



A validation of the Flemish School Burnout Assessment Tool for students between 17 and 21 years old (FS-BAT)

Van Royen Annelies^{*}, Wante Laura, Braet Caroline

Ghent University, Department of Developmental, Personality and Social Psychology, Henri Dunantlaan 2, 9000, Ghent, Belgium

ARTICLE INFO

Keywords:

School burnout
Higher education students
Confirmatory factor analysis
Convergent validity
Test retest reliability

ABSTRACT

Introduction: The present study assessed the factor structure, reliability, and convergent validity of the Flemish school burnout assessment tool (FS-BAT) for students between 17 and 21 years old.

Method: The sample consisted of 570 secondary and higher education students between 17 and 21 years old ($M_{age} = 19.14$, $SD_{age} = 1.11$, 81% female). Confirmatory factor analysis (CFA), reliability scores, and the convergent validity were assessed.

Results: CFA revealed four distinguishable but strongly related school burnout core symptoms (i.e., exhaustion, mental distance, cognitive impairment and emotion impairment), referring to one underlying construct 'school burnout'. The psychological stress complaints and psychosomatic complaints are two separate but positively correlated aspects of the secondary symptoms. The internal consistency of the scales ranged between excellent (.94; total core symptoms scale) and acceptable (.77; psychosomatic complaints scale). The test-retest reliability after five months varied between excellent (the total core scale and secondary symptoms subscales) and good (core symptoms subscales), indicating good stability over time. The convergent validity showed moderate positive correlations with the Perceived Stress Scale and the Perceptions of Academic Stress scale.

Conclusion: The current findings illustrate that the FS-BAT can be used as a reliable and valid instrument to assess school burnout symptoms in secondary and higher education students between 17 and 21 years old. Further research to assess the discriminant validity and the relation to other school burnout measures is needed.

1. Introduction

Burnout is a globally studied health phenomenon and is the result of chronic work-related stress. Initially believed to only affect adults in the labor market, research now shows that students can also experience burnout, the so-called school burnout (e.g., Bask & Salmela-Aro, 2013; Fiorilli et al., 2017; Salmela-Aro et al., 2008; Salmela-Aro et al., 2009b; Salmela-Aro & Upadyaya, 2014). Broadly, 'work' includes all structured, goal-directed activities with an obligatory nature (Schaufeli et al., 2020, p.34). Thus, school-related tasks like attending classes and writing exams can be considered as work and can result in school burnout in students. Similar to occupational burnout in adults, school burnout derives from an imbalance between school demands and resources (Bakker et al., 2005; Demerouti et al., 2001; Salmela-Aro et al., 2008; Salmela-Aro et al., 2009b, Salmela-Aro & Upadaya, 2014). When students are faced with increasing demands and a lack of resources (e.g., feedback, support) to cope with school demands, stress increases and can result in exhaustion, demotivation, a cynical attitude towards school, and a

general feeling of inadequacy to face school-related tasks (Romano et al., 2022; Salmela-Aro et al., 2009a).

The exact prevalence rates for school burnout are difficult to obtain since numbers vary by the studied population but large-scales studies show the magnitude of the school burnout problem in the current society. Rates can go up to 53% in high-level educational contexts (Litjens & Rujifrok, 2019; Wielers et al., 2020). Research has shown mixed results regarding the stability of school burnout symptoms over time, with some studies evidencing stability while others found an increase (see Vansoeterstede et al., 2023 for a systematic review). Increasing burnout symptoms are particularly noticeable during transition periods, which is in line with the presumption that school burnout symptoms can aggravate in accordance with increasing school demands (Salmela-Aro & Upadyaya, 2014). Therefore, transition periods form a crucial period for the assessment of school burnout symptoms. Longitudinal relations can also be found between the school burnout components. For example, exhaustion, the core component of burnout, predicts cynicism both in South-Korean and Finnish students (Lee et al., 2020; Salmela-Aro &

^{*} Corresponding Author: Tel. +32476985442

E-mail address: Annelies.VanRoyen@UGent.be (V.R. Annelies).

Upadyaya, 2017). While the latter findings show some cross-cultural overlap in symptom trajectory, other studies discovered cultural differences in symptom severity (Cabras et al., 2023). Cabras and colleagues (2023) showed that Russian university students reported higher school burnout levels than Italian university students. The cross-cultural differences and longitudinal trajectories hamper a clear assessment of school burnout symptoms.

While school burnout is mainly considered a ‘school-related’ issue, broader societal factors may further enhance symptom development. For example, the COVID-19 pandemic had a worldwide impact on the educational sector. Lockdowns led to the deprivation of traditional learning methods, limited social interactions with teachers and class mates, and general disruptions of student lives, which in turn created an increase in stress and mental health issues such as school burnout (Husky et al., 2020; Salmela-Aro et al., 2021; Simões-Perlant et al., 2023; UNESCO, 2020). Nineteen percent of Finnish middle and high school students showed high levels of school burnout and 47% showed high academic stress levels during the pandemic (Salmela-Aro & Upadyaya, 2020). The COVID-19 pandemic also led to an increase in the use of digital school work environments. While digital learning platforms can enhance students learning, it also poses a risk for students’ mental health (Erten & Özdemir, 2020). Adolescents and young adults are currently exposed to a constant digital overload via social media and email apps on smartphones, digital school programs and other technological platforms. The constant use and access of technology increases the risk for problematic internet use, which in turn is related to increased school burnout symptoms among high school students (Tomaszek & Muchacka-Cymerman, 2020). The unrestrained information flow stimulates the brain to be preoccupied, which creates an increase in stress, exhaustion and reduced efficiency. In the long term ‘the digital overload’ creates an increase in mental disorders, such as depression and burnout (Chang, 2016).

School burnout is associated with detrimental academic outcomes, such as academic underperformance, school absenteeism, and dropout (Bask & Salmela-Aro, 2013; Fiorilli et al., 2017; Salmela-Aro et al., 2009b). A study on 2000 Dutch youngsters found that 46% had stayed home at least once due to school burnout complaints (Ruggenberg & Stegeman, 2016). In addition, school burnout is associated with increased cannabis consumption and abuse (Walburg et al., 2015). School burnout is also associated with physical consequences as it can predict cardiovascular complications via physiological parameters (e.g., increased blood pressure, arterial stiffness) (May et al., 2014). In the long term, school burnout can predict occupational burnout and depressive symptoms later in life (Robins et al., 2018; Salmela-Aro et al., 2009b). To conclude, given the magnitude of the school burnout problem within the current society, it seems crucial to properly assess and tackle symptoms at an early stage to avoid negative personal and societal outcomes.

