of emotion regulation strategies, distinguished by where in the process they primarily act (Gross, 1998b). While strategies can be used together, the model aims to simplify a complex problem by focusing on each strategy family. The model identifies five key processes through which emotion regulation can occur: situation selection, situation modification, attentional deployment, cognitive change, and response modulation. Each of these processes represents a different point in the emotional response trajectory where individuals can intervene to influence their emotions.

Research indicates that both healthy individuals and those with social anxiety utilize multiple emotion regulation strategies (Aldao et al., 2010). This trend is also observed in children with anxiety disorders (Carthy et al., 2010) and autism spectrum disorders (Cibralic et al., 2019). While the efficacy of different blends of strategies in specific situations remains unclear, there is growing interest in interventions that integrate various emotion regulation elements. For instance, mindfulness practices are thought to enhance attention deployment and cognitive change while reducing expressive suppression (Moore et al., 2012; Quaglia et al., 2019). Gross suggests that the extended process model serves as a useful framework for systematically studying these blends.

Finally, the literature highlights the concept of emotion regulation flexibility (English & Eldesouky, 2020; Gross, 2015; Specker et al., 2024), which involves adjusting strategies to fit environmental circumstances. This flexibility is crucial for effective emotion regulation and can be achieved through the proper functioning of various processes. This area or research calls for further investigation in order to understand the mechanisms that enable this flexibility and to explore how individuals can dynamically adjust their emotion regulation strategies across different situations.

1.1.2.1. Cognitive emotion regulation strategies (CERS)

Cognitive emotion regulation strategies are mental processes that individuals employ to manage their emotional responses to various situations. Although these strategies can be classified into adaptive and maladaptive categories, based on the manner in which they influence psychological outcomes, research shows that this categorization is less straightforward than initially thought.

Emotion regulation strategies play a crucial role in psychological well-being. Adaptive strategies such as reappraisal—reinterpreting situations to reduce emotional impact (Aldao et al., 2010), positive refocusing—shifting attention to positive aspects or memories (Garnefski & Kraaij, 2006), planning—developing structured approaches to stress (Moyal et al., 2014), acceptance—acknowledging reality without resistance (Aldao et al., 2010), and putting things into perspective—viewing situations in a broader context (Garnefski & Kraaij, 2006), are associated with greater emotional resilience and reduced distress. In contrast, maladaptive strategies like rumination (Nolen-Hoeksema, 2000), self-blame, catastrophizing, and blaming others (Garnefski & Kraaij, 2006; Aldao et al., 2010) are linked to higher levels of anxiety, depression, and impaired coping.

Experimental research consistently shows that reappraisal effectively decreases self-reported negative emotions and physiological indicators of affect (Ray et al., 2010). It also reduces both the intensity and duration of amygdala activity, a crucial brain region for processing emotions (Buhle et al., 2014; Ochsner et al., 2002; Waugh et al., 2016). Notably, the ability to use cognitive reappraisal improves during adolescence (McRae et al., 2012; Willner et al., 2022), coinciding with significant prefrontal cortex development (Barnea-Goraly et al., 2005). While these findings suggest reappraisal is generally effective, it's important to note that no single emotion regulation strategy is universally adaptive or maladaptive.

Depending on the situation, distraction may be more beneficial than reappraisal. Given that distraction involves less cognitive work than reappraisal, it could be more adaptive in scenarios when time is of the essence (Sheppes & Gross, 2011; Sheppes & Meiran, 2007) or the emotional input is strong (Li et al., 2020). This suggests that the best way to regulate emotions may be to use distraction at first and reappraisal afterward. Thus, training in emotion regulation should place a strong emphasis on applying both strategies in a situation-specific manner.

According to research, those who use suppression in challenging situations see little to no decrease in their negative emotions (Gross, 1998a). Furthermore, there are situations where suppression exacerbates physiological reactions, including increased amygdala activity (Goldin et al., 2008). Western societies have a tendency to see suppression poorly from a social standpoint, and those who practice it are frequently perceived as less suitable social partners (Srivastava, 2009). These social impacts, however, are less noticeable in Eastern cultures, where suppression is more often

employed and socially acceptable (Butler et al., 2007). Further, from a psychological functioning standpoint, previous research has identified that suppression is associated with poor psychological functioning in European Americans, but not Chinese participants (Soto et al., 2011). This indicates how cultural norms have an impact on methods of regulating emotions.

1.1.3. Attachment

Attachment theory posits that early experiences of close and nurturing relationships play a critical role in shaping an individual's psychological well-being (Zhang et al., 2022) and influencing their interactions and behaviors in later life, including in romantic relationships (Bowlby, 1973; Spencer et al., 2020). These early bonds can impact how individuals respond to conflicts and other interpersonal challenges. Additionally, parent-child interactions are thought to provide a vital foundation for socializing children to various emotions, which may, in turn, influence their ability to regulate emotions during adolescence and adulthood (Brumariu, 2015; Peng et al., 2010; Babo et al., 2023). For instance, a recent systematic review revealed that secure attachment is more consistently linked to effective emotion recovery than to emotion reactivity. Among insecure attachment patterns, avoidant attachment was associated with reduced emotion reactivity and recovery, ambivalent attachment showed heightened emotion reactivity but no consistent connection to recovery, while disorganized attachment was characterized by high reactivity and significant challenges in emotion recovery.

Ainsworth et al. (1978) classified these attachment styles into four categories: secure, avoidant, anxious-resistant, and disorganized attachment. Securely attached infants showed distress upon separation but were easily comforted upon reunion, seeking proximity and contact with their caregiver. Avoidantly attached infants displayed minimal distress upon separation and actively avoided or ignored their caregiver upon reunion. Anxious-resistant attachment was characterized by high levels of distress, ambivalence, and a desire for contact with the caregiver upon reunion, often accompanied by expressions of anger or resistance. Disorganized attachment, a later addition to the classification system, was marked by a lack of a clear attachment behavior and was often associated with inconsistent caregiving.

A recent meta-analysis (Madigan et al., 2023) of 20,720 parent-child dyads assessed using the Strange Situation Procedure (Ainsworth & Wittig, 1969) revealed a global distribution of attachment styles as follows: 51.6% secure, 14.7% avoidant, 10.2% resistant, and 23.5% disorganized (Madigan et al., 2023). These findings suggest that while the majority of children form secure attachments, a substantial proportion experience insecure or disorganized attachment patterns, highlighting the need for targeted interventions to support healthy attachment development and address the potential long-term impact of insecure attachment on emotional and relational outcomes.

1.1.5. School burnout, attachment, and emotion regulation

Research indicates that effective emotion regulation is essential for fostering academic well-being, even in low-stress environments. Studies by Asareh et al. (2022) and Davis & Levine (2013) highlight that adaptive emotion regulation strategies can enhance motivation and academic success while reducing the risk of mental health issues, stress (Shahidi et al., 2017), and burnout (Narimanj et al., 2021). Furthermore, these strategies can help mitigate academic procrastination (Mohammadi Bytamar et al., 2020).

All CERS and general burnout dimensions were shown to be positively associated by Chen (2021), with self-blame demonstrating the highest correlation, particularly in male students. The positive correlation between burnout and both types of CERS indicates that individuals may use a mix of adaptive and maladaptive strategies in response to stress. This complexity could reflect the nuanced ways in which people cope with stress and academic challenges, where functional strategies do not necessarily mitigate the effects of burnout as expected. Given that self-blame was significantly correlated with burnout in male students, there may be gender-specific factors influencing how CERS are employed in the context of stress management.

Refocusing on planning was shown to be negatively but not significantly correlated with burnout by Vinter (2021). Rumination, on the other hand, was positively linked to burnout in both genders. Dominguez-Lara (2018) found in another study that the only strategies negatively related with emotional exhaustion were positive reappraisal and positive refocusing. Effective ER strategies, such as positive reappraisal, can serve as a protective factor for burnout development by helping students manage stress and emotional challenges more effectively (Chen, 2021; Dominguez-Lara, 2018). Conversely, ER difficulties such as the use of rumination and expressive suppression are associated with higher burnout levels (Chacón-Cuberos et al., 2019; Seibert et al., 2017).

The lack of longitudinal research complicates the understanding of the relationship between ER strategies and school burnout, as it leaves many aspects of this relationship unexplored. Most studies tend to treat ER difficulties primarily as antecedents of burnout rather than considering them as possible consequences. This oversight means that the dynamic interplay between these factors remains largely unknown, making it challenging to develop effective interventions or support systems for burnout prevention. Without longitudinal studies, it is difficult to ascertain how ER difficulties evolve over time in relation to burnout. Such research could provide insights into whether persistent burnout influences ER difficulties or if pre-existing ER difficulties contribute to the development of burnout.

Attachment theory, as proposed by Bowlby (1983), suggests that early interactions with caregivers shape individuals' internal working models of self-worth and the availability of others.

These internal models influence how individuals manage emotions, with securely attached individuals typically employing more adaptive ER strategies (Messina et al., 2023). Secure attachment is associated with positive outcomes such as better emotional regulation, hope, trust, and lower levels of burnout (Simmons et al., 2009). In contrast, insecure attachment styles, such as anxious attachment, have been linked to higher burnout levels in academic settings (Bumbacco & Scharfe, 2023; Silva & Figueiredo-Braga, 2019).

1.2. The Relevance of the Topic

There are several reasons why this research is particularly relevant in Romania, but its implications extend beyond this context. The first reason is the limited research on this topic in Romania, highlighting a gap in understanding this subject within our specific cultural and educational context. The Romanian education system is facing some serious challenges as the graduation rate for tertiary education remains the lowest of all European Union (EU) countries, as well as Romania's spending on education, which is one of the lowest in the EU (Cobzaru & Moraru, 2023). A study published in a national Romanian journal on a large sample of Romanian youth aged 10-19 shows that, with age, burnout tends to increase considerably, with a double mean burnout level at the age of 19 compared to the age of 10 (Cernea-Radu, 2023). The low tertiary graduation rates and insufficient investment in education further emphasize the need for early identification and intervention strategies to support students' emotional resilience and academic persistence.

The second reason this research is relevant is its focus on identifying key factors contributing to school burnout. Burnout is a complex phenomenon influenced by both individual (Jacobs & Dodd, 2003; Lin & Yang, 2021; Tomaszek & Muchacka-Cymerman, 2021) and environmental factors (Kossewska et al., 2023; Lin & Yang, 2021; Macałka et al., 2022), yet much of the existing research has primarily examined external stressors, such as academic stress (Jiang et al., 2021; Veyis et al., 2019). Understanding the psychological mechanisms, in this case, the role of emotion regulation and attachment, is essential for developing effective prevention and intervention strategies. By exploring these underlying factors, this research contributes to a more comprehensive approach to addressing school burnout, moving beyond structural reforms to consider the personal and emotional capacities that influence student resilience.

The results of two recent meta-analyses (Madigan et al., 2024; Tang et al., 2021) support the effectiveness of psychological interventions addressing individual factors in the context of burnout, as these interventions empower individuals with adaptive skills that not only alleviate current distress but also equip them with tools for long-term resilience. Beyond the classroom, parents are often the first line of support when it comes to how children and adolescents process emotions and cope with stress. The way a child learns to regulate emotions, handle frustration, and respond to pressure is

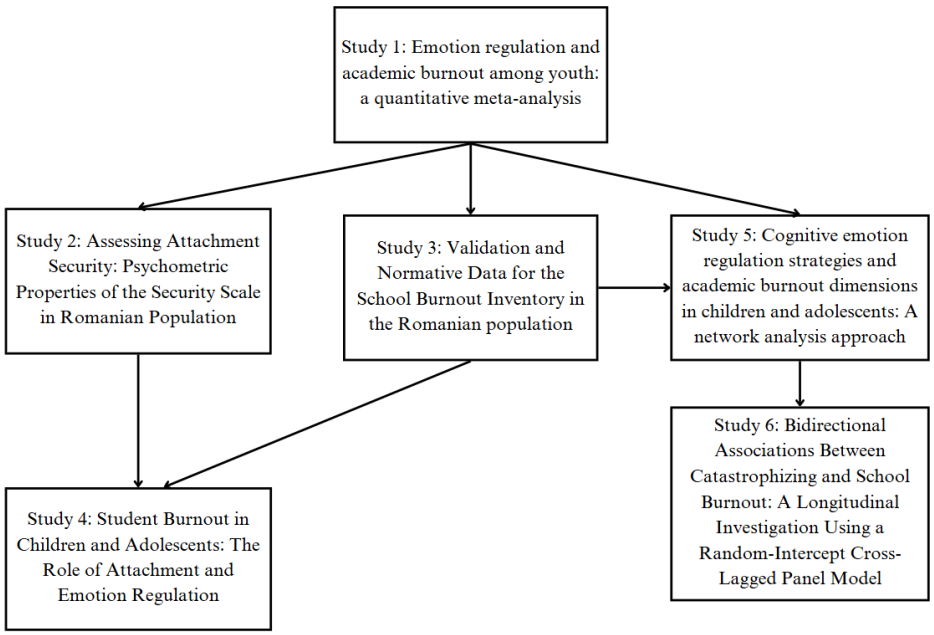
often shaped at home, through daily interactions and the attachment bonds they form with their caregivers. When parents are aware of the connection between attachment, emotion regulation, and burnout, they can offer more intentional support, helping their children navigate academic challenges without feeling overwhelmed. Ultimately, preventing burnout isn't just about reducing academic pressure; it's about building emotional resilience from an early age.

In summary, this thesis highlights the importance of emotion regulation and attachment in understanding and addressing school burnout, particularly in Romania, where educational challenges and burnout rates are pressing concerns. While much of the existing research focuses on external stressors, our approach shifts the emphasis toward internal coping mechanisms, providing a more holistic perspective on student well-being, offering a foundation for effective and targeted interventions.

CHAPTER 2: RESEARCH OBJECTIVES AND OVERALL METHODOLOGY

Several theoretical and methodological goals pertaining to the subject of school burnout were the focus of the current thesis. Figure 1. shows the study's organization in relation to the research goals.

Figure 1. *The structure of the Thesis*



This thesis investigates the complex relationship between ER strategies, attachment security, and student burnout across multiple studies using diverse methodologies. The primary aim is to systematically examine how different ER strategies relate to specific dimensions of school burnout

(emotional exhaustion, cynicism, and inadequacy) through a meta-analysis, while also testing moderating effects of school level, gender, and study quality. Given the limitations of cross-sectional designs in prior research, subsequent studies adopted network analysis and longitudinal models to better understand the temporal and reciprocal dynamics between ER, particularly catastrophizing, and burnout. Additionally, the thesis aims to improve assessment tools in Romania by validating two psychological instruments: the Security Scale for attachment and the School Burnout Inventory for children and adolescents, ensuring their reliability and cultural relevance. Building on the association between secure attachment and adaptive ER, the research also examines whether ER mediates the relationship between attachment security and school burnout and explores potential gender differences. Collectively, the studies aim to deepen our understanding of the emotional and relational mechanisms underlying academic burnout and enhance psychological assessment practices in educational settings.

