

Student Motivation Matters: A Longitudinal, Person-Centered Perspective on Student
Achievement Goals and Psychosocial Functioning

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ABSTRACT

Student Motivation Matters: A Longitudinal, Person-Centered Perspective on Student Achievement Goals and Psychosocial Functioning

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The achievement goals motivating students' academic engagement share important associations with their academic and socioemotional functioning. However, the literature on achievement goals remains mainly cross-sectional and variable-centered, ignoring how these goals act in combination over time. This thesis provides a longitudinal person-centered examination of the relations between students' achievement goals and their academic and socioemotional functioning at different educational stages.

In Chapter 2, we relied on Latent Profile and Latent Transition Analyses among a sample of 619 French Canadian elementary school students to estimate profiles encompassing students' own achievement goals and their perceptions of the goals held *for them* by their parents and teachers. Four profiles emerged which remained stable from one school year to the next: Low on all Goals, High on all Goals, Mastery-Oriented, and Low Mastery Goals. Students were moderately to highly likely to remain in their profile over time, and all profiles reflected alignment between students' personal goals and their perceived caregiver goals. Higher perceived competence was associated with higher mastery profiles, and students corresponding to the Mastery-Oriented profile fared best in terms of anxiety and achievement.

In Chapter 3, we relied on Growth Mixture Analyses to examine the developmental heterogeneity of burnout amongst 513 Finnish students transitioning from upper secondary to post secondary school. Four trajectory profiles emerged: High and Decreasing, Moderate and Decreasing, Low and Increasing, and Low and Stable. High initial levels of global self-esteem and mastery-extrinsic goals were associated with the Low and Stable profile, whereas high performance goals were associated with the High and Decreasing profile. The Low and Stable profile protected students from school dropout, underachievement, and substance use, whereas the High and Decreasing profile was associated with lower achievement, and more substance use.

Taken together, our results offer novel and nuanced person-centered insight into the relations between students' achievement goals and various markers of academic and socioemotional functioning over the course of the educational trajectory. The results from this thesis can be used to inform developmentally relevant interventions seeking to enhance students' mastery goals, perceived competence, and self-concept to promote their psychosocial functioning over time.

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This thesis includes two empirical studies. Authors' contributions are noted below.

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CHAPTER 1: General Introduction

Humans spend a large part of their formative years as students, and this role has a substantial influence on many spheres of their lives as children, adolescents, and even adults. In this context, understanding the internal forces that help initiate and sustain students' goal-directed behaviour across their whole educational trajectory (Elliot & Dweck, 1983; Eccles & Wigfield, 2002; Linnenbrink-Garcia et al., 2016; Schunk et al., 2008) is of critical interest to educators, researchers, and policy makers alike. Not only does student achievement motivation influence their ability to learn and succeed in school (e.g., Bücker et al., 2018; Wigfield & Cambria, 2010), but it also has a meaningful impact on their socioemotional functioning over time (Huang, 2011).

Achievement Goal Theory is arguably one of the main theoretical frameworks to guide our understanding of students' achievement motivation, as it describes the *reasons* driving them to become and remain engaged in their schoolwork (i.e., their achievement goals), while also addressing the likely academic and social emotional impact of these goals (Elliot & Thrash, 2001; Kaplan & Maehr, 2007). In this regard, goals that involve striving to learn and grow are particularly adaptive, whereas goals that involve striving to avoid appearing incompetent relative to others are considered particularly maladaptive (Hornstra et al., 2017; Pahljina-Reinić & Kolić-Vehovec, 2017; Urdan et al., 2002). Despite well-documented associations between achievement goals and students' psychosocial functioning, the achievement goals research literature remains predominantly cross-sectional and variable-centered in nature. More precisely, variable-centered analyses seek to identify typical relations among variables, assuming that these associations uniformly generalize to every member of the sample. These analyses thus neglect the possible presence of discrete subpopulations of students displaying unique achievement goals configurations or characterized by qualitatively distinct developmental patterns (e.g., Howard, & Hoffman, 2018; Morin et al., 2018). In contrast, person-centered approaches, especially when relying on longitudinal data, seek to identify developmental heterogeneity and are thus well-suited to increase our understanding of the role played by achievement goals for different types of students. This is the approach taken in the current thesis.

The overall aim of this thesis is to provide a person-centered longitudinal perspective on the association between achievement goals, academic functioning, and socioemotional

functioning amongst students at different educational stages. In our first study, presented in Chapter 2, we examine how elementary school students' personal achievement goals combine with their perceptions of the goals held for them by key caregivers to form distinct profiles that differentially relate to their perceptions of academic competence, to their academic achievement, and to their anxiety. In our second study, presented in Chapter 3, we focus on the developmental heterogeneity of school burnout among older students experiencing the transition from upper secondary school into higher education, while examining how students' achievement goals and global self-esteem predict their distinct burnout trajectory. We also consider the implications of these burnout trajectories for students' academic success (achievement and dropout) and behaviors (alcohol and drug use).

Theoretical Framework: Achievement Goal Theory

Introduction to Achievement Motivation

To understand achievement goals, we first need to understand the concept of motivation, which comes from the Latin *motivus* (“a moving cause”) from the verb *movere* (“to move”). In the most basic sense, motivation theories thus seek to understand the values, beliefs, and goals that move people to act (Eccles & Wigfield, 2002). More specifically, achievement motivation refers to the processes that contribute to initiating and sustaining goal-directed behaviour within achievement contexts, such as school (Elliot & Dweck, 1983; Kaplan & Maehr, 2007; Linnenbrink-Garcia et al., 2016; Schunk, Pintrich & Meece, 2008; Wigfield et al., 2006). Across theories, researchers typically categorize achievement motivation into two related concepts: (1) competence and control (“*can* I do this?”) and (2) values and goals (“*why* do I want to do this?”; Linnenbrink et al., 2016). Achievement goals represent the “*why*” behind students' actions (Kaplan & Maehr, 2007; Maehr & Nicholls, 1980; Maehr & Zusho, 2009).

Overview and Assumptions of Achievement Goal Theory

Achievement Goal Theory (AGT) has staked its claim as an integral theory of achievement motivation, garnering support from countless studies across multiple theoretical iterations over the past three decades (Chazan et al., 2022; Maehr & Zusho, 2009; Senko et al., 2011). AGT is concerned with the reasons driving humans' engagement in achievement contexts, such as school. More specifically, achievement goals are internally represented future-oriented objectives that guide behaviour in either an approach or avoidance direction (Elliot & Fryer, 2008). In their early synthesis of decades of achievement goals research, Maehr and Zusho (2009) highlighted several underlying principles which cut across the ever-evolving representations of AGT. First, achievement goals are assumed to be part of a multidimensional process that emerges and evolves under the influence of personal, cultural, and contextual

factors. This process gives rise to distinctive achievement-related scenarios, which in turn influence human behaviour (Ames, 1992; Maehr & Nicholls, 1980; Maehr & Zusho, 2009; Schunk et al., 2008). Second, competence (i.e., one's ability to do something effectively or successfully; Elliot & Dweck, 2005; Maehr & Nicholls, 1980) represents a central feature of AGT (Hulleman et al., 2010; Maehr & Zusho, 2009; Pintrich, 2003). In fact, Hulleman et al. (2010) define achievement goals as mental representations of desired competence-based outcomes (Chazan et al., 2022; Hulleman et al., 2010). Third, achievement goals create motivational systems, in which they come to represent the motivational centerpiece unifying human cognitions, emotions, and behaviours (Dweck, 1992; Maehr & Nicholls, 1980).

Evolution of Achievement Goal Theory

The earliest model of AGT highlighted the seminal distinction between mastery and performance goals, which is still a core component of modern AGT (Ames & Archer, 1988; Elliot & Dweck, 1983). From this perspective, mastery goals involve striving to *develop* competence, while performance goals involve striving to *demonstrate* competence relative to others (Elliot, 1999). This distinction highlights the early AGT assumption that achievement goals were approach-oriented in nature, helping individuals to move *towards* success. Later iterations acknowledged that achievement contexts, such as school, entail the dual experience of successes and failures (Chazan et al., 2022; McClelland, 1951), and that the latter can also play a role in goal-related behavior. Therefore, researchers began expanding on the initial mastery-performance dichotomy by incorporating a notion of directionality. As a result, and mimicking other areas of psychology (e.g., coping, development), AGT came to include a more nuanced approach-avoidance distinction. This distinction first emerged with performance-avoidance goals (i.e., the avoidance of situations in which one may demonstrate incompetence to others) (Elliot, 2006; Elliot & Harackiewicz, 1996), and then with mastery-avoidance goals (i.e., the avoidance of tasks that might elicit feelings of incompetence), resulting in a “2x2” model (Elliot & McGregor, 2001).

Alternative and more nuanced models have also emerged over time. For instance, some have highlighted the importance of acknowledging that mastery can be achieved both intrinsically (i.e., striving for personal growth and the internal validation associated with learning new concepts) and extrinsically (i.e., emphasizing grades and other external markers as evidence of mastery) (Heyman & Dweck, 1992; Niemivirta, 2002; Senko et al., 2011; Tuominen-Soini et al., 2008, 2011). Others have also differentiated between various forms of competence (i.e., relative to the task itself, to one's previous performance, and to other students' performance) (Elliot et al., 2011), different types of social goals (e.g., Dowson & McNerney,

2003; Urdan & Maehr, 1995), or goals focused on limiting energy expenditure (Harackiewicz et al., 1997).

