



# Developmental heterogeneity of school burnout across the transition from upper secondary school to higher education: A 9-year follow-up study

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## ABSTRACT

This study utilized piecewise linear growth mixture analysis to examine the developmental heterogeneity of school burnout among a sample of 513 (67.6% females) Finnish students as they transitioned from upper secondary school to higher education (ages 17–25 years). Encompassing five measurement points (two before the transition and three after), our results revealed four distinct burnout trajectory profiles, including (a) High and Decreasing (Profile 1), (b) Moderate and Decreasing (Profile 2), (c) Low and Increasing (Profile 3), and (d) Low and Stable (Profile 4). High initial levels of self-esteem and mastery-extrinsic goals served as personal resources and high-performance goals served as personal risk factors, making students more likely to belong to more (i.e., Profile 4) or less (e.g., Profile 1) adaptive profiles of burnout trajectories, respectively. Profile 4 displayed the lowest and most stable levels of burnout, thus protecting students from adverse outcomes like school dropout, underachievement, and substance use. Conversely, Profile 1 displayed the highest and least stable levels of burnout and was associated with higher risk of burnout, lower academic achievement, greater alcohol use and problems, and higher drug use relative to the other trajectory profiles. Together, these findings offer novel person-centered, longitudinal insight into the developmental heterogeneity of burnout across the transition to higher education and lend support for the self-equilibrium hypothesis in the context of school burnout. Importantly, our results underscore the importance of early intervention efforts aimed at increasing mastery goals and self-esteem to prevent burnout and its associated consequences.

## 1. Introduction

Although most individuals exit adolescence and enter adulthood relatively unscathed, some struggle with the need to adapt to the challenges and major life transitions that typically mark early adulthood (Dietrich et al., 2012; Salmela-Aro, 2009a, 2009b). Notably,

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the transition from secondary schooling to higher education can be particularly challenging as a result of, for instance, the increased complexity of academic subjects, the need to make more definitive career choices, the experience of major changes in lifestyle (e.g., moving out, living in a new city with a new peer group), and a greater need for academic and life subsistence autonomy (Bask and Salmela-Aro, 2013; Caspi, 2002; Dietrich et al., 2012; Salmela-Aro et al., 2008; Salmela-Aro and Tynkkynen, 2012; Vansoeterstede et al., 2023).

As a result of these challenges, some students come to experience school burnout during this life-changing transition period (Maslach et al., 2001; Salmela-Aro, 2009a). In turn, burnout increases their risk of experiencing a variety of detrimental consequences, including academic underperformance, school dropout, and substance misuse (Bask and Salmela-Aro, 2013; Madigan & Curran, 2021; Oller-Perret & Walburg, 2018). Fortunately, research has suggested that various factors amenable to intervention may help students avoid burnout development. For instance, students' sense of self-worth (i.e., global self-esteem; Baumeister et al., 2003; Rosenberg, 1965) and what drives them to engage in schoolwork (i.e., achievement goals; Elliot & Thrash, 2001, 2002, 2010; Kaplan & Maehr, 2007) could represent key predictors of burnout development (Eccles and Roeser, 2009; Luo et al., 2016; Parhiala et al., 2018; Parviainen et al., 2021; Tuominen et al., 2020; Tuominen-Soini et al., 2008, 2012).

However, the experience and development of burnout is not homogenous for all students (e.g., Eccles & Midgley, 1989; Salmela-Aro & Upadaya, 2014a). For instance, some may experience a drastic change in burnout levels after leaving secondary school, others may stay on a trajectory already marked by increasing burnout levels prior to the transition, and others may get better when entering higher education. This recognition has led many researchers to advocate the need to rely on a person-centered approach to properly understand the various types of burnout trajectories unfolding over time among different profiles of students, as well as their determinants and outcomes (see Mäkikangas & Kinnunen, 2016, for a review).

Despite this recognition, relatively few studies have systematically attempted to understand this developmental heterogeneity, its drivers, and its consequences across critical life transitions. Moreover, although it is relatively well-established that school burnout tends to increase during the lower secondary school years (e.g., Eccles, 2004; Eccles & Roeser, 2011), the research literature is less clear regarding burnout development across the transition between upper secondary school and tertiary or vocational education (see Vansoeterstede et al., 2023, for a review). To address these gaps, we investigated the developmental heterogeneity of burnout among a sample of youth followed between ages 17 and 25 years as they completed their upper secondary education and transitioned to the next stage of their educational trajectories. We also considered how their global self-esteem and achievement goals related to their burnout trajectories and how these trajectories related to their risk of experiencing school dropout, their academic achievement levels, and their use or misuse of drugs and alcohol.

### 1.1. School burnout

It is now well-established that burnout can occur among employees and students alike, often taking root in adolescence alongside other mental health concerns such as depression (e.g., Barboza, 2020; Olivier et al., 2023; Salmela-Aro et al., 2008; Vansoeterstede et al., 2023; Walburg, 2014). Burnout can be broadly understood as a psychological state of emotional exhaustion, often arising from ongoing exposure to work-related (among employees) or school-related (among students) stressors, coupled with a lack of sufficient resources to help manage these stressors (Maslach et al., 2001; Salmela-Aro et al., 2009a). School burnout is typically defined along three dimensions and is very similar to those dimensions used to depict work burnout: Exhaustion, cynicism regarding school, and feelings of inadequacy as a student (Salmela-Aro et al., 2009a). Although conceptually distinct, these three dimensions are highly correlated (Salmela-Aro, 2017); thus, burnout can be considered as a global construct varying in severity (e.g., Salmela-Aro & Upadaya, 2014a).

### 1.2. Developmental heterogeneity of school burnout

Life transitions, such as the one occurring at the end of upper secondary schooling when youth enter early adulthood and the next stage of their educational journey, are accompanied by a variety of biopsychosocial transformations that makes them particularly challenging (Dietrich et al., 2012; Salmela-Aro et al., 2009a, 2009b). As a result, these transitions provide researchers with a unique window of opportunity to study how the development of different phenomenon unfold over time (e.g., Dietrich et al., 2012). From a strictly educational standpoint, the transition out of upper secondary schooling provides students with more autonomy to design their courseload and schedule in alignment with their needs, goals, and interests (Eccles & Roeser, 2009, 2011; Vansoeterstede et al., 2023). Although these changes may suit most students, other students might perceive their evolving environment as becoming more competitive, more stressful, and less supportive (Pittman & Richmond, 2008; Posselt & Lipson, 2016; Salmela-Aro et al., 2008), thereby increasing their risk of burnout.

Results from variable-centered studies support the claim that the transition to lower secondary school (ages 13–17 years) is accompanied by increases in school burnout (see Vansoeterstede et al., 2023, for a review). However, after this early transition, research shows that burnout levels become more stable in the upper secondary school years (ages 17–19 years) and beyond (Tuominen-Soini & Salmela-Aro, 2014; Vansoeterstede et al., 2023; Wang et al., 2015). However, by focusing on average trends, variable-centered studies ignore the often important inter-individual heterogeneity in these trajectories (Mäkikangas & Kinnunen, 2016; Tuominen-Soini & Salmela-Aro, 2014). Indeed, enough heterogeneity (with some increasing, some decreasing, and some stable trajectories), once averaged at the sample level, is likely to result in a stable global trend that will only serve to mask the presence of subpopulations of students who struggle more or less than their peers (e.g., Morin et al., 2013).

Supporting this claim, longitudinal person-centered studies designed to examine the developmental heterogeneity in burnout have

typically identified between three to five burnout trajectory profiles during the secondary school years (Lee & Lee, 2018; Salmela-Aro & Upadyaya, 2014a; Sorkkila et al., 2019; Widlund et al., 2021; Zhou et al., 2019). More specifically, these studies have consistently identified a generally favorable profile marked by low levels of burnout that remain stable over time (i.e., Low and Stable) and an increasing profile characterized by low initial levels of burnout that increase over time (i.e., Low and Increasing; Lee & Lee, 2018; Salmela-Aro & Upadyaya, 2014a; Sorkkila et al., 2019; Widlund et al., 2021; Zhou et al., 2019). Trajectory profiles displaying initially high levels of burnout that decrease over time (i.e., High and Decreasing) have also been frequently identified (Salmela-Aro & Upadyaya, 2014a; Zhou et al., 2019). Finally, a few additional trajectory profiles have also been more rarely identified in a subset of studies, including one displaying moderate and stable (Lee & Lee, 2018; Sorkkila et al., 2019), moderate and increasing (Salmela-Aro et al., 2021), and moderate and decreasing (Salmela-Aro & Upadyaya, 2014a) levels of burnout. Past studies have also shown that most students tend to adopt more favorable burnout trajectories (i.e., characterized by lower levels of burnout) as they get older (e.g., Salmela-Aro & Upadyaya, 2014a; Vansoeterstede et al., 2023). Among older students (i.e., medical students) followed three times over a period of 1 year, Chae et al. (2020) also identified similar profiles of burnout trajectories (i.e., high and increasing, moderate and increasing, and low and stable). Although none of these studies specifically examined the transition between upper secondary schooling and higher education, some of these studies examined other transitions (i.e., see Salmela-Aro & Upadyaya, 2014a, and Widlund et al., 2021, for lower to upper secondary school; see Zhou et al., 2019, for changes following exposure to the Wenchuan earthquake). These studies confirmed the idea that transitions can be accompanied by more (i.e., trajectories displaying low or decreasing levels of burnout) or less (i.e., trajectories displaying high or increasing levels of burnout) adaptive burnout trajectories, and changes in these trajectories for specific profiles of students. These results highlight the heterogeneous nature of burnout trajectories among secondary school students and the importance of academic transitions for these trajectories.

We are not aware of any study that has specifically sought to investigate how burnout trajectories change across the transition out of upper secondary schooling and into the next stage of education among different profiles of students. The results from a subset of the previously described studies in which students were followed for one time point after this transition have suggested that the previous conclusions obtained among younger samples may generalize to this later period (Salmela-Aro & Upadyaya, 2014a; Zhou et al., 2019). However, the lack of study focusing specifically on this critical educational transition highlights the need for further research.

### 1.3. A self-equilibrium perspective of school burnout trajectories

When studying profiles of developmental trajectories, Morin et al. (2013) highlighted the importance of differentiating longitudinal changes occurring at the trait versus state levels. At the trait level, a *model implied* trajectory is estimated to reflect each individual generic pattern of evolution (i.e., increasing, decreasing, or unchanging school burnout trajectories). However, repeated measures of burnout rarely perfectly match one's generic trajectory, but rather typically show time-specific state-like deviations from that trait-like trajectory. These state-like deviations inform us about another type of change occurring over time, consistent with the presence of developmental instability (i.e., marked deviations from one's trait-like trajectory reflecting generally unstable levels of burnout) or equilibrium (i.e., lack of deviations, consistent with a smooth evolution process). For instance, in an earlier study of academic achievement, Morin et al. (2012) found that students displaying a generally low trait-like achievement trajectory also displayed marked fluctuations around that trajectory over time, identifying them as unstable achievers rather than as systematically low achievers.

Applying these considerations to the study of adolescents' self-esteem trajectories, Morin et al. (2013) proposed and provided support for a self-equilibrium hypothesis. The *self-equilibrium hypothesis* assumes that the presence of a strong core sense of identity (which can be defined as a one's perception of continuity regarding oneself, of remaining the same person over time despite situational changes; American Psychological Association, 2024) should result not only in more adaptive trait-like self-esteem trajectories (i.e., characterized by higher stable or increasing levels), but also in more stable trajectories at the state level, suggestive of self-equilibration processes helping youth to preserve their sense of identity and internal balance when facing temporary internal or external changes. This hypothesis has been supported in relation to adolescents' trajectories of academic achievement (Morin et al., 2012) and body image (Morin et al., 2017), as well as adults' trajectories of self-esteem (Mund & Neyer, 2016) and affective commitment to their occupation (Houle et al., 2022). For these constructs, results have demonstrated that higher and increasing trait-like levels tended to be associated with fewer state-like fluctuations over time, whereas lower and decreasing trait-like levels displayed high levels of state-like fluctuations.

More directly relevant to the present investigation, Gillet et al. (2022) found evidence that similar self-equilibrium processes were at play in teachers' burnout trajectories. More precisely, they found that more adaptive trait-like burnout trajectories (i.e., persistently low or decreasing) tended to display more state-like stability than less adaptive (i.e., persistently high or increasing) burnout trajectories. From the theoretical perspective of the self-equilibrium hypothesis, these results suggest that the ability to maintain persistently low or decreasing levels of burnout seemed to be intimately related to the presence of a strong core sense of identity consistent with those at play in achievement, self-esteem, body image, and commitment. The present study represents the first attempt to validate the self-equilibrium hypothesis in relation to school burnout. Importantly, by considering upper secondary schooling and the next stage of education and the transition between them, our study makes it possible to assess the generalizability of our results across two distinct developmental stages.

### 1.4. Predictors of students' burnout trajectory profiles

When facing developmental transitions (Dietrich et al., 2012; Salmela-Aro, 2009a, 2009b), it is easy for students to expend too

much of their personal resources in an attempt to cope with the multiple challenges to which they are exposed, thereby increasing their risk of experiencing burnout (e.g., Salmela-Aro et al., 2009b; Salmela-Aro & Upadaya, 2014b). From the theoretical perspective of the self-equilibrium hypothesis (Morin et al., 2013, 2017), variables likely to support the development of a strong core sense of identity (i.e., a sense of identity that is primarily a function of the person rather than of changing life circumstances) should help developing individuals avoid the dilapidation of personal resources, thereby decreasing their risk of experiencing burnout (Gillet et al., 2022). From this theoretical standpoint, we consider two characteristics likely to help students achieve a stronger sense of identity: self-esteem and mastery goals.

*Global self-esteem* is the overall subjective evaluation of one's worth as a person that, when in the positive direction, involves self-acceptance and a positive attitude toward oneself (Baumeister et al., 2003; Donnellan et al., 2015; MacDonald & Leary, 2012; Marsh & O'Mara, 2008; Rosenberg, 1965). Low levels of global self-esteem have often been reported to represent an antecedent to burnout (e.g., Jiang et al., 2021; Lee et al., 2010; Leupold et al., 2020; Lian et al., 2014; Luo et al., 2016; Parviainen et al., 2020; Salmela-Aro & Nurmi, 2007; Virtanen et al., 2018). Various theoretical explanations have been proposed to underpin these associations. For instance, individuals with lower self-esteem tend to seek external validation of their worth/competence, making them emotionally and psychologically vulnerable when facing externally demanding or stressful situations (Gilbert et al., 2024; Rosse et al., 1991; Zeigler-Hill, 2011). These explanations are consistent with the self-equilibrium hypothesis given that global self-esteem has previously been reported to play a key role in youths' (Morin et al., 2013) and adults' (Mund & Neyer, 2016) ability to maintain stability and balance in the face of changing external or internal circumstances.