CHAPTER 3: ORIGINAL RESEARCH

Study 1: Emotion regulation and academic burnout among youth: a quantitative meta-analysis

Introduction

The link between ER and school burnout can be understood through Gross's (1998a) process model of emotion regulation. This model suggests that an individual's emotional responses are influenced by their ER strategies, which are adaptive or maladaptive reactions to stressors like academic pressure. Given that academic stress greatly influences school burnout (Jiang et al., 2020; Nikdel et al., 2019), the ER strategies students use to manage this stress may impact their likelihood of experiencing burnout. In essence, whether a student employs efficient ER strategies or encounters ER difficulties could influence their susceptibility to school burnout.

Although we were unable to identify any reviews or meta-analyses that synthesize the literature concerning emotion regulation strategies and student burnout, recent meta-analyses have identified the role of emotion regulation across pathologies such as eating disorders (Leppanen et al., 2022), bipolar disorder symptoms (Miola et al., 2022), substance use (Weiss et al., 2022; Stellern et al. 2023). The study of Dawel et al. (2021) represents the many research papers asking the question ”Cause or symptom” in the context of emotion regulation. The longitudinal study brings forward the bidirectional relationship between ER and depression and anxiety, particularly in the case of suppression, suggesting that suppressing emotions is indicative of and can predict psychological distress.

Despite the increasing research attention to academic burnout in recent years, the current body of literature primarily concentrates on specific groups such as medical students (ALmutairi & El

Mahalli, 2020; Frajerman et al., 2019), educators (Aloe et al., 2014; Park & Shin, 2020), and students at the secondary and tertiary education levels (Madigan & Curran, 2021) in the context of meta-analyses and reviews. A limited number of recent reviews have expanded their focus to include a more diverse range of participants, encompassing middle school, graduate, and university students (B. Kim et al., 2018; S. Kim et al., 2021), with a particular emphasis on investigating social support and exploring the demand-control-support model in relation to student burnout.

Materials and Methods

Study Protocol

The present meta-analysis has been carried out following the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) statement (Moher et al., 2009). The protocol for the meta-analysis was pre-registered in PROSPERO (PROSPERO 2022 CRD42022325570).

Selection of Studies

A systematic search was performed using relevant databases (PubMed, Web of Science, PsychINFO, and Scopus). The search was carried out on 25 May of 2023 using 25 key terms related to the variables of interest, such as: (a) academic burnout, (b) school burnout, (c) student burnout (d) education burnout, (d) exhaustion, (e) cynicism, (f) inadequacy, (g) emotion regulation, (h) coping, (i) self-blame, (j) acceptance, and (h) problem solving. Studies of any design published in peer-reviewed journals were eligible for inclusion, provided they used empirical data to assess the relationship between student burnout and emotion regulation strategies. Only studies that employed samples of children, adolescents, and youth were eligible for inclusion. For the purpose of the current paper, we define youth as people aged 18 to 25, based on how it is typically defined in the literature (Westhues & Cohen, 1997).

Statistical Analysis

For the data analysis, we employed Comprehensive Meta-Analysis 4 software. Anticipating significant heterogeneity in the included studies, we opted for a random effects meta-analytic approach instead of a fixed-effects model. Heterogeneity among the studies was assessed using the I2 and Q statistics (Deeks et al., 2023). Publication bias was assessed through the use of funnel plot for the primary outcome measures. Furthermore, we utilized Duval and Tweedie's trim and fill procedure (Duval & Tweedie, 2000) to estimate the effect size after accounting for potential publication bias. Additionally, Egger's test of the intercept was conducted to quantify the bias detected previously. When dealing with continuous moderating variables, we employed meta-regression to evaluate the significance of their effects. For categorical moderating variables, we conducted subgroup analyses to test for significance.

Quality Assessment

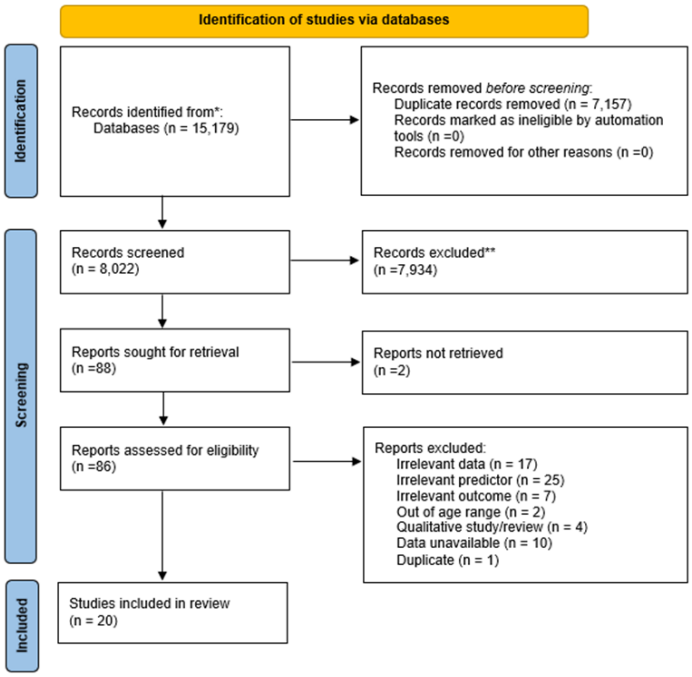
The full-text articles were assessed independently using the Standard Quality Assessment Criteria for Evaluating Primary Research Papers from a Variety of Fields tool (Kmet et al., 2004) by a pair of coders (II and SM), to ensure the reliability of the data, resulting in a substantial level of agreement (Cohen's k = 0.89). The disagreements and discrepancies between the two coders were resolved through discussion and consensus. If consensus could not be reached, a third researcher (OD) was consulted to resolve the disagreement.

Results

Study Selection

The combined search terms yielded a total of 15,179 results. The duplicate studies were removed using Zotero, and a total of 8,022 studies remained. The initial screening focused on the titles and abstracts of all remaining studies, removing all documents that target irrelevant predictors or outcomes, as well as qualitative studies and reviews.

Figure 1. *Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart of the study selection process*



Among the included studies, four focused on middle school students, two encompassed high school student samples, and the remaining 14 articles involved samples of university students. The majority of the included studies had cross-sectional designs (17), while the rest consisted of 2 longitudinal studies and one non-randomized controlled pilot study. The percentage of females within the samples ranged from 46 % to 88.3%, averaging 65%, while the mean age of participants ranged from 10.39 to 25. The investigated emotional regulation strategies within the included studies exhibit

variation, encompassing other-blame, self-blame, acceptance, rumination, catastrophizing, putting into perspective, reappraisal, planning, behavioral and mental disengagement, expressive suppression, and others.

Every study surpasses a quality threshold of 0.60, and 75% of the studies achieve a score above the more conservative threshold indicated by Kmet et al. (2004). Moreover, 80% of the studies adequately describe their objectives, while the appropriateness of the study design is recognized in 50% of the cases. While 95% of the studies provide sufficient descriptions of their samples, only 10% employ appropriate sampling methods. In terms of measurement, 85% of the studies employ validated and reliable tools. Adequacy in sample size and well-justified and appropriate analytic methods are observed across all included studies. While approximately 50% of the studies present estimates of variance, a mere 30% of them acknowledge the control of confounding variables. Lastly, 95% of the studies provide results in comprehensive detail, with 60% effectively grounding their discussions in the obtained results.

A sensitivity analysis using standardized residuals was conducted. Provided that the residuals are normally distributed, 95% of them would fall within the range of -2 to 2. Residuals outside this range were considered unusual. We applied this cutoff in our meta-analysis to identify any outliers. Re-analysis excluding these outliers demonstrated that our initial results were robust and did not significantly change in magnitude or significance.

The correlation between ER difficulties and student burnout is a significant one, with significant positive associations between ER difficulties and overall burnout (k = 13), r = .25 (95% CI = [0.18; 0.31]), p < .001, as well as individual burnout dimensions: cynicism (k = 9), r = .28 (95% CI =[0.20; 0.35]) p < .001, lack of efficacy (k = 8), r = .17 (95% CI = [0.02; 0.30]), p < .05 and emotional exhaustion (k = 11), r = .27 (95% CI = [0.21; 0.34]) p < .001. Regarding the relationship between adaptive ER strategies and student burnout, a statistically significant result is observed solely between overall student burnout and adaptive ER (k = 17), r = -14 (95% CI = [-0.24; 0.05]) p < .005.

All Q tests were significant, indicating that there is significant variation among the effect sizes of the individual studies included in the meta-analysis. Further, all I^2 are over 75%, ranging from 83.67 % to 99.32%, which also indicates high heterogeneity (Borenstein et al., 2017). This consistently high level of heterogeneity indicates substantial variation in effect sizes, pointing to influential factors that significantly shape the outcomes of the included studies. Consequently, subgroup and meta-regression analyses are to be carried out in order to unravel the underlying factors driving this pronounced heterogeneity. The results of the publication bias analysis are presented individually in Table 1.

Table 1. *Heterogeneity and publication bias indices*

	Heterogeneity			Egger's			
	Q	*p*	I^2	*B*	95% CI		*p*
					LL	UL	
Adaptive ER - School burnout	412.298	.000	96.119	-5.34	-11.85	1.16	.10
ER difficulties - School burnout	107.169	.000	88.803	2.20	-3.46	7.86	.41
Adaptive ER - Cynicism	241.462	.000	96.687	-2.19	-8.57	4.19	.43
ER difficulties - Cynicism	66.702	.000	88.006	2.09	-12.92	17.10	.75
Adaptive ER - Lack of efficacy	731.056	.000	99.042	-30.27	-73.89	13.35	.14
ER difficulties - Lack of efficacy	149.447	.000	95.316	7.76	-16.53	32.05	.46
Adaptive ER - Emotional exhaustion	148.967	.000	93.958	7.02	-23.05	9.02	.34
ER difficulties - Emotional exhaustion	60.485	.000	83.467	0.33	-9.36	10.03	.93

Note. CI = confidence interval; LL = Lower Limit; UL = Upper Limit, *Q* = Q statistic; I^2 = I^2 index; *B* = between-study coefficient of variation; **p* < .05. ***p* < .01. ****p* < .001

We performed moderator analyses for the categorical variables, in the case of significant relationships that were uncovered in the initial analysis. These analyses were carried out specifically for cases where there were more than three effect sizes available within each subgroup that fell under the same moderating variable.

Students' grade level was used as a categorical moderator. Pre-university students included students enrolled in primary and secondary education, while the university student category included tertiary education students. The results show that the moderating effect of grade level is not significant for the relationship between adaptive ER and overall school burnout Q(1) = .20, *p* = .66. At a specific level, the moderating effect is significant for the relationship between ER difficulties and overall burnout Q(1) = 9.81, *p* = .002, cynicism Q(1) = 16.27, *p* < .001, lack of efficacy Q(1) = 15.47 (*p* < .001), and emotional exhaustion Q(1) = 13.85, *p* < .001. A particularity of the moderator analysis in the relationship between ER difficulties and lack of efficacy is that, once the effect of the moderator is accounted for, the relationship is not statistically significant anymore for the university level, *r* = -.01 (95% CI = [-0.13; 0.14]), but significant for the pre-university level, *r* = .33 (95% CI = [0.22; 0.44]).

Meta-regression analyses were employed to examine how the effect size or relationship between variables changes based on continuous moderator variables. We included as moderators the female percentage and the study quality (Kmet et al., 2004). Results show that study quality does not significantly influence the relationship between ER and school burnout. The proportion of female participants in the study sample significantly influences the relationship between ER difficulties and overall burnout (*β*, -.0055, SE = 0.001, *p* < .001), as well as the emotional exhaustion dimension (*β*,

-.0049, SE = 0.002, $p < .01$). Mean age significantly influences the relationship between ER difficulties and overall burnout (β, -.0184, SE = 0.006, $p < .01$).

A post hoc power analysis was conducted using the metapower package in R. For the pooled effects analysis of the relationship between ER difficulties and overall school burnout, as well as with cynicism and emotional exhaustion, the statistical power was adequate, surpassing the recommended .80 cutoff. The analysis of the association between ER difficulties and lack of efficacy, along with the relationship between adaptive ER and school burnout, cynicism, lack of efficacy, and emotional exhaustion were greatly underpowered. In the case of the moderator analysis, the post-hoc power analysis indicates insufficient power.

Discussion

The central goal of this meta-analysis was to examine the relationship between emotion-regulation strategies and student burnout dimensions. Additionally, we focused on the possible effects of sample distribution, in particular on participants' age, education levels, and the percentage of female participants included in the sample. The study also aimed to determine how research quality influences the overall findings. Taking into consideration the possible moderating effects of sample characteristics and research quality, the study aimed to offer a thorough assessment of the literature concerning the association between emotion regulation strategies and student burnout dimensions. A correlation approach was used as the current literature predominantly consists of cross-sectional studies, with insufficient longitudinal studies or other designs that would allow for causal interpretation of the results.

The study's main findings indicate that adaptive ER strategies are associated with overall burnout, whereas ER difficulties are associated with both overall burnout and all its dimensions encompassing emotional exhaustion, cynicism, and lack of efficacy. Prior meta-analyses have similarly observed that adaptive ER strategies tend to exhibit modest negative associations with psychopathology, while ER difficulties generally presented more robust positive associations with psychopathology (Aldao et al., 2010; Miu et al., 2022). These findings could suggest that the observed variation in the effect of ER strategies on psychopathology, as previously indicated in the literature, can also be considered in the context of academic burnout.

However, it would be an oversimplification to conclude that adaptive ER strategies are less effective in preventing psychopathology than ER difficulties are in creating vulnerability to it. Alternatively, as previously underlined, researchers should consider the frequency, flexibility, and variability in the way ER strategies are applied and how they relate to well-being and psychopathology. Further, it's important to also address the possible directionality of the relationship. While the few studies that assume a prediction model for academic burnout and ER treat ER as a

predictor for burnout and its dimensions (Seibert et al., 2017; Vizoso et al., 2019), we were unable to identify studies that assume the role of burnout in the development of ER difficulties. Additionally, the studies identified that relate to academic burnout have a cross-sectional design that makes it even more difficult to pinpoint the ecological directionality of the relationship.