Important Considerations

The discussion of how to best conceptualize and measure achievement goals has resulted in several additional considerations relevant to the current thesis. First is the age-old state vs. trait discussion. A large portion of the research literature, particularly early on, describes achievement goals as stable aspects of the personality (i.e., trait-like) (Murphy & Alexander, 2000; Pintrich, 2000). Although research has supported the idea that there is certainly some level of intraindividual stability across time and contexts, others have argued that different goals can be activated in different situations (Pintrich, 2000; Hulleman et al., 2010). For example, a student may be mastery-oriented in general but can still become more performance-oriented within a classroom goal structure that emphasizes grades and competition. The discussion of achievement goal stability is particularly important when considering the design, implementation, and usefulness of interventions geared towards enhancing adaptive motivation in the classroom.

A second important discussion in the AGT literature is the concept of multiple goal pursuit. It has become common knowledge that individual students typically endorse multiple goals simultaneously (Dowson & McInerney, 2003; Litalien et al., 2017a, 2017b; Pintrich, 2000), with some combinations being more adaptive than the endorsement of a single goal (Barron & Harackiewicz, 2001; Senko et al., 2011). When considering these combinations, the adaptiveness of performance goals, which have historically been categorized as inherently maladaptive, has also been debated, especially when they are endorsed in combination with more adaptive goals. As a result, from a multiple goal perspective, it is now understood that performance goals can be adaptive for certain outcomes (e.g., academic performance) when held alongside mastery goals (Harackiewicz et al., 2002). These observations highlight the importance of relying on theoretical frameworks and statistical methodologies that accurately capture students' multiple goal pursuit.

Next, to understand one's achievement goal tendencies, it is important to consider the sociocultural context in which they are situated. AGT research has historically conceptualized motivation as an individual trait, focusing mainly on White, Anglo, and economically advantaged students (Zusho & Clayton, 2011; Zusho & Pintrich, 2003). Studies examining cultural differences have generally found minimal differences overall, with mastery-approach goals being consistently adaptive and performance-avoidance goals being consistently maladaptive across cultures (See review by Zusho & Clayton, 2011). However, there do seem

to be some sociocultural differences in how strongly certain goals, or goals combinations (e.g., Litalien et al., 2017b), are endorsed. For example, some studies suggest that students from low SES backgrounds are less likely to endorse approach goals (i.e., mastery and performance) relative to students with higher SES (Berger & Archer, 2015; 2016). It is therefore critical to consider how the theoretical tenets of AGT apply to students from culturally and socioeconomically diverse backgrounds, and to carefully consider the role of sociocultural context when interpreting empirical findings.

Finally, age and developmental/educational stage are also critically important factors to consider when interpreting research findings and deciding how to conceptualize and measure achievement goals. For elementary school children, it may be more practically useful to focus on approach goals, as younger children have trouble differentiating between approach and avoidance goals (Schwinger et al., 2016). Similarly, it may be more relevant to measure domain-general achievement goals (achievement goals across all school subjects), instead of subject-specific ones (e.g., goals in maths), with elementary children who typically have the same teacher across subjects (e.g., Dietrich et al., 2015). Importantly, children's own goals are shaped via their context, including their perceptions about what their parents and teachers value and expect of them (Briley et al., 2014; Kahraman & Sungur, 2013; Meece et al., 2003, 2006). It may thus be important to consider whether and how children's goals match those they perceive their parents and teachers to hold for them, as discrepancies could possibly have an impact comparable to the goals themselves. Lastly, developmental trends also reveal that as students age, their goals become increasingly more differentiated, and they tend to endorse more performance goals as a result of their school environment becoming more grades-oriented (e.g., Schwinger & Wild, 2012; Schwinger et al., 2016; Meece et al., 2003). In this context, even mastery-oriented students may derive their sense of academic mastery from external sources (i.e., mastery-extrinsic goals), or endorse mastery goals for social desirability purposes (Senko et al., 2011; Tuominen-Soini et al., 2008, 2011; Senko et al., 2011). Thus, for adolescents and young adults at the secondary and post-secondary level, it is important to use a more nuanced achievement goal framework.

Achievement Goals in the Current Thesis

The current thesis considers how achievement goals contribute to healthy academic and socioemotional functioning, while focusing on students from widely different developmental/educational stages, and while incorporating the important considerations described above. In our first study, presented in Chapter 2, we focus on elementary students' domain-general approach goals (mastery and performance) as well as their perceptions of the

goals held for them by their parents and teachers. This study relies on a person-centered, multidimensional, and longitudinal representation of achievement goals, allowing us to examine how certain combinations of goals (across referent groups) relate to important educational and emotional outcomes (i.e., multiple goal pursuit), and to examine the within-sample and within-person stability of these achievement goal profiles. To help increase the cross-cultural generalizability of our results, this study relies on a sample of predominantly first and second-generation immigrant students from low SES neighbourhoods located in the city of Montreal (Quebec, Canada). In our second study, presented in Chapter 3, we rely on a more differentiated achievement goals framework to capture the more complex goal tendencies held in adolescence and early adulthood. Specifically, we rely on a more contemporary framework that distinguishes mastery goals by their intrinsic versus extrinsic nature, and performance goals by their approach versus avoidance nature (Heyman & Dweck, 1992; Niemivirta, 2002b; Tuominen-Soini et al., 2008, 2011). By examining how achievement goals before and after the transition to post-secondary schooling relates to students' burnout trajectories, we hope to offer insight into the importance of cultivating mastery goals as early as possible to support the academic and socioemotional functioning of students.

Student Psychosocial Functioning

The psychosocial wellbeing of students remains an international public health concern (Stallman, 2010) for educators, mental health professionals, and policy makers (e.g., Suldo et al., 2014). According to Roeser et al. (2000), psychosocial functioning in the school context is defined by two interrelated areas: academic functioning (e.g., grades, competence), and socioemotional functioning (e.g., psychological distress, mental health). This dual focus is critical, as functioning in both domains have been shown to affect each other bidirectionally and to demonstrate developmental cascades where early difficulties in one area have potent long-term effects on other areas (Suldo et al., 2014; Moilanen et al., 2010). That is, students' academic achievement has an important impact on their mental health, while students' mental health, in turn, impacts their ability to succeed in school (Bask & Salmela-Aro, 2013; Roeser et al., 2000; Suldo et al., 2014). Although there are many individual and contextual factors that influence students' psychosocial functioning, achievement goals consistently emerge as important and can be considered the motivational unifier of students' cognitive, emotional, and behavioural experiences (Dweck, 1992).

Academic Functioning and Achievement Goals

Academic functioning encompasses students' knowledge and skills (often reflected in grades and other markers of achievement), as well as their school-related attitudes (e.g., self-

esteem, perceived competence) and behaviours (e.g., school engagement, truancy, dropout) (Suldo et al., 2014; York et al., 2015). Academic functioning is intimately tied to students' motivation. Through the lens of the most prominent 2x2 model of AGT (Elliot & McGregor, 2001), each achievement goal has a unique impact on students' capacity to succeed in school. Broadly speaking, students mainly motivated by the desire to learn and grow (i.e., mastery-approach) consistently fare best academically, whereas students driven by the desire to avoid demonstrating their incompetence to others (i.e., performance-avoidance) fare the worst (e.g., Hornstra et al., 2017; Scherrer et al., 2020; Schwinger et al., 2016). Mastery-approach goals have been shown to positively predict students' grades directly (e.g., Hulleman et al., 2010), as well as indirectly through processes such as better learning strategies (Huang, 2011), sustained interest (Senko & Harackiewicz, 2005; Scherrer et al., 2020), seeking out challenges (Mouratidis et al., 2018), and believing in one's ability to learn and improve through hard work (Grant & Dweck, 2003; Yu & McLellan, 2020). On the other hand, performance-avoidance goals (as well as mastery-avoidance goals) involve a deep-rooted fear of failure (Thrash & Elliot, 2001) and have been associated with easily giving up (Senko & Freund, 2015), low perceived competence, reduced help-seeking behaviors, and lower levels of academic achievement (see meta-analyses by Baranik et al., 2010; Huang, 2012).

When it comes to performance-approach goals (i.e., the desire to appear competent), research results are not as clear. From a multiple goal perspective, studies have found that students endorsing both mastery and performance-approach goals simultaneously tend to do well academically, as demonstrated by outcomes like high test scores and effective learning strategies (Harackiewicz et al., 2002; Hornstra et al., 2017; Rosa & Bernardo, 2013; Zhang et al., 2016). Additionally, studies have found that some goals are more helpful in certain evaluative contexts than in others. For example, Senko (2019) found that performance goals were more beneficial than mastery goals for university students' academic achievement when teachers clearly operationalized success.

Socioemotional Functioning and Achievement Goals

Student socioemotional functioning encompasses both psychological and behavioural manifestations (Roeser et al., 2000). Psychological difficulties are often operationalized as encompassing internalizing (i.e., self-focused problems such as anxiety, depression) and externalizing (i.e., outwardly expressed problems, such as aggression, hyperactivity, and impulsivity) symptoms (Achenbach, 1966; Nikstat & Riemann 2020; Suldo et al., 2014). In contrast, behavioural functioning is more typically operationalized as encompassing social competence, social integration, and the absence of a variety of undesirable behaviors (e.g.,

substance misuse) (Suldo et al., 2014). To properly support healthy development, it is crucial to recognize the factors that promote students' socioemotional functioning. We contend that students' achievement goals play an important role here, thus offering a potential avenue for prevention and intervention.