Contrasting with self-esteem, *achievement goals* reflect students' reasons for engaging in their studies (Elliot, 1999; Elliot & Thrash, 2001; Kaplan & Maehr, 2007). The original Achievement Goal Theory (AGT; Elliott & Dweck, 1988) distinguished between mastery (i.e., striving to develop competence) and performance (i.e., striving to demonstrate competence relative to peers) goals. However, recent developments highlight the need to distinguish mastery goals according to their intrinsic versus extrinsic nature and performance goals according to their approach versus avoidance orientation (Niemi-virta, 2002b; Tuominen-Soini et al., 2008, 2011), resulting in four achievement goals: (a) mastery-intrinsic, (b) mastery-extrinsic, (c) performance-approach, and (d) performance-avoidance.

Students driven by *mastery-intrinsic goals* strive for personal growth and the internal validation associated with learning new content (Heyman & Dweck, 1992; Niemi-virta, 2002b; Tuominen-Soini et al., 2008, 2011), whereas students driven by *mastery-extrinsic goals* focus on grades and other external markers as evidence of academic mastery (Heyman & Dweck, 1992; Tuominen-Soini et al., 2008, 2011). Students driven by *performance-approach goals* seek to demonstrate their competence relative to that of others, whereas students driven by *performance-avoidance goals* seek to avoid demonstrating their incompetence to others (Elliot et al., 2011; Elliot & Thrash, 2002; Hulleman et al., 2010; Senko & Dawson, 2017).

The self-equilibrium hypothesis (Morin et al., 2013, 2017) suggests that endorsing internally-driven objectives that do not depend on external contingencies should be most likely to support the development of a strong core sense of identity, which in turn should help prevent the emergence of burnout (see Crocker & Park, 2004; Kernis, 2003; Oyserman et al., 2012, and Zeigler-Hill & Wallace, 2012, for other similar theoretical perspectives). From this perspective, mastery-intrinsic goals should be most likely to help prevent burnout development whereas performance avoidance goals should be the most likely to favor burnout development. Thus far, variable- and person-centered studies anchored in the classical version of AGT have generally supported the idea that mastery-oriented students tend to display lower levels of burnout than performance-oriented students (e.g., Liu et al., 2020; Madjar et al., 2012; Nadon et al., 2020; Salmela-Aro et al., 2009b; Tuominen-Soini et al., 2012, 2020). Unfortunately, there is very little research that has longitudinally considered the role of the most current distinctions in relation to school burnout.

However, a recent study by Olivier et al. (2023) identified trajectory profiles of depressive symptoms among 2696 Finnish adolescents transitioning from lower to upper secondary school and is particularly relevant to the present investigation. Indeed, although burnout and depression are not equivalent, they share similarities, thus making this study a valuable source of indirect information (Nadon et al., 2022; Parviainen et al., 2021). In their study, Olivier et al. (2023) found that students initially endorsing higher levels of mastery intrinsic and extrinsic goals tended to follow more adaptive trajectory profiles (i.e., lower and more stable levels of depression), whereas students initially endorsing higher levels of performance approach and avoidance goals tended to follow more problematic trajectory profiles (i.e., high and stable levels of depression). These results seem to provide more support for the assumptions of the initial version of AGT (i.e., mastery versus performance goals) than to the later iteration (i.e., mastery intrinsic, mastery extrinsic, performance approach, and performance avoidance). Nonetheless, it is important to remember that depression remains a far more generalized phenomenon than burnout, which might be more intimately related to one's goal orientation specific to the school setting (e.g., Nadon et al., 2022). Our study thus investigated whether and how Olivier et al.'s (2023) results generalize to older students' burnout development.

### 1.5. Outcomes of students' burnout trajectory profiles

Previous research has shown that school burnout predicts various undesirable educational and developmental outcomes among students (see Vansoeterstede et al., 2023, and Wang et al., 2015, for reviews). To document the true practical meaningfulness and utility of the burnout trajectory profiles identified in this study, we considered their implications in relation to a variety of personal (e.g., alcohol and drug use and misuse) and educational (e.g., school dropout, underachievement) outcomes. This consideration is also consistent with the self-equilibrium hypothesis (Morin et al., 2013, 2017) as applied to burnout (Gillet et al., 2022), which suggests that the presence of a generally weak and permeable sense of identity, as implied by the presence of high and unstable burnout trajectories, should represent a generalized risk factor for various indicators of inadaptation.



### 1.5.1. School dropout

In Finland, where this study was conducted, there is a marked discrepancy between high academic achievement and low well-being (Bask & Salmela-Aro, 2013). More precisely, students on a more demanding academic track (i.e., typically leading to tertiary education) have been found to display a higher risk of school burnout, which in turn has been found to increase their risk of dropping out of school (Bask & Salmela-Aro, 2013). Similar relations have also been observed among secondary and post-secondary school students from other countries (e.g., Abreu Alves et al., 2022; Korhonen et al., 2014; Marôco et al., 2020; Parviainen et al., 2020), highlighting the need to consider school dropout as a potentially important outcome of school burnout.

### 1.5.2. Academic achievement

Madigan and Curran's (2021) meta-analysis reported a significant negative association between school burnout and academic achievement. A more recent person-centered study of school burnout provides a more nuanced look at this association (Widlund et al., 2021). More precisely, Widlund et al. (2021) found that students following low and stable burnout trajectories tended to perform better and to progress more quickly in their math curriculum relative to students following other types of burnout trajectories. In contrast, students following high and declining trajectories displayed high levels of math performance but progressed more slowly over time. Finally, students following increasing burnout trajectories were those who performed the worst overall in math. These results highlight the importance of considering academic achievement as a possible outcome of burnout among students attending higher levels of education.

### 1.5.3. Alcohol and drug use

When experiencing poor mental health, students sometimes turn to alcohol and drugs as a coping mechanism (Labouvie, 1986; Patterson & McCubbin, 1987; Wagner et al., 1999). If left unchecked and untreated, substance use can later evolve into substance use disorders (Elam et al., 2023; Sher et al., 2005; Sung et al., 2004). For example, Oller-Perret and Walburg (2018) found that burned-out secondary students tended to display higher levels of alcohol use and binge drinking than other students. In the present study, we expanded upon these previous results by considering students' levels of alcohol and drug use and misuse.

## 1.6. The present study

Our first objective was to identify, among a sample of Finnish youth followed from general upper secondary education across the transition into post-secondary education (roughly from ages 17 to 25 years), the most commonly occurring burnout trajectory profiles. Based on previous research (Chae et al., 2020; Lee & Lee, 2018; Salmela-Aro & Upadyaya, 2014a; Widlund et al., 2021; Zhou et al., 2019), we expected three to five distinct trajectory profiles (Hypothesis 1 [H1]). More precisely, we expected these profiles to match the most commonly identified burnout trajectories identified in previous research, including *Low and Stable*, *Low and Increasing*, and *High and Decreasing* trajectory profiles, although additional profiles identified less commonly in previous research (e.g., *Moderate and Stable*, *Moderate and Decreasing*) were also possible (H2). However, given that some students might experience the school transition positively, whereas others might perceive it as challenging, we also postulated that some of these profiles may be characterized by a change in their burnout trajectories before and after the transition (H3). Lastly, and in accordance with the self-equilibrium hypothesis (Morin et al., 2013, 2017) as applied to burnout (Gillet et al., 2022), we expected more favorable burnout trajectories (i.e., lower or decreasing) to display higher levels of state-like stability and less favorable burnout trajectories (i.e., higher or increasing) to display lower levels of state-like stability (H4).

Our second objective was to determine whether the likelihood of profile membership, as well as the shape of the within-profile burnout trajectories, would differ as a function of students' self-esteem and achievement goals (Jiang et al., 2021; Lee et al., 2010; Leupold et al., 2020; Lian et al., 2014; Olivier et al., 2023). We expected high initial levels of self-esteem and mastery goals (i.e., intrinsic and extrinsic) to act as personal resources, thereby increasing students' likelihood of corresponding to more adaptive profiles (H5) and of experiencing decreasing levels of burnout over time within their profile (H6). In contrast, we expected performance goals (i.e., approach and avoidance) to act as personal risk factors, thereby increasing students' likelihood of corresponding to less adaptive profiles (H7) and of experiencing increasing levels of burnout over time within their profile (H8).

Importantly, these predictive analyses were conducted controlling for students' sex and type of post-transition education program (i.e., university versus vocational/technical), both of which have been previously found to not only have strong associations with students' risk of burnout (Bask & Salmela-Aro, 2013; Herrmann et al., 2019; Salmela-Aro et al., 2008; Salmela-Aro & Tynkkynen, 2012; Salmela-Aro & Upadyaya, 2014a; Vansoeterstede et al., 2023; Widlund et al., 2021), but also with their self-esteem (e.g., Morin et al., 2013) and achievement goals (e.g., Litalien et al., 2017). When we more specifically focus on burnout, research has generally shown that girls presented a higher risk of burnout than boys (Herrmann et al., 2019; Salmela-Aro & Tynkkynen, 2012) and followed more problematic burnout trajectory profiles (Salmela-Aro & Upadyaya, 2014a; Widlund et al., 2021). Similarly, university students have also been found to display higher levels of burnout and less adaptive trajectories than students attending vocational or technical programs (Bask & Salmela-Aro, 2013; Salmela-Aro et al., 2008; Salmela-Aro & Tynkkynen, 2012; Vansoeterstede et al., 2023).

Our last objective was to investigate whether and how students' burnout trajectory profiles would be associated with their risk of school dropout, with their levels of academic achievement, and with their levels of drug and alcohol use and misuse. Following previous studies (Bask & Salmela-Aro, 2013; Madigan & Curran, 2021; Oller-Perret & Walburg, 2018; Widlund et al., 2021), we expected that students corresponding to less adaptive trajectory profiles would be more likely to drop out, to display lower levels of achievement, and to use and misuse alcohol and drugs more than their peers (H9).

## 2. Method

### 2.1. Participants and procedures

We relied on Cohort B (i.e., general upper secondary school) of the Finnish Educational Transitions project (FinEdu; [Salmela-Aro and Nurmi, 2003–2020](#)) that includes students recruited in their second year of general upper secondary school at the initial time point in the 2003–2004 academic year (ages 17–18 years;  $N = 614$ ).<sup>1</sup> The FinEdu project was approved by the research ethics committee of the Department of Psychology, University of Jyväskylä, Finland. We utilized the first five measurement points of the 513 participants (67.6% females; all reporting Finnish as their maternal language) who reported being enrolled in a formal education program after transitioning out of general upper secondary school (between Time 2 and Time 3).<sup>2</sup> Participants completed questionnaires in 2003–2004 (Time 1; ages 17–18 years;  $n = 438$ , 85.38%), 2005 (Time 2; ages 18–19 years;  $n = 463$ , 90.25%; participants could enter the study at Time 1, as well as Time 2), 2006 (Time 3; ages 19–20 years;  $n = 387$ , 75.44%), 2008/2009 (Time 4; ages 22–23 years;  $n = 390$ , 76.02%), and 2011 (Time 5; ages 24–25 years;  $n = 433$ , 84.41%). More precisely, 41.3% ( $n = 212$ ) of the sample completed all five measurement points, 34.9% ( $n = 179$ ) completed four measurement points, 17.7% ( $n = 91$ ) completed three measurement points, and only 6% ( $n = 31$ ) completed two measurement points (no participants completed only a single measurement point). Of those participants, 91% ( $n = 467$ ) reported attending university after this transition and 9% ( $n = 46$ ) reported attending another type of educational program (e.g., vocational or adult education). In 2023, 33% of Finnish students ages 15–19 year were enrolled in general upper secondary education, 27% in vocational upper secondary education, 23% in lower secondary programs, and 4% in tertiary programs ([Organisation for Economic Co-operation and Development, 2024](#)). Girls are, in general, more likely than boys to apply to the general upper secondary track compared to the vocational tracks, as are students whose parents have a higher educational level, students from nuclear families, and students with higher academic achievement ([Dobewall et al., 2019](#)).

### 2.2. Measures

#### 2.2.1. School burnout

Across all five measurement points, burnout was assessed using the 9-item Finnish School Burnout Inventory (SBI; [Salmela-Aro et al., 2009a](#)). This instrument encompasses the three burnout dimensions of (a) exhaustion (three items; e.g., “I feel I am drowning in school work”;  $\alpha_{t1} = 0.591$ ,  $\alpha_{t2} = 0.726$ ,  $\alpha_{t3} = 0.655$ ,  $\alpha_{t4} = 0.739$ ,  $\alpha_{t5} = 0.722$ ), (b) cynicism (three items; e.g., “I constantly ask myself if studying for school has any meaning”;  $\alpha_{t1} = 0.822$ ,  $\alpha_{t2} = 0.816$ ,  $\alpha_{t3} = 0.889$ ,  $\alpha_{t4} = 0.873$ ,  $\alpha_{t5} = 0.843$ ), and (c) feelings of inadequacy (three items; e.g., “I feel I have less and less to give in my studies”;  $\alpha_{t1} = 0.739$ ,  $\alpha_{t2} = 0.712$ ,  $\alpha_{t3} = 0.768$ ,  $\alpha_{t4} = 0.792$ ,  $\alpha_{t5} = 0.778$ ). These dimensions can also be used to obtain a single score of school burnout ( $\alpha_{t1} = 0.827$ ,  $\alpha_{t2} = 0.849$ ,  $\alpha_{t3} = 0.853$ ,  $\alpha_{t4} = 0.870$ ,  $\alpha_{t5} = 0.875$ ), which is the approach taken in this study. All items are rated on a 6-point scale (1 = *completely disagree*, 6 = *completely agree*).