Following the moderator analysis, the results indicate that the moderating effect of grade level did not have a substantial impact on the relationship between adaptive ER and school burnout. In the context of this discussion, it is important to note that regarding the relationship between adaptive ER and overall burnout, there is an imbalance in the distribution of studies between the university and pre-university levels, which could potentially present a source of bias or error. When it comes to the relationship between ER difficulties and burnout, the inclusion of the moderator exhibited notable significance, overall and at the dimensions' level. There are several contextual factors that could be framing the current findings, such as parental education anxiety (Wu et al., 2022), parenting behaviors, classroom atmosphere (F. Lin & Yang, 2021), and self-efficacy (Naderi et al., 2018). The findings of the meta-regression analysis suggest that the association between ER and school burnout is not significantly impacted by study quality. It's important to interpret these findings in the context of rather homogenous study quality ratings that can limit the detection of significant impacts.

Significant Q tests and I^2 statistics identified in the case of several analyses indicate a strong heterogeneity among the effect sizes of individual studies in the meta-analysis's findings. This variability suggests that there is a significant level of diversity and variation among the effects observed in the studies, and it is improbable that this diversity is solely attributable to random chance. Even with as few as 10 studies, with 30 participants in the primary studies, the Q test has been demonstrated to have good power for identifying heterogeneity (Maeda & Harwell, 2016). Recent research (Mickenautsch et al., 2024), suggests that the I^2 statistic is not influenced by the number of studies and sample sizes included in a meta-analysis. While the relationships between certain variables are based on a limited number of studies (8-9 studies), it's noteworthy that the primary study sample sizes for these relationships are relatively large, averaging above 300. This suggests that despite the small number of studies, the robustness of the findings may be supported by the substantial sample sizes, which can contribute to the statistical power of the analysis. Despite these considerations, the combination of substantial primary study sample sizes and the robustness of the Q test provides a basis for confidence in the results.

One important limitation of our meta-analysis is represented by the small number of studies included in the analysis that could result in less reliable findings, with estimates that could be significantly influenced by outliers and inclusion of studies with extreme results. The small number of studies also interferes with the interpretation of both Q and I^2 heterogeneity indices (von Hippel,

2015). In small sample sizes, it may be challenging to detect true heterogeneity, and the I^2 value may be imprecise or underestimate the actual heterogeneity.

The studies included in the current meta-analysis focused on investigating how individuals generally respond to stressors. However, it's crucial to remember that people commonly use various ER strategies based on particular contexts, or they could even combine ER strategies within a single context. This adaptability in ER strategies reflects the dynamic and context-dependent nature of emotional regulation, where people draw upon various tools and approaches to effectively manage their emotions in different circumstances.

Given the limited number of studies that investigate ER as a context-dependent phenomenon in the context of academic burnout, as well as the diverse nature of these existing studies, it becomes imperative for future research to consider a number of key aspects. First and foremost, future studies should aim to expand the body of literature on this topic by conducting more research specifically focusing on the context-dependent and flexible nature of ER in the context of academic burnout and other psychopathologies.

Finally, insufficient research that delves into the connection between burnout and particular emotional regulation strategies, such as reappraisal or suppression, has made it unfeasible to conduct a meaningful analysis within the scope of the current meta-analysis, that could further bring specificity as to which ER strategies could influence or be affected in the context of academic burnout. Consequently, the expansion of the inclusion criteria for future meta-analyses should be considered, along with the replication of the current meta-analysis in the context of future publications on this topic.

Study 2: Assessing attachment security: psychometric properties of the Security Scale in the Romanian population

Introduction

According to longitudinal and meta-analytic research, children with insecure attachment styles are more likely to develop internalizing and externalizing disorders and other psychopathologies such as, but not limited to, depression (Spruit et al., 2020), early childhood emotional, behavioral, and developmental difficulties (Arguz Cildir et al., 2020; Bintaş-Zörer & Dirik, 2023), hyperactivity and attentional difficulties (Wylock et al., 2023), and decreased socioemotional competencies (Forslund et al., 2020). The importance of a secure and healthy attachment is further underlined by the interest in designing interventions with the purpose of promoting healthy parent-child attachment, especially in vulnerable groups such as adoptees (Lind et al., 2021; Newman et al., 2022; IJzendoorn et al., 2023).

Considering the significance of accurate assessment of attachment in both research and clinical settings, it is crucial to employ reliable and suitable measurement instruments. Self-report measures of attachment are widely used in psychological research to assess individuals' perceptions of their attachment relationships and entail individuals providing responses to questions regarding either their parents' interactions with them (Kerns et al., 1996) or their overall approach to attachment relationships (Brenning et al., 2011). Several reviews of the measures used to assess attachment (Ravitz et al., 2010; Wilson & Wilkinson, 2012; Jewell et al., 2019,), both self-report and observer-rated, point to the existence of a large number of assessment tools, together with the lack of evidence of adequate psychometric properties for a large number of the available measures.

The Security Scale (SS; Kerns et al., 2001) stands out as a prominent self-report assessment tool in the domain of attachment. The SS was developed to capture Bowlby's concept of a secure base. The items evaluate the extent to which kids consider an attachment figure to be approachable and available, depend on the figure in stressful situations, and find it easy and enjoyable to communicate with an attachment figure (Kerns et al., 1996). The initial tool was intended to assess how secure children felt about their attachments to certain attachment figures, such as their mothers or fathers. Although it has been used outside of this age range, it was created to solve the "measurement gap" in the field since, at the time, there were no validated measures to assess attachment for children in the later middle childhood years (Brumariu et al., 2018). A single score on a security dimension is obtained by adding the scores on the 15 items in the Security Scale, which follows Susan Harter's (1982) pioneered format of "Some kids... Other kids."

The research concerning the factor structure of the SS is rather limited and inconsistent. Marci et al., (2018) provided evidence for the unidimensional structure of the SS, confirming that the scale assesses a single underlying construct of attachment security, while Barcsi et al. (2017) provided evidence for and three-factor structure of the SS, consisting of Security, Reliance, and Availability factors, derived from exploratory factor analysis. These results contrast with previous research suggesting a unidimensional structure.

The objective of our research is to assess the psychometric properties and the factorial structure of the Security Scale (SS; Kerns et al., 2001), a widely used instrument for the assessment of attachment. Based on previous literature inconsistencies concerning the factorial structure of the SS (Barcsi et al., 2017; Marci et al., 2018), we opted to test several models for the factorial structure of the scale in order to build upon previous knowledge, offering further support for one of the models. In order to test the construct validity of the scale, the SS was tested against scales measuring constructs previously linked to attachment security, namely school burnout and children’s difficulties – emotional, behavioral, hyperactivity, and peer problems total score and compassion towards others.

By conducting thorough analyses, we seek to provide valuable insights into the scale's strengths, limitations, and overall utility in measuring attachment constructs accurately and reliably.

Methods

Participants and Procedures

Participants (N = 351) were recruited as part of a larger research project investigating technology-based prevention tools for youth (David et al., 2024). Participants were recruited from several sources, including educational institutions, and completed the survey online using the *RE*Think Emotions platform. For the overall sample, the participants were aged between 9 and 12 years old, with a mean age of 10.11 and 57.55% of participants were female.

Measures

The Security Scale (SS; Kerns & Stevens, 1996) is a self-report questionnaire designed to assess the perception of security in parent-child relationships, particularly throughout middle childhood and early adolescence. Several aspects are being assessed using this scale: a) the extent to which children view a specific attachment figure as responsive and available, (b) the predisposition of children to seek the attachment figure under difficult situations, and (c) children's stated interest in communicating with the attachment figure. A stronger evidence of a stable attachment is reflected in a higher score on each item. Previous validation studies presented adequate psychometric properties. Cronbach's alpha for the total security scores in the current sample was $\alpha = .80$. The Compassion Scale for Children (CSC; Nas & Sak, 2021) is a 20-item self-report scale. For the current study, the subscale compassion toward oneself was used. The scale presents adequate psychometric properties. Cronbach's alpha for the compassion toward oneself subscale in the current sample was $\alpha = .87$. The School Burnout Inventory (SBI; Salmela-Aro et al., 2009) is a 9-item self-report scale assessing youth's burnout related to the school environment, distributed on three dimensions: (a) exhaustion at school, (b) cynicism toward the meaning of school, and (c) sense of inadequacy at school. For the current sample, Cronbach's alpha for the overall scale is one of .90. Emotional and behavioral problems were evaluated using the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). For our study, the total difficulties subscale was used, with adequate internal consistency, $\alpha = .71$.

Statistical Analysis

Internal consistency of the SS was assessed using Cronbach's alpha. Pearson correlations were used to test the construct validity of the scale. The scale's factor structure was examined through Confirmatory Factor Analysis (CFA), employing maximum likelihood. Model fit was evaluated using the following indices: Chi-square (χ^2), the Root Mean Square Error of Approximation (RMSEA; Browne & Cudeck 1993), the Comparative Fit Index (CFI; Bentler, 1990), and the Tucker-Lewis

Index (TLI; Tucker & Lewis, 1973). Criteria for deeming the model fit as adequate were as follows: RMSEA ≤ 0.08 (Browne & Cudeck, 1993), CFI ≥ 0.90 (Bentler, 1990), and TLI ≥ 0.90 (Hu & Bentler, 1999). The analyses were conducted using JASP version 0.18.3.0.

Results

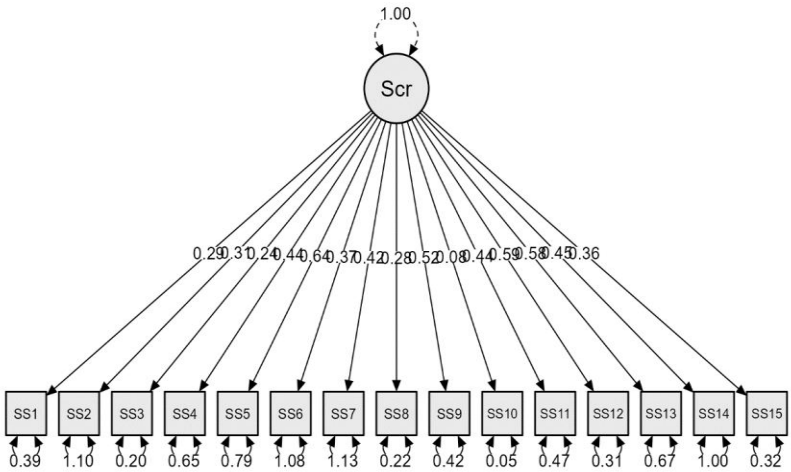
Confirmatory Factor Analysis

Confirmatory factor analysis was used to investigate the initially proposed one-component model. Model 1 is a simple model with no correlated residuals between measured variables, whereas Model 2 incorporates certain changes, including correlated residuals.

Model 1 (refer to Figure 1) with a Chi-square value of 329.80 (df = 90, p <.001) demonstrated a poor fit. Poor fit is indicated by the TLI (.750) and CFI (.786), both of which are below the generally accepted criteria of.90. In addition, the RMSEA (.087) is higher than the targeted threshold of .06, with a 90% confidence interval spanning from.077 to .097, suggesting a lack of fit, but the SRMR (.064) is within an acceptable range (less than .08) .

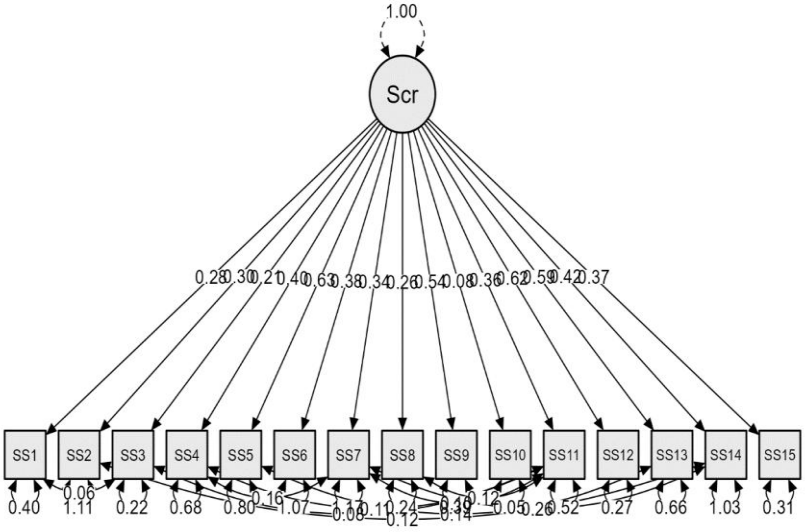
Model 2, displayed in Figure 2, had a significantly better fit, as evidenced by its Chi-square value of 181.43 (df = 81, p <.001). Both the TLI (.884) and the CFI (.910) are close to or beyond the threshold needed for a great fit. Both the RMSEA (.059) and SRMR (.049) fall within acceptable bounds, and the model's better fit is confirmed by the RMSEA's 90% confidence interval (LL =.048, UL =.071). In general, Model 2 significantly outperforms Model 1 in terms of data fitting.

Figure 1. *Single-Factor Confirmatory Factor Analysis Model*



Note. The figure represents a Single-Factor Confirmatory Factor Analysis (CFA) model for the latent variable "Security," measured by 15 observed indicators (SS1 to SS15).

Figure 2. *Single-Factor CFA Model with Correlated Residuals*



Note. The figure represents a Single-Factor Confirmatory Factor Analysis with correlated residuals (CFA) model for the latent variable "Security," measured by 15 observed indicators (SS1 to SS15).

Table 1 provides comprehensive details on the factor loadings for the "Security" factor for each of the 15 indicators (SS1–SS15). Each of the items and the latent component "attachment security" are positively correlated according to the estimates. The loadings, show varying degrees of association between each item and the attachment security factor, ranging from .076 for item 10 to .633 for item 12. The strongest correlations between the factor and items such as 12 (.633) and 5 (.629) indicate that they are good representations of the underlying "Attachment Security" factor. The lowest factor loading, on the other hand, is seen in item 10 (.076), suggesting a lower but statistically significant relationship with the Security factor. All p-values in the table are less than .001, suggesting the statistical significance of each item loading.

Table 1. *Estimates, Standard Errors, and 95% Confidence Intervals for Security Factor Indicators*

						95% CI	
Factor	Indicator	Estimate	SE	z-value	p	LL	UL
Security	SS1	.29	.038	7.80	< .001***	0.22	0.37
	SS2	.29	.062	4.69	< .001***	0.17	0.41
	SS3	.27	.029	9.45	< .001***	0.22	0.33
	SS4	.41	.050	8.27	< .001***	0.32	0.51
	SS5	.63	.059	10.67	< .001***	0.51	0.74
	SS6	.36	.062	5.78	< .001***	0.23	0.48
	SS7	.38	.064	5.89	< .001***	0.25	0.50
	SS8	.26	.030	8.62	< .001***	0.20	0.32
	SS9	.54	.042	12.82	< .001***	0.46	0.62

						95% CI	
Factor	Indicator	Estimate	SE	z-value	p	LL	UL
	SS10	.076	.013	5.87	< .001***	0.05	0.10
	SS11	.360	.045	7.94	< .001***	0.27	0.45
	SS12	.633	.040	15.78	< .001***	0.55	0.71
	SS13	.573	.053	10.80	< .001***	0.47	0.68
	SS14	.413	.061	6.81	< .001***	0.29	0.53
	SS15	.366	.035	10.37	< .001***	0.30	0.44

Note. Estimate = unstandardized regression coefficient; SE = standard error; *z*-value = z-test statistic; *p* = p-value for significance testing; 95% CI = 95% Confidence Interval * $p < .05$, ** $p < .01$, *** $p < .001$.