Students' socioemotional functioning should be contextualized within their developmental and educational trajectory. In the elementary school years, children are first embedded in the complex and dynamic system that is their school environment (Bronfenbrenner, 1979; Masten, 2003; Ringeisen et al., 2003). There, they are exposed to new caregivers, social dynamics, expectations, goals, and opportunities for both successes and failures. The processes that occur through interactions between the child and their environment play an important role for their academic and socioemotional functioning (Bronfenbrenner, 1979; Masten, 2003; Ringeisen et al., 2003). Heightened anxiety is one of the most common socioemotional problems to emerge in childhood and adolescence (Kessler et al., 2005; Polanczyk et al., 2015). Without intervention, anxiety can have a persistent impact on students' overall development and functioning (Bittner et al., 2007; Broeren et al., 2013; Kessler et al., 2005; Polanczyk et al., 2015). Students who highly endorse mastery-approach goals and who perceive their parents and teachers to emphasize mastery goals tend to experience lower levels of anxiety, whereas the opposite is true for performance-avoidance goals (e.g., Baudoin & Galand, 2022; Huang, 2011; Pahljina-Reinić & Kolić-Vehovec, 2017; Schwinger et al., 2016). However, it is worth noting that although performance-oriented students often do well academically, this may come at a cost to their socioemotional wellbeing (e.g., Daniels et al., 2008). Specifically, performance goals are known to elicit anxiety because they involve processes like social comparison and self-doubt (Goetz et al., 2016; Huang, 2011; Luo et al., 2011; Pahljina-Reinić & Kolić-Vehovec 2017; Pekrun et al., 2006).

Subsequently, the secondary school years are known to be a challenging developmental period for many adolescents, as they are confronted with various biological, psychological, and social changes (Zarret & Eccles, 2006). It is widely acknowledged that socioemotional difficulties, like anxiety and depression, become more prevalent during this period (Barboza, 2020; Costello et al., 2006; Rapee et al., 2009; Zahn-Waxler et al., 2000). In addition to biopsychosocial changes experienced during adolescence, youth also face ever-increasing academic demands and pressure to choose their career path, particularly as they progress through secondary school into higher education (Dietrich et al., 2012; Vansoeterstede et al., 2023). As such, many students become prone to developing school burnout, a psychological state of exhaustion stemming from persistent exposure to school-related stressors and

insufficient resources to cope with these stressors (Demerouti & Bakker, 2008), towards the end of secondary school and across the transition into higher education (Salmela-Aro et al., 2009a). From an educational psychology perspective, it is critical to monitor school burnout amongst adolescents and young adults, given its association with harmful concurrent and persistent consequences like school dropout and substance misuse (Bask & Salmela-Aro, 2013; Oller-Perret & Walburg, 2018). To offset the development of burnout and its consequences, researchers have pointed to the adaptive nature of mastery goals. Much like anxiety, mastery-oriented students (i.e., mastery-approach, mastery-intrinsic, mastery-extrinsic) consistently display lower levels of burnout than performance-oriented students (e.g., Liu et al., 2020; Nadon et al., 2020; Tuominen-Soini et al., 2020; Tuominen-Soini et al., 2012).

Students' Self-Conceptions, Achievement Goals, and Functioning

It is also important to acknowledge the association between students' self-concept, their achievement goals, and subsequently, their psychosocial functioning. Self-concept represents the perceptions that individuals hold about themselves, which emerge and evolve through interactions and reinforcement from their environment (Maiano et al., 2019; Shavelson et al., 1976). According to Shavelson et al., (1976), self-concept is organized hierarchically, with global self-esteem sitting at the top, domain specific self-conceptions (e.g., academic self-concept, physical self-concept, social self-concept) occupying the middle, and even more specific affective and competence-based self-conceptions (Arens et al., 2011; Arens & Morin, 2016) at the bottom (e.g., sport competence, math enjoyment, math competence) (Maiano et al., 2019; Shavelson et al., 1976). For the purpose of this thesis, we primarily focus on two components of students' self-concepts: How they assess their self-worth in general (i.e., global self-esteem), as well as their sense of competence in specific school subjects (e.g., perceived competence in math) (Maiano et al., 2019; Shavelson et al., 1976).

At the lower level of the self-concept hierarchy, perceived competence and achievement goals share important relations. Indeed, perceived competence is a core theoretical pillar of AGT (Hulleman et al., 2010; Maehr & Zusho, 2009; Pintrich, 2003), and can be defined as a belief in one's internal resources to meet their goals and surmount challenges (Connell, 1990; Deci & Ryan, 2000). Person-centered studies have found that students with high levels of perceived competence in school subjects were more likely to belong to profiles marked by moderate to high levels of mastery goals (Fortunato & Goldblatt, 2006; Wormington & Linnenbrink-Garcia, 2017), or by simultaneously high levels of mastery and performance goals (Luo et al., 2011; Wormington & Linnenbrink-Garcia, 2017). These findings make sense, as students who feel competent are likely to see school tasks as achievable challenges, making

them more likely to persevere and move *towards* success, which in turn should lead to more adaptive functioning (Cury et al., 2006; Duchesne & Larose, 2018; Elliot & Church, 1997; Greene et al., 2004; Schunk, 2003; Schunk & DiBenedetto, 2016; Schunk & DiBenedetto, 2020).

At the upper and more general level of the self-concept hierarchy, students' global self-esteem also shares important associations with their achievement goals and has been shown to predict adaptive functioning across a wide range of domains (Craven & Marsh, 2008). First, mastery-oriented students tend to focus on learning and individual standards of performance and growth rather than anchoring their worth on their relative performance. As such, they are more likely to present higher self-esteem than performance-oriented students (Chen et al., 2018; Ferradás et al., 2020; Kaplan & Midgley, 1999; Shim et al., 2012). For example, when students highly endorse mastery goals in their first year of college, this seems to have a positive impact on their self-esteem trajectory throughout higher education (Shim et al., 2012). Next, global self-esteem and achievement goals seem to interact with one another to promote student wellbeing. Achievement goals have been shown to act as a buffer (i.e., moderator) against the impacts of low self-esteem, thus eliciting more positive emotions and fewer negative emotions (Shim et al., 2013). Finally, low global self-esteem is considered an antecedent to burnout (e.g., Jiang et al., 2021; Leupold et al., 2020). In line with the self-equilibrium hypothesis (Morin et al., 2013, 2017), high levels of self-esteem have been shown to also be more stable – or better able to withstand adversity – over time. Interestingly, burnout has been shown to display similar properties, with lower levels being more stable over time, suggesting that they may be anchored in a strong sense of identity (Gillet et al., 2022), which makes it particularly important to consider self-esteem when trying to understand the evolution of burnout trajectories.

Student Psychosocial Functioning and Self-Conceptions in the Current Thesis

It is perhaps unsurprising that motivational, self-concept, academic, and socioemotional issues tend to cluster together. As such, the current thesis examines the relationship between achievement goals and key indicators of academic and socioemotional functioning, while also considering the role of students' self-concept (i.e., global self-esteem and perceived competence in core subjects). With regards to academic functioning, we rely primarily on measures of students' academic achievement (i.e., knowledge and skills domain), their perceived competence (i.e., attitudes domain), and to a lesser and more distal degree, their experience of school dropout (i.e., behavioural domain). With regards to socioemotional functioning, we rely predominantly on measures of students' psychological distress (i.e., anxiety and school burnout), their self-esteem as a core indicator of global functioning, and to

a lesser and more distal degree, students' behavioural dysfunction (i.e., alcohol and drug use).

More precisely, our first study, presented in Chapter 2, focuses on how elementary school students' perceived competence in core subjects predicts their membership into distinct achievement goal profiles and, in turn, on how profile membership predicts their academic achievement and anxiety symptoms. The decision to focus on perceived competence in core subjects in this first study comes from the observation that these perceptions are particularly important in elementary school (Arens et al., 2011; Arens & Morin, 2016) where students are exposed to clearly distinct curriculum across different domains of competence.

Then, in our second study, presented in Chapter 3, we examine how secondary and post-secondary school students' achievement goals and global self-esteem predict their burnout trajectory profiles, and subsequently on how students' burnout trajectories relate to their grades, school dropout, and substance use and misuse. The decision to focus on global self-esteem in this second study comes from its demonstrated importance across the lifespan (Craven & Marsh, 2008) and its relevance for burnout development (Jiang et al., 2021; Leupold et al., 2020), which may be anchored in joint developmental mechanisms (i.e., self-equilibrium processes; Gillet et al., 2022). For these reasons, we wanted to examine whether achievement goals had an added value *beyond* self-esteem for predicting burnout. Moreover, given that self-esteem and achievement goals are known to potentially interact (e.g., Shim et al., 2013), we also wanted to assess this potential interaction. However, as we found no evidence supporting this interaction, which was not central to the manuscript submitted for publication (and presented in Chapter 3), this interaction is not further discussed.

Person-Centered and Longitudinal Focus

Introduction to the Person-Centered Approach

Despite the wealth of studies underscoring important associations between students' achievement goals and their socioemotional and academic functioning, the research literature remains primarily cross-sectional and variable-centered. The current thesis expands upon existing research by relying on longitudinal and person-centered methodologies. In variable-centered research, researchers examine average relations between variables, and assume that these relations generalize to the entire sample (Howard & Hoffman, 2018; Morin et al., 2018). This has historically been the dominant approach in the social sciences and is generally well-suited to examine common associations between variables (Howard & Hoffman, 2018). Although the variable-centered approach can be considered parsimonious, familiar, and easily interpretable, it also provides the least amount of nuance and specificity, as it relies on a single averaged set of parameters for the entire sample (Howard & Hoffman, 2018; Morin et al.,

2018).

Conversely, person-centered work allows researchers to identify different subpopulations of students, and to examine the associations between these subpopulations and a host of important variables (Lanza et al., 2013; Howard & Hoffman, 2018; Meyer & Morin, 2016). Person-centered methodologies have become increasingly popular in recent years and can be considered a balanced middle ground between variable-centered and even more fine-grained person-specific approaches, as they allow for a moderate level of parsimony and specificity by relying on multiple sets of parameters (Howard & Hoffman, 2018; Meyer & Morin, 2016; Morin et al., 2018). Importantly, person-centered analyses can be employed to answer research questions that are both cross-sectional and longitudinal (Meyer & Morin, 2016). Some of the most common person-centered approaches include Latent Profile Analyses, Latent Transition Analyses, and Growth Mixture Analyses. Latent Profile Analyses involves the identification of qualitatively and quantitatively distinct subpopulations, or profiles, of individuals within a given sample, and examines how profile membership is associated with various theoretically relevant predictors and outcomes (Lanza et al., 2013). Latent Transition Analyses takes this one step further, by also examining how likely it is for individuals to transition from one profile to another over time (i.e., stability), and by identifying the most common transitions (Lanza et al., 2013). Adding yet another layer of complexity, Growth Mixture Analyses allow researchers to examine how different profiles of individuals may follow different developmental trajectories over longer periods of time (Meyer & Morin, 2016). The current thesis employs all the aforementioned person-centered approaches.