1.1. Three-factor-structure of burnout

The golden standard to conceptualize both occupational and school burnout builds on the definition by Maslach and colleagues, who define burnout as a three-dimensional construct, consisting of *exhaustion* (i.e., the draining of an individuals’ mental resources at work), *cynicism/depersonalization* (i.e., a detached attitude towards one’s occupation and occupational related tasks), and *reduced personal efficacy* (i.e., reduced achievement or productivity at work) (Maslach et al., 2001; Schaufeli et al., 2020). Studies found that students suffering from school burnout report exhaustion due to school demands, display a cynical attitude towards school and feel inadequate as a student (Salmela-Aro et al., 2008; Schaufeli et al., 2002). The three-dimensional framework is still widely used in burnout research (Salmela-Aro et al., 2009a). However, based on decades of research, the initial three-factor conceptualization does not seem to fully capture the burnout construct (Desart et al., 2017; Schaufeli et al., 2020). Recent studies presume that individuals suffering

from burnout symptoms also experience cognitive and emotional deficits (e.g., memory and concentration difficulties, uncontrolled crying), which are not included in the initial conceptualization. In addition, reduced personal efficacy is found to be a consequence related to burnout rather than a core symptom (Schaufeli et al., 2020). Furthermore, the three-factor structure is only partially supported in student samples (Schaufeli et al., 2002). Since the current conceptualizations – and therefore also the measurement methods – on (school) burnout show significant limitations, there is a need to introduce a more broad and more comprehensive conceptualization and measurement.

1.2. New conceptualization

Based on the new insights from decades of burnout research, a new conceptual model on occupational burnout was developed, which consists of four core symptoms and three secondary symptoms (Desart et al., 2017). The primary core symptom is *exhaustion*, both mentally and physically. In addition, burned-out individuals experience *emotional impairment* (i.e., emotional outbursts; second core symptom) and *cognitive impairment* (i.e., concentration deficits; third core symptom). In order to cope with the experienced stress and symptoms, individuals will mentally distance themselves from work (i.e., fourth core symptom ‘*mental distance*’) by developing negative attitudes and an aloof attitude towards work and work-related tasks. Paradoxically, this response leads to an increase in stress and creates a vicious circle, resulting in three secondary symptoms: 1) *psychosomatic complaints* (e.g., gastrointestinal problems), 2) *psychological stress complaints* (e.g., sleeping problems), and 3) a *depressed mood* (Desart et al., 2017).

Due to the conceptual overlap between adults’ occupational stress and students’ school-related stress, the above-mentioned burnout conceptualization is also applicable to school burnout (Schaufeli et al., 2002). The core and secondary symptoms have also been discovered in adolescents suffering from school burnout symptoms. Previous studies have shown bidirectional relations between students’ school burnout and their emotional and cognitive impairments (May et al., 2015). Students’ distress and strain can result in cognitive dysfunctions, such as memory deficits and a decreased attention span, and emotional dysfunction, such as uncontrolled crying. In turn, school burnout can further deteriorate students’ emotional and cognitive well-being (May et al., 2015). Furthermore, previous research showed bidirectional relations between school burnout and sleeping problems (Lehto et al., 2019; Liu et al., 2021; May et al., 2020; Yan et al., 2018). Students suffering from stress and school burnout symptoms can develop psychosomatic complaints, such as decreased sleep quality or insomnia (Yan et al., 2018). A study on Finnish students between 15 and 20 years found a positive association between daytime sleepiness and school burnout.

1.3. Measuring burnout

Several inventories are currently available to assess school burnout symptoms (see Appendix A for an overview). For long, the golden standard for the assessment of school burnout was the Maslach Burnout Inventory Student Survey [MBI-SS] (Schaufeli et al., 2002). However, the MBI-SS has been criticized due to limitations regarding psychometric properties, conceptualization and practical applicability (Schaufeli et al., 2020). In an attempt to overcome the above-mentioned weaknesses, Salmela-Aro and colleagues developed the School Burnout Inventory [SBI] (Salmela-Aro et al., 2009a). Although the SBI is considered a validated measurement to assess school burnout worldwide, the inventory does not capture specific core symptoms of school burnout (e.g., cognitive and emotional impairment). The latter limitation is also applicable to the Oldenburg Burnout Inventory for students [OLBI-S], developed by Reis et al. (2015). The OLBI-S was found to be a robust measure for school burnout, but captures only two factors: emotional exhaustion and detachment. Therefore, the greatest

limitation is that all previously developed measurements do not capture all core symptoms and thus do not provide a comprehensive measurement of school burnout (Reis et al., 2015; Schaufeli et al., 2002). A potential comprehensive measurement for school burnout can be derived from the newly developed conceptualization on occupational burnout by Desart et al. (2017). The latter model served as the basis for the Burnout Assessment Tool to measure occupational burnout (BAT; Schaufeli et al., 2020). The BAT measures all core and secondary symptoms of burnout, except for 'depressed mood' since many validated questionnaires on depressive symptoms already exist (Schaufeli et al., 2020). The BAT is validated worldwide and displays excellent reliability and validity (for an overview see 'Publications | Burnout Assessment Tool, 2023').

Given the applicability of the new model to school burnout, an adaptation of the BAT can potentially be used to assess school burnout. To the best of our knowledge, no study proposed a validated version of the BAT for school burnout, except for an Italian (Romano et al., 2022) and Romanian version (Popescu et al., 2023). Romano et al. (2022) found a similar factor structure (i.e., four first-order factors that load onto a main high-order factor (school burnout) in Italian middle school students between 9-13 years old. However, the authors solely focused on the core symptoms of burnout and did not assess the applicability of the BAT regarding the secondary symptoms. In addition, also to the best of our knowledge, only one study (Popescu et al., 2023) assessed the applicability of the BAT in secondary and higher education students. Popescu et al. (2023) supported the usage of a student version of the BAT in Romanian higher education students between 18 and 48 years ($M = 20.76$). Specifically, the authors confirmed the original factor structure (i.e., four core symptoms and two secondary symptoms) and found the measurement to be reliable and valid. However, the study solely focused on psychology and computer science students, thus nothing is known about the applicability of a student version of the BAT in other educational programs. Previous research provided evidence that school burnout levels can vary across faculties (Aguayo et al., 2019). Given that school burnout is prone to fluctuations during transition periods (Salmela-Aro Upadyaya, 2014), the transition from secondary and higher education forms a crucial developmental period for all students and calls for a comprehensive and detailed assessment of school burnout symptoms.

1.4. The present study

School burnout is a rising problem in students and is related to detrimental personal, and societal outcomes (Bask & Salmela-Aro, 2013; Fiorilli et al., 2017; May et al., 2014; Robins et al., 2018; Salmela-Aro et al., 2009b; Walburg et al., 2015). However, school burnout is still under-researched and measurement methods are questioned as they were insufficient to capture the school burnout concept fully. Previous research indicated that the newly developed model for occupational burnout can be applied to school burnout (Popescu et al., 2023; Romano et al., 2022). However, as the measurement deriving from that model has only been applied to smaller age groups and specific samples, it remains unclear whether it is applicable to secondary and higher education students. This is nevertheless an important age group to study as school burnout symptoms are prone to destabilization during transition periods (Salmela-Aro & Upadyaya, 2014). Therefore, the present study had a dual aim: 1) to assess whether the novel conceptualization of occupational burnout in adults (i.e., four core symptoms and two secondary symptoms) can be found in students between 17 and 21 years old using an adapted version of the BAT, the Flemish School Burnout Assessment Tool (FS-BAT) and 2) to evaluate the psychometric properties (i.e., internal consistency, test-retest reliability, and convergent validity) of the FS-BAT.