#### 2.2.2. Achievement goals

At Time 1 (pre-transition) and Time 3 (post-transition), participants completed an instrument developed in Finnish by [Niemi-virta \(2002a, 2002b, 2004\)](#) to assess their endorsement of (a) performance-approach goals (three items; e.g., “An important goal for me in studies is to succeed better than other students”;  $\alpha_{t1} = 0.742$ ,  $\alpha_{t3} = 0.756$ ), performance-avoidance goals (two items; e.g., “It is important to me that I don’t fail in front of other students”;  $\alpha_{t1} = 0.739$ ,  $\alpha_{t3} = 0.746$ ), (c) mastery-intrinsic goals (three items; e.g., “I study in order to learn new things”;  $\alpha_{t1} = 0.873$ ,  $\alpha_{t3} = 0.902$ ), and (d) mastery-extrinsic goals (three items; e.g., “It is important to me that I get good grades”;  $\alpha_{t1} = 0.863$ ,  $\alpha_{t3} = 0.894$ ). These items are rated on a 7-point scale (1 = *does not describe me at all*, 7 = *describes me completely*).

#### 2.2.3. Self-esteem

At Time 1 (pre-transition) and Time 3 (post-transition), participants completed a short Finnish version ([Tuominen-Soini et al., 2008; Tuominen-Soini & Salmela-Aro, 2014](#)) of the [Rosenberg \(1965\)](#) Self-Esteem Inventory (five items; e.g., “I have a positive view of myself”;  $\alpha_{t1} = 0.780$ ,  $\alpha_{t3} = 0.842$ ) using a 7-point response scale (1 = *does not describe me at all*, 7 = *describes me completely*).

#### 2.2.4. School dropout

Across all time points, participants were asked to indicate whether they were still enrolled in an educational program, whether their education was completed, or whether they had dropped out of their program. This information was used to generate a binary indicator identifying participants who dropped out of education at any point in time after transitioning out of general upper secondary school (0 = No, 1 = Yes).

#### 2.2.5. Academic achievement

Academic achievement was assessed at Time 1, Time 2 (pre-transition), and Time 3 (post-transition). At each timepoint,

<sup>1</sup> In Finland, students attend 9 mandatory years of general education, after which they transition either into general upper secondary school (the most academically demanding route, leading to university), vocational upper secondary school, or adult education ([Tuominen-Soini et al., 2012](#)).

<sup>2</sup> Most participants had completed their education by the time they reached the last two time points taken in 2013–2014 and 2016–2017, making it impossible to rely on these time points in the present study given our focus on education.

participants' grade point averages from the previous year/term were recorded using an 8-point scale corresponding to the Finnish academic grading system, with lower values representing lower grades and higher values representing higher grades (i.e.,  $1 \leq 6.5$ ,  $2 = 6.5-6.9$ ,  $3 = 7.0-7.4$ ,  $4 = 7.5-7.9$ ,  $5 = 8.0-8.4$ ,  $6 = 8.5-8.9$ ,  $7 = 9.0-9.4$ , and  $8 = 9.5-10$ ).

### 2.2.6. Alcohol use and alcohol problems

At Time 1, Time 2, Time 3, and Time 5, participants self-reported the frequency of their use of alcohol (i.e., "How often do you use alcohol?") using a 5-point scale ( $1 = \text{Once a week or more often}$ ,  $5 = \text{I do not use alcohol}$ ). At Time 4, they completed additional items (i.e., "Have you considered reducing your drinking?", "Have you been annoyed about the criticism you have gotten about your drinking?", and "Have you ever felt guilt about your drinking?") related to their experience of problems associated with alcohol use using a 4-point scale ( $1 = \text{Yes, often}$ ,  $4 = \text{No, never}$ ).

### 2.2.7. Drug use

At Time 1, Time 3, and Time 4, participants self-reported the frequency of their use of drugs other than alcohol (i.e., "Have you ever tried or used drugs or medication for a narcotic purpose [e.g., hashish, ecstasy, heroin, cocaine, amphetamine, LSD, thinner, glue?]") using a 5-point scale ( $1 = \text{Never}$ ,  $5 = 5 \text{ times or more}$ ). At Time 5, this item was separated into two items to separately assess the frequency of use of hard drugs (i.e., "Have you ever tried or used hard drugs [ecstasy, amphetamine, cocaine, heroin, LSD] or medication for narcotic purpose?") versus milder drugs (i.e., "Have you ever tried or used mild drugs [cannabis products] for a narcotic purpose?") using the same response scale.

## 2.3. Analyses

### 2.3.1. Preliminary analyses

Preliminary analyses were conducted to assess the psychometric properties (i.e., factor structure, composite reliability, and measurement invariance over time) of all multi-item measures used in this study (i.e., global levels of burnout, achievement goals, and self-esteem). Factor scores were saved from the most invariant of these preliminary measurement models (i.e., to ensure comparability over time; Millsap, 2011) and were used in our main analyses. These factors scores were estimated with  $M = 0$  at Time 1 and  $SD = 1$  for the burnout measure, and with grand  $M = 0$  (over time) and  $SD = 1$  for the predictors. When compared to scale scores, factor scores provide a partial control for unreliability in addition to presenting the underlying measurement structure (DiStefano et al., 2009; Meyer & Morin, 2016). These preliminary measurement models (see Supplementary Materials Tables S1–S3) and correlations among variables and reliability (see Supplementary Materials Table S4) are reported in the Supplementary Materials.

### 2.3.2. Growth mixture analyses (GMA)

All analyses were conducted in Mplus 8.8 (Muthén & Muthén, 2022) using the maximum likelihood robust (MLR) estimator. Models including 1–8 latent trajectory profiles of burnout were estimated using 10,000 random sets of start values, 1000 iterations, 1000 second stage optimizations, and 100 final stage optimizations (Hipp & Bauer, 2006). Missing responses were handled using Full Information Maximum Likelihood (FIML) procedures, allowing us to capitalize on the entire sample of students without relying on the problematic listwise deletion of those with missing responses or missing time points (Enders, 2010; Graham, 2009). FIML allows missing responses to be conditioned on all variables in the analyses, including the variables themselves at other time points in longitudinal models, making it very robust to even very high rates of attrition (Enders, 2010; Graham, 2009). Attrition analyses were conducted to assess possible associations between the variables considered in this study and the number of time points completed by participants. These analyses revealed a single statistically significant association suggesting female participants were slightly more likely than males to complete more time points ( $b = 0.300$ ,  $SE = 0.079$ ,  $p < .001$ ,  $\beta = 0.228$ ), thus reinforcing the need to include sex in our analyses.

GMA are built from latent curve models with the goal of identifying subpopulations of participants following distinctively shaped longitudinal trajectories (e.g., Grimm et al., 2016; Morin & Litalien, 2019). To account for the effect of participants' transition between general upper secondary schooling and their next educational stage, we relied on piecewise linear GMA. Piecewise linear GMA estimate profile-specific (a) random intercepts representing initial levels of burnout (i.e., the loadings of the time-specific measures on the intercept factor are all fixed to 1), (b) pre-transition random slopes reflecting the rate of change occurring in pre-transition burnout trajectories (i.e., upper general schooling: T1–T2), and (c) post-transition random slopes reflecting the rate of change occurring in post-transition burnout trajectories (i.e., next education stage: T3–T5). The loadings of the time-specific measures on the slope factors are fixed to reflect the passage of time (in years) before (pre-transition slope: 0, 1, 2, 2, 2) or after (post-transition slope: 0, 0, 0, 3, 5) the transition.<sup>3</sup>

Statistical recommendations indicate that it is better to estimate GMA while allowing all model parameters to be freely estimated across profiles (i.e., intercept and slopes means, intercept and slopes variances and covariances, and time-specific residuals; Diallo et al., 2016; Morin et al., 2011b). However, analysts have also cautioned that this completely free estimation often results in improper

<sup>3</sup> When participants differ in age, Metha and West (2000) demonstrated that it was still appropriate to rely on uniform time codes when (a) the regression of the intercept of a latent curve model on age is equal to the slope(s) and (b) the regression of the slope(s) on age is equal to zero. In the present study, participants were close in age and both conditions were met as shown by a non-significant  $\chi^2$  difference test between a baseline model without these constraints and one incorporating both constraints ( $\Delta\chi^2 = 2.820$ ,  $df = 4$ ,  $p = .588$ ).

or nonconverging solutions that indicate overparameterization and the need to rely on simpler models (e.g., Diallo et al., 2016; Morin & Litalien, 2019). This was the case in the present study, forcing us to rely on a more parsimonious specification, established following best practices recommendations outlined in Diallo et al. (2016; also see Morin & Litalien, 2019). More precisely, intercept and slopes means were freely estimated across profiles, their variances and covariances were constrained to equality across profiles (consistent with Mplus's default parameterization), and the residuals were freely estimated across profiles but set up to be equal (i.e., homoscedastic) within each time period (i.e., before versus after the transition; Diallo et al., 2016). This piecewise homoscedastic specification means that the profiles provide an equally efficient representation of the repeated measures within each period while allowing that precision to differ across profiles and periods.

The decision of how many profiles to retain was based on the meaningfulness (i.e., each profile is interpretable and qualitatively distinct from the others), theoretical value (i.e., the profiles are consistent with theoretical expectations, when relevant), and statistical adequacy (i.e., statistically proper parameter estimates and support from statistical indicators designed to guide this selection; Marsh et al., 2009; Morin & Litalien, 2019; Muthén, 2003). Four statistical indicators were considered, including the (a) Akaike Information Criterion (AIC) and its consistent counterpart (CAIC), (b) Bayesian Information Criterion (BIC) and its sample-size adjusted counterpart (ABIC), (c) Lo-Mendel-Rubin (Lo et al., 2001) adjusted likelihood ratio (ALMR) test, and (d) bootstrap likelihood ratio test (BLRT). Lower AIC, CAIC, BIC, and ABIC scores indicate a higher level of fit to the data, whereas statistically significant ALMR or BLRT supports the value of a solution relative to one including fewer profiles. According to statistical simulation studies, the CAIC, BIC, ABIC, and BLRT provide useful information regarding the number of profiles present in the data, whereas the AIC and ALMR do not (Diallo et al., 2016, 2017; Nylund et al., 2007; Peugh & Fan, 2013; Tein et al., 2013; Tofghi & Enders, 2007). We thus only report these two indicators to ensure transparency. Identification of the optimal number of profiles present in the data serve to assess H1 whereas parameter estimates from the retained solution were used to assess H2, H3, and H4.

### 2.3.3. Predictors

To assess H5, H6, H7, and H8, predictors (i.e., self-esteem and achievement goals) and controls (i.e., sex and type of educational program) were directly included to the final solution according to a sequential strategy recommended by Diallo et al. (2017; also see Morin & Litalien, 2019). In the first model, the effects of all predictors (measured at T1 and T3) on participants' likelihood of profile membership, as well as on the intercept and slopes of their burnout trajectories, were constrained to be zero (i.e., a null model). This first model served as a baseline comparison model against which the other models would be contrasted to determine whether the predictors had any effect on participants' burnout trajectories. The next models were used to locate the specific nature of these effects. Thus, in a second model, the T1 predictors were allowed to predict participants' likelihood of profile membership. In a third model, the T3 predictors were allowed to predict participants' likelihood of profile membership. In a fourth model, the T1 predictors were allowed to predict participants' within-profile initial levels of burnout (i.e., the intercept of the burnout trajectories). In a fifth model, the effects of the T1 predictors on the within-profile pre-transition slope factor were freely estimated. In a sixth model, the effects of the T3 predictors on the within-profile post-transition slope factor were freely estimated. The second to sixth models were built upon the result from the previous model (i.e., if one type of effect is not found to contribute to the model, it is not retained in the next step). In the fourth to sixth models, when predictors were found to contribute to the prediction of the within-profile intercepts and slopes factors, a subsequent model was then estimated allowing these effects to vary across profiles.<sup>4</sup> In summary, using a baseline comparison model (i.e., the null Model 1) involving a complete lack of associations between the predictors and burnout profiles and trajectories, we sequentially tested whether T1 (Model 2) and T3 (Model 3) predictors each had an impact on participants' profile membership, whether initial predictor levels (T1) influenced initial levels of burnout within each of the profiles (Model 4) and the within-profile slope (change over time) of the burnout trajectories prior to the transition (Model 5), and whether T3 predictors levels influenced the within-profile slope (change over time) of the burnout trajectories after the transition. Each model was compared with the previous one from the sequence based on the aforementioned information criteria (i.e., CAIC, BIC, and ABIC); the model with the lowest value on two out of three of those indicators was retained (Diallo et al., 2017; Morin et al., 2016).

### 2.3.4. Outcomes

To assess H9, time-specific outcome levels were finally contrasted across all trajectory profiles using a model-based approach proposed by Lanza et al. (2013) and implemented through the Auxiliary (DCON) function (Asparouhov & Muthén, 2014; Morin & Litalien, 2019). More precisely, profiles were compared to one another based on the (a) school dropout indicator obtained by the end of the study; (b) levels of academic achievement levels measured at T1, T2, and T3; (c) levels of alcohol use reported at T1, T2, T3, and T5; (d) levels of alcohol-related problems assessed at T4; and (e) levels of drug use reported at T1, T3, T4, and T5.

## 3. Results

### 3.1. Identifying the number of burnout trajectory profiles

Results from the solutions including 1–8 profiles are reported in the top section of Table 1. The CAIC reached its lowest point almost equivalently for the 3- and 4-profile solutions (which differed by only 1 point), the BIC reached its lowest point for the 4-profile

<sup>4</sup> We also tested for the possible presence of 2- and 3-way interactions between self-esteem, achievement goals, and sex and found no evidence of moderation. These results are available upon request from the authors.



solution, the ABIC reached its lowest point almost equivalently for the 5- and 6-profile solutions (which differed by <1 point), and the BLRT supported the 5-profile solution. Solutions including 3–6 profiles were thus thoroughly examined. In relation to the four profiles illustrated in Fig. 1 (corresponding to our final solution), the 3-profile solution resulted in the identification of trajectories corresponding to Profiles 1, 3, and 4. Adding a fourth profile to the solution resulted in the estimation of a qualitatively distinct moderate and decreasing trajectory to the solution (Profile 2). In contrast, adding a fifth or sixth profile simply resulted in more extreme versions of Profiles 2 and 3 representing only a small proportion of the participants ( $\leq 5\%$ ). Based on this inspection, and in accordance with the results associated with the CAIC and BIC that also supported this solution, the 4-profile solution was retained for interpretation, thus supporting our hypothesis (H1) that 3–5 profiles would be identified. However, because this solution revealed a lack of inter-individual variability in the post-transition slope (close to zero and not statistically significant), it had to be re-estimated after fixing the covariance between this second slope and the other trajectory factors (i.e., intercept and pre-transition slope) to zero to avoid converging on improper parameter estimates resulting from this lack of variability (Diallo et al., 2016; Gillet et al., 2018; Morin et al., 2011b). The resulting model was statistically proper and had a level of fit to the data (see Table 1) consistent with that of the initial solution. Consistent with the moderate entropy of this solution (0.633), it resulted in a reasonably accurate classification of participants into their most likely profiles (range = 75.4%–84.4% across profiles, as shown in Supplementary Materials Table S5).