Research Objectives

Taken together, the overarching aim of the current work is to examine relations between achievement goals, academic functioning, and socioemotional functioning amongst students at different educational stages, using person-centered longitudinal methodologies. In our first study, presented in Chapter 2, we rely on Latent Profile and Latent Transition Analyses to examine: (1) how elementary school children's achievement goals combine with their perceptions of the goals held for them by key caregivers to form distinct profiles, (2) the within-person and within-sample stability of these profiles from one school year to the next, (3) how students' perceived academic competence is likely to influence their profile membership; and (4) how profile membership predicts students' academic achievement and anxiety symptoms. In our second study, presented in Chapter 3, we rely on Growth Mixture Analyses to examine: (1) the developmental heterogeneity of school burnout across the transition from upper secondary school to higher education, (2) how students' achievement goals and self-esteem

predict their burnout trajectory profiles, and (3) how their burnout trajectory profiles relate to important personal (i.e., drug and alcohol use) and academic outcomes (i.e., school dropout, academic performance). Contextualized within the current work, person-centered approaches can provide a more holistic, nuanced, and multidimensional perspective on student achievement goals and psychosocial functioning over time. As a result, they tend to elicit findings that are meaningful from an intervention standpoint (Howard & Hoffman, Morin et al., 2018). Since educators and clinicians generally think about students in terms of categories or types (e.g., “highly motivated students”) (Morin et al., 2018), this perspective is well-suited for the development and implementation of interventions aiming to optimally support and enhance the academic and socioemotional functioning of different categories of students across the educational trajectory (Cauley & McMillan, 2010; Hardre & Reeve, 2003; Morin & Marsh, 2015; Vansteenkiste et al., 2004; Yeager et al., 2016).

CHAPTER 2:

A Longitudinal Person-Centered Representation of Elementary Students' Motivation: Do Perceptions of Parent and Teacher Achievement Goals Matter?

Introduction

Achievement Goal Theory (AGT) is arguably one of the main theoretical frameworks that researchers use to explain what motivates students' involvement in their academic work (Kaplan & Maehr, 2007). More precisely, AGT describes the various reasons or purposes that drive students' involvement in their schoolwork (i.e., their achievement goals). The present study focused on domain-general approach goals that involve students' drive toward academic success across academic domains (Elliot & Thrash, 2001, 2002, 2010). Compared to avoidance goals that seek to avoid undesired outcomes, approach goals tend to be more practically relevant for children for whom approach and avoidance goals are harder to differentiate (Schwinger et al., 2016). Approach goals center around the notion that students strive to demonstrate (i.e., performance goals) or to develop (i.e., mastery goals) their competence, thus promoting educational attainment and wellbeing (Elliot, 1999; Elliot & McGregor, 2001; Elliot & Murayama, 2008; Nadon et al., 2020).

With some noteworthy exceptions (see Wormington & Linnenbrink-Garcia, 2017, for a review), the bulk of AGT research remains predominantly variable-centered. Variable-centered research focuses on the average associations between variables observed within a specific sample, assumed to generalize to the whole sample, and is thus not well-suited to consider how different types of students might be characterized by qualitatively distinct achievement goal configurations. AGT acknowledges that individual students typically display a combination of goals (Dowson & McInerney, 2003; Pintrich, 2000), with some combinations being more adaptive than the isolated endorsement of a single type of goal (Barron & Harackiewicz, 2001; Senko et al., 2011). In alignment with this perspective, person-centered research explicitly seeks to identify subpopulations (or profiles) of students differing qualitatively and quantitatively from one another in their achievement goal configurations (e.g., Morin et al., 2018). The adoption of a person-centered approach thus provides a more holistic and nuanced perspective on the way achievement goals work in combination, rather than in isolation, to drive students' motivation (e.g., Litalien et al., 2017a, 2017b). Importantly, by focusing on profiles of students, the person-centered approach tends to be more clearly aligned with practitioners' and educators' tendency to think about different "types" of students rather than

in terms of complex variable associations (e.g., Morin et al., 2018). As a result, this perspective is well aligned with the development and implementation of targeted and effective motivation-related interventions seeking to maximally nurture, support, and improve the educational and emotional wellbeing of different categories of students (Cauley & McMillan, 2010; DeBacker et al., 2018; Hardre & Reeve, 2003; Morin & Marsh, 2015; Vansteenkiste et al., 2004; Yeager et al., 2016).

Furthermore, rather than being static, achievement goals are dynamic constructs that are likely to evolve over time (Harackiewicz et al., 2002; Pintrich, 2000) as students are exposed to different classrooms and teaching styles from one school year to the other (Dietrich et al., 2015). This evolving nature of achievement goals is particularly important to consider in childhood, a period when school-related beliefs, values, and expectations first emerge as a result of interactions between children and their primary caregivers (i.e., parents and teachers; Anderman et al., 1999; Anderman & Maehr, 1994; Briley et al., 2014; Fredricks & Eccles, 2002; Friedel et al., 2007, 2010; Kaplan & Maehr, 2002, 2007). Indeed, during this period, children come to develop perceptions about what these important adults expect of, and value for them, which in turn contribute to shape their own perceptions (Kahraman & Sungur, 2013; Meece et al., 2003, 2006). The present study was designed to consider the role played by children's achievement goals and their perceptions of the achievement goals held for them by their caregivers via the adoption of a person-centered perspective. More precisely, we first assessed how children's own achievement goals combined with their perceptions of the goals held for them by their parents and teachers to generate qualitatively distinct achievement goal profiles. Second, we systematically assessed the within-sample (i.e., whether the same number of profiles, characterized by the same shape, within-profile variability, and size will be identified over time) and within-person (whether students' membership in specific profiles will change over time) stability of these profiles across 2 consecutive school years. Third, we assessed how membership into these various profiles is influenced by children's beliefs regarding their own academic perceived competence (in French and Math). Fourth, we investigated the impact of profile membership in relation to important academic (i.e., academic achievement) and-emotional (i.e., anxiety) outcomes.

Achievement Goal Profiles: Perceptions of Student, Teacher, and Parental Goals

According to Maehr and colleagues' social-cognitive perspective on AGT (Anderman et al., 1999; Anderman & Maehr, 1994; Kaplan & Maehr, 2002, 2007; Maehr & Braskamp, 1986; Maehr & Pintrich, 1991), children's propensity to move towards positive educational outcomes (i.e., approach achievement goals) is connected to the characteristics of their social

environments (i.e., home and school). This perspective has led some to highlight the role that children's *subjective perceptions* of the achievement goals held for them by their teachers and parents may play in influencing their own achievement goals and goal-directed behaviors (Kahraman & Sungur, 2013; Meece et al., 2003, 2006). Additionally, whereas younger students tend to perceive their caregivers' goals (i.e., parents and teachers) as matching their own, these perceptions tend to evolve at the approach of adolescence, leading to more clearly distinct evaluations of these goals (Bardach et al., 2020; Gonida et al., 2009, 2014). Still, goal alignment might be higher between students' personal goals and their perceptions of the goals held for them by their parents, relative to their perceptions of their teachers' goals (Friedel et al., 2007). Finally, although students' own goals are key in fostering their achievement and wellbeing, their perception of their caregivers' goals is also closely related to various educational and emotional outcomes, such as academic achievement and anxiety (e.g., Baudoin & Galand, 2022; Gonida et al., 2009; Wigfield & Cambria, 2010; Zubković & Kolić-Vehovec, 2014). A grey area that remains to be explored is how students combine all three perceptions of achievement goals (i.e., own, parent, and teacher), which would make it possible to identify whether one combination is more optimal than others in supporting student achievement and wellbeing. This was the focus of the present study.

Individual Students' Achievement Goal Profiles

Relatively few studies have relied on a person-centered approach to investigate the most commonly occurring achievement goal configurations among children. This dearth of research limits our understanding of how mastery and performance approach goals might differentially combine among distinct subpopulations of students. In the present study, we focused on domain-general (rather than subject-specific) approach goals, which tend to be far more relevant for children relative to older students (e.g., Sparfeldt & Rost, 2011). Indeed, whereas approach goals initially emerge in an undifferentiated manner across all subjects to reflect children's orientation toward their education in general, these goals become progressively more differentiated across subjects as children grow and develop their specific interests. For instance, studies have found that the correlations between subject-specific mastery goals decreased progressively between Grades 4 and 10 (Józsa et al., 2017). Moreover, motivation and goals related to different subjects are also likely to be more similar for students exposed to a single teacher and teaching style across all subjects, which is common in primary school and was the case for the sample recruited in the present study. In this context, studies conducted among primary school students have generally shown that student goals and motivation in one domain were highly related to their goals and motivation in other domains, when both domains were

taught by the same teacher (Dietrich et al., 2015). Lastly, this convergence across subjects is likely to be even greater for students' perceptions of the goals held for them by their teachers (who are teaching them all subjects) and parents (whose goals are more likely to be education-oriented than subject specific in this age group).