2. Method

2.1. Study procedure

The present study included secondary and higher education students between 17 and 21 years old. Participants were recruited via social media channels and internal communication channels of secondary schools and higher education institutes (websites and platforms). To be included in the study, they had to be between 17 and 21 years old and enrolled in an educational program. Participants were excluded if they did not meet the age criteria or were not engaged in an educational program. Participants first read an information letter and then signed an active informed consent online. When participants were younger than 18, a parent or legal guardian signed an informed consent form as well. After giving consent, participants filled in online self-report questionnaires. All questionnaires were administered in a fixed order. To motivate the students to participate, 50 gift vouchers were distributed randomly among the participants. The study is part of a larger project on the developmental pathways of school burnout and depressive symptoms in students. The data collection and analysis were approved by the ethics committee of the Faculty of Psychology and Educational Sciences (ID number 2021/209).

2.2. Material

School burnout symptoms were measured via the FS-BAT, consisting of 33 items. All items were measured on a 5-point Likert scale, ranging from 'never applicable' (1) to 'always applicable' (5). All core symptoms items of the original Dutch version of the BAT were rephrased to apply to the school context (e.g., *At school*, I feel physically exhausted vs. *At work*, I feel physically exhausted). A complete comparison can be found in Appendix B. The items were pilot tested and cleared by our targeted population (i.e., students between 17 and 21 years old) before sending out the adjusted questionnaire. The core symptoms were composed of 23 items, divided over four subscales: Exhaustion (8 items; e.g., 'At the end of my school day, I feel mentally exhausted and drained'), Mental Distance (5 items; e.g., 'I am cynical about what my schoolwork means to others'), Emotional Impairment (5 items; e.g., 'At school, I may overreact unintentionally') and Cognitive Impairment (5 items; e.g., 'At school, I have trouble staying focused'). The total score (Total-C) was computed by calculating the mean of the core symptoms. The secondary symptoms were measured via 10 items, divided over two subscales: Psychosomatic Complaints (5 items; e.g., 'I suffer from headaches') and Psychological Stress Complaints (5 items; e.g., 'I have trouble falling or staying asleep').

To assess the convergent validity, the Perceptions of Academic Stress (PAS; Bedewy & Gabriel, 2015) and the short version of the Perceived Stress Scale (PSS-10; Cohen et al., 1983) were used. The PAS is an 18-item self-report questionnaire on sources of academic stress among university students. Factor analysis distinguished four subscales: 1) Pressures to perform (5 items; e.g., 'Examination times are very stressful to me'), 2) Perceptions of workload (4 items; e.g., 'The size of the curriculum (workload) is excessive'), 3) Academic self-perceptions (4 items; e.g., 'I fear failing courses this year'), and 4) Time restraints (5 items; e.g., 'I am unable to catch up if getting behind the work). Bedewy and Gabriel (2015) found evidence for an acceptable internal consistency reliability, and face, content, and convergent validity. The present study found good internal consistency for the total scale ($\alpha = .83$) but not for the subscales. In addition, factor analysis could not replicate the findings from Bedewy and Gabriel (2015). Therefore, the present study solely focused on the total scale. Higher scores imply higher academic stress levels.

The PSS-10 is a self-report questionnaire to measure the extent to which certain situations in a person's life are perceived as stressful. The PSS-10 specifically asks about feelings and thoughts in the past month. The questionnaire consists of 10 items (e.g., In the past month, how

often did you feel stressed and nervous?), which are scored on a five-point Likert scale ranging from 'never' (0) to 'very often' (4). Higher total scores imply higher stress levels. The PSS-10 shows great psychometric properties with a good internal consistency and concurrent validity in university students (Lee, 2012). In the current sample, the PSS-10 showed good internal consistency with Cronbach's $\alpha = .81$.

2.3. Data analysis

Primarily, descriptive statistics (i.e., means, standard deviations) and correlations were calculated between the scales (see Table 1) and items (see Table 2 for the core symptoms and Table 3 for the secondary symptoms).

Secondly, Confirmatory Factor Analysis (CFA) was performed in MPlus 8.9. CFA allowed to test and replicate the factor structure from the original BAT. The analyses were based on the CFA on the original BAT (Schaufeli et al., 2020). Different CFA were conducted for the core symptoms and the secondary symptoms. Specifically, regarding the core symptoms, a second-order model was tested (Model 1a), consisting of four first-order factors (i.e., Exhaustion, Mental Distance, Cognitive Impairment, and Emotional Impairment) loading onto a high-order factor. Model 1a was compared to a single-factor model (Model 2a) and a four-factor model consisting of the four separate subscales (Model 3). Regarding the secondary symptoms, the hypothesized model (Model 1b) consisted of two first-order factors (Psychosomatic complaints and Psychological stress complaints). The model was compared to a single-factor model (Model 2b).

The model fit was established via the following fit indices: Chi-square test of exact fit (χ^2), comparative fit index (CFI; >0.95 for good; >0.90 for acceptable), Tucker–Lewis index (TLI; >0.95 for good, >0.90 for acceptable), standardized root mean square residual (SRMR; <0.05 for good, <0.10 for acceptable), and the root mean square error of approximation (RMSEA; <0.06 for good, <0.08 for acceptable) (Romano et al., 2022).

Third, two types of reliability were calculated. First, Cronbach's Alpha coefficients (α) were calculated in SPSS v. 29 to assess the internal consistency of the second-order scales and the subscales. The following cut-offs were used: $\alpha \geq .90$ for excellent, $\alpha \geq .80$ for good, $\alpha \geq .70$ for acceptable, $\alpha \geq .60$ for questionable, $\alpha \geq .50$ for poor, and $\alpha < .50$ for unacceptable (Romano et al., 2022). Second, to assess the test-retest reliability, the stability coefficient (r_t) was calculated using the Intra Class Correlation (ICC; single measure). One-hundred-seventy-three participants ($M_{age} = 19.08$, $SD_{age} = 1.06$, 82.7% female, 1.7% no gender declared) filled in the FS-BAT twice, with a five-six months interval. Based on Cicchetti (1994), the following cut-offs were employed: $40 < r_t < 59$ for fair, $60 < r_t < 74$ for good, and $r_t \geq 75$ for excellent. In addition, the test-retest reliability coefficients were compared between the FS-BAT and the original BAT.

Finally, to assess the convergent validity of the FS-BAT, the FS-BAT scales were correlated with the total scale of the PAS and PSS-10. Positive correlations were expected since higher scores on the PSS-10 and

Table 1
Means, standard deviations and Pearson correlations between the FS-BAT scales

Scale	M	SD	1	2	3	4	5	6	7
1. Ex	3.11	.81	–						
2. Dis	2.52	.80	.63	–					
3. Cog	2.87	.79	.67	.60	–				
4. Emo	2.07	.82	.58	.42	.52	–			
5. Psy	3.20	.91	.63	.40	.49	.62	–		
6. Som	2.66	.89	.53	.30	.36	.50	.63	–	
7. Tot-C	2.70	.70	.91	.79	.83	.75	.66	.52	–

Note. N = 570. Ex = Exhaustion, Dis = Mental Distance, Cog = Cognitive Impairment, Emo = Emotional Impairment, Psy = Psychological Stress Complaints, Som = Psychosomatic Complaints, Tot-C = Total core symptoms. All correlations were significant with $p < .001$.