The final 4-profile solution is illustrated in Fig. 1 and detailed parameter estimates from this solution are reported in Table 2. This solution resulted in the identification of four qualitatively distinct profiles that were generally consistent with those commonly identified in previous research, thus supporting H2. These profiles were labeled (a) High and Decreasing (representing 14.89% of the sample), (b) Moderate and Decreasing (27.19%), (c) Low and Increasing (22.16%), and (d) Low and Stable (35.77%). When interpreting these results, it is important to recall that all burnout scores were in standardized units. Examination of the parameter estimates associated with these solutions further indicates that the levels of burnout observed in Profile 1 (High and Decreasing) only started to decrease in a statistically significant manner after the transition, whereas in Profile 2 (Moderate and Decreasing) this decrease became less pronounced after the transition. These two profiles support H3, according to which we expected to identify some profiles displaying differentially shaped trajectories before and after the transition. For Profile 3 (Low and Increasing), levels of burnout displayed a similar rate of increase before and after the transition, whereas these levels remained stable over the course of the study in Profile 4 (Low and Stable). Lastly, when we consider the time-specific residuals (i.e., reflecting participants state-like deviations from their trait-like burnout trajectory), they reveal that trajectories characterized by higher levels of burnout (such as Profile 1) tended to fluctuate more over time (i.e., higher time-specific residuals) than those characterized by lower levels of burnout (such as Profile 4). This effect was particularly pronounced in Profile 2 (Moderate and Decreasing) where the pre-transition moderate levels of burnout were associated with higher residuals than the lower post-transition levels of burnout, and in Profile 3 (Low and Increasing), where the pre-transition low levels of burnout were associated with smaller residuals than the higher post-transition levels of burnout. This last set of results aligns with H4, which expected more favorable burnout trajectories (lower or decreasing) to display higher levels of state-like stability and less favorable burnout trajectories (higher or increasing) to display lower levels of state-like stability. These results are also consistent with previous reports of self-equilibrium processes associated with burnout trajectories among teachers (Gillet et al., 2022).

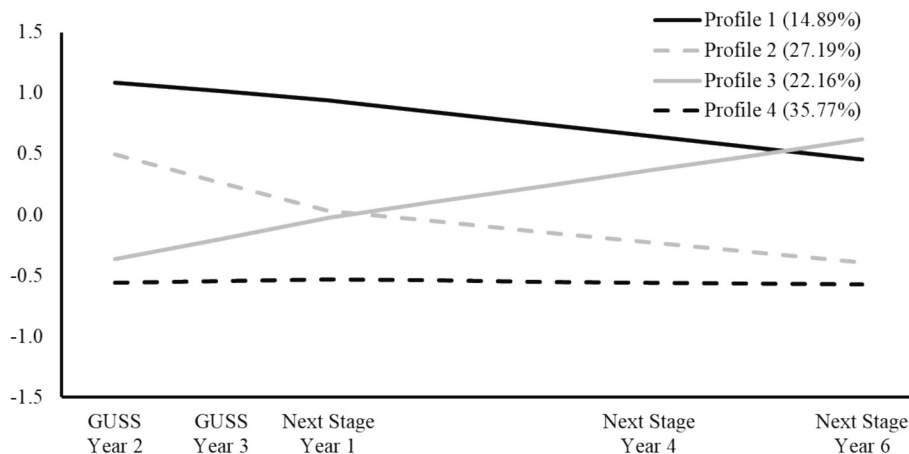
### 3.2. Self-esteem and achievement goals as predictors of the burnout trajectory profiles

The results from the predictive solutions are reported in the lower half of Table 1. Relative to the null model, the next model

**Table 1**  
Results from the growth mixture analyses.

Model	LL	#fp	S.C.	AIC	CAIC	BIC	ABIC	Entropy	aLMR	BLRT
<i>Unconditional Models</i>										
1 Profile	−2903.286	11	1.439	5828.572	5886.215	5875.215	5840.300			
2 Profiles	−2728.377	17	1.150	5490.754	5579.839	5562.839	5508.878	0.675	0.000	0.000
3 Profiles	−2693.698	23	1.163	5433.397	5553.923	5530.923	5457.917	0.669	0.015	0.000
4 Profiles	−2672.458	29	1.175	5402.916	5554.884	5525.884	5433.833	0.626	0.216	0.000
5 Profiles	−2657.415	35	1.106	5384.829	5568.239	5533.239	5422.143	0.672	0.135	0.000
6 Profiles	−2648.590	41	1.012	5379.179	5594.030	5553.030	5422.890	0.676	0.107	0.060
7 Profiles	−2648.590	47	0.883	5391.179	5637.472	5590.472	5441.286	0.701	0.056	0.000
8 Profiles	−2645.634	53	0.838	5397.267	5675.002	5622.002	5453.771	0.743	0.212	0.000
Final 4 Profiles	−2679.945	27	1.228	5413.889	5555.377	5528.377	5442.674	0.633	0.250	0.000
<i>Predictions</i>										
Null	−6496.490	117	1.391	13,226.980	13,840.092	13,723.092	13,351.715	0.633	NA	NA
C ON T1	−6426.389	138	1.319	13,128.779	13,851.937	13,713.937	13,275.902	0.679	NA	NA
C ON T1 + T3	−6407.730	153	1.314	13,121.459	13,923.221	13,770.221	13,284.575	0.693	NA	NA
C I ON T1	−6407.014	145	1.384	13,104.028	13,863.868	13,718.868	13,258.614	0.708	NA	NA
C S1 ON T1	−6421.328	145	1.313	13,132.655	13,892.495	13,747.495	13,287.241	0.677	NA	NA
C ON T1 + S2 ON T3	−6422.933	145	1.312	13,135.866	13,895.706	13,750.706	13,290.452	0.678	NA	NA

*Note.* #fp = Number of Free Parameters; S.C. = scaling factor; AIC = Akaike Information Criteria; CAIC = Constant AIC; BIC = Bayesian Information Criteria; ABIC = Sample-Size adjusted BIC; aLMR = Adjusted Lo-Mendell-Rubin likelihood ratio test; BLRT = Parametric Bootstrapped Likelihood Ratio Test; NA = Not applicable; C = Profile membership; I = Intercept factor; S1 = Pre-transition slope factor; S2 = Post-transition slope factor; T1 = Pre-transition scores on the predictors; T3 = Post-transition scores on the predictors.



**Fig. 1.** Profiles of burnout trajectories.

*Note.* GUSS = General upper secondary school; Profile 1 = High and Decreasing; Profile 2 = Moderate and Decreasing; Profile 3 = Low and Increasing; Profile 4 = Low and Stable. The repeated measures of burnout are factor scores estimated with  $M = 0$  at Time 1 and  $SD = 1$  over time.

**Table 2**

Parameter estimates for the final unconditional growth mixture solution.

	Profile 1 (High and Decreasing)	Profile 2 (Moderate and Decreasing)	Profile 3 (Low and Increasing)	Profile 4 (Low and Stable)
Parameter	Estimate ( <i>t</i> )	Estimate ( <i>t</i> )	Estimate ( <i>t</i> )	Estimate ( <i>t</i> )
Intercept Mean	1.086 (4.456)**	0.495 (1.685)	-0.367 (-3.510)**	-0.558 (-7.618)**
Pre-Transition Slope Mean	-0.072 (-0.646)	-0.232 (-4.634)**	0.172 (5.115)**	0.013 (0.474)
Post-Transition Slope Mean	-0.097 (-3.153)**	-0.085 (-3.871)**	0.128 (3.374)**	-0.008 (-0.755)
Intercept Variability ( $SD = \sqrt{\sigma}$ )	0.379 (4.483)**	0.379 (4.483)**	0.379 (4.483)**	0.379 (4.483)**
Pre-Transition Slope Variability ( $SD = \sqrt{\sigma}$ )	0.122 (2.005)*	0.122 (2.005)*	0.122 (2.005)*	0.122 (2.005)*
Post-Transition Slope Variability ( $SD = \sqrt{\sigma}$ )	0.045 (1.476)	0.045 (1.476)	0.045 (1.476)	0.045 (1.476)
Intercept vs. Pre-Transition Slope Correlation	-0.512 (-3.454)**	-0.512 (-3.454)**	-0.512 (-3.454)**	-0.512 (-3.454)**
Intercept vs. Post-Transition Slope Correlation	0 (fixed)	0 (fixed)	0 (fixed)	0 (fixed)
Pre- vs. Post- Transition Slopes Correlation	0 (fixed)	0 (fixed)	0 (fixed)	0 (fixed)
$SD(\epsilon_{yi})$ T1–T2	0.817 (2.962)**	0.624 (4.791)**	0.414 (5.007)**	0.298 (4.295)**
$SD(\epsilon_{yi})$ T3–T5	0.919 (3.118)**	0.485 (2.117)*	0.867 (7.953)**	0.318 (8.570)**

*Note.*  $t$  = Estimate/standard error of the estimate ( $t$  values are computed from the original variance estimates and not from the square root of these estimates);  $SD(\epsilon_{yi})$  = Standard deviation of the time-specific residual; The square root of the estimate of variability (trajectory factor, time-specific residual) is presented so that the results can be interpreted in the same unit as the construct used in the model (here, standardized factor score with  $M = 0$  at Time 1 and  $SD = 1$  over time); T1–T2 = Pre-transition; T3–T5 = Post-transition.

\* $p \leq .05$ . \*\* $p \leq .01$ .

including associations between the T1 predictors and profile membership resulted in a decrease in the value of the BIC and ABIC and was thus retained. The next model, including associations between the T3 predictors and profile membership resulted in an increase in the value of all information criteria, leading to its rejection. Likewise, the model including associations between the T1 predictors and the intercepts of the trajectories was also rejected based on higher values on the CAIC and BIC. Finally, the last two models also resulted in an increase in the value of all information criteria, leading to their rejection. These results are consistent with an effect of the T1, but not T3, predictors limited to profile membership. The parameter estimates associated with all models further supported this conclusion, leading us to retain the model including effects of the T1 predictors on profile membership. The results from these models are reported in Table 3.

These results first showed that neither sex nor the type of post-transition education program had an impact on participants' likelihood of profile membership. In contrast, higher levels of self-esteem were associated with an increase in participants' likelihood of membership into the Low and Stable (Profile 4) burnout trajectory profile relative to all other profiles, as well as into the Moderate and Decreasing (Profile 2) and Low and Increasing (Profile 3) burnout trajectory profiles relative to the High and Decreasing (Profile 1) profile. Just like self-esteem, mastery extrinsic goals were associated with an increase in the likelihood of membership into the Low and Stable (Profile 4) burnout trajectory profile relative to all other profiles. These goals were also associated with a higher likelihood of membership into the Low and Increasing (Profile 3) burnout trajectory profiles relative to the High and Decreasing (Profile 1) profile. Performance avoidance goals were associated with an increase in participants' likelihood of membership into the High and Decreasing (Profile 1) and Moderate and Decreasing (Profile 2) burnout trajectory profiles relative to the Low and Increasing (Profile 3) and Low and Stable (Profile 4) profiles. Neither performance approach goals nor mastery intrinsic goals shared any associations with

**Table 3**

Associations between the predictors and the participants' likelihood of profile membership.

Predictors	Profile 1 vs. Profile 4		Profile 2 vs. Profile 4		Profile 3 vs. Profile 4	
	Coeff (SE)	OR	Coeff (SE)	OR	Coeff (SE)	OR
Sex (0 = male, 1 = female)	0.779 (0.524)	2.178	0.042 (0.508)	1.043	0.340 (0.408)	1.405
Program (0 = Voc./Tech, 1 = University)	−0.316 (0.719)	0.729	0.306 (0.797)	1.357	1.938 (1.118)	6.947
Performance Approach	0.550 (0.441)	1.733	0.085 (0.396)	1.089	0.152 (0.314)	1.164
Performance Avoidance	1.324 (0.382)**	3.760	0.774 (0.373)*	2.168	0.141 (0.292)	1.152
Mastery Intrinsic	0.065 (0.324)	1.067	−0.097 (0.261)	0.907	0.261 (0.279)	1.299
Mastery Extrinsic	−2.080 (0.447)**	0.125	−1.419 (0.391)**	0.242	−0.722 (0.353)*	0.486
Self-Esteem	−1.335 (0.287)**	0.263	−0.786 (0.286)**	0.456	−0.607 (0.265)*	0.545

Predictors	Profile 1 vs. Profile 3		Profile 2 vs. Profile 3		Profile 1 vs. Profile 2	
	Coeff (SE)	OR	Coeff (SE)	OR	Coeff (SE)	OR
Sex (0 = male, 1 = female)	0.438 (0.572)	1.550	−0.298 (0.476)	0.742	0.736 (0.495)	2.088
Program (0 = Voc./Tech, 1 = University)	−2.255 (1.375)	0.105	−1.633 (1.325)	0.195	−0.622 (0.664)	0.537
Performance Approach	0.398 (0.452)	1.489	−0.067 (0.378)	0.935	0.465 (0.422)	1.592
Performance Avoidance	1.183 (0.383)**	3.264	0.633 (0.303)*	1.882	0.551 (0.378)	1.734
Mastery Intrinsic	−0.196 (0.384)	0.822	−0.359 (0.280)	0.699	0.163 (0.265)	1.177
Mastery Extrinsic	−1.359 (0.430)**	0.257	−0.697 (0.395)	0.498	−0.661 (0.377)	0.516
Self-Esteem	−0.728 (0.298)*	0.483	−0.179 (0.280)	0.836	−0.549 (0.223)*	0.578

Note. Coef = Regression coefficient (these are multinomial logistic regression coefficients for the prediction of profile membership and unstandardized multiple regression coefficients for the prediction of the intercept and slope factors); SE = standard error of the coefficient; OR = Odds ratio;  $\beta$  = standardized multiple regression coefficients. The multinomial logistic regression coefficients and OR reflect the predictor effects on the likelihood of membership in the bottom listed profile relative to the top listed profile; apart from sex and program, the other predictors are factors scores estimated with  $M = 0$  over time and  $SD = 1$ ; Profile 1 = High and Decreasing; Profile 2 = Moderate and Decreasing; Profile 3 = Low and Increasing; Profile 4 = Low and Stable.