Despite their rarity, studies conducted among adolescent populations generally identify between four and six profiles of student achievement goals (Hayenga & Corpus, 2010; Litalien et al., 2017a, 2017b; Shim & Finch, 2014; Tuominen et al., 2020; see Wormington & Linnenbrink-Garcia, 2017, for a review). These studies showed that profiles dominated by mastery goals were among the most common and most adaptive regarding students' well-being, engagement, and achievement. Albeit less frequent, profiles dominated by performance goals tended to be associated with generally maladaptive outcomes. In contrast, profiles characterized by a combination of mastery and performance goals were found to be associated with positive outcomes, suggesting that performance goals might not be as harmful as previously thought (e.g., Elliot, 1999; Elliot & McGregor, 2001) when held alongside mastery goals. Finally, profiles characterized by low or average levels of goals also appeared to be relatively common and were associated with generally maladaptive outcomes.

Person-centered studies of achievement goals conducted specifically amongst elementary school students have generally yielded similar results, although these studies have identified slightly fewer profiles (i.e., between 3 and 5). Consistently, these studies have revealed profiles of students simultaneously endorsing high levels of mastery and performance goals (In De Wal et al., 2016; Hornstra et al., 2017; Schwinger & Wild, 2012; Schwinger et al., 2016; Zhang et al., 2016). Profiles characterized by moderate levels of mastery and performance goals were also commonly identified in these studies (Hornstra et al., 2017; In De Wal et al., 2016; Schwinger et al., 2016; Schwinger & Wild, 2012), whereas a single study identified a profile characterized by low levels of all goals (Schwinger et al., 2016). Finally, whereas several studies found profiles dominated by mastery goals (Schwinger & Wild, 2012; Schwinger et al., 2016; Zhang et al., 2016), fewer studies identified the opposite configuration (Schwinger et al., 2016; Zhang et al., 2016).

Students' Perceptions of their Own, their Teachers', and their Parents' Achievement Goals

Children's achievement goals do not occur in a vacuum, but rather tend to be intimately related to the characteristics of their social contexts (e.g., Anderman et al., 1999; Anderman & Maehr, 1994; Briley et al., 2014; Fredricks & Eccles, 2002; Friedel et al., 2007, 2010; Kaplan & Maehr, 2002, 2007; Tynkkynen et al., 2012), including children's perceptions of the goals held for them by their primary caregivers (e.g., Kahraman & Sungur, 2013; Meece et al., 2003,

2006). For instance, Gonida et al. (2014) found that students (Grade 4 and Grade 6) who perceived that their parents emphasized both mastery and performance goals reported more mastery-oriented goals than their peers. Yet, the low-to-moderate correlations reported by Gonida et al. (mastery $M_{|r|} = .24$; performance $M_{|r|} = .07$) suggest that the achievement-related messages students receive from their parents only partially influence their own goals, consistent with the presence of other sources of influence. In addition, previous variable-centered studies, predominantly conducted among adolescents, have also revealed that students' perceptions of the goals held for them by their parents and teachers were important determinants of their academic motivation (Vedder-Weiss & Fortus, 2013). For example, students who see their parents and teachers as being mastery-oriented tend to endorse mastery goals more strongly themselves (Gonida et al., 2009). Lastly, in a meta-analysis of 62 studies including samples of elementary, secondary, and tertiary (i.e., college and university) students, Bardach et al. (2020) reported a moderate to high level of correspondence between students' personal goals and their classroom/teacher goal structure ($r = .373$ to $.571$). Interestingly, the relation between students' mastery goals and their exposure to mastery classroom goal structures was weakest in elementary ($r = .439$) and secondary ($r = .485$) school than in tertiary ($r = .605$) education. The authors explained this difference by suggesting that younger students might have more difficulty differentiating between the various goal-related messages present in their environment, leading them to more frequently pursue a combination of mastery and performance goals simultaneously.

Despite the interest of these previous results, no study has yet considered the interplay between students', teachers', and parents' domain-general achievement goals, or the specific profiles taken by the combination of these three sets of goals for different students. Although students' personal goals tend to match their perceptions of their parents and teachers' goals, there also can be a mismatch. For example, Friedel et al. (2007) found that although elementary and middle school students' perceptions of their parent and teacher achievement goals were positively correlated ($r = .28$ to $.40$), they still played a distinct role in predicting students' personal goals. Thus, when compared to teachers, parents seemed to play a greater role in predicting children's performance and mastery goals. Adopting a person-centered perspective provides a unique way to address these issues through the identification of profiles of students presenting qualitatively distinct configurations of achievement goals while considering their own goals and their perception of the goals held for them by their parents and teachers. This approach will thus reveal the nature, prevalence, and educational and emotional implications of profiles characterized by matching or divergent achievement goals across the perceived

source of the goal (i.e., self, parent, and teacher) and the type of goal (i.e., mastery and performance).

Achievement Goals and Sociocultural Context

Students' own goals as well as their perceptions of their parents' and teachers' goals need to be contextualized within their larger sociocultural background. Studies often investigate student motivation and goals in samples from moderate to high SES backgrounds (Berger & Archer, 2016; Hornstra et al., 2017), which shields our understanding of the equally complex, and yet different, reality of students enrolled in low-SES schools. Studies often describe students from low-SES backgrounds as less likely to endorse approach goals (i.e., mastery and performance) or to report lower global levels of goal endorsement relative to students from higher SES backgrounds (Berger & Archer, 2015, 2016). However, these conclusions do not necessarily represent the multifaceted cultural backgrounds often found in low-SES schools. Indeed, students from immigrant backgrounds (who were born abroad or whose parents were born abroad) are more likely to attend schools situated in low-SES neighborhoods and to face more economic adversity, often despite having highly educated parents (e.g., whose qualifications are not always recognized by the host country; Archambault et al., 2017). This is particularly the case in countries, such as Canada, where a high number of selected economic immigrants are routinely welcomed. The poverty experienced by these immigrant families is typically the result of having left good employment and financial situations in their home country. For those families, poverty does not entail the same background characteristics commonly seen in the general population living in low SES communities. As a result, several immigrant students attending low-SES schools even outperform non-immigrant students, in addition to reporting higher levels of motivation (Archambault et al., 2017). The goals and aspirations of these students' parents often play a critical role in their schooling trajectory, as immigration is likely considered an instrument to attain a better life (Portes & Rumbaut, 2001). As a result, some students develop a sense of family obligation toward their studies (Urduan et al., 2007), which may lead to a greater tendency to endorse performance goals (Urduan, 2004). Additionally, Kim et al.'s (2020) results suggest that non-immigrant students' perceptions of their teachers' mastery goals are more closely related to their own goals, compared to the goals of students from immigrant backgrounds who often share a stronger association with their perceptions of their parents' mastery goals. Given this complex reality found among students attending low-SES schools, it is important for studies to better understand how students' goals are connected to their perceptions of the goals held for them by their key caregivers.

Achievement Goal Profiles: A Construct Validation Perspective

Although person-centered analyses can be used for both deductive and inductive purposes, they remain methodologically inductive in nature (Morin et al., 2018). It thus is important to document the construct validity of the identified profiles (Marsh et al., 2009; Meyer & Morin, 2016; Morin et al., 2016; Muthén, 2003). In person-centered research, construct validity typically comes from three sources of evidence showing that the identified profiles can be (a) replicated over time or across distinct samples of participants, (b) predicted by theoretically meaningful variables, and (c) differentially related to theoretically relevant outcomes. In the present study, we considered all three sources of evidence.

Replicability Over Time: Effects of Time and Maturation

Tests of replicability, typically referred to as tests of profile similarity, are particularly important in person-centered analyses to discriminate profiles that systematically occur over time and contexts, from profiles that only emerge under specific conditions, and from profiles that infrequently occur because of random sampling variations (e.g., Morin et al., 2016; Solinger et al., 2013). In the present study, we considered the longitudinal similarity of the identified profiles across a time interval of one year. Longitudinal tests of profile similarity make it possible to consider two different sources of stability (or change) in profile solutions (McLarnon et al., 2021; Morin et al., 2016, 2020).

First, within-sample stability refers to whether profiles with the same characteristics (e.g., number, shape, within-profile variability, size) can be identified over time. Examining profile stability is critically important for practical purposes (e.g., Houle et al., 2020; Meyer & Morin, 2016; Spurk et al., 2019). Indeed, the ability to design generalizable interventions based on person-centered solutions is predicated on the identification of a core set of profiles likely to emerge over time and ideally across similar contexts. In the absence of interventions, the nature of the profiles should not change in an unpredictable manner over time as this would indicate that profiles are ephemeral states and unreliable categories. Lacking a core set of profiles would also mean that interventions would need to be designed on a case-by-case basis (e.g., separately for each school grade).

A second form of stability is within-person stability, which refers to whether students' membership into specific profiles remains the same over time and helps to document the most common transitions in profile membership occurring over time. Although some level of within-person stability should be expected to support the value of intervention efforts, this stability should also be limited. Indeed, perfectly stable profile memberships would suggest rigidity, making intervention harder. In contrast, random fluctuations in profile membership over time

would suggest that the effects of interventions are unlikely to last.

Person-centered research suggests that, as students get older, their achievement goals tend to become increasingly differentiated, and their endorsement of performance goals tends to increase (e.g., Meece et al., 2003; Schwinger & Wild, 2012; Schwinger et al., 2016). However, person-centered research strictly focused on elementary students' achievement goal profiles suggests a relatively stable within-sample profile structure over time (e.g., Hornstra et al., 2017; In de Wal et al., 2016; Schwinger et al., 2016; Tuominen et al., 2020). Likewise, previous research also reveals a relatively high level of within-person stability in profile membership from one school year to the next (e.g., In de Wal et al., 2016; Schwinger et al., 2016) and shows that students rarely transition from mastery-oriented profiles toward performance-oriented ones (Schwinger et al., 2016). However, transitions from profiles characterized by high levels of mastery and performance goals to profiles characterized by low or moderate levels of all goals are more common (e.g., In De Wal et al., 2016). Overall, these previous studies thus show that stability tends to decrease as the time interval between the measurement points increases, but that changes in profile structure and profile membership tend to remain limited over a period of one elementary school year. These observations suggest that a 1-year interval might be suitable for tests of profile replicability designed to ensure that the profiles identified in the present study represent reasonably valid and replicable phenomena. Yet, no previous study has simultaneously considered students' own achievement goals together with their perceptions of the goals held for them by their parents and teachers. Although we could expect children's perceptions of their parents' achievement goals to match their own goal instability, children are exposed to different teachers each year. As such, their perceptions of teachers' achievement goals might display a higher level of year-to-year variability, making it important to test whether and how previous results would generalize to this more comprehensive representation of achievement goals.