Table 2
Means, standard deviations and Pearson correlations between the FS-BAT items (core symptoms)

Item	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1.	2.93	.93	–																							
2.	3.14	.99	.60	–																						
3.	2.98	1.15	.47	.46	–																					
4.	2.94	1.06	.57	.52	.54	–																				
5.	3.04	1.11	.56	.54	.46	.55	–																			
6.	3.05	1.13	.50	.51	.54	.59	.46	–																		
7.	3.45	1.07	.59	.47	.53	.53	.45	.51	–																	
8.	2.86	1.04	.44	.46	.35	.35	.43	.51	.35	–																
9.	2.88	1.13	.45	.44	.40	.42	.40	.53	.44	.43	–															
10.	2.76	1.09	.43	.49	.41	.36	.43	.51	.40	.35	.71	–														
11.	2.11	1.00	.30	.26	.20	.27	.31	.37	.25	.17	.51	.39	–													
12.	2.00	1.05	.31	.24	.21	.27	.23	.300	.29	.25	.35	.35	.45	–												
13.	3.16	.94	.45	.44	.28	.38	.38	.53	.37	.36	.42	.44	.45	.32	–											
14.	2.79	.97	.56	.50	.47	.48	.39	.53	.50	.46	.44	.49	.46	.31	.62	–										
15.	2.69	1.07	.43	.39	.34	.41	.32	.41	.43	.41	.35	.46	.36	.25	.28	.47	–									
16.	3.09	.96	.45	.44	.28	.39	.39	.54	.40	.35	.43	.41	.43	.31	.25	.76	.64	–								
17.	2.60	.97	.37	.36	.40	.35	.25	.38	.40	.34	.33	.41	.35	.26	.28	.41	.52	.56	–							
18.	1.87	.99	.38	.31	.35	.41	.24	.36	.33	.37	.23	.29	.25	.15	.20	.27	.39	.42	.29	–						
19.	1.78	1.02	.40	.31	.35	.40	.25	.33	.40	.34	.33	.41	.35	.26	.28	.41	.52	.56	.43	–						
20.	1.78	1.02	.40	.31	.35	.40	.25	.33	.40	.34	.33	.41	.35	.26	.28	.41	.52	.56	.43	.37	–					
21.	3.03	1.17	.37	.40	.42	.36	.29	.37	.41	.37	.34	.36	.38	.17	.27	.33	.41	.37	.28	.41	.40	–				
22.	1.95	1.02	.46	.33	.35	.44	.30	.39	.40	.43	.26	.27	.31	.16	.24	.29	.40	.38	.29	.34	.61	.56	–			
23.	1.74	.94	.38	.25	.30	.35	.20	.29	.30	.33	.19	.24	.24	.15	.21	.21	.34	.36	.25	.30	.66	.62	.48	.42	–	
																										.68

Note. N = 570, All correlations were significant with $p < .001$.

Table 3
Means, standard deviations and Pearson correlations between the FS-BAT items (secondary symptoms)

Item	M	SD	24	25	26	27	28	29	30	31	32	33
24.	3.02	1.26	–									
25.	3.66	1.12	.44	–								
26.	3.43	1.11	.37	.58	–							
27.	2.73	1.30	.40	.54	.61	–						
28.	.314	1.27	.33	.39	.45	.54	–					
29.	2.19	1.16	.31	.28	.38	.51	.41	–				
30.	2.54	1.31	.26	.28	.33	.41	.33	.46	–			
31.	2.96	1.19	.32	.37	.42	.42	.34	.41	.38	–		
32.	3.18	1.32	.33	.33	.43	.37	.33	.34	.36	.48	–	
33.	2.41	1.18	.25	.27	.30	.33	.28	.33	.44	.37	.40	–

Note. N = 570, All correlations were significant with $p < .001$.

PAS indicate increased stress levels. Based on Schober and colleagues (2018) the following cut-offs were employed: $.10 \leq r < .40$ for weak, $.40 \leq r < .70$ for moderate, $r \geq .70$ for strong.

3. Results

3.1. Preliminary analysis and descriptive statistics

The sample consisted of 570 secondary and higher education students between 17 and 21 years old ($M_{age} = 19.14$, $SD_{age} = 1.11$, 81% female, 1.6% no gender declared). The majority of the participants (89.6%) were university students, 7.4% were college students, 2.6% studied at a secondary school, and .4% studied elsewhere. Half of the participants (50.5%) dwelled in a student room, 3.5% shared a residence with a roommate (e.g., partner, friends), 39.8% resided at home with their parent(s), and 6.1% lived alone.

Table 1 provides an overview of the means, standard deviations (SD) and correlations between the FS-BAT scales. Tables 2 and 3 display the means, standard deviations (SD) and correlations between the FS-BAT items for respectively the core symptoms and secondary symptoms. As expected, all scales and all items were positively correlated.

3.2. Main analysis

3.2.1. Confirmatory Factor Analysis (CFA)

Table 4 provides an overview of the CFA results for the core symptoms and secondary symptoms. Regarding the core symptoms, Model 1a and Model 3 fitted the data best based on the fit indices. The findings show that school burnout consists of four distinguishable but strongly related factors (i.e., Exhaustion, Mental Distance, Cognitive Impairment and Emotion Impairment). These four factors refer to one underlying construct, namely school burnout. Regarding the secondary symptoms, Model 1b fitted the data best based on the fit indices. In this model, the psychological stress complaints and psychosomatic complaints are two separated but positively correlated aspects of the secondary symptoms. Figure C.1 and C.2 (see Appendix C) provides a visual overview of

Table 4
Model fit indices for the different FS-BAT models

Model	χ^2	df	RMSEA	CFI	TLI	SRMR
Model 1a	856.85	226	.070	.909	.899	.063
Model 2a	2096.90	230	.119	.732	.705	.081
Model 3	842.80	224	.070	.911	.900	.062
Model 1b	120.572	34	.067	.954	.939	.036
Model 2b	218.320	35	.096	.902	.875	.050

Note. Model 1a, 2a, and 3 include the core symptoms. Model 1b and 2b refer to the secondary symptoms. Model 1a = hypothesized second order model (4 first order + 1 second order) variables, Model 2a = one factor model, Model 3 = four factor model. Model 1b = hypothesized two-factor model, Model 2b = one-factor model. RMSEA = root mean square error of approximation, CFI = comparative fit index, TLI = Tucker Lewis Index, SRMR = Standardized Root Mean Square Residual.

respectively the core and secondary symptoms model with the corresponding standardized coefficients.

3.2.2. Reliability

Table 5 provides an overview of the Cronbach's Alpha and stability coefficients of the first and second order scales of the FS-BAT. The α - and r_t -values were compared to the values from the original version of the BAT. The FS-BAT scales showed an excellent (Total core symptoms), good (Exhaustion, Mental distance, Emotional impairment, Cognitive impairment, and Psychological stress complaints) or acceptable (Psychosomatic complaints) internal consistency. Based on stability coefficients, the FS-BAT showed a good test-retest reliability for the core-symptoms subscales. The subscales of the secondary symptoms and the total core symptoms scales showed excellent test-retest reliability. These findings indicate that the school burnout scores are relatively stable, which is in line with the chronic nature of burnout.

3.2.3. Convergent Validity

As expected, moderate positive correlations were found between the PAS and all FS-BAT scales, ranging between .40 and .61. Moderate positive correlations were also found between the PSS-10 and FS-BAT scales, ranging between .44 and .69. All correlations were significant at $p < .001$. See Table 6 for a detailed overview.