\* $p \leq .05$ . \*\* $p \leq .01$ .

**Table 4**

Associations between profile membership and the outcomes.

	Profile 1 (High & Decreasing) Mean [95% Confidence Interval]	Profile 2 (Mod. & Decreasing) Mean [95% Confidence Interval]	Profile 3 (Low & Increasing) Mean [95% Confidence Interval]	Profile 4 (Low & Stable) Mean [95% Confidence Interval]	Summary of Significant Differences
<i>Dropout (0 = No; 1 = Yes)</i>	0.418 [0.302, 0.534]	0.279 [0.201, 0.357]	0.279 [0.195, 0.363]	0.262 [0.195, 0.329]	1 > 2 = 3 = 4
<i>Achievement (1 = Low to 8 = High)</i>					
Time 1	5.416 [5.112, 5.720]	5.702 [5.494, 5.910]	6.186 [5.970, 6.402]	6.004 [5.822, 6.186]	3 = 4 > 1 = 2
Time 2	3.903 [3.566, 4.240]	4.628 [4.383, 4.873]	5.488 [5.225, 5.751]	5.116 [4.895, 5.337]	3 > 4 > 2 > 1
Time 3	4.726 [4.342, 5.110]	4.886 [4.612, 5.160]	5.589 [5.311, 5.867]	5.482 [5.247, 5.717]	3 = 4 > 1 = 2
<i>Alcohol Use (1 = High to 5 = Low)</i>					
Time 1	3.443 [3.169, 3.717]	3.239 [3.035, 3.443]	3.513 [3.292, 3.734]	3.571 [3.395, 3.747]	4 > 2; 1 = 2 = 3; 1 = 3 = 4
Time 2	2.332 [2.093, 2.571]	2.743 [2.547, 2.939]	2.959 [2.730, 3.188]	2.739 [2.559, 2.919]	2 = 3 = 4 > 1
Time 3	2.728 [2.403, 3.053]	2.540 [2.311, 2.769]	2.666 [2.425, 2.907]	2.505 [2.295, 2.715]	1 = 2 = 3 = 4
Time 5	2.612 [2.300, 2.924]	2.623 [2.402, 2.844]	2.322 [2.101, 2.543]	2.436 [2.242, 2.630]	1 = 2 = 3 = 4
<i>Alcohol Related Problems (Time 4)</i>					
Attempts to Reduce (1 = High to 4 = Low)	2.576 [2.302, 2.850]	3.079 [2.899, 3.259]	3.038 [2.866, 3.210]	3.291 [3.136, 3.446]	2 = 3 > 1; 2 = 4 > 1; 4 > 3
Criticism (1 = High to 4 = Low)	2.847 [2.580, 3.114]	3.418 [3.259, 3.577]	3.358 [3.203, 3.513]	3.546 [3.413, 3.679]	2 = 3 = 4 > 1
Guilt (1 = High to 4 = Low)	2.537 [2.276, 2.798]	3.070 [2.884, 3.256]	3.015 [2.839, 3.191]	3.084 [2.913, 3.255]	2 = 3 = 4 > 1
<i>Drug Use (1 = Low to 4 = High)</i>					
Time 1 (Any)	1.373 [1.169, 1.577]	1.164 [1.064, 1.264]	1.141 [1.039, 1.243]	1.215 [1.113, 1.317]	1 > 3; 1 = 2 = 4; 2 = 3 = 4
Time 3 (Any)	1.661 [1.361, 1.961]	1.290 [1.137, 1.443]	1.066 [0.993, 1.139]	1.263 [1.128, 1.398]	1 > 2 = 4 > 3
Time 4 (Any)	1.809 [1.482, 2.136]	1.527 [1.331, 1.723]	1.345 [1.188, 1.502]	1.360 [1.205, 1.515]	1 > 3 = 4; 1 = 2; 2 = 3 = 4
Time 5 (Mild)	2.034 [1.720, 2.348]	1.653 [1.457, 1.849]	1.564 [1.366, 1.762]	1.621 [1.449, 1.793]	1 > 2 = 3 = 4
Time 5 (Hard)	1.316 [1.110, 1.522]	1.130 [1.036, 1.224]	1.029 [0.984, 1.074]	1.069 [1.008, 1.130]	1 > 2 = 3 = 4

participants' likelihood of profile membership. These results support H5 in relation to self-esteem and mastery extrinsic goals that were both expected to increase the likelihood of membership into more adaptive profiles. They also support H7 in relation to performance avoidance goals that were expected to increase students' likelihood of membership into less adaptive profiles. However, they fail to support these hypotheses in relation to mastery intrinsic (expected to play a role like self-esteem and mastery intrinsic goals) and performance approach (expected to play a role similar to performance avoidance goals) goals. Finally, and failing to support H6 and H8 (i.e., expected associations between the predictors and within-profile changes in burnout levels), none of the predictors was found to be associated with within-profile variability in the shape of students' burnout trajectories.

### 3.3. Outcomes of the burnout trajectory profiles

Our last hypothesis (H9) expected the less-adaptive trajectory profiles to display higher levels of drop out, lower levels of achievement, and higher levels of alcohol and drug use and misuse. Comparison of the burnout trajectory profiles in relation to the outcomes are reported in Table 4. Consistent with H9, post-transition risks of dropping out of school were higher in Profile 1 (High and Decreasing) than in all other profiles, which did not differ from one another in this regard. Also consistent with H9, retrospective levels of achievement measured at T1, T2, and T3 (i.e., pre-transition) were highest in Profile 3 (Low and Increasing), followed by Profile 4 (Low and Stable), then by Profile 2 (Moderate and Decreasing), and were lowest in Profile 1 (High and Decreasing). However, the first two and the last two pairs of profiles did not differ at T1 and T3 (i.e.,  $3 = 4 > 1 = 2$ ).

At T1, alcohol use (higher scores reflect lower levels of use) was lower in Profile 4 (Low and Stable) than in Profile 2 (Moderate and Decreasing), with no other statistically significant differences. At T2, alcohol use was higher in Profile 1 (High and Decreasing) than in all other profiles, which did not differ from one another. At T3 and T5, alcohol use no longer differed between profiles. These results suggest a generic lack of difference between profiles in terms of alcohol use, although early levels of alcohol use seemed to share small associations with participants' levels of burnout. In contrast, alcohol related problems (all measured at T4, with higher scores indicating fewer problems) were clearly more present in Profile 1 (High and Decreasing) than in all other profiles. Attempts to reduce alcohol use were also higher in Profile 4 (Low and Stable) than in Profile 3 (Low and Increasing). Lastly, levels of drug use (any drug use at T1, T2, T4; mild and hard drug use at T5) were systematically higher in Profile 1 (High and Decreasing) than in all other profiles, although differences were less marked at T1 than at the other time points. Moreover, immediately after the transition (T3), levels of any drug use were also higher in Profiles 2 (Moderate and Decreasing) and 4 (Low and Stable) than in Profile 3 (Low and Increasing). This last set of results lend additional – albeit partial – support to H9 by showing that Profile 1 (High and Decreasing) displayed slightly higher early levels alcohol use, more alcohol-related problems, and higher levels of drug use compared to other profiles.

## 4. Discussion

Academic transitions are critical periods of human development when exposure to a variety of co-occurring biopsychosocial transformations is likely to increase youths' risks of experiencing school burnout (Caspi, 2002; Eccles & Roeser, 2009; Salmela-Aro & Tynkkynen, 2012; Tuominen-Soini & Salmela-Aro, 2014; Vansoeterstede et al., 2023; Walburg, 2014; Wang et al., 2015). Although most students transition from upper secondary to post-secondary education without facing major problems, some have difficulty adjusting to their new educational context and early adulthood (Tuominen-Soini & Salmela-Aro, 2014; Vansoeterstede et al., 2023; Wang et al., 2015). The present study sought to increase our understanding of the school burnout trajectories unfolding when upper secondary students transition into higher education. We found evidence supporting the developmental heterogeneity of the school burnout trajectories observed among students undergoing this transition. We also found that the most adaptive trajectory, at least from the perspective of personal and academic outcomes, involved low and stable levels of burnout, whereas the least adaptive trajectory involved high initial levels of burnout that decreased somewhat over time. Moreover, by demonstrating significant associations between students' self-esteem and achievement goals and their membership into the burnout trajectory profiles identified in our study, our results suggest important avenues for intervention, highlighting the importance of prevention and early intervention.

### 4.1. Burnout trajectory profiles

Consistent with H1 and H2, our results revealed four distinct trajectory profiles, displaying High and Decreasing (Profile 1), Moderate and Decreasing (Profile 2), Low and Increasing (Profile 3), and Low and Stable (Profile 4) school burnout trajectories. These profiles were generally consistent with those identified in previous studies of school burnout conducted among younger (Lee & Lee, 2018; Salmela-Aro & Upadyaya, 2014a; Sorkkila et al., 2019; Widlund et al., 2021; Zhou et al., 2019) or older (Chae et al., 2020) student populations. Our High and Decreasing profile (Profile 1) was the smallest (14.89%) and displayed initially high levels of burnout that only started to decrease *after* the transition. A similar profile was identified in previous studies (Salmela-Aro & Upadyaya, 2014a; Zhou et al., 2019). This profile thus seems to characterize highly burned-out upper secondary school students whose functioning started to improve slightly but slowly, after the transition, possibly because of exposure to a slightly more adaptive learning environment or improved personal resources (e.g., Salmela-Aro et al., 2009a). However, despite experiencing a reduction in burnout levels, these students retained the highest burnout levels at the end of the study, suggesting that their initially high levels of burnout are unlikely to simply fade away on their own in the absence of intervention.

Conversely, our Moderate and Decreasing profile (Profile 2) initially displayed moderate levels of burnout that decreased significantly *before* the transition but became more stable *after* the transition. Indeed, although they kept on decreasing, the rate of decrease was much lower after the transition. The fact that a similar profile was only identified in one prior study (Salmela-Aro & Upadyaya,

2014a) suggests that this profile may be more typical of transitional periods. This profile likely depicts students who experienced moderately high levels of burnout during their upper secondary school years, perhaps because of investing a high level of energy in their studies, but who seem to improve as their upper secondary school years progressed, possibly as a result of becoming increasingly familiar with the requirements of their educational programs. As a result of this sharp decrease, these students managed to enter the next stage of their education with more normative (i.e., average) levels of burnout that kept on decreasing over time. These students thus seem generally well-adjusted to their post-secondary education context (Dietrich et al., 2012; Salmela-Aro & Upadyaya, 2014b). This profile is consistent with the average trends typically reported in research showing that burnout levels tend to decrease and stabilize as students progress in their education (e.g., Tuominen-Soini & Salmela-Aro, 2014; Vansoeterstede et al., 2023; Wang et al., 2015). The fact that this profile matches normative tendencies is consistent with the observation that it is one of the largest profiles identified in this study, corresponding to 27.19% of the sample.

The trajectories observed in these two profiles were consistent with H3 in revealing a change in the shape of burnout trajectories as students transitioned into the next stages of their education. This observation is consistent with the recognized impact of academic transitions for exposed students, showing that these transitions can indeed represent important turning points for students in terms of well-being and adaptation (Dietrich et al., 2012; Salmela-Aro, 2012). From a stage-environment fit perspective, shifts in well-being can arise when there is either a match or a mismatch between students' developmental needs and the opportunities provided by their institutions, particularly following academic transitions (Eccles & Midgley, 1989; Eccles & Roeser, 2009, 2011; Tuominen-Soini et al., 2012). Our first two profiles generally suggest that the transition to post-secondary education seems to help reduce, or stabilize already reduced, levels of burnout for 40% of the students (Pittman & Richmond, 2008; Posselt & Lipson, 2016; Salmela-Aro et al., 2008).

In contrast, the remaining profiles displayed trajectories that generally remained unchanged upon entry into post-secondary education, suggesting that the post-secondary school environment remains similar to the upper secondary school environment, at least in terms of its ability to support students' developmental needs (Eccles & Midgley, 1989; Eccles & Roeser, 2009, 2011; Tuominen-Soini et al., 2012). Thus, our Low and Increasing profile (Profile 3), corresponding to 22.16% of the sample, displayed initially low levels of burnout that steadily increased over time, seemingly unaffected by the transition, even reaching the levels of burnout observed in the first profile by the end of the study. A similar profile has been reported in most previous studies (Lee & Lee, 2018; Salmela-Aro & Upadyaya, 2014a; Widlund et al., 2021; Zhou et al., 2019). This profile is particularly worrisome as it describes students whose functioning becomes increasingly more problematic over time, placing them at risk of experiencing a difficult entry into adulthood and into the workforce (Dietrich et al., 2012; Salmela-Aro, 2012). These students may struggle more than their peers with the requirements of higher levels of education (e.g., academic load, too much autonomy, pressure to excel) without being able to muster the social or personal resources needed to adequately cope with these requirements (Salmela-Aro et al., 2009b; Salmela-Aro & Upadyaya, 2014b).

Our Low and Stable profile (Profile 4) was fortunately the largest (35.77%), displaying persistently low levels of burnout over time. A similar profile was consistently identified in previous studies (Chae et al., 2020; Lee & Lee, 2018; Salmela-Aro & Upadyaya, 2014a; Sorkkila et al., 2019; Widlund et al., 2021; Zhou et al., 2019) and arguably reflects the fact that, for a number of developing youth, developmental and educational transitions are positive experiences that remain untainted by negative emotions and adaptive difficulties (e.g., Dietrich et al., 2012; Morin et al., 2013, 2017).