The residual covariances between several item pairs were significant, suggesting shared variance beyond the main latent construct. Items 8 and 11 showed a positive residual covariance of .12 ($p < .001$), while items 3 and 11 had a covariance of .08 ($p < .001$). Items 7 and 14 had a covariance of .26 ($p < .001$) and items 4 and 11 had a covariance of .11 ($p < .001$). Items 5 and 13 demonstrated a covariance of .14 ($p = .002$), while items 1 and 3 had a covariance of .06 ($p < .001$). Additionally, items 4 and 7 had a covariance of .16 ($p = .01$), items 2 and 14 showed a covariance of .12 ($p < .05$), and items 7 and 11 had a covariance of .10 ($p < .05$).

Validity of the Security Scale

The validity of the Security Scale was assessed using a wide range of variables that have been previously shown to be associated with attachment security in the literature. As expected, a higher attachment security score is positively and significantly associated with higher compassion towards others ($r = .36$, $p < .01$), suggesting a good construct validity of the scale. Further, higher attachment security scores are associated with lower school burnout in children ($r = .52$, $p < .01$). Finally, children's higher levels of attachment security are negatively and significantly associated with emotional and behavioral problems ($r = .42$, $p < .01$). These results suggest a good construct validity of the SS.

Discussion

An insufficient number of studies have investigated the factor structure of this instrument (Barcsi et al., 2017; Marci et al., 2018), and their results have been discordant. Therefore, the present study aimed to evaluate the psychometric properties of the SS and explore its factor structure in a sample of Romanian children. Model 2 showed a substantially better match, with model fit indices that either met or exceeded the commonly used standards for model fit evaluation. This demonstrates that Model 2 more accurately depicts the underlying structure and connections within the data.

Regarding the "Security" factor, the results indicated significant loadings for all measured items. Most items showed moderate to strong connections with the underlying construct, with a few

items demonstrating particularly strong associations. While one item exhibited a weaker relationship, it was still statistically significant, indicating that all items contribute meaningfully to the overall structure. Overall, the findings suggest that the "Attachment Security" construct is well-represented by the items in the model, with most items displaying strong or moderate alignment with the latent factor. The model revisions in Model 2 led to a much more accurate and reliable representation of the underlying data, highlighting the stability and validity of the factor structure.

The residual covariances suggest that these item pairs share additional variance beyond what is explained by the overarching latent construct of "attachment security." Previous methodological research has suggested that this could be due to overlapping content, where the items measure closely related aspects of the child's relationship with their mother, such as emotional availability, trust, and support (Bandalos, 2021). For instance, item 8 (worry about love) and item 11 (worry about availability) both reflect concerns about the mother's presence, which may lead to additional shared variance. In addition, some items may reflect subdomains within attachment security, such as emotional closeness or reliance, creating stronger links between certain item pairs. Methodological factors, like the phrasing or structure of the items, might also contribute to these covariances by prompting similar responses from the child. The study's findings support the validity of the Security Scale as an indicator of children's perceived levels of attachment. Following the internal consistency analysis, a good internal consistency was revealed, suggesting that the items of the scale are measuring the same underlying construct in a consistent manner. Further, the good alpha Cronbach coefficient suggests that the scale is measuring a single construct, thus indicating unidimensionality.

The results of the correlation analysis support the construct validity of the scale and reveal associations between attachment security scores and a series of psychological constructs. A long line of studies, both correlational and experimental, have previously demonstrated the influence of attachment security on people's compassionate attitudes and behavior (Mikulincer et al., 2005; Vachon, 2020). In an experimental study, compared to the participants primed with positive affect or neutral narratives, those primed with an attachment security story reported feeling more empathetic (Gilbert, 2017).

Attachment security scores are negatively associated with the total difficulties scores of the SDQ. This result is in line with previous research (Keskin & Çam, 2010), which identified that adolescents with secure attachment had significantly lower scores on the SDQ subscales for emotional symptoms, conduct problems, hyperactivity, and peer problems compared to those with insecure attachment styles). Our results reveal a higher magnitude of the association compared with previous research. In the context of academic burnout, previous research revealed positive associations between attachment avoidance and academic burnout (Chen et al., 2021).

Some limitations of our study should be considered. Firstly, the sample cannot be deemed representative of the Romanian population of children and adolescents, necessitating replication studies on larger samples to enhance the generalizability of the study findings. Secondly, an additional limitation is represented by the exclusive reliance on children and adolescents' self-report ratings. In order to assess additional forms of validity and enhance the reliability of the measurements, future research should include alternative attachment instruments, assessment methodologies, and sources of information (for example, parents).

Our study has several implications for both psychological research and practice. Firstly, by validating the SS in the Romanian population, we increase the availability of reliable instruments for assessing attachment security in this cultural setting, consequently enhancing the comparability of research findings across populations and facilitating more accurate assessment that can result in interventions that are better informed. Furthermore, our investigation of the factor structure of the scale also provides insights into its underlying dimensions in the Romanian population. Additionally, the validity of the scale, along with the relevance of attachment for the psychological wellbeing of children and adolescents is supported by the correlations identified between attachment security and a number of psychological dimensions. Finally, the identification of a number of items with low factor loadings points to potential areas where the SS can be refined in order to enhance its psychometric qualities.

Study 3: Validation and Normative Data for the School Burnout Inventory in the Romanian population

Introduction

Studies indicate that burnout from school increases the likelihood of emotional problems, including depression and anxiety (Salmela-Aro et al., 2009; Slivar, 2001), and somatic problems (Murberg & Bru, 2007). Furthermore, there has been evidence of associations between school burnout and suicidal ideation (Ang & Huan, 2006; Bolatov et al., 2022). Poorer academic results, such as a higher chance of school dropout (Bask & Salmela-Aro, 2013) and worse school engagement and success (Tuominen-Soini & Salmela-Aro, 2014; Vasalampi et al., 2009), are also associated with burnout and academic stress. In terms of students' well-being, longitudinal research shows that school burnout negatively predicts students' psychological well-being (Raiziene et al., 2014) and sleep quality (May et al., 2020). Further, May et al. (2014) demonstrated a strong correlation between elevated ambulatory blood pressure (systolic and diastolic) and heart rate variability markers, which are indicators of heightened cardiac sympathovagal tone, and school burnout. These results

corroborate the theories and imply that pre-hypertension or early cardiovascular disease may be related to school burnout.

The School Burnout Inventory (Salmela-Aro et al., 2009) is a 9-item survey constructed to assess school burnout in youth. When the SBI was first validated in a Finnish setting, it was shown that school burnout could be explained by a second-order structure consisting of three first-order factors, specifically, exhaustion, cynicism, and inadequacy, as well as by a solution of three correlated factors. Over the next few years, the SBI has been validated in European and North American contexts such as Turkey (Secer et al., 2013), Indonesia (Rahman, 2020), Chile (Carmona-Halty et al., 2022), Italy (Platania et al., 2020), Spain (Moyano & Riaño Hernández, 2013), and Germany (Hoferichter et al., 2022). Nevertheless, some of these investigations (Fiorilli et al., 2014) were unable to reproduce the three-component structure; instead, they suggested a two-factor model by removing the factor inadequacy (Herrmann et al., 2019). While the aforementioned research has yielded noteworthy progress in the understanding of school burnout, more investigation is necessary to evaluate the SBI's cross-cultural suitability and appropriate use in the Romanian context.

Our study aims to investigate the validity and reliability of the Romanian translation of the SBI. We anticipate that the SBI's psychometric properties will enable a global and/or dimensional evaluation of school burnout, and we hypothesize that the SBI's factorial structure will be the same as the original SBI, despite the disagreement in the research on the multidimensionality of the burnout concept. Secondly, based on previous literature, we expect the SBI scores to be positively associated with the MBI-SS scores and overall emotional and behavioral problems scores. Conversely, we expect burnout scores to be negatively associated with mindful attention awareness, work engagement in the school context, and well-being. Finally, our study aims to establish cut-off scores for the SBI within a Romanian-speaking student population. These norms will serve as a reference point, allowing for the interpretation of individual scores in relation to the broader population, thus enhancing the tool's practical application in both research and clinical contexts.

Method

Data Analysis

Data analysis was performed using SPSS version 22 and JASP 0.18.3.0. To evaluate the validity of the SBI, bivariate correlation analyses were conducted between the SBI and related constructs. Reliability analysis was employed to assess the internal consistency of the scale, utilizing Cronbach's alpha. The scale's structure was examined using Confirmatory Factor Analyses (CFA). Model fit was assessed using indices such as Chi-square (χ^2), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Standardized Root Mean Square Residual (SRMR). Criteria for adequate model fit were defined as

RMSEA ≤ 0.08, SRMR ≤ 0.08, CFI ≥ 0.90, and TLI ≥ 0.90. The cut-off scores for the scale were determined using K-Means Cluster Analysis.

Participants and Procedure

The study involved a total sample of 975 participants. Among these participants, 56.9% identified as female, showcasing a slight majority of women in the study. A significant portion of the sample, 60.2%, fell within the age range typically defined as middle childhood, which encompasses children aged 6 to 12 years. Data was collected in class, under the supervision of a researcher, using the REThink Emotions app.

Measures

Participants were assessed using The School Burnout Inventory (SBI; Salmela-Aro et al., 2009), employing emotional exhaustion (α. = 82), cynicism (α = .86), and the inadequacy subscale (α = .64). The internal consistency of the total SBI score is .91, The Maslach Burnout Inventory – Student Survey (MBI-SS - Schaufeli et al., 2002) assessed exhaustion (α = .81), cynicism (α = .84), and academic efficacy (α = .83). The Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) was used to assess mindfulness in the study. The internal consistency of the overall score is α = .91. The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) is a widely used screening tool designed to assess the emotional and behavioral difficulties of children and adolescents. Developed by Goodman (1997), the SDQ consists of 25 items that are divided into five scales, each measuring different aspects of a child's psychological well-being. For overall problems the internal consistency is appropriate, α = .85. The Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2006) is a widely used instrument designed to measure work engagement among students. In the current sample, the internal consistency for the vigor subscale was one of .80, for dedication .85 and for absorption one of .77. For the total work engagement score, the internal consistency is one of .90. The World Health Organization-5 Well-Being Index (WHO-5; World Health Organization, 1998; Topp et al., 2015) is a brief self-reported measure designed to assess an individual's current mental well-being. The WHO-5 has demonstrated good psychometric properties, including high internal consistency, with Cronbach's alpha of α = .87.

Results

Construct Validity

The predictive validity of the scale was assessed using the Strengths and Difficulties Questionnaire. The total difficulties score is positively and significantly correlated to the total academic burnout score, r = .64, p < .001, as well as with the scores for the exhaustion dimension of SBI, r = .56, p < .001, the cynicism dimension, r = .64, p < .001, and the inadequacy dimension r = .58, p < .001. The concurrent validity of SBI was assessed using the MBI-SS. The total school burnout

scores measured with MBI-SS present a positive and significant association with the total school burnout scores measured with SBI, $r = .55$, $p < .001$. For the exhaustion dimension, the association between the two subscales' scores is moderate, $r = .59$, $p < .001$. Finally, for the cynicism dimension, the association between the two subscales' scores is $r = .66$, $p < .001$. The remaining subscale is not common between the two instruments. Nonetheless, the inadequacy subscale of SBI presents a moderate and positive association with the total school burnout measured using MBI-SS.

The convergent validity of SBI was assessed using the UWES, the MAAS and The WHO-5. We have identified a negative and significant association both between the overall work engagement scores and the total academic burnout scores, $r = -.36$, $p < .001$, and between the vigor dimension $r = -.34$, $p < .001$, dedication dimension $r = -.31$, $p < .001$, absorption dimension $r = -.30$, $p < .001$ and the overall school burnout scores. Further, there are negative and significant associations between the work engagement dimensions and school burnout dimensions, with the strongest ones being between cynicism and vigor ($r = -.46$, $p < .001$), cynicism and dedication ($r = -.43$, $p < .001$), and cynicism and absorption ($r = -.44$, $p < .001$), see Table 2 for the complete correlation matrix. Concerning the association with mindful attention awareness, there are negative and significant associations between mindful attention awareness and the overall academic burnout score ($r = -.58$, $p < .001$), the scores for the exhaustion dimension ($r = -.49$, $p < .001$), the scores for the cynicism dimension ($r = -.53$, $p < .001$), and the scores for the inadequacy dimension ($r = -.53$, $p < .001$). The results show a negative and significant association between the overall well-being scores and overall burnout scores, $r = -.35$, $p < .001$, emotional exhaustion, $r = -.25$, $p < .001$, cynicism $r = -.36$, $p < .001$, and inadequacy, $r = -.20$, $p < .001$.

Reliability

Test-retest reliability was conducted by administering the SBI scale one month after the first completion. The results show moderate and positive correlations between the results of the SBI at the two time points, as follows: total school burnout score, $r = .59$, $p < .001$, emotional exhaustion, $r = .50$, $p < .001$, cynicism, $r = .48$, $p < .001$, and inadequacy, $r = .55$, $p < .001$. In terms of internal consistency, the emotional exhaustion subscale achieved a Cronbach's alpha of .82, cynicism was measured at .86, while the inadequacy subscale had a lower internal consistency of .64. The internal consistency of the total SBI score is .91.

Confirmatory Factor Analysis

A confirmatory factor analysis was conducted based on the originally proposed 3-factor model (Salmela-Aro, et al., 2009). For the emotional exhaustion dimension, the item loadings range from .66 to .80, indicating very good to excellent loadings. The cynicism dimension has item loadings

between .80 and .86, reflecting excellent loadings. Lastly, the inadequacy dimension shows item loadings from .78 to .90, also indicating excellent loadings (see Table 1). The three factors also demonstrate excellent loadings on the second-order factor, which represents academic burnout (see Table 2).