4. Discussion

School burnout is a rising health phenomenon causing detrimental outcomes on both academic and personal life domains (Bask & Salmela-Aro, 2013; Fiorilli et al., 2017; Salmela-Aro et al., 2009b; Walburg et al., 2015). To date, a handful validated questionnaires to measure school burnout exist, but have several practical and content-related limitations (Schaufeli et al., 2020). Recent studies in adults led to the development of a comprehensive measurement for occupational burnout (i.e., Burnout Assessment Tool; BAT). The primary aim of the present study was to assess the applicability and psychometric properties of an adjusted version of the BAT, namely the Flemish School Burnout Assessment Tool (FS-BAT), in students between 17 and 21 years old.

Table 5
Cronbach's Alpha and stability coefficients of the FS-BAT and the original BAT

Scale	α FS-BAT	α BAT	r_t FS-BAT	r_t BAT
Exhaustion	.89	.92	.69	.65
Mental distance	.81	.91	.68	.65
Cognitive impairment	.86	.92	.64	.59
Emotional impairment	.85	.90	.67	.61
Psychological stress complaints	.81	–	.80	–
Psychosomatic complaints	.77	–	.80	–
Total core symptoms	.94	.96	.75	.68

Note. For Cronbach's Alpha (α): N FS-BAT = 570 students between 17-21 years old, N BAT = 1500 Flemish adults. For the stability coefficients (r_t): N FS-BAT = 173 students between 17-21 years old, N BAT = 263 Flemish adults.

Table 6
Correlations between the FS-BAT scales and the PAS and PSS-10

Scale	<i>r</i> PAS	<i>r</i> PSS-10
Exhaustion	.60	.66
Mental distance	.45	.44
Cognitive impairment	.50	.55
Emotional impairment	.46	.59
Psychological stress complaints	.47	.53
Psychosomatic complaints	.40	.67
Total core symptoms	.61	.69

Note. $N = 515$. All correlations (r) were significant at $p < .001$.

The results demonstrate the applicability of the FS-BAT in secondary and higher education students. Factor analyses distinguished four separate – but related – school burnout core symptoms (i.e., Exhaustion, Mental distance, Cognitive impairment and Emotion impairment). These core symptoms all refer to one underlying factor, school burnout. In addition, two secondary subscales (i.e., Psychological stress complaints and Psychosomatic complaints) were discovered. Regarding the reliability, the results indicate a good internal consistency, ranging between excellent (total core symptoms scale) and acceptable (Psychosomatic complaints scale). In addition, the stability coefficients showed excellent (subscales of the secondary symptoms and the total core and secondary symptoms scale) or good (core symptoms subscales) test-retest reliability over a five-months period. Finally, as expected, the convergent validity was proven by moderate positive correlation between all FS-BAT scales and the PAS and PSS-10.

The findings of the present study indicate that school burnout is a multidimensional construct. The results are in line with previous findings in middle school and university students of psychology and computer science (Popescu et al., 2023; Romano et al., 2022). This could indicate that the expression of school burnout symptoms might generally be stable across cultures, although symptom levels can differ (Cabras et al., 2023). In addition, the FS-BAT shows a similar factor structure as the original version (BAT) for occupational burnout in adults and displays similar reliability and validity indices. This further evidences the link between school burnout and occupational burnout later in life (Robins et al., 2018). The predictive validity of the FS-BAT over a five-months period indicates stability over time; however, longitudinal studies over a greater time period are needed. Potentially, the longitudinal relations between the school burnout core components could also have great implications for the conceptualization and assessment model (Vansoeterstede et al., 2023). To conclude, the FS-BAT might be a reliable and valuable instrument to assess school burnout symptoms in students between 17 and 21 years old in Flanders.

The present study has several strengths. To the best of our knowledge, it is the first to develop an up-to-date and comprehensive school burnout measure in Flanders and tests its psychometric properties in a community sample of secondary and higher education students. The latter sample forms an important risk group for the development of school burnout and psychopathology in general. The transition period from secondary to higher education is considered a stressful time since students are faced with several new academic, social and personal demands but lack the (cognitive) resources to adequately cope with these demands. Furthermore, school burnout levels are prone to fluctuations during transition periods, making it a crucial assessment period (Salmela-Aro Upadhyaya, 2014).

However, the strengths have to be seen in the light of some limitations. Primarily, the discriminant validity and relation to other school burnout measures was not assessed since the present study is part of a greater research project so no additional measures could be added. Although the relation to other stress measures (i.e., PAS and PSS-10) was evaluated, which also provide data on academic related stress, future studies should assess how the FS-BAT relates to other school burnout measures. Regarding the discriminant validity, future studies should implement measures that are expected to correlate negatively with

school burnout, such as academic achievement or engagement. In addition, future studies could extend the assessment period over a longer time period to evaluate the predictive validity. Longitudinal research indicates that symptoms at an early age are predictive of school symptom severity later in life and even occupational burnout symptoms when entering the labor market (Parviainen et al., 2021; Robins et al., 2018). This highlights the need for long-term studies that examine the validity of the FS-BAT scores in students to predict occupational burnout (scores) later in life. That way, the FS-BAT could serve as an important tool in the prevention of both school burnout and occupational burnout. Thirdly, the sample characteristics display important limitations regarding the generalizability of the findings. The participants did not report their educational program so little is known about their educational background. As participants were recruited via social media and general platforms of higher institutes, it is assumed the sample consisted of a heterogeneous group. However, it remains possible that specific educational groups were over- or underrepresented. Furthermore, no data was collected on specific demographic variables, such as SES or ethnicity. The sample is assumed to mainly focus on Western, educated, industrialized, rich, and democratic (WEIRD) participants, given to recruitment via higher education institutions in Flanders. The applicability of the present findings can thus not be verified to specific ethnic (minority) groups or across cultures. In addition, 80% of the sample identified as female. Future research should aim for a gender-balanced sample, with sufficient attention to minority groups and the assessment of SES. Lastly, the present study specifically focused on students between 17 and 21 years old. The applicability of the FS-BAT remains unknown in older students. Future research could broaden the age range to assess the applicability of the FS-BAT and the generalizability of the results. Finally, the present study solely relied on self-report measurements, which are sensitive to recall bias and social desirability. As cognitive systems of adolescents are still maturing, some might not be able to reflect and report on their well-being and stress levels. In addition, self-report measures are prone to questionnaire fidelity, for which the present study did not control. Future research could include strategies (e.g., including a test-item where participants have to select a specific option) to assure clean assessments. Future studies could potentially benefit from a multi-method perspective, and include objective measurements (e.g., psychophysiology such as heart rate variability) on school burnout. Combining questionnaire data with objective measures could strengthen the results of the present study.

5. Conclusion

To conclude, the present study provided evidence that a student version of the BAT (i.e., FS-BAT) can be used on students between 17 and 21 years of age in Flanders. The confirmatory factor analysis indicates that the BAT structure is also applicable to school burnout. The reliability indices displayed acceptable to excellent internal consistencies of the scales and the stability coefficients show good stability over a five-months period. Finally, the associations between the Perceptions of Academic Stress scale, Perceived Stress Scale and FS-BAT scales provided evidence for the convergent validity. Based on the preliminary results of the present study, the FS-BAT can be used to measure school burnout symptoms in secondary and higher education students between 17 and 21 years old. The questionnaire can be used as a valuable prevention and assessment tool for the early detection of vulnerable youth. Future research could evaluate the relation to other school burnout measures, the discriminant validity and applicability in other age groups.