Interestingly, the nature of the burnout trajectories identified within those four profiles was consistent with H4, thus supporting the relevance of the self-equilibrium hypothesis in relation to school burnout (Gillet et al., 2022; Morin et al., 2013, 2017). Indeed, in the present study, lower levels of burnout, as well as decreasing burnout trajectories, were both found to fluctuate less over time at the state level compared to higher or increasing burnout trajectories. More precisely, this hypothesis states that individuals with a strong core sense of identity (i.e., those able to retain a stable sense of identity despite experiencing internal and external changes) should display more adaptive trait-like trajectories over time (low and stable or decreasing trajectories). Those individuals also display trajectories characterized by fewer state-like deviations over time, consistent with the presence of smoothly evolving identity processes that remain relatively impervious to internal or external contingencies (Crocker & Park, 2004; Kernis, 2003; Zeigler-Hill & Wallace, 2012). Beyond its theoretical interest, this result suggests that short-term interventions are unlikely to be sufficient to curb less adaptive burnout trajectories if they ignore the stable, trait-like, identity processes likely to underpin these trajectories (Gillet et al., 2022; Morin et al., 2013, 2017). Conversely, from a resilience perspective, these results suggest that students displaying low burnout trajectories are also unlikely to develop burnout following exposure to short-term changes in life circumstances.

#### 4.2. Predictors of students' burnout trajectory profiles

Our results revealed associations between students' achievement goals and self-esteem and their profile membership. These associations were only partially consistent with H5 and H7 as the associations involving achievement goals were found to be limited to mastery extrinsic (rather than mastery intrinsic) and performance avoidance (rather than performance approach) goals. In alignment with H5, our results supported the role of self-esteem and mastery extrinsic goals as important personal resources likely to help students navigate the changing nature of their educational context while limiting their risk of experiencing school burnout. Our results were generally consistent with this assertion, showing that students presenting high initial levels of global self-esteem and mastery extrinsic goals were more likely to belong to the Low and Stable burnout profile (Profile 4) than to any of the other profiles. Moreover, students with high initial levels of self-esteem were more likely to belong to the Moderate and Decreasing profile (Profile 2) and displayed a level of burnout similar to that of the Low and Stable profile by the end of the study relative to the remaining profiles (i.e., High and Decreasing profile and Low and Increasing profile).

In relation to self-esteem, these results are consistent with the idea that self-esteem is a core component of one's identity that is particularly helpful in preserving well-being when facing challenges and transitions (Craven & Marsh, 2008). This interpretation is



consistent with the self-equilibrium hypothesis (Morin et al., 2013, 2017) that was developed to highlight the ability of strong self-esteem levels to remain unaffected by temporary situational changes. As we found similar processes to characterize burnout trajectories (Gillet et al., 2022), it makes sense for self-esteem to play a role in generalizing self-equilibrium processes to other components of students' functioning.

In relation to mastery extrinsic goals, finding that these goals played a stronger and more positive role than mastery intrinsic goals was not entirely expected. For example, seeking to achieve mastery has repeatedly been found to predict higher levels of adaptation and success than the pursuit of performance (e.g., Elliot, 1999; Elliot & Thrash, 2001; Kaplan & Maehr, 2007), which is consistent with the benefits of these goals observed in the present study. Conversely, students pursuing mastery extrinsic goals also tend to focus on performance, not as an end as an external contingency or as a social comparison benchmark, but as an indicator of their own levels of mastery. However, the self-equilibrium hypothesis suggests that the pure pursuit of mastery for its own sake in a way that is disconnected from external contingencies (i.e., mastery intrinsic) should have resulted in even more benefits than pursuing mastery in a way that remains connected to external contingencies (see Crocker & Park, 2004; Kernis, 2003, and Zeigler-Hill & Wallace, 2012, for other theoretical perspectives converging on similar conclusions). In any case, our results suggest that when both types of goals are jointly considered as possible predictors of burnout trajectories across the transition from upper secondary school to post-secondary education, mastery extrinsic goals are most impactful. This interesting perspective could possibly reflect the unique nature of upper secondary schooling in Finland, which is highly rigorous academically, and in which grades coupled with a very demanding entrance examination are critically important for admission into higher education (Salmela-Aro et al., 2008; Tuominen-Soini et al., 2012). It is important to keep in mind that we focused here on students who have never left the academic track, relative to returning students who may wish to pursue a career more aligned with their own interest after a first attempt. In this context, seeking mastery for its own sake might not be enough to prevent burnout, whereas seeking a sense of mastery anchored in external validation procedures might be more beneficial (Gilbert et al., 2024). However, it is important to note that mastery extrinsic goals were also found to be associated with students' likelihood of belonging to the Low and Increasing profile (Profile 3) relative to the High and Decreasing profile (Profile 1), suggesting that these goals may not always be enough to prevent the development of burnout over longer periods of time. Clearly, these results call for further studies investigating the role of mastery-intrinsic and mastery-extrinsic goals in relation to student psychological health, and particularly for studies seeking to understand how the role of these goals may change across education levels.

In alignment with H7, our results demonstrated the harmful nature of performance avoidance goals that were associated with membership into the two profiles displaying the highest initial levels of burnout (i.e., High and Decreasing profile and Moderate and Decreasing profile). This finding supports the well-established association between performance avoidance goals and student burnout (Nadon et al., 2022; Sorkkila et al., 2018; Tuominen et al., 2020; Tuominen-Soini et al., 2008). Moreover, it is also consistent with the idea that students who rely too much on external contingencies to assess their own value, preferring avoidance rather than the risk of failure, should display more problematic burnout trajectories characterized by more numerous and pronounced state-like fluctuations resulting from these contingencies (Crocker & Park, 2004; Kernis, 2003; Morin et al., 2013, 2017; Zeigler-Hill & Wallace, 2012). It was more surprising to find a lack of associations between performance-approach goals and student burnout trajectory profiles. Although this last result calls for further investigation, it also reinforces previous results showing that performance-avoidance goals may be far more damaging to student mental health than performance-approach goals (e.g., Ellis et al., 2019; Winch et al., 2015). For instance, previous research has shown that performance approach goals may even be helpful when they occur in combination with other types of goals (see Wormington & Linnenbrink-Garcia, 2017, for a review). This last finding suggests that the lack of effects of performance approach goals may have come from the multivariate nature of our analyses, implying that once all types of goals are jointly considered, the core driver of burnout seems to be performance-avoidance goals.

Lastly, our results failed to support H6 and H8, showing that neither initial nor post-transition levels of self-esteem and achievement goals were associated with within-profile changes in the shape of students' burnout trajectories over time. This finding suggests that initial levels (Time 1) of self-esteem and achievement goals are critical when it comes to understanding their role in students' burnout, so much that changes over time in these levels do not seem to help limit the beneficial or harmful effects of early levels. These results support the idea that students' self-esteem and achievement goals operate at the trait, rather than the state, level, which is consistent with the theoretical positioning of achievement goals as relatively stable dispositional tendencies (see Monni et al., 2020, for a review). These results also align with the observation that self-esteem tends to display a relatively high level of longitudinal stability at the trait level (e.g., Morin et al., 2011a, 2013). From a practical perspective, these results highlight the importance of early interventions designed to exert a lasting impact (i.e., trait) rather than of punctual interventions seeking to provide short-term relief.

#### 4.3. Outcomes of students' burnout trajectory profiles

In terms of academic outcomes, we found that students from the High and Decreasing profile (Profile 1) were those with the highest risk of dropping out of school and those presenting the lowest levels of upper secondary school achievement. Moreover, levels of upper secondary school achievement were highest in the two profiles displaying the lowest pre-transition levels of burnout (i.e., Low and Stable profile and Low and Increasing profile), whereas students from the Moderate and Decreasing profile fell in between these two extremes. These results are consistent with H9 and with previous reports showing that levels of school burnout tend to be negatively associated with important academic outcomes (Bask & Salmela-Aro, 2013; Madigan & Curran, 2021; Widlund et al., 2021). Importantly, the current results suggest that the high levels of achievement observed in the Low and Increasing profile might have taken a long-term toll on the well-being of these students as reflected in their steadily increasing levels of burnout over time. In turn, this would suggest that burnout and achievement may be dynamically and bidirectionally related over time, at least for some students. It would be interesting for future studies to test these suggestions by assessing whether the present associations generalize to post-secondary levels

of achievement and whether burnout and achievement levels are mutually linked during these educational stages and transitions.

In terms of personal outcomes, our results showed that at Time 1, students from the Low and Stable profile displayed less alcohol use than those from the Moderate and Decreasing profile. However, after the post-secondary transition (i.e., Time 3 and Time 5), these profiles no longer differed from one another. These results suggest that this small association between profile membership and alcohol use early in upper secondary school may only reflect a transient phenomenon, either limited to the early stages of alcohol use, or simply reflecting random sampling variations. However, it is interesting to note that students corresponding to the Low and Stable profile also reported more attempts to reduce their drinking than members of some of the other profiles, which also suggest that their reduced levels of alcohol use after Time 1 may have resulted from their own efforts. In contrast, students corresponding to the High and Decreasing profile displayed the highest levels of alcohol use at Time 2 and, although this difference did not persist over time, they also displayed the highest levels of alcohol-related problems at Time 4. These students also reported the highest levels of drug use across all time points. These results are generally consistent with H9 as well as with the previous results (Oller-Perret & Walburg, 2018), suggesting that exposure to persistently high levels of burnout seems to be accompanied by a higher risk of alcohol-related problems and drug use, possibly as a way to help cope with their distress (Labouvie, 1986; Patterson & McCubbin, 1987; Wagner et al., 1999).

#### 4.4. Practical implications

Our results have practical implications for clinicians and educators who wish to support the psychosocial and educational well-being of adolescents and young adults. First, our reliance on a person-centered longitudinal approach benefits the practice of school psychology by enhancing our understanding of the different ways in which students develop school burnout over time and how these trajectory profiles are differentially related to achievement goals, self-esteem, dropout, achievement, and substance use. The identification of distinct subpopulations of students differing in their longitudinal development of burnout across the transition into post-secondary education allows for the application of more targeted and developmentally appropriate interventions specifically tailored to different types of students (e.g., Morin & Marsh, 2015).

From our standpoint, two profiles (comprising 37% of our sample) should be closely monitored by educators and clinicians. The High and Decreasing profile was clearly the most problematic one, depicting students who, despite showing an overall decline in their levels of burnout over time, maintained high levels of burnout throughout upper secondary school and higher education. As these students also seemed to experience the worst educational and personal outcomes, they are the most obvious in their need for support. However, our results also suggest that it may be equally important to monitor students displaying a Low and Increasing burnout trajectory, especially because these students displayed similar levels of burnout as their peers from the High and Decreasing profile by the end of the study. Luckily, their low levels of burnout early in upper secondary school may protect them from other adverse outcomes during this critical period (e.g., substance misuse). However, although these students may appear personally and educationally well-adjusted during their upper secondary school years, their strong academic performance in upper secondary school may come at a long-term cost to their well-being that may place them at risk of experiencing deterioration in their mental health throughout adulthood. Surprisingly, although these students might have experienced a difficult transition into upper secondary school, this transition seems to have resulted from their already progressively increasing levels of burnout, which continued to increase after the transition.

Fortunately, intervention efforts seeking to cultivate mastery goals and self-esteem (i.e., found to support membership into the Low and Stable profile relative to the Low and Increasing profile) could possibly help these students presenting low levels of burnout in upper secondary school maintain similarly low levels of burnout after the post-secondary transition. To maximally cultivate mastery goals, upper secondary school teachers should be encouraged to emphasize individual competence over grades and social comparisons, avoid practices that enable competition between students, introduce more formative assessment measures, and allow students to tailor their learning in personally meaningful ways whenever possible (Cauley & McMillan, 2010; Nadon et al., 2020; Yeager et al., 2016). Likewise, to cultivate self-esteem, educators should praise success, model an internal locus of control, encourage students to set achievable and measurable goals, help students recognize their strengths and successes, and encourage connectedness between peers (Bruno & Njoku, 2014; Canfield, 1990; King et al., 2002). Considering that initial levels of mastery goals and self-esteem were most critical in predicting profile membership, the measures described above should be implemented as early as possible, possibly even before upper secondary school. By ensuring that the school environment helps cultivate self-esteem and mastery goals early in youth development, interventions could help reduce burnout across all stages of education and transitions.

#### 4.5. Limitations and future directions

The present study presents limitations that are important to keep in mind when considering our results. First, it is important to note that we relied exclusively on participants' self-reported ratings of self-esteem, achievement goals, burnout, and substance use. As self-report measures can potentially introduce measurement error (e.g., recall bias, social desirability bias), we recommend that future studies incorporate data from additional sources, such as observational data as well as parent or teacher reports. Doing so could provide a richer and potentially more accurate depiction of students' experiences. Second, we relied on a convenience sample of Finnish students, which means that our findings may not truly represent the entire Finnish population and may not generalize to other countries with vastly different educational structures. As such, it would seem important to replicate our findings among samples of students from other countries, cultures, and school systems.

Third, as we only examined students following an academic track, we lack the ability to discern how burnout develops in other less rigorous tracks, across other educational levels, and upon entry into the workforce. Although we know from previous research that

students' experience of school burnout differs across academic tracks (Salmela-Aro et al., 2008; Salmela-Aro & Upadaya, 2014a), we were not able to test this assumption in the present study. As such, to enhance the validity and widespread applicability of our results, we recommend that future researchers replicate our findings using both vocational-track and academic-track students, as well as across the transition from various types of educational programs and into the workforce. Fourth, person-centered evidence is cumulative in nature, and thus relies on numerous studies to determine with confidence whether trajectory profiles are systematic across contexts, or whether they are context-specific (Morin et al., 2020). Given that our study was the first to explicitly examine the developmental heterogeneity of burnout across the transition from secondary to post-secondary school, we recommend that future studies follow suit using a similar piecewise GMA approach.

Fifth, despite the various advantages of relying on a large data archive such as FinEdu, data archives are always collected for specific objectives that may not directly match those of the researchers who later use them. In the present study, this meant having to rely on a set of predictors and outcomes that were not necessarily available across all time points (precluding, for instance, tests of time-varying associations between the predictors and burnout levels). More importantly, this also meant having to rely on the specific predictors and outcomes available in the data archive. For this reason, we feel that it would be important for future research to complement our examination of the role of personal resources as predictors while also considering the role played by contextual characteristics (e.g., social support, educational climate). Likewise, it may be fruitful to consider a broader range of outcomes (e.g., mental health, occupational satisfaction).