Table 1. *Factor loadings for the first-order factors*

						95% CI		
Factor	Indicator	Estimate	SE	*z*	*p*	LL	UL	Std. Est
EXH	SBI1	0.38	0.04	11.02	< .001	0.32	0.45	0.66
	SBI4	0.46	0.04	10.87	< .001	0.38	0.54	0.76
	SBI7	0.44	0.04	10.71	< .001	0.36	0.517	0.70
	SBI9	0.45	0.04	10.94	< .001	0.37	0.53	0.80
CYN	SBI2	0.50	0.04	13.33	< .001	0.43	0.57	0.81
	SBI5	0.57	0.04	13.28	< .001	0.48	0.65	0.86
	SBI6	0.58	0.04	13.50	< .001	0.50	0.67	0.82
INAD	SBI3	0.61	74.45	0.01	0.99	-145.31	146.52	0.90
	SBI8	0.64	77.87	0.01	0.99	-151.99	153.26	0.78

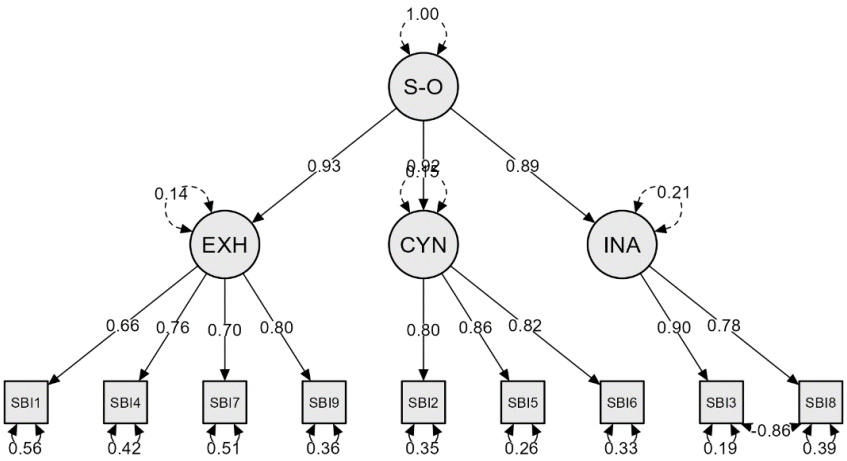
Note. 95% CI = Confidence Intervals for the factor loadings of each item; Estimate = estimated loading; SE = standard error, z = z-value, *p* = p-value; 95% CI (Lower, Upper) = the lower and upper bounds of the 95% confidence interval; Std. Est. = standardized estimate.

Table 2. *Factor loadings for the second-order factors*

						95% CI		
Factor	Indicator	Estimate	SE	*z*	*p*	LL	UL	Std. Est.
BURNOUT	EXH	2.52	0.25	10.03	< .001	2.03	3.01	0.93
	CYN	2.35	0.20	11.74	< .001	1.95	2.74	0.92
	INAD	1.94	238.08	0.01	0.993	-464.69	468.57	0.89

Note. 95% CI = Confidence Intervals for the factor loadings of each item; Estimate = estimated loading; SE = standard error, *z* = z-value, *p* = p=value; 95% CI (LL, UL) = the lower and upper bounds of the 95% confidence interval; Std. Est. = standardized estimate.

Figure 1. *Factor structure of the SBI*



Note. EXH = Emotional exhaustion, CYN = Cynicism, INA = Inadequacy, S-O = Second-order factor, represented by academic burnout.

The fit indices of the model are also excellent, with CFI = .99, TLI = .98, RMESEA = .06 and SRMR = .02. The X^2 indicator is significant, suggesting that that there is a statistically significant difference between the observed data and the model being tested. While a significant chi-square indicates poor model fit, it is important to note that the chi-square test is sensitive to sample size.

The K-Means Cluster Analysis was conducted with four predefined clusters. This analysis identified four groups. Cut-off scores were determined by calculating the midpoints between the cluster centroids. The results indicate that SBI total scores below 18,38 correspond to low total academic burnout, between 18.38 - 29.44 correspond to moderate academic burnout and between 29.44 - 39.41 correspond to high academic burnout. Scores above 39.41 correspond to severe burnout. Further, cut-off scores were determined for individual burnout dimensions. An additional analysis that revealed the cut-off scores for individual genders, the scores do not appear to differ between genders.

Discussion

The aim of this study was to assess the psychometric properties of the Burnout School Inventory among Romanian pre-university students. The results aligned with previous research (Boada-Grau et al., 2015), confirming a higher-order factor structure consisting of three first-order factors. In terms of validity, the study hypothesized that the SBI scores would be positively associated with scores on the Maslach Burnout Inventory-Student Survey and measures of overall emotional and behavioral problems. Conversely, burnout scores were expected to be negatively correlated with mindful attention awareness, school-related work engagement, and well-being. Establishing norms for the SBI within the Romanian-speaking student population was another key objective of the study.

The predictive validity of the SBI is demonstrated through its significant positive correlation with the SDQ overall difficulties scores. Previous research has demonstrated the positive relationship between all three burnout dimensions assessed using the SBI and internalizing problems measured using the SDQ scale (Parviainen et al., 2021). The total school burnout scores from the MBI-SS show a strong positive association with the total school burnout scores from the SBI. This suggests that higher burnout levels measured by the MBI-SS correspond to higher burnout levels measured by the SBI, confirming that both instruments effectively capture the construct of school burnout. For the exhaustion and cynicism dimensions, the correlation between the two instruments is strong, indicating that students who report higher exhaustion/cynicism on the MBI-SS also tend to report higher exhaustion on the SBI, reinforcing the idea that both tools assess similar aspects of burnout related to emotional exhaustion.

Examining SBI against validated measures of academic engagement, mindfulness, and well-being reveals adequate convergent validity, according to the findings. In line with previous research (Salmela-Aro et al., 2009a), our results show a significant negative association between school burnout and school engagement, implying that as students' burnout increases, their engagement in school activities decreases. Additionally, in terms of the strength of the relationship between total school engagement scores and overall burnout, our results are comparable with previous research showing a moderate magnitude (Carmona-Halty et al., 2022; Salmela-Aro & Upadyaya, 2014). Increased levels of mindfulness are associated with lower levels of burnout. Our results are in line with previous research that found a significant negative relationship between mindfulness and burnout among senior students and adolescents (Bilgiz & Peker, 2021; Yıldız Akyol & Demir, 2019). Finally, the negative associations between overall well-being scores and school burnout scores imply that students with greater well-being report less burnout. The results are in line with research that has linked school burnout dimensions to psychological well-being concerns among students (Parviainen et al., 2020; Virtanen et al., 2019), and have identified negative associations between school burnout and social, emotional, and psychological well-being (Cadime et al., 2016).

The test-retest reliability assessment of the SBI align with previous research, which demonstrates a moderate relationship in the test-retest index over a four-month period, indicating that the assessments maintain a stable level of reliability over time (Carmona-Halty et al., 2022). Regarding internal consistency, the overall SBI score demonstrates high reliability, indicating that the instrument effectively measures the overall construct of school burnout. The results are in line with the literature, with numerous studies identifying a lower internal consistency for the inadequacy subscale (Carmona-Halty et al., 2022; Parker & Salmela-Aro, 2011). Research emphasizes that while two-item scales can provide useful measures, they often show lower reliability compared to longer

scales. The implications suggest careful consideration when using two-item scales, as their reliability may vary depending on the context and the coefficient used (Eisinga et al., 2013).

The confirmatory factor analysis results strongly support the validity of the originally proposed three-factor model of the SBI. Our findings align with previous research (Fiorilli et al., 2014; May et al., 2020; Meylan et al., 2015; Moyano & Riaño Hernández, 2013; Salmela-Aro et al., 2009) indicating that the three-factor solution with a second-order factor of SBI was applicable and comparable across genders. Overall, the CFA results provide robust evidence that the three-factor structure of the SBI is a valid and reliable framework for measuring academic burnout, confirming that emotional exhaustion, cynicism, and inadequacy are key components of this construct.

Our study has significant strengths, such as a large and diverse sample size, employing both cross-sectional and longitudinal approaches, and thoroughly assessing the temporal stability and internal consistency of the SBI. However, it is important to acknowledge certain limitations. The sample was limited to Romanian pre-university students, which restricts the generalizability of our findings to broader populations. Additionally, the study relied solely on self-reported data without incorporating additional information sources, such as teacher assessments or academic performance metrics, which could provide a more comprehensive understanding of student burnout.

The cutoff scores established for the SBI are crucial for effectively categorizing levels of academic burnout among students. These thresholds enable educators and clinicians to identify at-risk students more accurately and tailor interventions accordingly. By providing clear benchmarks, the cutoffs enhance the practical application of the SBI in both research and clinical settings, allowing for a standardized interpretation of individual scores relative to the broader population. This is essential for early detection, targeted support, and monitoring burnout over time.

Study 4: Student Burnout in Children and Adolescents: The Role of Attachment and Emotion Regulation

Introduction

Human cognitive functions such as learning, perception, attention, memory, reasoning, and problem solving are all significantly influenced by emotions (Brosch et al., 2013; Tyng et al., 2017). An important construct that was extensively explored in relation to various mental health outcomes (see Visted et al., 2018 for depression, Ludwig et al., 2019 for psychotic symptoms), and which has recently received attention in relation to academic outcomes, including burnout (Chacón-Cuberos et al., 2019; Vinter et al., 2021), is emotion regulation (ER). Muchacka-Cymerman & Tomaszek (2018) show that emotional coping strategies, both dispositional and situational, are negatively associated with overall burnout dimensions, while situational emotional coping can negatively influence

dimensions such as inadequacy and a loss of interest in relation with school. Expressive suppression, which refers to attempts to reduce or inhibit ongoing emotion expressive behavior (Balzarotti et al., 2010) has been shown to be positively associated with overall and specific burnout dimensions (Chacón-Cuberos et al., 2019; Seibert et al., 2017). Further, emotional self-awareness has been linked to lower burnout rates in the workplace context (Lee, 2018).

Among the factors that can influence the development and usage of the ER strategies, attachment theory has been used to explore these variations, and attachment has received support as a contributing factor (Morris et al., 2007; Sutton, 2019; Turnbull & Salas, 2021). Internal working models further influence ER by guiding cognitive, affective, and behavioral responses in challenging situations. Thus, securely attached youth develop functional ER strategies on the basis of positive beliefs regarding their primary attachment figure's availability and capacity to reduce their distress, as well as previous positive experiences regulating emotion with the assistance of caregivers (Brumariu et al., 2012; Cassidy, 1994; Cooke et al., 2019).

In middle childhood, attachment security is associated with more adaptive ER, manifested through less avoidance of conversing about negative emotions with mothers (Waters et al., 2010) and less difficulty identifying emotions (Brumariu et al., 2012). In youth samples, the association between attachment security and adaptive ER is supported, with securely attached youth showing increased positivity, coherence of content and affect, lower emotion dysregulation (Hershenberg et al., 2011), less dysfunctional anger (Kobak et al., 1993), and the use of adaptive ER strategies (Besharat & Shahidi, 2014). Studies involving elementary school samples indicate that a stronger parent–child attachment negatively predicts learning burnout (He et al., 2022). Moreover, studies conducted with university students demonstrate that an anxious attachment style positively predicts burnout dimensions (Bumbacco & Scharfe, 2023; Silva & Figueiredo-Braga, 2019).

The research of student burnout has been subjected to conflicting findings regarding male and female variations in burnout levels and symptoms expression. Several studies show that in academic settings, girls experience higher levels of all three student burnout dimensions (Salmela-Aro et al., 2009a; Vinter, 2021). On the contrary, other research shows that girls, on average, scored higher on the exhaustion subscale of school burnout than boys and there are no cynicism-related group mean differences (Herrmann et al., 2019).

The main aim of the current study is to examine whether emotion regulation strategies mediate the relationship between children's attachment security and student burnout dimensions. A secondary objective of the study is to explore potential overall or dimension-specific differences in burnout levels between boys and girls.

Methods

Setting and Participants

Participants were enrolled through a larger research project on the validation of a game-based assessment system of emotion regulation skills in children and adolescents. The sample consisted of 602 children (55% female) aged 8–16 (M = 10.45; SD = 2.14) from 18 schools. The students completed questionnaires assessing their level of attachment security, ER strategies, and levels of school burnout. In the current sample, 90.4% of students were enrolled in middle school (grades 2–8) and 15.5% were enrolled in private education programs.

Procedure

In September 2021, invitations for collaboration were sent via email to management bodies of schools from the county and to the County Center of Resources and Educational Assistance. Letters of informed consent were filled out by parents, either in physical format or online, through the REThink Emotions platform and app. All data were collected using the mobile app, in class, with the guidance of the project team.

Measures

The School Burnout Inventory (SBI; Salmela-Aro et al., 2009) consists of 9 items measuring three aspects of school burnout, namely exhaustion at school, cynicism toward the meaning of school, and the sense of inadequacy at school. For the current sample, the Cronbach's alpha for the emotional exhaustion subscale is .82, for cynicism it is .85, and for inadequacy it is .62. The Emotion Regulation Index for Children and Adolescents (ERICA; MacDermott et al., 2010) was used to assess ER. The first ERICA component, emotional control, involves the ability to modify your emotional responses and displays. The second ERICA factor, emotional awareness, contains items that represent emotional self-awareness and situational response. For the current sample, the Cronbach's alpha for the emotional control subscale is .79 and for emotional awareness it is .69. The Security Scale (Kerns & Stevens, 1996) is a self-report questionnaire developed to assess children and adolescent's perception of security in parent–child relationships. The scale offers a continuous measure of attachment security, with items addressing whether the child perceives the attachment figure as responsive and available. For the current sample, Cronbach's alpha is one of .85.

Statistical Analysis

The study adopted a cross-sectional design. SPSS version 22.0 (International Business Machines Corporation–IBM, Armonk, NY, USA) was used to explore the sample's characteristics. Pearson's r correlation analyses were conducted to explore the associations between all the variables of interest (attachment security, emotion regulation strategies, and student burnout). In order to assess the reliability of the measurement tools, we employed Cronbach's alpha. Analyses aimed at

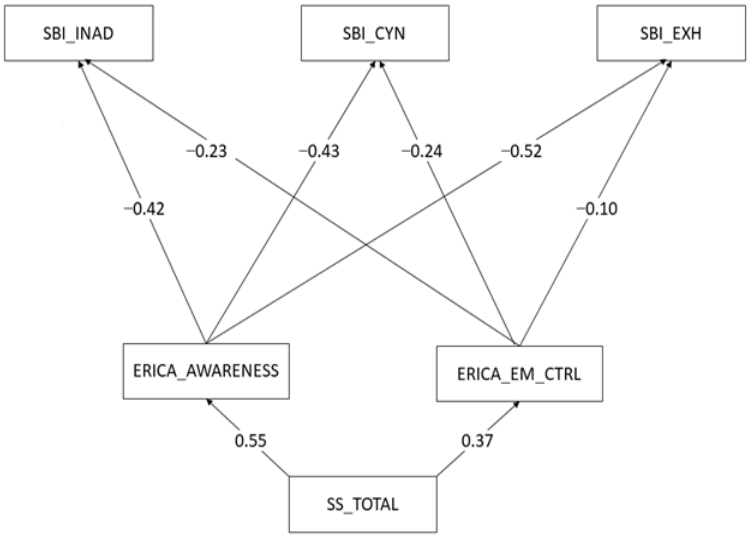
investigating gender differences were conducted through independent t tests. Multiple regressions were used to explore the relationship between the independent variable, mediating variables, and dependent variables. Jamovi version 2.3.18 (The jamovi project, Sydney, Australia) was employed to perform path analysis modeling in order to test the mediation model. We used bootstrapping with 5000 samples to assess the significance of the standardized direct, indirect, and total effects of the variables influencing student burnout.