Data statement

The anonymized dataset can be shared upon request. Please contact the corresponding author.

CRedit authorship contribution statement

Van Royen Annelies: Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Wante Laura:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Braet Caroline:** Writing – review & editing, Supervision, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix

Appendix A

List of all existing school burnout measures

Measure	Scales	Author
Maslach Burnout Inventory Student Survey (MBI-SS)	Exhaustion, Cynicism, and Efficacy	Schaufeli et al. (2002)
School Burnout Inventory (SBI)	Exhaustion, Cynicism, and Sense of inadequacy	Salmela-Aro et al. (2009)
Oldenburg Burnout Inventory for Students (OLBI-S)	Exhaustion and Detachment	Reis et al. (2015)
Student version of the Burnout Assessment Tool (S-BAT)	4 core symptoms: Exhaustion, Mental Distance, Cognitive Impairment, and Emotional Impairment 2 secondary symptoms: Psychosomatic complaints, Psychological distress symptoms	Popescu et al. (2023)
Burnout Assessment Tool Core Symptoms for Students (BAT-C)	4 core symptoms: Exhaustion, Mental Distance, Cognitive Impairment, and Emotional Impairment	Romano et al. (2022)
Secondary School Burnout Scale (SSBS)	Loss of interest to school, Burnout from family, Burnout from studying, Burnout from homework, Burnout from teacher attitudes, Need to rest and time for fun, Feelings of insufficiency at school	Aypay (2002)

Appendix B

Comparison between the core symptoms FS-BAT and the BAT items

Item	FS-BAT	BAT
1	Op school voel ik me geestelijk uitgeput ('leeg gevoel')	Op het werk voel ik me geestelijk uitgeput
2	Alles wat ik op school doe, kost mij moeite	Alles wat ik doe op mijn werk, kost mij moeite
3	Ik raak maar niet uitgeput nadat ik voor school heb gewerkt	Ik raak maar niet uitgeput nadat ik gewerkt heb
4	Op school voel ik me lichamenlijk uitgeput ('slap gevoel')	Op het werk voel ik me lichamenlijk uitgeput
5	Als ik 's morgens opsta, mis ik de energie om aan de schooldag te beginnen	Als ik 's morgens opsta, mis ik de energie om aan de werkdag te beginnen
6	Ik wil wel actief zijn op school, maar het lukt mij niet	Ik wil wel actief zijn op het werk, maar het lukt mij niet
7	Als ik me inspan op school, dan word ik snel moe	Als ik me inspan op het werk, dan word ik snel moe
8	Op het einde van een schooldag voel ik me mentaal uitgeput en leeg	Op het einde van de werkdag voel ik me mentaal uitgeput en leeg
9	Ik kan geen belangstelling en enthousiasme opbrengen voor mijn schoolwerk	Ik kan geen belangstelling en enthousiasme opbrengen voor mijn werk
10	Op school denk ik niet veel na en functioneer ik op automatische piloot	Op mijn werk denk ik niet veel na en functioneer ik op automatische piloot
11	Ik voel een sterke weerzin tegen mijn schoolwerk	Ik voel een sterke weerzin tegen mijn werk
12	Mijn schoolwerk laat mij onverschillig	Mijn werk laat mij onverschillig
13	Ik ben spottend over wat mijn schoolwerk voor anderen betekent	Ik ben cynisch over wat mijn werk voor anderen betekent
14	Op school kan ik er mijn aandacht moeilijk bijhouden	Op het werk kan ik er mijn aandacht moeilijk bijhouden
15	Op school heb ik moeite om helder na te denken	Tijdens mijn werk heb ik moeite om helder na te denken
16	Ik ben vergeetachtig en verstrooid op school	Ik ben vergeetachtig en verstrooid tijdens mijn werk
17	Als ik op school zit, kan ik me moeilijk concentreren	Als ik aan het werk ben, kan ik me moeilijk concentreren
18	Ik maak fouten in mijn schoolwerk omdat ik er met mijn hoofd 'niet goed bij ben'	Ik maak fouten in mijn werk omdat ik er met mijn hoofd 'niet goed bij ben'
19	Op school heb ik het gevoel geen controle te hebben over mijn emoties	Op mijn werk heb ik het gevoel geen controle te hebben over mijn emoties
20	Ik herken mezelf niet in de wijze waarop ik emotioneel reageer op school	Ik herken mezelf niet in de wijze waarop ik emotioneel reageer op mijn werk
21	Tijdens het maken van mijn schoolwerk raak ik snel geïrriteerd als de dingen niet lopen zoals ik dat wil	Tijdens mijn werk raak ik snel geïrriteerd als de dingen niet lopen zoals ik dat wil
22	Ik word kwaad of verdrietig op school zonder goed te weten waarom	Ik word kwaad of verdrietig op mijn werk zonder goed te weten waarom
23	Op school kan ik onbedoeld te sterk emotioneel reageren	Op mijn werk kan ik onbedoeld te sterk emotioneel reageren

Note. Items 1-8 = Exhaustion, items 9-13 = Mental distance, items 14-18 = Cognitive impairment, items 19-23 = Emotional impairment

Source of funding

This work was supported by the special research fund of Ghent University (grant number BOF21/DOC/097). The funding source had no involvement in the study design, collection, analysis and interpretation of the data.

Acknowledgements

The authors want to thank the special research fund of Ghent University for funding the present study. Special thanks to statistical consultant Dries De Beer who provided guidance on the statistical analyses.