## 5. Conclusion

Despite the understanding that some students are more at risk of experiencing school burnout than others, our study represents the first attempt to examine the developmental heterogeneity of school burnout trajectories among students transitioning from upper secondary school into higher education. In this regard, the convergence between our results and those obtained among younger and older samples of students suggest that similar developmental processes might be at play and thus adds to the cumulative person-centered evidence regarding the nature of the school burnout trajectory profiles observed throughout the adolescent and young adult years. Moreover, our results provide the first replication evidence that self-equilibrium processes may be involved in school burnout development, providing an interesting connection between research focused on identity and school burnout. In this regard, our results also showed that two components known to represent a key component of youth's developing identity (i.e., their self-esteem and their achievement goals) appear to play a role in burnout development. Whereas this role seems desirable for self-esteem and mastery extrinsic goals, performance avoidance goals seem particularly harmful. Finally, and supporting the generalized assumption that burnout is an undesirable psychological state, we found evidence linking the most problematic burnout profiles to school dropout, lower levels of achievement, alcohol related problems, and substance use. These associations clearly demonstrate that burnout is not a harmless state and the bulk of our results highlight that burnout trajectories are unlikely to change on their own in the absence of intervention. Moreover, intervention should occur early and be specifically designed to generate lasting effects. Ultimately, we hope that our study extends our understanding of the developmental heterogeneity of school burnout and the importance of enhancing self-esteem and mastery goals to support students' academic attainment and mental health.

## CRediT authorship contribution statement

**Lindsey Nadon:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Alexandre J.S. Morin:** Writing – review & editing, Writing – original draft, Validation, Supervision, Resources, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **William Gilbert:** Writing – review & editing, Writing – original draft, Validation, Supervision, Formal analysis, Conceptualization. **Elizabeth Olivier:** Writing – review & editing, Writing – original draft, Validation, Supervision, Formal analysis, Conceptualization. **Katariina Salmela-Aro:** Writing – review & editing, Writing – original draft, Validation, Resources, Project administration, Methodology, Investigation, Funding acquisition, Data curation, Conceptualization.

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## Appendix A. Supplementary data

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## References

- Abreu Alves, S., Sinval, J., Lucas Neto, L., Marôco, J., Gonçalves Ferreira, A., & Oliveira, P. (2022). Burnout and dropout intention in medical students: The protective role of academic engagement. *BMC Medical Education*, 22, 1–11.
- American Psychological Association. (2024). Identity. In *APA dictionary of psychology*. Retrieved July 3, 2024, from <https://dictionary.apa.org/identity>.
- Asparouhov, T., & Muthén, B. O. (2014). Auxiliary variables in mixture modeling: Three-step approaches using Mplus. *Structural Equation Modeling*, 21, 1–13.
- Barboza, G. E. (2020). Child maltreatment, delinquent behavior, and school factors as predictors of depressive symptoms from adolescence to adulthood. *Youth & Society*, 52, 27–54.
- 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.
- Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychological Science in the Public Interest*, 4, 1–44.
- Bruno, U. D. O., & Njoku, J. (2014). The role of the teacher in improving students' self-esteem. *International Journal of Academic Research in Progressive Education and Development*, 3, 47–53.
- Canfield, J. (1990). Improving students' self-esteem. *Educational Leadership*, 48, 48–50.
- Caspi, A. (2002). Social selection, social causation, and developmental pathways: Empirical strategies for better understanding how individuals and environments are linked across the life-course. In L. Pulkkinen, & A. Caspi (Eds.), *Paths to successful development: Personality in the life course* (pp. 281–301). Cambridge University Press.
- Cauley, K. M., & McMillan, J. H. (2010). Formative assessment techniques to support student motivation and achievement. *Clearing House*, 83, 1–6.
- Chae, H., Cloninger, C. R., & Lee, S. J. (2020). Effects of personality on the developmental trajectories of academic burnout among Korean medical students. *PeerJ*, 8, Article e10362.
- Craven, R. G., & Marsh, H. W. (2008). The centrality of the self-concept construct for psychological wellbeing and unlocking human potential: Implications for child and educational psychologists. *Educational and Child Psychology*, 25, 104–118.
- Crocker, J., & Park, L. E. (2004). The costly pursuit of self-esteem. *Psychological Bulletin*, 130, 392–414.
- Diallo, T. M. O., Morin, A. J. S., & Lu, H. (2016). Impact of misspecifications of the latent variance-covariance and residual matrices on the class enumeration accuracy of growth mixture models. *Structural Equation Modeling*, 23, 507–531.
- Diallo, T. M. O., Morin, A. J. S., & Lu, H. (2017). The impact of total and partial inclusion or exclusion of active and inactive time invariant covariates in growth mixture models. *Psychological Methods*, 22, 166–190.
- Dietrich, J., Parker, P. D., & Salmela-Aro, K. (2012). Phase-adequate engagement at the post-school transition. *Developmental Psychology*, 48, 1575–1593.
- DiStefano, C., Zhu, M., & Mindrila, D. (2009). Understanding and using factor scores: Considerations for the applied researcher. *Practical Assessment, Research & Evaluation*, 14, 1–10.
- Dobewall, H., Lindfors, P., Karvonen, S., Koivusilta, L., Vainikainen, M.-P., Hotulainen, R., & Rimpelä, A. (2019). Health and educational aspirations in adolescence: A longitudinal study in Finland. *BMC Public Health*, 19, 1447.
- Donnellan, M. B., Trzesniewski, K. H., & Robins, R. W. (2015). Measures of self-esteem. In G. J. Boyle, D. H. Saklofske, & G. Matthews (Eds.), *Measures of personality and social psychological constructs* (pp. 131–157). Elsevier.
- Eccles, J. S. (2004). Schools, academic motivation, and stage-environment fit. In R. M. Lerner, & L. D. Steinberg (Eds.), *Handbook of adolescent psychology* (2nd ed., pp. 125–153). Wiley.
- Eccles, J. S., & Midgley, C. (1989). Stage-environment fit: Developmentally appropriate classrooms for young adolescents. *Research on Motivation in Education*, 3, 139–186.
- Eccles, J. S., & Roeser, R. W. (2009). Schools, academic motivation, and stage-environment fit. In R. M. Lerner, & L. Steinberg (Eds.), *Handbook of adolescent psychology* (3rd ed., pp. 404–434). Wiley.
- Eccles, J. S., & Roeser, R. W. (2011). Schools as developmental contexts during adolescence. *Journal of Research on Adolescence*, 21, 225–241.
- Elam, K. J., Mun, C. J., Connell, A., & Ha, T. (2023). Coping strategies as mediating mechanisms between adolescent polysubstance use classes and adult alcohol and substance use disorders. *Addictive Behaviors*, 139, Article 107586.
- Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist*, 34, 169–189.
- Elliot, A. J., & Thrash, T. M. (2001). Achievement goals and the hierarchical model of achievement motivation. *Educational Psychology Review*, 13, 139–156.
- Elliot, A. J., & Thrash, T. M. (2002). Approach-avoidance motivation in personality: Approach and avoidance temperaments and goals. *Journal of Personality and Social Psychology*, 82, 804–818.
- Elliot, A. J., & Thrash, T. M. (2010). Approach and avoidance temperament as basic dimensions of personality. *Journal of Personality*, 78, 865–906.
- Elliot, A. J., Murayama, K., & Pekrun, R. (2011). A 3 × 2 achievement goal model. *Journal of Educational Psychology*, 103, 632–648.
- Elliot, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology*, 54, 5–12.
- Ellis, A. J., Salgari, G., Miklowitz, D. J., & Loo, S. K. (2019). The role of avoidance motivation in the relationship between reward sensitivity and depression symptoms in adolescents: An ERP study. *Psychiatry Research*, 279, 345–349.
- Enders, C. K. (2010). *Applied missing data analysis*. Guilford.
- Gillet, N., Morin, A. J. S., Huat, I., Odry, D., Chevalier, S., Coillot, H., & Fouquereau, E. (2018). Self-determination trajectories during police officers' vocational training program: A growth mixture analysis. *Journal of Vocational Behavior*, 109, 27–43.
- Gilbert, W., Eltanoukhi, R., Morin, A. J. S., & Salmela-Aro, K. (2024). Achievement goals as mediators of the links between self-esteem and depressive symptoms from mid-adolescence to early adulthood. *Journal of Youth and Adolescence*. In press, Early view: <https://doi.org/10.1007/s10964-024-02045-z>.
- Gillet, N., Morin, A. J. S., Sandrin, E., & Fernet, C. (2022). Predictors and outcomes of teachers' burnout trajectories over a seven-year period. *Teaching and Teacher Education*, 117, Article 103781.
- Graham, J. W. (2009). Missing data analysis: Making it work in the real world. *Annual Review of Psychology*, 60, 549–576.
- Grimm, K. J., Ram, N., & Estabrook, R. (2016). *Growth modeling: Structural equation and multilevel modeling approaches*. Guilford.
- Herrmann, J., Koeppen, K., & Kessels, U. (2019). Do girls take school too seriously? Investigating gender differences in school burnout from a self-worth perspective. *Learning and Individual Differences*, 69, 150–161.
- Heyman, G. D., & Dweck, C. S. (1992). Achievement goals and intrinsic motivation: Their relation and their role in adaptive motivation. *Motivation and Emotion*, 16, 231–247.
- Hipp, J. R., & Bauer, D. J. (2006). Local solutions in the estimation of growth mixture models. *Psychological Methods*, 11, 36–53.
- Houle, S. A., Morin, A. J. S., & Fernet, C. (2022). Longitudinal trajectories of affective commitment to the occupation among school principals: A person-centered perspective. *Journal of Vocational Behavior*, 137, Article 103758.
- Hulleman, C. S., Schrager, S. M., Bodmann, S. M., & Harackiewicz, J. M. (2010). A meta-analytic review of achievement goal measures: Different labels for the same constructs or different constructs with similar labels? *Psychological Bulletin*, 136(3), 422–449.
- Jiang, S., Ren, Q., Jiang, C., & Wang, L. (2021). Academic stress and depression of Chinese adolescents in junior high schools: Moderated mediation model of school burnout and self-esteem. *Journal of Affective Disorders*, 295, 384–389.
- Kaplan, A., & Maehr, M. L. (2007). The contributions and prospects of goal orientation theory. *Educational Psychology Review*, 19, 141–184.
- Kernis, M. (2003). Toward a conceptualization of optimal self-esteem. *Psychological Inquiry*, 14, 1–26.
- King, K. A., Vidourek, R. A., Davis, B., & McClellan, W. (2002). Increasing self-esteem and school connectedness through a multidimensional mentoring program. *Journal of School Health*, 72, 294–299.
- Korhonen, J., Linnanmäki, K., & Aunio, P. (2014). Learning difficulties, academic well-being and educational dropout: A person-centred approach. *Learning and Individual Differences*, 31, 1–10.