Results

Negative significant correlations were identified between attachment security and exhaustion, $r(599) = -0.50$, $p < .001$, cynicism, $r(599) = -.51$, $p < .001$, and inadequacy, $r(599) = -.47$, $p < .001$ subscales of SBI, as well as between attachment and the overall burnout score, $r(599) = -.54$, $p < .001$. Negative significant associations were also identified between the emotional control subscale of ERICA and exhaustion $r(599) = -.42$, $p < .001$, cynicism, $r(599) = -.49$, $p < .001$, and inadequacy, $r(599) = -.48$, $p < .001$. The emotional awareness subscale was negatively associated with emotional exhaustion, $r(599) = -.57$, $p < .001$, cynicism, $r(599) = -.56$, $p < .001$, and inadequacy, $r(599) = -.55$, $p < .001$. Positive significant correlations were identified between attachment security and emotional control, $r(599) = .37$, $p < .001$, as well as emotional awareness $r(598) = .55$, $p < .001$. The results indicate that there are no significant gender differences between males and females concerning overall student burnout, as well as for specific subscales.

The examination of the parameter estimates shows that all prediction pathways are significant. More specifically, attachment security significantly predicts functional ER strategies in children and adolescents. In turn, the use of functional ER strategies negatively predicts the onset of student burnout. The indirect effects computed based on the path analysis model (see Figure 1) reveal the presence of the expected effect for both emotional awareness and emotional control in the context of all burnout dimensions.

Figure 1. *Path diagram*



Note. The upper level of the figure presents the student burnout dimensions, followed by the emotion regulation strategies in the middle level and attachment security on the bottom level.

The relationship between attachment and emotional exhaustion is mediated by both emotional control and emotional awareness. This is also the case for cynicism, where the relationship is mediated by emotional control and emotional awareness. Finally, the relationship between attachment security and inadequacy in relation to schoolwork is also mediated by both emotional control and emotional awareness (see Table 2).

Table 2. *Indirect effects*

			95% CI				
	b	SE	LL	UL	*β*	*z*	*p*
SS_TOTAL ⇒ ERICA_EM_CTRL ⇒ SBI_CYN	−.04	0.01	−0.06	−0.02	−.09	−4.11	<0.001
SS_TOTAL ⇒ ERICA_EM_CTRL ⇒ SBI_EXH	−.02	0.01	−0.04	−0.00	−.04	−2.06	0.040
SS_TOTAL ⇒ ERICA_EM_CTRL ⇒ SBI_INAD	−.03	0.01	−0.04	−0.01	−.09	−3.95	<0.001
SS_TOTAL ⇒ ERICA_AWARE ⇒ SBI_CYN	−.11	0.02	−0.14	−0.08	−.24	−7.04	<0.001
SS_TOTAL ⇒ ERICA_AWARE ⇒ SBI_EXH	−.16	0.02	−0.20	−0.13	−.29	−8.46	<0.001
SS_TOTAL ⇒ ERICA_AWARE⇒ SBI_INAD	−.07	0.01	−0.09	−0.05	−.23	−7.30	<0.001

Note. ERICA_EM_CTRL = Emotional Control; ERICA_AWARE = Emotional Awareness; SS_TOTAL = Attachment Total; SBI_EXH = Exhaustion; SBI_CYN = Cynicism; SBI_INAD = Inadequacy, 95% CI = 95% confidence interval.

Discussion

Given that student burnout is a widespread issue that can negatively influence academic outcomes and students' wellbeing, the present research aimed to investigate its mechanisms, namely the relationship between attachment, burnout, and emotional regulation in a sample of children and adolescents. A secondary objective of the study was to explore the gender differences in burnout dimensions, following the line of research presented by previous studies that have explored the topic (Vinter et al., 2021)

Our results have shown that both emotional awareness and emotional control negatively predict exhaustion, cynicism, and inadequacy dimensions, as well as overall student burnout scores in youth samples. In previous studies, ER strategies that have gained recognition as being adaptive have been, in general, negatively related to student burnout dimensions, whereas maladaptive ones have been positively related to these dimensions (Vizoso et al., 2019; Yu et al., 2022). When it comes to the ER strategies investigated in the current paper, there are no studies relating either emotion awareness or emotional control to burnout dimensions in children and adolescents. Insight from studies conducted on adult samples suggests that higher emotion awareness is found in samples with low emotional exhaustion related to work activities (Lahoud et al., 2019) and the link between emotional self-awareness and burnout follows a negative trend (Lee, 2018). Emotional control has also been negatively related to burnout in nurse samples (Görgens-Ekermans & Brand, 2012).

The current findings, showing that emotional control and emotion awareness strategies are significantly predicted by attachment security, further build on a long line of research that closely links attachment to ER in both children and adults (Cassidy, 1994; Richards & Hackett, 2012). Waters et al. (2010) suggested that children with secure attachments are more willing to engage in talks about emotions and have a greater understanding of negative emotions. Our findings on the relationship between attachment security and emotional control are also consistent with a comprehensive meta-analysis that showed that children and adolescents who are more securely attached experience less negative effects when provoked and are better at regulating emotions (Cooke et al., 2019).

Lower attachment security has been previously linked to student burnout dimensions in college samples (Bumbacco & Scharfe, 2023). On the contrary, a higher level of attachment security has been negatively related to emotional exhaustion and depersonalization burnout dimensions, while being positively related to students' personal accomplishment (Bordoagni et al., 2021). Our paper extends these findings to youth samples, showing that a secure attachment negatively predicts exhaustion, cynicism, and inadequacy in children and adolescents. These findings provide insight on a potential mechanism in the relationship between attachment security and burnout, and are in line

with the extensive research that emphasizes the role of children's secure attachment for their emotional health (Brumariu, 2015; Hershenberg et al., 2011).

Although previous studies and meta-analyses indicated gender differences concerning burnout, we were unable to replicate these findings. The current study was unable to identify gender differences in terms of overall or dimension-specific burnout levels. Cultural studies show that in the school context, collectivistic cultures prioritize interpersonal relationships, interdependence, and intragroup ambitions (Cortina et al., 2017). A possible explanation for the diverging results might arise from the cultural context of the study, as the sample comes from a previously collectivistic society. Future studies should investigate cultural and social influences that could explain the difference in symptom expression identified within student burnout research.

One important limitation of this study is that the children were predominantly enrolled in public schooling. Studies have shown higher levels of academic stress being present in public education institutions (Eva et al., 2015). Given the well-established relationship between academic stress and burnout (Jung et al., 2015), future studies should investigate how school characteristics could affect burnout rates. Academic stress can fluctuate as a function of age, with older children experiencing higher levels of stress in face of exams and growing demands (Salmela-Aro & Tynkkynen, 2012). Being that the current sample mainly consists of middle school students, age differences concerning burnout rates were unable to be established. An additional limitation is important to note. Self-report measures were completed by children for attachment, ER strategies, and burnout levels. All the measures are susceptible to desirability, with children being evaluated in classrooms. Taking into account the measure of ER, the limited number of ER strategies included may limit the information concerning possible strategies employed by children in the context of academic stress. Future studies should consider sampling methods that could assure a more balanced sample in terms of age and school characteristics, which would allow more differences in terms of student burnout levels to be established. In terms of assessment, given that burnout dimensions can fluctuate as a function of stress levels, it is recommended that Ecologic Momentary Assessment tools be used in order to have a better understanding of the development of student burnout dimensions.

From a practical standpoint, the current study brings attention to the importance of warm and reliable parental involvement as a foundation for the development of secure attachment in children which would further encourage the use of adaptive ER strategies and a better awareness and understanding of emotional states. These prerequisites have the potential to act as a buffer in the development of burnout in highly stressful academic settings.

Study 5: Cognitive emotion regulation strategies and academic burnout dimensions in children and adolescents: A network analysis approach

Introduction

Cognitive reactions to the emotional experience of hazardous or stressful life situations are known as cognitive emotion regulation strategies (CERS; Garnefski et al., 2001). Previous research has focused on the nine processes of catastrophizing, self-blame, blaming others, acceptance, focusing on planning, positive refocusing, rumination, and positive reappraisal in relationship with psychopathology (S. Chen, 2021; Garnefski et al., 2001).

With regard to academic burnout in youth populations, there is a limited number of studies that have investigated the role of CERS (S. Chen, 2021; Tajik et al., 2018; Vinter, 2021). Chen (2021) identified positive and significant associations between all CERS and overall burnout but did not provide the association for specific burnout dimensions. The highest association in the male sample was identified in the case of burnout and self-blame, followed by focus on planning. In the female population, the associations were overall lower compared to the male one, with the highest coefficient for the relationship between overall burnout and self-blame, followed by acceptance. The interesting aspect presented in the study is that, although, traditionally, the evaluated CERS are considered either functional (e.g., acceptance, focus on planning, etc.) or dysfunctional (e.g., rumination, catastrophizing), both categories are positively associated with burnout dimensions, phenomenon that is not explained by the authors.

In the study conducted by Vinter (2021), refocus on planning was negatively, but not significantly associated with overall burnout in both girls and boys, while positive refocusing was negatively and significantly associated with burnout in girls, but not boys; in the same study, rumination was positively and significantly associated with burnout for both genders. The other dimensions of academic burnout were not included in the study. Although the paper identified gender differences in individual paths, the structural invariance of the structural equation model did not show any statistically significant differences between boys and girls in terms of associations between CERS and burnout.

Dominguez-Lara (2018) investigated the relationship between CERS and one of the dimensions of academic burnout, namely, emotional exhaustion. Out of the nine strategies investigated, only positive reappraisal and positive refocusing are negatively associated with emotional exhaustion. The previous findings and the research gaps described above concerning the direction and strength of the relationship between CERS and academic burnout dimensions, the lack of consensus regarding the gender differences in the context of academic burnout, along with the previous studies' lack of specificity regarding specific burnout dimensions call for the further

exploring of these relationships. In response, the present study used a network analysis approach to explore and further characterize the relationship between CERS and academic burnout dimensions.

Methods

Participants

The study is conducted amongst schoolchildren from public and private education establishments in Romania. A single measurement was conducted, leading to a total sample of 710 participants belonging to 19 schools with various socio-economic contexts. The age of participants was reported to be between 8 and 16 years old (M = 10.67, SD = 2.34). The sample consisted of 54.9% (N = 390) female participants and 45.1% (N = 320) male participants. Out of the 19 participating schools, two of them were private education institutions, providing 16.3% (N = 119) of participants. Most of the schools are located in urban areas. The study sample was recruited through the RethinkWELL (PN-III-P2-2.1-PED-2019-3837) and REThink Emotions (PN-III-P4-ID-PCE-2020-2170) projects awarded by the Executive Agency for Higher Education, Research, Development and Innovation Funding.

Instruments

The School Burnout Inventory (Salmela-Aro et al., 2009) consists of nine self-report items, which are rated on a five-point Likert scale (1 = completely disagree; 5 = completely agree). For the current sample, the Cronbach's alpha for the overall scale is one of .91, while the subscale scores range from .83 for exhaustion, .64 for inadequacy and .86 for cynicism.

The Short Cognitive Emotion Regulation Questionnaire (CERQ-short; Garnefski & Kraaij, 2006) assesses cognitive emotion regulation strategies in dealing with challenging life events. The CERQ-short has 18 items, with two items for each of the following strategies; self-blame, other-blame, rumination, catastrophizing, acceptance, refocus on planning, positive refocusing, positive assessment, and perspective-giving. The first four strategies can be categorized as maladaptive (dysfunctional) strategies, and the latter five as adaptive (functional) strategies. For this study, the internal consistencies were α = .64 (self-blame), α = .61 (catastrophizing), α = .35 (acceptance), α = .60 (rumination), α = .74 (positive refocusing), α = .65 (refocus on planning), α = .53 (positive reappraisal), α = .66 (putting into perspective), α = .59 (other blame).

Data Analysis

All statistical data analyses were performed in JASP version 0.17 (Love et al., 2019) and Rstudio version 2023.03.1+446 software (Campbell, 2019). For network estimation, the Gaussian Graphical Model (GGM; Epskamp et al., 2018) was employed. The GGM was computed by using the Graphical Least Absolute Shrinkage and Selection Operator, based on the Extended Bayesian Information Criterion (EBICglasso; Chen & Chen, 2008; Foygel & Drton, 2010; Friedman &

Tibshirani, 2019). Centrality indices such as betweenness, closeness, strength and expected influence, together with a bootstrapped difference test, were employed in order to estimate the relative importance of the network's nodes and the potential statistically significant differences between 1) nodes, in terms of centrality indices and 2) edge weights. Network stability was evaluated by computing correlation stability coefficients (CS) for each of the centrality indices. According to existing literature, the CS coefficient should not be below 0.25 and preferably above 0.5 “bootnet” (Epskamp et al., 2018) statistical library was employed for estimating/bootstrapping the network and performing accuracy/stability tests. The networks for males and females were directly compared via the Network Comparison Test (Borkulo et al., 2023 a,b).

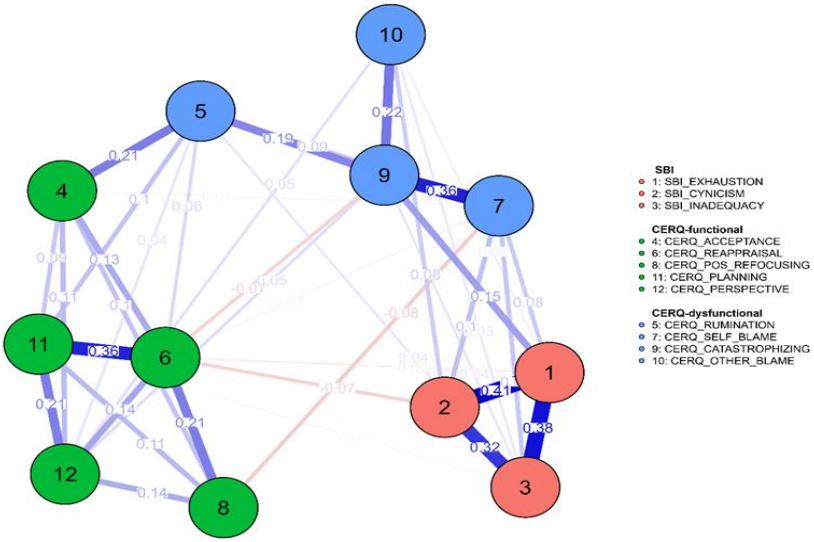
Results

Network Description

Firstly, we inspected the variables with regard to the assumption of normality, which was met for all included variables, with no values exceeding ±3 for skewness, or ±10 for kurtosis.