The Role of Perceived Competence as a Predictor of Profile Membership

In this study, we considered children's perceptions of their academic perceived competence in math and first language (French) as possible predictors of profile membership. Perceived competence, which is the belief that individuals can use their internal resources to overcome challenging tasks and meet specific goals (Connell, 1990; Deci & Ryan, 2000), often has been reported as a critical driver of achievement goals (Cury et al., 2006; Ferla et al., 2010; Law et al., 2012). Contrary to achievement goals that are not yet subject-specific in young students, perceived competence is often defined as subject-specific, and often even as task-specific (Bandura, 1986; Bong, 2002; Jiang et al., 2014; Schunk & Mullen, 2012; Schunk &

Pajares, 2009; Usher 2009). However, young students typically do not differentiate between their task-specific competence within more global subjects (i.e., reading versus writing verbal competence) as clearly as older students (e.g., Siefer et al., 2021). Students who feel competent academically are more likely to see school subjects as achievable challenges, making them more likely to persevere in the accomplishment of all tasks associated with those subjects (Cury et al., 2006; Duchesne & Larose, 2018; Schunk, 2003; Schunk & DiBenedetto, 2016, 2020). As a result, perceived competence helps to nurture students' adoption of mastery and performance goals (Duchesne & Larose, 2018; Elliot & Church, 1997; Greene et al., 2004).

Previous person-centered studies have shown that students who report high levels of perceived competence are more likely to correspond to profiles characterized by moderate to high levels of mastery goals (Fortunato & Goldblatt, 2006; Wormington & Linnenbrink-Garcia, 2017) or by high levels of mastery and performance goals (Luo et al., 2011; Wormington & Linnenbrink-Garcia, 2017). Moreover, and consistent with self-consistency theory (Swann, 1983), students' perceived competence might lead them to perceive their parents' and teachers' expectations in a way that confirms their own beliefs. Thus, students who feel competent could potentially perceive their parents and teachers as holding similarly high mastery and performance goals for them. This possibility has, however, never been considered in research as previous studies have mainly focused on how parents' and teachers' goals influence student perceived competence, rather than the other way around (Bandura, 1986; Friedel et al., 2007, 2010; Jiang et al., 2014; Schunk & Mullen, 2012; Usher, 2009). The present study was specifically designed to address this possibility.

The Implications of the Profiles for Students' Academic Achievement and Anxiety

In this study, we considered students' academic achievement and anxiety as outcomes of profile membership. Students who are motivated by a desire to learn and grow (i.e., mastery goals) consistently fare best with academic and socioemotional outcomes (Hornstra et al., 2017; Pahljina-Reinić & Kolić-Vehovec, 2017; Schwinger et al., 2016). Academic achievement represents students' learning, mastery, and performance in school subjects, generally based on grades or teachers' normative assessments (York et al., 2015). Although school-specific anxiety is commonly studied in relation to academic achievement goals (e.g., Huang, 2011), it is also important to understand how achievement-related factors influence anxiety more generally. Anxiety, defined as “an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure” (American Psychological Association, 2021), is one of the most common psychological health problems in childhood and adolescence (Kessler et al., 2005; Polanczyk et al., 2015). Left undetected and untreated, anxiety can have

long term effects on development and functioning (Bittner et al., 2007; Broeren et al., 2013; Kessler et al., 2005; Polanczyk et al., 2015).

Students' achievement goals, anxiety, and achievement are inter-connected. Whereas performance goals can sometimes contribute to academic success (Butler, 2006; Kesici & Erdogan, 2010; Harackiewicz et al., 2008; Midgley et al., 2001; Mouratidis et al., 2018; Muyarama & Elliot, 2012; Skaalvik, 2018; Tanaka et al., 2006; Van Yperen et al., 2014; Wirthwein et al., 2013), they can also come at a cost for mental health outcomes, like anxiety, by eliciting social comparison processes and self-doubt (Goetz et al., 2016; Huang, 2011; Linnenbrink, 2005; Luo et al., 2011; Pahljina-Reinić & Kolić-Vehovec 2017; Pekrun et al., 2006). Students pursuing mastery goals, however, tend to report generally more adaptive outcomes such as higher academic achievement and lower anxiety (Hornstra et al., 2017; Huang, 2011, 2012; Pahljina-Reinić & Kolić-Vehovec, 2017; Schwinger et al., 2016; Van Yperen et al., 2014, 2015). Similar findings also seem to apply to perceptions of goals held by parents and teachers. Thus, when students perceive that their teachers and parents emphasize mastery goals, they tend to feel less anxious, to employ better learning strategies, and to achieve higher grades (Baudoin & Galand, 2022; Gonida et al., 2009; Wigfield & Cambria, 2010; Zubković & Kolić-Vehovec, 2014). However, research results are equivocal regarding teachers' and parents' performance goals. Some studies suggest that students tend to exhibit less adaptive learning processes when they perceive that their teacher focuses on social comparisons (a component of classroom performance goal structures; Elliot & Church, 1997; Skaalvik, 1997). Likewise, limited information is available regarding the effects of discrepancies between personal goals and perceived parent and teacher achievement goals. One possibility that has not yet been empirically evaluated is that misalignment could create a cognitive goal conflict (Festinger, 1957; Harmon-Jones, 2019) whereby students feeling exposed to discrepant messages from their environments may come to experience higher levels of anxiety.

Person-centered studies suggest that mastery-oriented students, and students endorsing both mastery and performance approach goals, tend to experience the most adaptive outcomes. However, performance goals only seem adaptive when combined with mastery goals (Hornstra et al., 2017; Schwinger et al., 2016; Zhang et al., 2016), and the adaptiveness of this combination may depend on the outcome of interest (Schwinger & Wild, 2012). In terms of anxiety, profiles characterized by high levels of mastery goals consistently seem to experience the lowest levels of anxiety (Liu et al., 2020; Jang & Liu, 2012). Additionally, profiles characterized by low levels of mastery and performance goals tend to experience lower levels of anxiety than profiles characterized by low or moderate levels of goals (Liu et al., 2020; Jang

& Liu, 2012). Taken together, these studies thus suggest that performance goals can be adaptive for academic achievement when held alongside mastery goals, but that high mastery goals alone are likely to result in the most adaptive outcomes.

The Present Study

The present study first investigated how students' own domain-general approach achievement goals combine with their perceptions of the goals held for them by their parents and teachers among a sample of elementary school students from low-SES backgrounds. Based on previous person-centered research conducted among elementary school students (In De Wal et al., 2016; Hornstra et al., 2017; Schwinger & Wild, 2012; Schwinger et al., 2016; Zhang et al., 2016) we expected to identify between 3 and 5 profiles (Hypothesis 1). We also expected some of these profiles to match one or more of the following configurations (Hypothesis 2): (a) high mastery and performance goals (i.e., high on all goals); (b) low or moderate mastery and performance goals (i.e., low or moderate on all goals); (c) high mastery goals, combined with low to moderate performance goals (i.e., mastery-oriented); (d) high performance goals, combined with low to moderate mastery goals (i.e., performance-oriented); and (e) at least one profile marked by discrepancies between perceived student, parent, and/or teacher goals. Consistent with research suggesting that parents play a larger role than teachers in predicting students' goals (Friedel et al., 2007), especially among students from an immigrant background (Kim et al., 2020), we anticipated that such discrepancies would be more likely to emerge between students' own and perceived teacher goals, compared to between students' own and perceived parents' goals.

Our second objective was to document the within-sample and within-person stability of the achievement goal profiles over a 1-year interval taken across 2 consecutive school years. We expected to extract the same number of profiles, characterized by the same shape, within-profile variability, and size across timepoints (i.e., within-sample stability; Hypothesis 3). Based on the age of our sample and the 1-year gap between timepoints, we also expected most profiles to display moderate (50%+) to high (75%+) levels of within-person stability over time (Hypothesis 4).

Our third objective was to assess how perceived competence in core academic subjects of math and French (first language) would be associated with profile membership. We expected that students who reported high levels of perceived competence in both subjects would more likely correspond to a mastery-oriented or high on all goals profile, rather than to other profiles (Hypothesis 5).

Our last objective was to investigate associations between profile membership,

achievement, and anxiety. We expected the mastery-oriented profile to display the highest levels of academic achievement and the lowest levels of anxiety, followed by the high on all goals profile, then by the low on all goals and performance-oriented profiles (Hypothesis 6). We left open the research question of whether and how profile(s) marked by goal discrepancies might be associated with these outcomes.

Method

Participants and Procedures

This study relied on a sample of 619 elementary school students (52.5% female; age range = 7–12 years, $M_{\text{age}} = 9.782$, $SD_{\text{age}} = 1.052$) who completed questionnaires in the spring of two consecutive school years. Participants were enrolled in Grade 3 ($n = 208$), Grade 4 ($n = 177$), and Grade 5 ($n = 189$) in five French-speaking primary schools located in ethnically diverse neighborhoods with low socioeconomic status in the city of Montreal (Québec, Canada). Of these participants, 153 completed a single time point (54.2% females; $M_{\text{age}} = 9.790$ years), whereas 466 (51.9% females; $M_{\text{age}} = 7.780$ years) completed both time points.