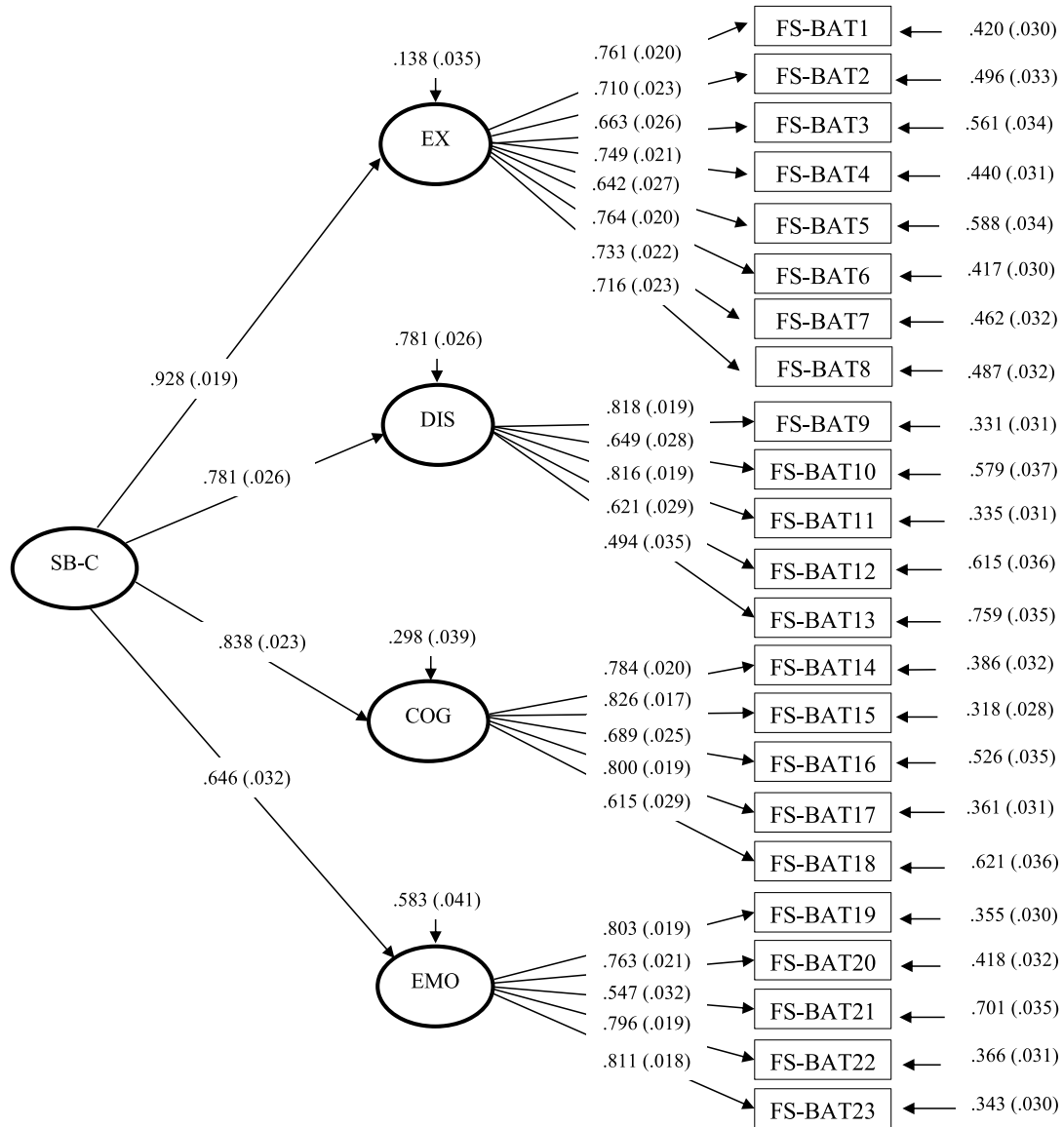


Figure C.1. Appendix C: CFA model of the core symptoms

Note. SB-C = School burnout core symptoms, Ex = Exhaustion, Dis = Mental distancing, Cog = Cognitive impairment, Emo = Emotional Impairment. Model includes standardized loadings and standardized errors between brackets.