Secondly, the network plot, presented in Figure 1 showed a well-connected network, with 12 nodes, and 42 non-zero edges out of a maximum 66 possible edges. The initial network analysis indicated that the strongest regularized partial correlations were between the following variables: exhaustion - cynicism (0.41), exhaustion - inadequacy (0.38), cynicism - inadequacy (0.32), self-blame - catastrophizing (0.36), positive reappraisal - refocus on planning (0.36) (see Table 1 for all partial correlations).

Figure 1. *Network of CERS and burnout dimensions (N = 710)*



Note. Academic burnout dimensions and cognitive emotion regulation strategies are represented as nodes, while partial correlations between nodes are represented as edges. The correlation valence is shown by edge color, while edge thickness shows the strength of the partial correlations. While red

edges represent a negative partial correlation between nodes, blue edges indicate a positive partial correlation. The symptoms within a certain symptom cluster are displayed in the same color.

Table 1. *Regularized partial correlations matrix that was obtained for the study variables in the main network analysis*

Variable	1	2	3	4	5	6	7	8	9	10	11	12
Exhaustion	.00											
Cynicism	.41	.00										
Inadequacy	.38	.32	.00									
Acceptance	.00	.00	.00	.00								
Rumination	.00	.00	.04	.21	.00							
Positive reappraisal	-.03	-.07	-.01	.13	.06	.00						
Self-blame	.09	.10	.09	.01	.09	-.02	.00					
Positive refocusing	.00	.00	.00	.10	.00	.21	-.08	.00				
Catastrophizing	.15	.00	.04	.00	.20	-.08	.36	.00	.00			
Other-blame	.02	.08	.03	.00	.00	.00	.00	.00	.22	.00		
Refocus on planning	-.88	.00	-.01	.09	.10	.36	.00	.11	.00	.00	.00	
Putting into perspective	.00	.00	.00	.11	.04	.14	.00	.14	.05	.05	.21	.00

Note. A regularized partial correlation of 0 denotes the fact that there is no connection between nodes, 1 = exhaustion, 2 = cynicism, 3 = inadequacy, 4 = acceptance, 5 = rumination, 6 = positive reappraisal, 7 = self-blame, 8 = positive refocusing, 9 = catastrophizing, 10 = other-blame, 11 = refocus on planning, 12 = putting into perspective.

Network Analysis

The analysis of stability indicated an adequate accuracy for edge weights, with a central stability coefficient (CS) of 0.74. Similarly, for expected influence (*CS* = 0.74) and strength (*CS* = 0.75), the stability of centrality indices was excellent. The stability indices for betweenness and closeness fell short of the suggested 0.50 criterion with values of 0.43 and 0.36, respectively (Epskamp et al., 2018). For this reason, in our following interpretations of the main network analysis's findings, we placed a stronger emphasis on expected influence and strength.

We found the catastrophizing and exhaustion nodes to have the highest strength (each significantly higher than 72.72% of the total number of nodes), followed by the reappraisal (significantly higher than 63.63% of the total number of nodes) and cynicism nodes (significantly higher than 45.45% of the total number of nodes). We discovered that the exhaustion node had the highest expected influence (significantly higher than 81.81% of the entire number of nodes), followed by the catastrophizing node (significantly higher than 63.63% of the total number of nodes).

The strongest edges were those between the exhaustion and cynicism nodes, the exhaustion and inadequacy nodes, the self-blame and catastrophizing nodes, the positive reappraisal and refocus

on planning nodes and the cynicism and inadequacy nodes, each of them being significantly stronger than 90% of the other edges in the network. Other strong edges were those between the catastrophizing and other-blame nodes, and the refocus on planning and putting into perspective nodes, each of which being significantly stronger than 75% of the other edges in the network, respectively between the acceptance and rumination nodes, and the positive reappraisal and positive refocusing nodes, each of which being significantly stronger than 72.5% of the other edges in the network. Finally, the edge between rumination and catastrophizing was significantly stronger than 65% of the other edges in the network.

Subgroup Network Analysis

We employed a network subgroup analysis in order to test for statistically significant differences between the networks for females and males, respectively. In terms of global strength, there was no statistically significant difference across the networks (S = 0.41, p = 0.239). Similarly, the global difference in edge weights was statistically non-significant ($S = 0.16$, $p = 0.349$). When we looked at the individual edge differences, we discovered the following edges to have statistically significant differences between networks: inadequacy and rumination ($p = 0.009$, males partial correlation: 0.11 vs. females partial correlation: 0.00), acceptance and rumination ($p = 0.025$, males partial correlation: 0.10 vs. females partial correlation: 0.27), acceptance and self-blame ($p = 0.009$, males partial correlation: 0.11 vs. females partial correlation: 0.00), cynicism and positive refocusing ($p = 0.034$, males partial correlation: 0.00 vs. females partial correlation: -0.03), rumination and catastrophizing ($p = 0.022$, males partial correlation: 0.10 vs. females partial correlation: 0.25), cynicism and other-blame ($p = 0.029$, males partial correlation: 0.15 vs. females partial correlation: 0.001). There were no statistically significant differences between male and female networks with regard to the comparison of individual node centrality indices of strength and expected influence.

Discussion

The current study aimed at exploring the interrelations between burnout dimensions and nine cognitive emotion regulation strategies in a sample of children and adolescents enrolled in primary and secondary education institutions in Romania. To our knowledge, this study is the first to explore the link between specific dimensions of burnout and individual CERS, as previous studies mainly focused on overall burnout levels (Chen, 2021; Vinter, 2021) or have only taken into account a limited range of dimensions when exploring this phenomenon in the child and adolescent population (Dominguez-Lara, 2018).

Our results show that the most central dimension of academic burnout is represented by emotional exhaustion. These results are in line with the theoretical framework presented by Leiter (1989), that places emotional exhaustion in the center of burnout development. Indeed, within the

burnout literature, emotional exhaustion is consistently regarded as a core component (M. Lee et al., 2020; Skaalvik & Skaalvik, 2017). With regard to emotion regulation strategies relevant in the context of academic burnout, a central strategy is represented by catastrophizing, which is followed by reappraisal. In the academic context, previous research conceptualized catastrophizing appraisals as a motivational risk factor, being associated with higher levels of emotional reactivity and lower levels of motivational resilience, self-efficacy and psychological well-being (Pitzer & Skinner, 2017; Roohi et al., 2019).

In terms of edge weights, the edges connecting the exhaustion and cynicism nodes present to be the strongest, together with the exhaustion and inadequacy nodes, the self-blame and catastrophizing nodes, the positive reappraisal and refocus on planning nodes and the cynicism and inadequacy nodes. The relationship between emotional exhaustion and cynicism is in line with the results of previous studies (Chacón-Cuberos et al., 2019; Elsaied, 2022) and can be explained by the theoretical standpoint of the conservation of resources (COR). The COR theory implies that the marker of resource depletion, in this case emotional exhaustion, is a significant element of stress and is essential for preventing further resource depletion (Simha et al., 2014). When dealing with emotional exhaustion, cynicism acts as a defense mechanism to stop or slow down additional resource depletion (Abraham, 2000; AL-Abrrow, 2018). In the context of CERS, the strongest links identified are the ones between self-blame and catastrophizing, and positive reappraisal and refocus on planning. The research conducted by Chen (2021) was unable to identify significant associations between self-blame and catastrophizing, but it revealed a very strong connection between reappraisal and refocus on planning. Previous network analyses have also identified the link between refocus on planning and positive reappraisal, but no link between catastrophizing and self-blame (Luo et al., 2022; Zhang, 2022).

As suggested by the indicators of global strength and the global difference in edge weights, there were no statistically significant differences between the two networks. In terms of individual edges of the network, the results suggest several significant differences, which however do not change the overall connectivity of the network. The male population presents a higher partial association between rumination and inadequacy, as well as between other-blame and cynicism. The ”cynicism – positive refocusing” edge was negative for the female population, while in the case of males, no association has been identified.

While the previous study conducted by Vinter (2021) showed that rumination represents an equally important factor in the development of burnout for both genders, the current results suggest that it may be more strongly related to inadequacy in young male populations. The current study further supports the findings of Vinter (2021), who also identified that positive refocusing presented

statistically significant associations for girls, but not for boys. In the case of gender differences identified in the relationship between other-blame and cynicism, male populations were previously shown to use other-blame more frequently compared to female ones (Zlomke & Hahn, 2010). Rusillo and Arias (2004) found that male students show more external attribution patterns when faced with failure, suggesting that males would not admit failure to internal characteristics but would rather attribute it to an external cause. External attributions and cynicism have been previously linked, as external attributions are associated with the belief that one has no control over current or future events (Bahadir & Levent, 2022).

This research has several constraints. First off, the sample was limited to students from Romania, which could make our result less generalizable. Examining students from multiple countries may lead to a change in the network's properties (such as network connectivity and node centrality). Future research may benefit from employing a multicenter study approach with a larger sample size. Second, cross-sectional data were used to determine the network structure of CERS and the dimensions of academic burnout. As a result, no causal relationship can be inferred from the results at hand. Researchers can create hypotheses and analyze potential causal relationships among nodes in cross-sectional data using the sophisticated method known as the directed acyclic graph (DAG). We did not use the DAG method to formulate plausible causal relations since the current data did not satisfy the DAG premise of assessing all confounds (Briganti et al., 2022; Moffa et al., 2017).

Another limitation of the study is represented by the low internal consistency indices calculated for the CERQ subscales. This study employed Cronbach's coefficient alpha, as it is the most frequently reported reliability statistic. Although many researchers report this coefficient for a two-item measure (Cuijpers et al., 2009; Löwe et al., 2005; Young et al., 2009), in order for the coefficient to accurately reflect an estimate of reliability, rather restrictive assumptions have to be met. Research shows that the alpha coefficient consistently underestimates actual reliability (Revelle & Zinbarg, 2009; Sijtsma, 2009), often quite considerably, as these circumstances are typically too much to assume from a composite scale (Eisinga et al., 2013). Last but not least, network analysis was employed in the current study as a bottom-up, data-driven strategy for exploratory analysis. Therefore, further research is needed to corroborate the current findings.

Study 6: Bidirectional associations between catastrophizing and school burnout: a longitudinal investigation using a random-intercept cross-lagged panel model

Introduction

The relationship between emotion regulation (ER) and school burnout can be understood through Gross's (1998) model of ER, which emphasizes how individuals' ER strategies shape their

emotional responses to stress. In the academic context, ER plays a crucial role in managing the pressures associated with school. Effective ER strategies can help students cope with academic stress, reducing their risk of experiencing burnout (Jiang et al., 2020; Nikdel et al., 2019), while poor ER strategies may increase their susceptibility to emotional exhaustion and disengagement from school (Iuga & David, 2024).

The Conservation of Resources (COR) Theory (Hobfoll, 1989, 2004) is a leading framework for understanding burnout development, particularly because it emphasizes the role of resource management in individuals' well-being. According to COR theory, individuals are driven to acquire, maintain, and protect key resources, such as personal characteristics, conditions, and energy, that are crucial to their overall well-being (Hobfoll, 2004). Stress arises when these resources are at risk of being lost, are actually lost, or when individuals are unable to gain resources after investing them. Over time, if individuals continuously invest resources without experiencing adequate resource replenishment, they become vulnerable to burnout (Gorgievski & Hobfoll, 2008).

According to a recent meta-analysis (Iuga & David, 2024), there is a significant limitation regarding the directionality of the relationship between school burnout and emotional regulation, due to the lack of longitudinal research. While the findings indicate that higher burnout levels are associated with difficulties in ER (such as the use of denial; self-blame, and catastrophizing ER strategies) it is emphasized that the existing studies do not establish whether burnout leads to diminished emotional regulation, or if inadequate emotional regulation contributes to the development of burnout. Further, while a significant body of literature recognizes the importance of catastrophizing as a transdiagnostic risk factor for psychopathology in the adult population (Gellatly & Beck, 2016; Mason & Mullins-Sweatt, 2021; Potard & Landais, 2021), this factor has not been investigated in the context of youth burnout. This ambiguity highlights a crucial gap in the literature, as understanding the causal pathways would have important implications for interventions. Without clarity on directionality, educators and policymakers may struggle to design effective strategies to combat school burnout. Thus, this uncertainty underscores the need for further longitudinal research that can elucidate these dynamics and inform targeted approaches to support student well-being.

The objective of our research is to investigate the relationship between school burnout and emotional regulation through a longitudinal study utilizing a random-intercept cross-lagged panel model (RI-CLPM). This approach allows us to examine how these two constructs influence each other over time, addressing the significant limitation identified in the meta-analysis by Iuga & David (2024), which highlighted the ambiguity surrounding the directionality of their relationship.

Hypotheses

H1: Higher levels of school burnout will lead to increased levels of catastrophizing over time.

H2: Higher levels of catastrophizing will predict increased levels of school burnout over time.

Methods

Participants and Procedure

The study sample consisted of 89 participants (65 girls and 25 boys; 73 % female) aged 13 to 18 years, with a mean age of 16 years. These participants were recruited from a secondary school in Romania. Data collection was conducted in class through the MoodWheel app and the REThink Emotions platform. Participants completed the required self-report questionnaires at five distinct measurement points, with assessments taking place at regular intervals of one week.

Instruments

For the current study, we have used the catastrophizing subscale of The Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski et al., 2002) with and internal consistency between .72 and .89 for the different timepoints and The School Burnout Inventory (SBI; Salmela-Aro et al., 2009). For the current sample, we have used the total burnout score, with an internal consistency score varying from .86 to .92 across different timepoints.

Data Analysis Strategy

Statistical analyses were conducted using SPSS 26.0 (IBM Corporation, Armonk, NY, USA) and SPSS AMOS 22. The evaluation of model fit indicators adopts the following indexes proposed by Kline (2011): the chi-square statistic ($\chi 2$), the root-mean-square error of approximation (RMSEA), the standardized root-mean-square residual (SRMR) and the comparative fit index (CFI). Utilizing the RI-CLPM, we decomposed the within-person effects and between-person effects among associations between catastrophizing ER strategy and school burnout. RI-CLPM analyses are utilized to investigate dynamic effects in longitudinal data (Hamaker et al., 2015). In contrast to the traditional cross-lagged panel model, the RI-CLPM assumes that psychological constructs can change within an individual over time while also accounting for stable between-person differences. A RI-CLPM is thus able to disentangle effects on the within-person level (auto-regressive paths, cross-lagged paths) from effects on the between-person level (random intercepts).