This sample was mainly composed of first- (38.4%) and second- (40.8%) generation immigrants. For first- or second-generation immigrant students, the main countries of origin were Haiti (34.0%), Algeria (18.8%), Morocco (11.0%), or others (15.4%; e.g., Cameroon, El Salvador, France, Guatemala, Ivory Coast, Peru, Tunisia, U.S.A, Vietnam). Among participating families, about 45% had a mean annual income lower than \$30,000 (CAD), which is under the low-income threshold in Québec. Among the remaining families, roughly 30% reported a mean annual income between \$30,000 and \$49,999 (CAD) per year, 16% reported a mean annual income between \$50,000 and \$79,999 (CAD) per year, and 9% reported a mean annual income over \$80,000 (CAD) per year. At the school level, parents of students enlisted in four of the five participating schools reported an average annual income between the response categories of less than \$30,000 (CAD) and \$30,000–\$49,999 (CAD). Parents of one school reported a mean income ranging between \$50,000 and \$79,999 (CAD).

Data collection was approved by the research ethics committee of the third author's institution, as well as by the school board of the participating schools. Active parental consent was obtained for all students, who also consented to their own participation. The participation rate of students was slightly above 70%. Given the large proportion of participating students whose language spoken at home was other than French, consent forms were translated into the five most common languages spoken at home (i.e., English, Spanish, Creole, Turkish, and Arabic) to facilitate parental understanding. At each time point, students completed a computerized questionnaire in their classroom. Two trained research assistants supervised the

data collection while teachers answered a questionnaire in a separate room. Research assistants read the questions aloud and, when necessary, answered students' questions to ensure their understanding. The questionnaire took a maximum of 1 hour to answer.

Teachers provided their own informed consent to participate in the study, with a participation rate of 100%. In the Quebec school system, primary teachers teach all subjects (e.g., math, language, science). The 56 (in Year 1, including 90.6% females) and 53 (in Year 2, including 89.6% females) teachers involved with these students were asked to report on the academic achievement of all students. Over 50% of participating teachers had at least 10 years of teaching experience (54.7% at T1 and 60.4% at T2) and over 90% of them were born in Canada (90.4% at T1 and 92.2% at T2).

Measures

Achievement Goals

The French adaptation (Duchesne et al., 2012) of the Patterns of Adaptive Learning Scales (Midgley et al., 2000) was used to assess domain-general achievement goals at both measurement points. At both time points, students completed a total of 33 items reflecting their own achievement goals, as well as their perceptions of the achievement goals that their parents and teachers held for them using a scale ranging from 1 (*almost never*) to 5 (*almost always*). For self-reported achievement goals, students responded to five items measuring mastery goals (e.g., "It is important to me to learn new things this year"; Time 1 $\alpha = .825$, Time 2 $\alpha = .861$) and five items measuring performance goals (e.g., "It's important for me to appear intelligent compared to my classmates"; Time 1 $\alpha = .922$, Time 2 $\alpha = .937$). In relation to perceptions of their parents' goals, students completed six items measuring mastery goals (e.g., "My parents want me to understand the work I do in class, not just memorize how to do it"; Time 1 $\alpha = .678$, Time 2 $\alpha = .690$) and five items measuring performance goals (e.g., "My parents want me to demonstrate that I'm better at school than the other students in my class"; Time 1 $\alpha = .814$, Time 2 $\alpha = .825$). In relation to perceptions of their teacher's goals, students completed three mastery items (e.g., "My teacher thinks that it's okay to make mistakes, as long as we are learning"; Time 1 $\alpha = .606$, Time 2 $\alpha = .606$) and three performance items (e.g., "My teacher tells us where we rank compared to the other students in the class"; Time 1 $\alpha = .720$, Time 2 $\alpha = .734$).

Perceived Competence

Students' perceptions of their own academic perceived competence in math (e.g., I have difficulty in math; Time 1 $\alpha = .759$, Time 2 $\alpha = .837$) and French were assessed at both time points using six items (e.g., I find that I am good at French; Time 1 $\alpha = .750$, Time 2 $\alpha = .784$).

taken from the New Approaches New Solutions originally developed in French (Janosz et al., 2010). These items were rated using a 5-point scale ranging from 1 (*almost never*) to 5 (*almost always*).

Anxiety

Students' manifestations of anxiety were assessed at both measurement points using all 28 items of the French adaptation (Turgeon & Chartrand, 2003) of the Revised Children's Anxiety Manifest Scale (RCAMS; Reynolds & Richmond, 1978). This instrument includes 12 items covering manifestations of worry/hypersensitivity (e.g., "I worry most of the time"; Time 1 $\alpha = .838$, Time 2 $\alpha = .855$), eight items covering physiological symptoms (e.g., "I am often tired"; Time 1 $\alpha = .695$, Time 2 $\alpha = .695$), and eight items covering social concerns and concentration difficulties (e.g., "Other children are happier than me" or "I have trouble concentrating on my school work"; Time 1 $\alpha = .754$, Time 2 $\alpha = .787$), which can be combined into a total score (Time 1 $\alpha = .901$, Time 2 $\alpha = .910$). Participants indicated whether these symptoms generally applied to them using a binary (*yes/no*) response format. We relied on a bifactor operationalization (e.g., Morin et al., 2020) that allowed us to obtain a global anxiety factor estimated from all items for our analyses while accounting for the specificity associated with each subscale (see Supplementary Materials).

Academic Achievement

At both time points, teachers ranked each of their student's academic achievement compared to other students in the classroom, which represents a normative assessment of their achievement. More precisely, they completed one item each related to children's performance in math, reading, and writing (e.g., "Since the beginning of the school year, how would you evaluate this students' average math performance compared to the other children in your class?"; Time 1 $\alpha = .905$, Time 2 $\alpha = .890$) using a 5-point scale ranging from 1 (*well below average*) to 5 (*well above average*). In the Canadian province of Québec, primary school students are taught all subjects by the same teacher who is responsible for grading all assignments, tests, and exams. Teachers are thus the primary source of information in relation to primary school students' achievement (Ministère de l'Éducation du Québec, 2002, 2003). Our measure of achievement is also highly correlated with students' official school records (Duncan et al., 2007; Pagani et al., 2001). In addition, this measure was found to remain stable from year to year (i.e., when achievement is assessed by different teachers) and associated with relevant motivational outcomes (i.e., student engagement and perceived competence) both concomitantly and longitudinally (Olivier et al., 2019).

Analyses

Preliminary Analyses

Preliminary Confirmatory Factor Analyses (CFAs) were conducted to verify the measurement properties and invariance (i.e., equivalence; Millsap, 2011) over time of all variables used in the present study. These analyses are reported in the first section of the Supplementary Materials and support the adequacy, measurement invariance, and composite reliability of our main factors: (a) teachers' mastery goals ($\omega = .747$), (b) teachers' performance goals ($\omega = .796$), (c) students' mastery goals ($\omega = .920$), (d) students' performance goals ($\omega = .957$), (e) parents' mastery goals ($\omega = .867$), (f) parents' performance goals ($\omega = .814$), (g) math perceived competence ($\omega = .865$), (h) French perceived competence ($\omega = .832$), (i) academic achievement ($\omega = .924$), and (j) global anxiety ($\omega = .956$). Time-invariant factor scores, estimated in standardized units with a mean of 0 and a variance of 1, were saved from these analyses and used in the main analyses. Factor scores have the advantage of affording a partial correction for measurement errors (Skrondal & Laake, 2001) and preserve the measurement structure (e.g., invariance, bifactor) of the measurement model (Morin et al., 2016).

Latent Profile Analyses

All analyses were conducted in *Mplus* 8.4 (Muthén & Muthén, 2019). Latent Profile Analyses (LPA) were estimated using the Maximum Likelihood Robust estimator (MLR) and Full Information Maximum Likelihood (FIML; Enders, 2010; Graham, 2009) procedures to retain all participants who completed at least one measurement point ($n = 619$) rather than to inappropriately eliminate (i.e., listwise deletion) those who only participated once ($n = 153$). All models were estimated using 6000 randomly generated sets of start values each allowed 1000 iterations. The best 500 and 100 of them were, respectively, retained for the second and final rounds of optimization (Hipp & Bauer, 2006; McLachlan & Peel, 2000).

To identify student achievement goal profiles, LPA including 1–8 profiles were first estimated separately at each time point using the achievement goal factor scores from our preliminary analyses. In these solutions, the means and the variances of the profile indicators were freely estimated across profiles. To select the optimal time-specific solution, we considered the meaning, theoretical conformity, and statistical adequacy of each solution (Marsh et al., 2009; Morin & Litalien, 2019), as well as various statistical indices. Thus, a lower value on the Akaike Information Criterion (AIC), the consistent AIC (CAIC), the Bayesian Information Criterion (BIC), or on the sample-size Adjusted BIC (ABIC) are indicative of a better fitting model. Likewise, a statistically significant p -value on the adjusted Lo, Mendel, and Rubin's (2001) Likelihood Ratio Test (aLMR) or on the Bootstrap Likelihood Ratio Test (BLRT) support the value of an LPA solution relative to a solution including one less profile.

Statistical simulation studies have demonstrated that the CAIC, BIC, ABIC, and BLRT are reliable indicators of the optimal number of profiles, but not that of the AIC and ALMR, which are thus only reported for purposes of transparency (e.g., Diallo et al., 2016, 2017; Morin & Litalien, 2019). However, because these indicators are all sample-size dependent, they often fail to converge on a specific solution (Marsh et al., 2009). When this happens, it is recommended to display the value of the information criterion as a function of the number of profiles (i.e., an elbow plot). In these displays, the optimal solution is suggested by the point at which the decrease in the value of these indicators reaches an inflection point (Morin & Litalien, 2019; Morin et al., 2011). Finally, although this indicator should not be used to guide the selection of the optimal solution, we also report the model entropy. This indicator varies from 0 to 1, with higher values indicating a higher accuracy in the classification of students into the various profiles.