- Labouvie, E. W. (1986). The coping function of adolescent alcohol and drug use. In R. K. Silbereisen, K. Eyferth, & G. Rudinger (Eds.), *Development as action in context: Problem behavior and normal youth development* (pp. 229–240). Springer.
- Lanza, S. T., Tan, X., & Bray, B. C. (2013). Latent class analysis with distal outcomes: A flexible model-based approach. *Structural Equation Modeling*, 20, 1–26.
- Lee, M. Y., & Lee, S. M. (2018). The effects of psychological maladjustments on predicting developmental trajectories of academic burnout. *School Psychology International*, 39, 217–233.
- Lee, J., Puig, A., Kim, Y. B., Shin, H., Lee, J. H., & Lee, S. M. (2010). Academic burnout profiles in Korean adolescents. *Stress and Health*, 26, 404–416.
- Leupold, C. R., Lopina, E. C., & Erickson, J. (2020). Examining the effects of core self-evaluations and perceived organizational support on academic burnout among undergraduate students. *Psychological Reports*, 123, 1260–1281.
- Lian, P., Sun, Y., Ji, Z., Li, H., & Peng, J. (2014). Moving away from exhaustion: How core self-evaluations influence academic burnout. *PLoS One*, 9, Article e87152.
- Litalien, D., Morin, A. J. S., & McInerney, D. M. (2017). Achievement goal profiles among adolescent males and females. *Developmental Psychology*, 53, 731–751.
- Liu, H., Yao, M., & Li, J. (2020). Chinese adolescents' achievement goal profiles and their relation to academic burnout, learning engagement, and anxiety. *Learning and Individual Differences*, 83, Article 101945.
- Lo, Y., Mendell, N., & Rubin, D. (2001). Testing the number of components in a normal mixture. *Biometrika*, 88, 767–778.
- Luo, Y., Wang, Z., Zhang, H., Chen, A., & Quan, S. (2016). The effect of perfectionism on school burnout among adolescence: The mediator of self-esteem and coping style. *Personality & Individual Differences*, 88, 202–208.
- MacDonald, G., & Leary, M. R. (2012). Individual differences in self-esteem. In M. R. Leary, & J. P. Tangney (Eds.), *Handbook of self and identity* (pp. 354–377). Guilford Press.
- Madigan, D. J., & Curran, T. (2021). Does burnout affect academic achievement? A meta-analysis of over 100,000 students. *Educational Psychology Review*, 33, 387–405.
- Madjar, N., Bachner, Y. G., & Kushnir, T. (2012). Can achievement goal theory provide a useful motivational perspective for explaining psychosocial attributes of medical students? *BMC Medical Education*, 12, 1–6.
- Mäkikangas, A., & Kinnunen, U. (2016). The person-oriented approach to burnout: A systematic review. *Burnout Research*, 3, 11–23.
- Marôco, J., Assunção, H., Harju-Luukkainen, H., Lin, S. W., Sit, P. S., Cheung, K. C., ... Campos, J. A. (2020). Predictors of academic efficacy and dropout intention in university students: Can engagement suppress burnout? *PLoS One*, 15, Article e0239816.
- Marsh, H. W., & O'Mara, A. (2008). Reciprocal effects between academic self-concept, self-esteem, achievement, and attainment over seven adolescent years: Unidimensional and multidimensional perspectives of self-concept. *Personality and Social Psychology Bulletin*, 34, 542–552.
- Marsh, H. W., Lüdtke, O., Trautwein, U., & Morin, A. J. S. (2009). Latent profile analysis of academic self-concept dimensions: Synergy of person- and variable-centered approaches to the internal/external frame of reference model. *Structural Equation Modeling*, 16, 1–35.
- Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annual Review of Psychology*, 52, 397–422.
- Metha, P. D., & West, S. G. (2000). Putting the individual back into individual growth curves. *Psychological Methods*, 5, 23–43.
- Meyer, J. P., & Morin, A. J. S. (2016). A person-centered approach to commitment research: Theory, research, and methodology. *Journal of Organizational Behavior*, 36, 584–612.
- Millsap, R. E. (2011). *Statistical approaches to measurement invariance*. Taylor & Francis.
- Monni, A., Olivier, E., Morin, A. J. S., Belardinelli, M. O., Mulvihill, K., & Scalas, L. F. (2020). Approach and avoidance in Gray's, Higgins', and Elliot's perspectives: A theoretical comparison and integration of approach-avoidance in motivated behavior. *Personality & Individual Differences*, 166, Article 110163.
- Morin, A. J. S., & Litalien, D. (2019). Mixture modeling for lifespan developmental research. In *Oxford research encyclopedia of psychology*. Oxford University Press.
- Morin, A. J. S., & Marsh, H. W. (2015). Disentangling shape from level effects in person-centered analyses: An illustration based on university teachers' multidimensional profiles of effectiveness. *Structural Equation Modeling*, 22, 39–59.
- Morin, A. J. S., Maïano, C., Marsh, H. W., Janosz, M., & Nagengast, B. (2011a). The longitudinal interplay of adolescents' self-esteem and body image: A conditional autoregressive latent trajectory analysis. *Multivariate Behavioral Research*, 46, 157–201.
- Morin, A. J. S., Maïano, C., Nagengast, B., Marsh, H. W., Morizot, J., & Janosz, M. (2011b). Growth mixture modeling of adolescents trajectories of anxiety: The impact of untested invariance assumptions on substantive interpretations. *Structural Equation Modeling*, 18, 613–648.
- Morin, A. J. S., Rodriguez, D., Fallu, J.-S., Maïano, C., & Janosz, M. (2012). Academic achievement and adolescent smoking: A general growth mixture model. *Addiction*, 107, 819–828.
- Morin, A. J. S., Maïano, C., Marsh, H. W., Nagengast, B., & Janosz, M. (2013). School life and adolescents' self-esteem trajectories. *Child Development*, 84, 1967–1988.
- Morin, A. J. S., Meyer, J. P., Creusier, J., & Biétry, F. (2016). Multiple-group analysis of similarity in latent profile solutions. *Organizational Research Methods*, 19, 231–254.
- Morin, A. J. S., Maïano, C., Scalas, L. F., Janosz, M., & Litalien, D. (2017). Adolescents' body image trajectories: A further test of the self-equilibrium hypothesis. *Developmental Psychology*, 53(8), 1501–1521. <https://doi.org/10.1037/dev0000355>.
- Morin, A. J. S., McLarnon, M. J., & Litalien, D. (2020). Mixture modeling for organizational behavior research. In Y. Griep, & S. D. Hansen (Eds.), *Handbook on the temporal dynamics of organizational behavior* (pp. 351–379). Edward Elgar.
- Mund, M., & Neyer, F. J. (2016). Rising high or falling deep? Pathways of self-esteem in a representative German sample. *European Journal of Personality*, 30, 341–357.
- Muthén, B. (2003). Statistical and substantive checking in growth mixture modeling. *Psychological Methods*, 8, 369–377.
- Muthén, L. K., & Muthén, B. O. (2022). *Mplus user's guide*. Muthén & Muthén.
- Nadon, L., Babenko, O., Chazan, D., & Daniels, L. M. (2020). Burning out before they start? An achievement goal theory perspective on medical and education students. *Social Psychology of Education*, 23, 1055–1071.
- Nadon, L., De Beer, L. T., & Morin, A. J. (2022). Should burnout be conceptualized as a mental disorder? *Behavioral Science*, 12, 82.
- Niemivirta, M. (2002a). Individual differences and developmental trends in motivation: Integrating person-centered and variable-centered methods. In P. R. Pintrich, & M. L. Maehr (Eds.), *Vol. 12. Advances in motivation and achievement* (pp. 241–275). JAI Press.
- Niemivirta, M. (2002b). Motivation and performance in context: The influence of goal orientations and instructional setting on situational appraisals and task performance. *Psychologia*, 45, 250–270.
- Niemivirta, M. (2004). *Habits of mind and academic endeavors: The correlates and consequences of achievement goal orientations*. Helsinki University Press.
- Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling*, 14, 535–569.
- Olivier, E., Morin, A. J., Leo, V., & Salmela-Aro, K. (2023). The interconnected development of depressive symptoms and school functioning from mid-adolescence to early adulthood: A piecewise growth mixture analysis. *Journal of Educational Psychology*, 115(3), 427–445. <https://doi.org/10.1037/edu0000761>.
- Oller-Perret, C., & Walburg, V. (2018). L'impact du burnout scolaire sur les comportements d'alcoolisation des adolescents. *Psychologie Française*, 63, 319–326.
- Organisation for Economic Co-operation and Development. (2024). Education GPS: Finland. Retrieved July 3 2024, from <https://gpseducation.oecd.org/CountryProfile?plotter=h5&primaryCountry=FIN&threshold=5&topic=EO#:~:text=In%20Finland%2C%2033%25%20of%2015,and%204%25%20in%20tertiary%20programmes>.
- Oyserman, D., Elmore, K., & Smith, G. (2012). Self, self-concept, and identity. In M. R. Leary, & J. P. Tangney (Eds.), *Handbook of self and identity* (2nd ed., pp. 69–104). Guilford.
- Parhiala, P., Torppa, M., Vasalampi, K., Eklund, K., Poikkeus, A. M., & Aro, T. (2018). Profiles of school motivation and emotional well-being among adolescents: Associations with math and reading performance. *Learning and Individual Differences*, 61, 196–204.
- Parviainen, M., Aunola, K., Torppa, M., Poikkeus, A. M., & Vasalampi, K. (2020). Symptoms of psychological ill-being and school dropout intentions among upper secondary education students: A person-centered approach. *Learning and Individual Differences*, 80, Article 101853.
- 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.
- Patterson, J. M., & McCubbin, H. I. (1987). Adolescent coping style and behaviors: Conceptualization and measurement. *Journal of Adolescence*, 10, 163–186.



- Peugh, J., & Fan, X. (2013). Modeling unobserved heterogeneity using latent profile analysis: A Monte Carlo simulation. *Structural Equation Modeling*, 20, 616–639.
- Pittman, L. D., & Richmond, A. (2008). University belonging, friendship quality, and psychological adjustment during the transition to college. *Journal of Experimental Education*, 76, 343–362.
- Posselt, J. R., & Lipson, S. K. (2016). Competition, anxiety, and depression in the college classroom: Variations by student identity and field of study. *Journal of College Student Development*, 57, 973–989.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton University Press.
- Rosse, J. G., Boss, R. W., Johnson, A. E., & Crown, D. F. (1991). Conceptualizing the role of self-esteem in the burnout process. *Group & Organization Studies*, 16, 428–451.
- Salmela-Aro, K. (2009a). School-related burnout during educational tracks: Antecedents and consequences. In I. Schoon, & R. K. Silbereisen (Eds.), *Transitions from school to work: Globalization, individualization, and patterns of diversity* (pp. 293–311). Cambridge University Press.
- Salmela-Aro, K. (2009b). Personal goals and well-being during critical life transitions: The four C's—Channelling, choice, co-agency and compensation. *Advances in Life Course Research*, 14, 63–73.
- Salmela-Aro, K. (2012). From burnout to engagement during transition from school to work. In A. Efklides, & D. Moraitou (Eds.), *Social Indicators Research Series: vol. 51. A positive psychology perspective on quality of life* (pp. 259–272). Springer.
- Salmela-Aro, K. (2017). Dark and bright sides of thriving-school burnout and engagement in the Finnish context. *European Journal of Developmental Psychology*, 14, 337–349.
- Salmela-Aro, K., & Nurmi, J.-E. (2003–2020). *FinEdu – Finnish educational transitions study*. Academy of Finland.
- Salmela-Aro, K., & Nurmi, J. E. (2007). Self-esteem during university studies predicts career characteristics 10 years later. *Journal of Vocational Behavior*, 70, 463–477.
- Salmela-Aro, K., & Tynkkynen, L. (2012). Gendered pathways in school burnout among adolescents. *Journal of Adolescence*, 35, 929–939.
- Salmela-Aro, K., & Upadaya, K. (2014a). Developmental trajectories of school burnout: Evidence from two longitudinal studies. *Learning and Individual Differences*, 36, 60–68.
- Salmela-Aro, K., & Upadaya, K. (2014b). School burnout and engagement in the context of demands–resources model. *British Journal of Educational Psychology*, 84, 137–151.
- Salmela-Aro, K., Kiuru, N., & Nurmi, J. E. (2008). The role of educational track in adolescents' school burnout: A longitudinal study. *British Journal of Educational Psychology*, 78, 663–689.
- Salmela-Aro, K., Kiuru, N., Leskinen, E., & Nurmi, J. E. (2009a). School burnout inventory (SBI): Reliability and validity. *European Journal of Psychological Assessment*, 25, 48–57.
- Salmela-Aro, K., Tolvanen, A., & Nurmi, J. E. (2009b). Achievement strategies during university studies predict early career burnout and engagement. *Journal of Vocational Behavior*, 75, 162–172.
- Salmela-Aro, K., Upadaya, K., Vinni-Laakso, J., & Hietajärvi, 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, 796–807.
- Senko, C., & Dawson, B. (2017). Performance-approach goal effects depend on how they are defined: Meta-analytic evidence from multiple educational outcomes. *Journal of Educational Psychology*, 109, 574–598.
- Sher, K. J., Grekin, E. R., & Williams, N. A. (2005). The development of alcohol use disorders. *Annual Review of Clinical Psychology*, 1, 493–523.
- Sorkkila, M., Aunola, K., Salmela-Aro, K., Tolvanen, A., & Ryba, T. V. (2018). The co-developmental dynamic of sport and school burnout among student-athletes: The role of achievement goals. *Scandinavian Journal of Medicine & Science in Sports*, 28, 1731–1742.
- Sorkkila, M., Tolvanen, A., Aunola, K., & Ryba, T. V. (2019). The role of resilience in student-athletes' sport and school burnout and dropout: A longitudinal person-oriented study. *Scandinavian Journal of Medicine & Science in Sports*, 29, 1059–1067.
- Sung, M., Erkanli, A., Angold, A., & Costello, E. J. (2004). Effects of age at first substance use and psychiatric comorbidity on the development of substance use disorders. *Drug & Alcohol Dependence*, 75, 287–299.
- Tein, J. Y., Cox, S., & Cham, H. (2013). Statistical power to detect the correct number of classes in latent profile analysis. *Structural Equation Modeling*, 20, 640–657.
- Tofighi, D., & Enders, C. K. (2007). Identifying the correct number of classes in growth mixture models. In G. R. Hancock, & K. M. Samuels (Eds.), *Advances in latent variable mixture models* (pp. 317–341). Information Age.
- Tuominen, H., Niemivirta, M., Lonka, K., & Salmela-Aro, K. (2020). Motivation across a transition: Changes in achievement goal orientations and academic well-being from elementary to secondary school. *Learning and Individual Differences*, 79, Article 101854.
- Tuominen-Soini, H., & Salmela-Aro, K. (2014). Schoolwork engagement and burnout among Finnish high school students and young adults: Profiles, progressions, and educational outcomes. *Developmental Psychology*, 50, 649–662.
- Tuominen-Soini, H., Salmela-Aro, K., & Niemivirta, M. (2008). Achievement goal orientations and subjective well-being: A person-centred analysis. *Learning and Instruction*, 18, 251–266.
- Tuominen-Soini, H., Salmela-Aro, K., & Niemivirta, M. (2011). Stability and change in achievement goal orientations: A person-centered approach. *Contemporary Educational Psychology*, 36, 82–100.
- Tuominen-Soini, H., Salmela-Aro, K., & Niemivirta, M. (2012). Achievement goal orientations and academic well-being across the transition to upper secondary education. *Learning and Individual Differences*, 22, 290–305.
- Vansoeterstede, A., Cappe, E., Lichtlé, J., & Boujut, E. (2023). A systematic review of longitudinal changes in school burnout among adolescents. *Journal of Adolescence*, 95, 224–247.
- Virtanen, T. E., Lerkkanen, M. K., Poikkeus, A. M., & Kuorelahti, M. (2018). Student engagement and school burnout in Finnish lower-secondary schools: Latent profile analysis. *Scandinavian Journal of Educational Research*, 62, 519–537.
- Wagner, E. F., Myers, M. G., & McIninch, J. L. (1999). Stress-coping and temptation-coping as predictors of adolescent substance use. *Addictive Behaviors*, 24, 769–779.
- Walburg, V. (2014). Burnout among high school students: A literature review. *Children and Youth Services Review*, 42, 28–33.
- Wang, M. T., Chow, A., Hofkens, T., & Salmela-Aro, K. (2015). The trajectories of student emotional engagement and school burnout with academic and psychological development: Findings from Finnish adolescents. *Learning and Instruction*, 36, 57–65.
- Widlund, A., Tuominen, H., & Korhonen, J. (2021). Development of school engagement and burnout across lower and upper secondary education: Trajectory profiles and educational outcomes. *Contemporary Educational Psychology*, 66, Article 101997.
- Winch, A., Moberly, N. J., & Dickson, J. M. (2015). Unique associations between anxiety, depression and motives for approach and avoidance goal pursuit. *Cognition and Emotion*, 29, 1295–1305.
- Wormington, S. V., & Linnenbrink-Garcia, L. (2017). A new look at multiple goal pursuit: The promise of a person-centered approach. *Educational Psychology Review*, 29, 407–445.
- Yeager, D. S., Romero, C., Paunesku, D., Hulleman, C. S., Schneider, B., Hinojosa, C., ... Dweck, C. S. (2016). Using design thinking to improve psychological interventions: The case of the growth mindset during the transition to high school. *Journal of Educational Psychology*, 108(3), 374–391.
- Zeigler-Hill, V. (2011). The connections between self-esteem and psychopathology. *Journal of Contemporary Psychotherapy*, 41, 157–164.
- Zeigler-Hill, V., & Wallace, M. T. (2012). Self-esteem instability and psychological adjustment. *Self and Identity*, 11, 317–342.
- Zhou, X., Zhen, R., & Wu, X. (2019). Trajectories of academic burnout in adolescents after the Wenchuan earthquake: A latent growth mixture model analysis. *School Psychology International*, 40, 183–199.