Results

The catastrophizing scores show strong positive correlations with each other across all measurement points (e.g., catastrophizing at time 1 with catastrophizing at time 2, $r = .72$; catastrophizing at time 3 with catastrophizing at time 4, $r = .65$; all $p < .001$). This indicates a high level of consistency in the use of catastrophizing as a cognitive ER strategy over time among participants. The total school burnout scores also demonstrate very strong positive correlations across the different time points (e.g., school burnout at time 1 with school burnout at time 2, $r = .87$; school burnout at time 3 with school burnout at time 4, $r = .72$; all $p < .001$). Catastrophizing shows moderate

positive correlations with school burnout scores at several measurement points. For example, catastrophizing measured at the fourth time point has moderate correlations with school burnout levels measured at the first time point ($r = .39$, $p < .01$) and at the fourth time point ($r = .60$, $p < .001$). Similarly, catastrophizing measured at the fifth time point shows moderate correlations with school burnout levels at the third time point ($r = .36$, $p < .01$) and at the fourth time point ($r = .42$, $p < .01$). Some correlations between catastrophizing at certain time points and specific school burnout scores are weak or not statistically significant (i.e., catastrophizing at time 1 and school burnout at time 3) indicating limited or no relationship between those measures at those specific times.

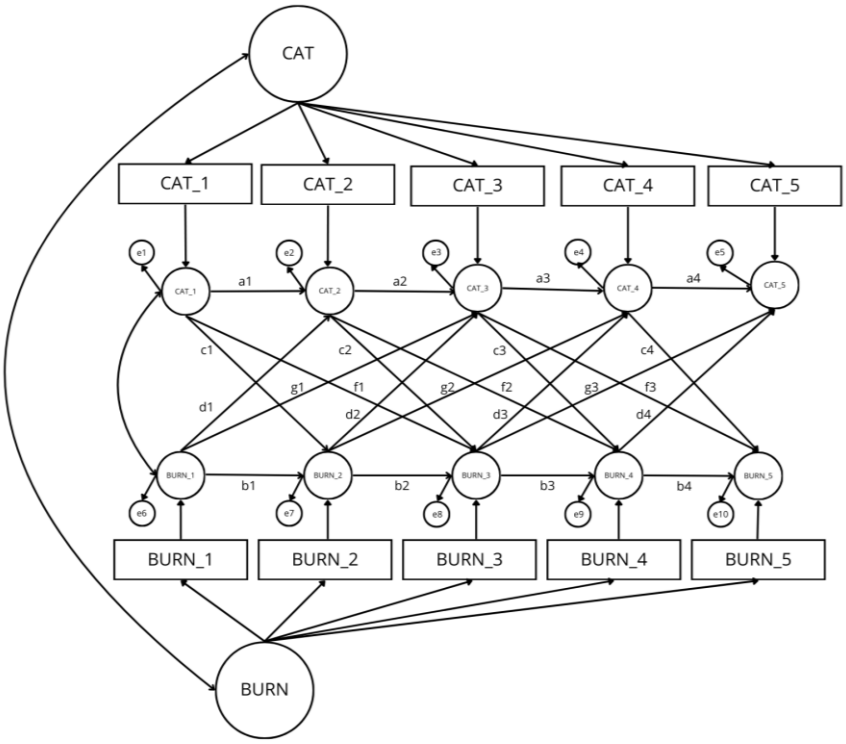
The Results of the RI-CLPM

The RI-CLPM demonstrated a good fit to the data ($\chi 2 = 31.887$ df = 19, $p < .05$; CFI = .976; TLI = 0.931; RMSEA = .088, 90% CI [.026, .139]). Figure 1 reports a graphical representation of the paths for the entire sample, whereas Table 3 includes a detailed overview of the path coefficients.

At the within-person level, the auto-regressive effects were significant for catastrophizing at time one to time two and for burnout at time one to time two and from time two to time three. However, there were no significant auto-regressive effects for catastrophizing from time two to time five or burnout from time three to time five. Concurrent associations between catastrophizing and school burnout were also not significant at all waves. Within-person changes in catastrophizing and within-person changes in school burnout presented a bidirectional prediction for time one and time two, with catastrophizing at time 1 significantly and positively predicting school burnout at time two, $b = .555$, $SE = .213$, $CR = 2.599$, $p < .01$, and burnout at time 1 positively and significantly predicting catastrophizing at time 2, $b = .202$, $SE = .051$, $CR = 3.975$, $p < .001$. Further, catastrophizing at time 1 significantly and positively predicts burnout at time 3, $b = .749$, $SE = .229$, $CR = 3.975$, $p < .001$, while burnout at time 2 positively and significantly predicts catastrophizing at time 4, $b = 0.158$, $SE = 0.065$, $CR = 2.435$, $p = .015$.

At the between-person level, there was a moderate and significant correlation between the random intercepts of catastrophizing and school burnout, indicating that, at the group level, youth who used more catastrophizing as an ER strategy had higher levels of school burnout.

Figure 1. *Graphical representation of the RI-CLPM of the total sample.*



Note. BURN = intercept of school burnout, CAT = intercept of catastrophizing. The variables CAT_1 through CAT_5 represent catastrophizing measured at five successive time points, and BURN_1 through BURN_5 represent Burnout measured at the same time points. The arrows denote the direction of the effects: auto-regressive effects (e.g., CAT_1 -> CAT_2) and cross-lagged effects (e.g., CAT_1 -> BURN_2). The model also includes measurement errors (e.g., e1, e2) and path labels (e.g., β1, γ1).

Discussion

Through a longitudinal study using a random-intercept cross-lagged panel model, our goal was to examine the connection between ER difficulties and school burnout, specifically between the catastrophizing strategy, in a sample of Romanian schoolchildren. The significant auto-regressive effects observed for both catastrophizing and burnout from time 1 to time 2 indicate that an individual's levels of catastrophizing and burnout at the initial assessment are substantial predictors of their subsequent levels at the following assessment. In other words, individuals exhibiting difficulties in ER, manifested by elevated levels of catastrophizing or burnout at time 1, are more likely to maintain these levels at time 2. For burnout from time 2 to time 3, the same holds true.

The auto-regressive effects, however, cease to be significant after time 2 for catastrophizing and after time 3 for burnout. This indicates that in the later stages of the study, individual degrees of burnout and catastrophizing are no longer accurately indicative of future levels. This reducing impact may indicate that after the first time points, outside variables or modifications to the participants'

surroundings (such as coping mechanisms, academic pressure, and social support) start to affect how catastrophizing and burnout develop. These maladaptive behaviors appear to become less stable with time, which may be a reflection of adaptation or changes in how people cope with stress as the school year or study period progresses.

At the within-person level, catastrophizing at time 1 significantly predicts burnout at time 2, and catastrophizing at time 1 also predicts burnout at time 3. These findings suggest that, at the individual level, initially using catastrophizing as an ER strategy has a direct and lasting impact on their future experiences of burnout. The extension of this relationship into time 3 indicates that the detrimental effects of catastrophizing are not solely immediate but also progressively accumulate over time. This suggests that students who are prone to using catastrophizing as a ER strategy may not only feel burnt out shortly after engaging in this pattern but could experience a sustained impact on their emotional well-being, which compounds as time progresses.

Similarly, burnout at time 1 significantly predicts catastrophizing at time 2, indicating a reciprocal or bidirectional relationship. These findings suggest that individuals experiencing elevated levels of burnout early on are more likely to adopt catastrophizing as an ER strategy at a later time. Furthermore, burnout at time 2 significantly predicts catastrophizing at time 4, demonstrating the potential for burnout to exert long-term effects on individuals' ER patterns. This reciprocal relationship establishes a cyclical dynamic where elevated burnout at one-time point leads to increased catastrophizing in the future, which subsequently exacerbates burnout.

Our findings show that those with high levels of catastrophizing across all five assessments were also more likely to experience school burnout. The results are in line with recent research that underline the link between catastrophizing beliefs and academic burnout (Rahman et al., 2024). This could be because individuals who frequently engage in catastrophizing are more prone to perceive academic challenges as insurmountable. Although there is no previous research on a similar sample of children and adolescents, catastrophizing has been proved to lead to heightened stress (DiLorenzo et al., 2007) and emotional exhaustion (Bamonti et al., 2019). Over time, this pattern of thinking can deplete emotional resources, having been associated with burnout in the occupational context (Potard & Landais, 2021).

The connection between catastrophizing and burnout is significant because it points to a potentially modifiable risk factor for school burnout. If students can be taught to replace catastrophizing with more adaptive strategies, they may be better equipped to handle the demands of academic life without becoming emotionally overwhelmed. Addressing catastrophizing not only helps to reduce immediate stress but could also protect students from the long-term negative risks

posed by chronic burnout, such as lower engagement at school, impaired identity development, and lower satisfaction with life (Vansoeterstede et al., 2023).

The statistical power and generalizability of the results are limited by participant attrition, with the sample size decreasing from 77 at Time 1 to 54 at Time 4. Future studies should adjust for attrition by increasing the initial sample size or offering stronger incentives for continued participation. Additionally, the sample's homogeneity, drawn from a single educational institution, restricts generalizability. Factors such as cultural background, academic environment, and socioeconomic status, which may influence the relationship between catastrophizing and burnout, were not considered. Future research should replicate these findings in more diverse samples to enhance external validity.

While significant cross-lagged effects suggest reciprocal influences, correlation does not imply causality. The RI-CLPM model addresses directionality but cannot establish causality. Experimental designs could manipulate catastrophizing to observe its direct effect on burnout, providing stronger causal evidence. The study provides theoretical insights into the reciprocal relationship between catastrophizing and school burnout. Previous research has often examined these constructs in isolation or treated their relationship as unidirectional. Our findings contribute to the literature by demonstrating that burnout could lead to increased catastrophizing and that catastrophizing exacerbates burnout over time. This supports the idea of a self-reinforcing cycle between cognitive patterns and emotional states.

The findings have practical implications for the development of interventions in academic settings. Since the study shows that catastrophizing and burnout reinforce each other, interventions aimed at reducing catastrophizing may help prevent the onset or escalation of burnout. Similarly, addressing burnout directly may reduce students' reliance on maladaptive ER strategies. School counselors, educators, and mental health professionals can design targeted programs focusing on early identification and treatment of these patterns. The study emphasizes the importance of providing long-term emotional support for students experiencing burnout.

CHAPTER 4: GENERAL CONCLUSIONS AND IMPLICATIONS

The general scope of this thesis was to examine the psychological mechanisms contributing to school burnout in the pre-university population, with a focus on attachment and emotion regulation as potential risk or protective factors within the academic environment. By examining these factors, the research aimed to identify key predictors of burnout and contribute to a more comprehensive understanding of how students handle educational challenges.

The results of this thesis align and contribute to the theoretical discussion on the causal links and interdependencies between the various dimensions of burnout. The findings of the network analysis support the hypothesis that emotional exhaustion is the primary dimension in student burnout. This is in line with Schaufeli and Taris' (2005) contention that burnout is primarily based on exhaustion and cynicism/depersonalization, with diminished personal accomplishment (or inadequacy in the academic context) possibly coming in second. The findings of the longitudinal study provide strong empirical support for the Conservation of Resources Theory (Hobfoll, 1989, 2004) in explaining the reciprocal relationship between school burnout and catastrophizing. In this case, students who frequently engage in catastrophizing might be more likely to perceive academic stressors as overwhelming, leading to heightened stress and emotional exhaustion (DiLorenzo et al., 2007; Bamonti et al., 2019). This, in turn, diminishes their emotional and cognitive resources, increasing their likelihood of experiencing burnout over time. Furthermore, the reciprocal nature of this relationship suggests that burnout itself fosters catastrophizing, exacerbating secondary resource losses, such as further emotional exhaustion and burnout.

The results of this thesis have important clinical and practical ramifications, especially in the domains of education, mental health care, and the formulation of policies meant to enhance students' academic resilience. By highlighting the significance of attachment security and emotion regulation, this research lays the groundwork for evidence-based treatments that might promote students' mental health. Given the protective influence of reappraisal as a functional ER strategy in relation to burnout and the fact that emotional regulation difficulties, specifically the use of catastrophizing, have been identified as a significant contributor to burnout, cognitive-behavioral therapy interventions may be able to assist students in restructuring negative thought patterns and creating adaptive methods of stress management that diminish their susceptibility to burnout. Furthermore, the validation of assessment tools for school burnout and attachment security provides a reliable method for early detection of at-risk students. These results point to the necessity of school-based prevention initiatives that emphasize stress management solutions through emotion regulation training, cognitive behavioral strategies and mindfulness practices (see David et al., 2021; Fenwick-Smith et al., 2018; Kozina, 2020). Given the role of attachment security in burnout prevention, schools could also engage parents in psychoeducational workshops that help them understand how their parenting styles and emotional availability impact their children's academic and emotional resilience. Providing resources and training to caregivers can bridge the gap between home and school environments, fostering a more holistic approach to student well-being (Twum-Antwi et al., 2020).

One of the key innovations is the use of a meta-analysis to synthesize existing findings on the relationship between emotion regulation strategies and student burnout. While previous research has

examined these constructs separately, this study systematically aggregates and quantifies effect sizes, allowing for a more generalizable and statistically robust conclusion. Furthermore, it incorporates moderator analyses to assess how sample characteristics (e.g., age, education level, gender) and study quality influence the observed effects. A significant methodological contribution is the use of a Random-Intercept Cross-Lagged Panel Model to examine the reciprocal relationship between difficulties in emotion regulation (the use of catastrophizing) and burnout over time. By implementing longitudinal modeling across multiple time points, this study demonstrates that catastrophizing predicts future burnout, reinforcing theories of maladaptive cognitive and regulatory patterns leading to burnout.

While this research provides valuable insights into the relationship between emotion regulation, attachment, and school burnout, several limitations must be acknowledged. These include methodological constraints related to sample composition, reliance on self-report measures, cross-sectional designs, and measurement consistency. Addressing these limitations in future studies will enhance the robustness and applicability of findings. Despite the limitations that have been presented for every study, this research provides valuable contributions to understanding the role of emotion regulation and attachment in school burnout. Addressing these methodological challenges in future studies by increasing sample diversity, employing longitudinal and experimental designs, refining measurement tools, and integrating multiple data sources will improve the reliability and applicability of findings. Expanding research on ER's dynamic nature and refining validated instruments will further enhance both theoretical understanding and practical interventions in educational and clinical settings.

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