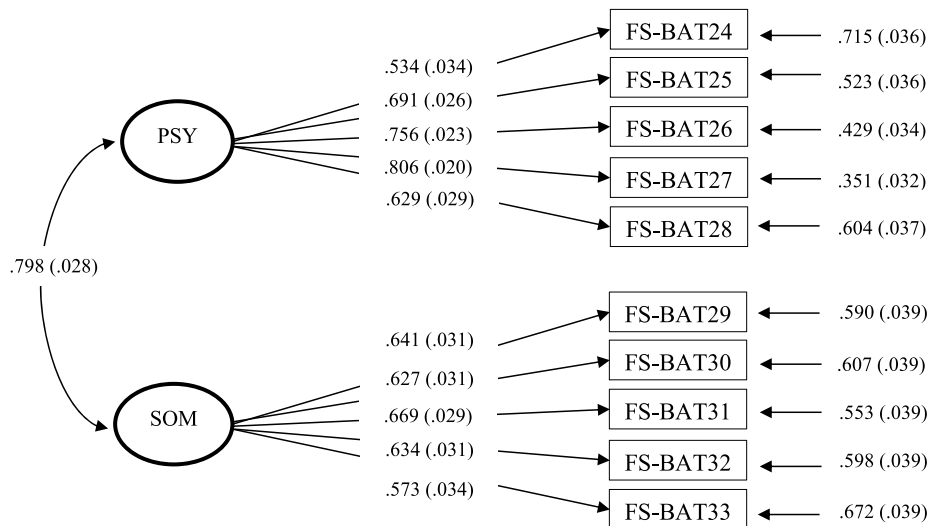


Figure C.2. CFA model of the secondary symptoms

Note. Psy = Psychological stress complaints, Som = Psychosomatic complaints

References

- Aguayo, R., Cañadas, G. R., Assbaa-Kaddouri, L., Cañadas-De la Fuente, G. A., Ramírez-Baena, L., & Ortega-Campos, E. (2019). A risk profile of sociodemographic factors in the onset of academic burnout syndrome in a sample of university students. *International journal of environmental research and public health*, *16*(5), 707.
- Bakker, A. B., Demerouti, E., & Euwema, M. C. (2005). Job resources buffer the impact of job demands on burnout. *Journal of occupational health psychology*, *10*(2), 170.
- Bask, M., & Salmela-Aro, K. (2013). Burned out to drop out: Exploring the relationship between school burnout and school dropout. *European journal of psychology of education*, *28*, 511–528.
- Bedewy, D., & Gabriel, A. (2015). Examining Perceptions of academic stress and its sources among university students: The Perception of Academic Stress Scale. *Health Psychology Open*, *2*(2), 2055102915596714.
- Cabras, C., Konyukhova, T., Lukianova, N., Mondo, M., & Sechi, C. (2023). Gender and country differences in academic motivation, coping strategies, and academic burnout in a sample of Italian and Russian first-year university students. *Heliyon*, *9*(6).
- Chang, D. (2016). Digital burnout: The new, invisible threat to businesses. *Flux Trends*. Retrieved October 31st 2024 from <http://www.fluxtrends.com/digital-burnout-the-new-invisible-threat-to-businesses/>.
- Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological assessment*, *6*(4), 284.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A Global Measure of Perceived Stress. *Journal of Health and Social Behavior*, *24*(4), 385. <https://doi.org/10.2307/2136404>
- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied psychology*, *86*(3), 499.
- Desart, S., Schaufeli, W. B., & De Witte, H. (2017). Op zoek naar een nieuwe definitie van burn-out. *Tijdsch Steunpunt Werk*, *1*, 90–1.
- Erten, P., & Özdemir, O. (2020). The digital burnout scale. *İnönü Üniversitesi Eğitim Fakültesi Dergisi*, *21*(2), 668–683.
- Fiorilli, C., De Stasio, S., Di Chiacchio, C., Pepe, A., & Salmela-Aro, K. (2017). School burnout, depressive symptoms and engagement: Their combined effect on student achievement. *International Journal of Educational Research*, *84*, 1–12. <https://doi.org/10.1016/j.ijer.2017.04.001>
- Husky, M. M., Kovess-Masfety, V., & Swendsen, J. D. (2020). Stress and anxiety among university students in France during Covid-19 mandatory confinement. *Comprehensive Psychiatry*, *102*, 152–191.
- Lee, E. H. (2012). Review of the psychometric evidence of the perceived stress scale. *Asian nursing research*, *6*(4), 121–127.
- Lee, M., Lee, K.-J., Lee, S. M., & Cho, S. (2020). From emotional exhaustion to cynicism in academic burnout among Korean high school students: Focusing on the mediation effects of hatred of academic work. *Stress and Health*, *36*(3), 376–383.
- Lehto, J. E., Kortesoja, L., & Partonen, T. (2019). School burnout and sleep in Finnish secondary school students. *Sleep Science*, *12*(1), 10–14. <https://doi.org/10.5935/1984-0063.20190051>
- Litjens, B., & Rujifrok, N. (2019). Analyse studentenwelzijn: Een analyse van bestaande databronnen over studentenwelzijn in het hoger onderwijs. Interstedelijk Studenten Overleg.
- Liu, X., Zhang, L., Wu, G., Yang, R., & Liang, Y. (2021). The longitudinal relationship between sleep problems and school burnout in adolescents: A cross-lagged panel analysis. *Journal of Adolescence*, *88*, 14–24.
- Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annual review of psychology*, *52*(1), 397–422.
- May, R. W., Bauer, K. N., & Fincham, F. D. (2015). School burnout: Diminished academic and cognitive performance. *Learning and Individual Differences*, *42*, 126–131.
- May, R. W., Bauer, K. N., Seibert, G. S., Jaurequi, M. E., & Fincham, F. D. (2020). School burnout is related to sleep quality and perseverative cognition regulation at bedtime in young adults. *Learning and Individual Differences*, *78*, Article 101821. <https://doi.org/10.1016/j.lindif.2020.101821>
- May, R. W., Sanchez-Gonzalez, M. A., Brown, P. C., Koutnik, A. P., & Fincham, F. D. (2014). School burnout and cardiovascular functioning in young adult males: a hemodynamic perspective. *Stress*, *17*(1), 79–87.
- Parviainen, M., Aunola, K., Torppa, M., Lerkkanen, M. K., Poikkeus, A. M., & Vasalampi, K. (2021). Early antecedents of school burnout in upper secondary education: A five-year longitudinal study. *Journal of Youth and Adolescence*, *50*, 231–245.
- Popescu, B., Maricuțoiu, L. P., & De Witte, H. (2023). The student version of the Burnout assessment tool (BAT): psychometric properties and evidence regarding measurement validity on a romanian sample. *Current Psychology*, 1–15. *Publications | Burnout Assessment Tool*. (2023, 22 maart). Burnout Assessment Tool | A research project by KU Leuven. https://burnoutassessmenttool.be/publicatie_eng/.
- Reis, D., Xanthopoulos, D., & Tsaousis, I. (2015). Measuring job and academic burnout with the Oldenburg Burnout Inventory (OLBI): Factorial invariance across samples and countries. *Burnout research*, *2*(1), 8–18.
- Robins, T. G., Roberts, R. M., & Sarris, A. (2018). The role of student burnout in predicting future burnout: Exploring the transition from university to the workplace. *Higher Education Research & Development*, *37*(1), 115–130.
- Romano, L., Angelini, G., Consiglio, P., & Fiorilli, C. (2022). An Italian Adaptation of the Burnout Assessment Tool-Core Symptoms (BAT-C) for Students. *Education Sciences*, *12*(2), 124.
- Ruggerberg, A., & Stegeman, L. (2016). *Stop met stressen /druk 1: handleiding voor jongeren met een (bijna) burn-out.*
- Salmela-Aro, K., Kiuru, N., Leskinen, E., & Nurmi, J. E. (2009a). School burnout inventory (SBI) reliability and validity. *European journal of psychological assessment*, *25*(1), 48–57.
- Salmela-Aro, K., Kiuru, N., Pietikäinen, M., & Jokela, J. (2008). Does school matter? The role of school context in adolescents' school-related burnout. *European psychologist*, *13*(1), 12–23.
- Salmela-Aro, K., Savolainen, H., & Holopainen, L. (2009b). Depressive symptoms and school burnout during adolescence: Evidence from two cross-lagged longitudinal studies. *Journal of Youth and Adolescence*, *38*(10), 1316–1327. <https://doi.org/10.1007/s10964-008-9334-3>
- Salmela-Aro, K., & Upadyaya, K. (2014). Developmental trajectories of school burnout: Evidence from two longitudinal studies. *Learning and Individual Differences*, *36*, 60–68.
- Salmela-Aro, K., & Upadyaya, K. (2017). Co-development of educational aspirations and academic burnout from adolescence to adulthood in Finland. *Research in Human Development*, *14*(2), 106–121. <https://doi.org/10.1080/15427609.2017.1305809>
- Salmela-Aro, K., & Upadyaya, K. (2020). School engagement and school burnout profiles during high school – The role of socio-emotional skills. *European Journal of Developmental Psychology*, *17*(6), 943–964.
- Salmela-Aro, K., Upadyaya, K., Vinni-Laakso, J., & Hietajarvi, L. (2021). Adolescents' longitudinal school engagement and burnout before and during COVID-19—The role of socio-emotional skills. *Journal of research on adolescence*, *31*(3), 796–807.

- Schaufeli, W. B., Desart, S., & De Witte, H. (2020). Burnout Assessment Tool (BAT)—development, validity, and reliability. *International journal of environmental research and public health*, *17*(24), 9495.
- Schaufeli, W. B., Martinez, I., Pinto, A. M., Salanova, M., & Bakker, A. (2002). Burnout and engagement in university students: A cross-national study. *Journal of Cross-Cultural Psychology*, *33*, 464–481.
- Schober, P., Boer, C., & Schwarte, L. A. (2018). Correlation coefficients: appropriate use and interpretation. *Anesthesia & analgesia*, *126*(5), 1763–1768.
- Simoës-Perlant, A., Barreau, M., & Vezilier, C. (2023). Stress, anxiety, and school burnout post COVID-19: A study of French adolescents. *Mind, Brain, and Education*, *17*(2), 98–106.
- Tomaszek, K., & Muchacka-Cymerman, A. (2020). Examining the relationship between student school burnout and problematic internet use. *Educational Sciences: Theory and Practice*, *20*(2), 16–31.
- UNESCO. (2020). *Nurturing the social and emotional wellbeing of children and young people during crises*. UNESCO COVID-19 Education Response. <https://unesdoc.unesco.org/ark:/48223/pf000>.
- Vansoeterstede, A., Cappe, E., Lichtle, J., & Boujut, E. (2023). A systematic review of longitudinal changes in school burnout among adolescents: Trajectories, predictors, and outcomes. *Journal of Adolescence*, *95*(2), 224–247.
- Walburg, V., Moncla, D., & Mialhes, A. (2015). Burnout among high-school students and cannabis use, consumption frequencies, abuse and dependence. In *Child & Youth Care Forum*, *44* pp. 33–42). Springer US.
- Wielers, R., Hummel, L., & Hooftman, W. (2020). Jongeren, loopbaanperspectief en burn-outklachten. *Tijdschrift Voor Arbeidsvraagstukken*, *36*(1), 59–76. <https://doi.org/10.5117/2020.036.001.005>
- Yan, Y. W., Lin, R. M., Su, Y. K., & Liu, M. Y. (2018). The relationship between adolescent academic stress and sleep quality: A multiple mediation model. *Social Behavior and Personality: International Journal*, *46*(1), 63–77. <https://doi.org/10.2224/sbp.6530>