Tests of Profile Similarity and Latent Transition Analyses

Considering that the LPA retained at each time point included the same number of profiles, both time-specific solutions were combined into a single longitudinal LPA of configural similarity. From this model, following sequential procedures described by Morin et al. (2016) and adapted to the longitudinal context by Morin and Litalien (2017), we tested the within-sample structural (whether the profiles retain the same shape), dispersion (whether the within-profile variability remains the same), and distributional (whether the profile sizes remain the same) similarity of the profiles over time. Morin et al. (2016) noted that similarity is supported when at least two out of the CAIC, BIC, and ABIC indices are lower in a model relative to the previous one in the sequence. The most similar model was converted to a Latent Transition Analysis (LTA) model (Collins & Lanza, 2010) to assess within-person stability in profile membership over time (i.e., stability and change in profile membership; Kam et al., 2016). This conversion was done using the manual three-step approach described by Morin and Litalien (2017) to ensure that the profiles remained unchanged.

Demographic Controls and Predictors

Student's demographic characteristics (measured at Time 1) and the predictors (measured at Time 1 and Time 2) were then included in the LTA using a multinomial logistic regression to assess their role in predicting students' likelihood of membership into the various profiles. To verify the need to include these variables in our main analyses, these analyses were first realized using only the demographic variables, including students' sex (coded 0 for boys, 1 for girls), grade level (ranging from 3 to 6), and immigration status (coded 0 for third generation immigrants or higher, 1 for first- and second-generation immigrants). Four

alternative models were contrasted. In the first model, we allowed the relation between these variables and likelihood of profile membership to vary over time, and as a function of students' membership into the Time 1 profiles in the prediction of their membership into the Time 2 profiles. Doing so allowed us to test whether demographic variables had a direct influence on specific profile transitions (i.e., transitioning from one profile at Time 1 to a different profile at Time 2). In the second model, these predictions were only allowed to differ over time. In the third model, these predictions were constrained to be equivalent over time, corresponding to a model of predictive similarity (Morin et al., 2016). A final model (i.e., null effects) constrained these predictions to be exactly 0, consistent with a complete lack of effects of the demographic variables. The same sequence of models was then repeated with the theoretical predictors (i.e., math and French perceived competence), with or without the demographic controls based on the previous results.

Outcomes

Outcomes (i.e., anxiety and achievement at Time 1 and Time 2) were directly incorporated in the final LTA solution and associated with profile membership at the matching timepoint (i.e., profiles at Time 1 associated with outcomes at Time 1). As recommended by Morin et al. (2016), two alternative models were contrasted in which outcome levels were allowed to differ across profiles and time points, or only across profiles (corresponding to a model of explanatory similarity). Mean differences in outcome levels across profiles were tested in a single step using the multivariate delta method (Raykov & Marcoulides, 2004), implemented in Mplus via the MODEL CONSTRAINT function. The global theoretical model tested in the present study is summarized in Figure 2.1.

Results

Latent Profiles Analyses

The results of the alternative time-specific LPA are reported in the top sections of Table 2.1, and graphically presented in Figures S1 and S2 of the Supplementary Materials. At both time points, the CAIC, BIC, ABIC, and BLRT suggested the addition of profiles without converging on any specific solution. The elbow plots seemed to suggest a slight inflection point in the decrease of the information criteria associated with the four-profile solution. For this reason, we more carefully inspected solutions including 3–5 profiles. This inspection first revealed a high level of similarity in the nature of the estimated profiles across time points, thus providing preliminary evidence of configural similarity. Furthermore, these results revealed that adding a fourth profile to the solution resulted in the estimation of a meaningfully distinct profile with regards to shape (corresponding roughly to Profile 4 in Figure 2.2).

However, adding a fifth profile only resulted in the arbitrary division of one of the existing profiles (corresponding roughly to Profile 2 in Figure 2.2) into smaller similarly shaped profiles, differing only in their level of achievement goals. Therefore, and supporting Hypothesis 1, the four-profile solution was retained at both time points, consistent with its configural similarity.

Longitudinal Tests of Profile Similarity

The results from the longitudinal tests of profile similarity conducted on this four-profile solution are reported in the middle section of Table 2.1. These results support the structural (lower CAIC and BIC relative to the configural similarity model), dispersion (lower CAIC, BIC, and ABIC relative to the structural similarity model), and distributional (lower CAIC and BIC relative to the dispersion similarity model) similarity of this solution. These results indicate that the number, nature, within-profile variability, and size of the profiles remains unchanged over time, supporting Hypothesis 3.

Profile Description

This final model of distributional similarity is represented in Figure 2.2 and the detailed parameter estimates from this solution are reported in Table S6 of the Supplementary Materials. First, there was a high level of correspondence between perceived goal sources, such that no profiles were marked by discrepancies between students' and perceived parents' and teachers' goals. Next, both Profile 1 and Profile 2 corresponded to roughly one fifth of the sample (18% for Profile 1 and 19% for Profile 2). However, whereas Profile 1 was characterized by low levels of all goals (i.e., Low on all Goals), Profile 2 was characterized by high levels of all goals (i.e., High on all Goals). Profile 3, corresponding roughly to a fourth of the sample (23%), had a more differentiated shape characterized by high levels of mastery goals and low levels of performance goals across all perceived sources (i.e., self, parents, and teachers). This profile was termed *Mastery-Oriented*. Profile 4 was the largest, corresponding to 40% of the sample. Contrasting with Profile 3, Profile 4 was characterized by average levels of performance goals and low levels of mastery goal across all perceived sources and was labeled *Low Mastery Goals*. This solution was associated with a relatively high level of classification accuracy of students into their most likely profile as indicated by an entropy value of .828. These results partially support Hypothesis 2. Specifically, Profiles 1, 2, and 3 aligned with our predictions, whereas Profile 4 (i.e., Low Mastery Goals) was not expected. Additionally, the lack of profiles characterized by discrepancies between student and perceived parents' or teachers' goals was unexpected.

Latent Transition Analysis

The final model of distributional similarity was converted to an LTA. The transition probabilities (i.e., within-person stability and change) from this model are reported in Table 2. Membership into all profiles was moderately to highly stable over time (probabilities of remaining in the same profile ranging from 58.7% to 79.4%), thus supporting Hypothesis 4. Students corresponding to Profile 1 (i.e., Low on all Goals) at Time 1 had a 77.1% probability of remaining in the same profile at Time 2. For students corresponding to Profile 1 who transitioned to another profile, 12.7% transitioned to Profile 3 (i.e., Mastery-Oriented) and 10.4% transitioned to Profile 4 (i.e., Low Mastery Goals), but none of them transitioned to Profile 2 (i.e., High on all Goals). Profile 2 (i.e., High on all Goals) was the least stable, with 58.7% of the students corresponding to this profile remaining in the same profile at Time 2. For this profile, the most likely transitions were toward Profiles 4 (Low Mastery Goals; 23.2%) or 3 (Mastery-Oriented; 16.2%), with only 2% of students initially corresponding to this profile transitioning to Profile 1 (i.e., Low on all Goals) over time. Profile 3 (i.e., Mastery-Oriented) demonstrated a high stability (78.8%), with the most likely transitions involving Profile 1 (i.e., Low on all Goals; 13.0%) and fewer transitions toward Profile 2 (i.e., High on all Goals; 3.4%) and Profile 4 (i.e., Low Mastery Goals; 4.7%). Finally, Profile 4 (i.e., Low Mastery Goals) demonstrated the highest stability (79.4%) but involved transitions toward all other profiles, including Profile 1 (i.e., Low on all Goals; 9.8%), Profile 3 (i.e., Mastery-Oriented; 7.4%), and Profile 2 (i.e., High on all Goals; 3.5%). Overall, these results suggest that between school years, students' pattern of goal endorsement remains quite stable. However, students characterized by a high and undifferentiated level of goal endorsement appeared to be the most likely to transition to another profile by the end of the subsequent school year.

Predictors of Profile Membership

The results related to the alternative predictive models are reported in the third (demographic variables) and second (perceived competence) to last sections of Table 2.1. These results first indicate that the demographic variables shared no association with students' likelihood of profile membership (i.e., the null effects model resulted in the lowest values on the CAIC, BIC, and ABIC). Therefore, these variables were not included in further analyses. In contrast, our theoretical predictors (i.e., Math and French perceived competence) were associated with students' likelihood of profile membership in a way that was similar over time and profiles (i.e., the model of predictive similarity resulted in the lowest values on the CAIC, BIC, and ABIC). This model was thus retained for interpretation. The results from this model are reported in Table 2.3. These results indicate that students with higher Math and French perceived competence had a higher likelihood of belonging to Profiles 2 (i.e., High on all

Goals) or 3 (i.e., Mastery-Oriented) relative to Profile 4 (i.e., Low Mastery Goals). Additionally, students reporting higher levels of Math perceived competence also had a higher likelihood of membership into Profile 2 (i.e., High on all Goals) and Profile 3 (i.e., Mastery-Oriented) relative to Profile 1 (i.e., Low on all Goals). These results support Hypothesis 5.

Outcomes of Profile Membership

The results related to the alternative outcome models are reported in the last section of Table 1. These results support the model of explanatory similarity (which resulted in the lowest values on the CAIC, BIC, and ABIC), consistent with outcome associations that are stable over time. The results from this model are reported in Table 2.4 and graphically illustrated in Figure 2.3. These results indicate that students corresponding to Profile 3 (*Mastery-Oriented*) displayed higher levels of academic achievement relative to students corresponding to all other profiles, who did not differ from one another in this regard. Students corresponding to Profiles 1 (*Low on all Goals*) and 3 (*Mastery-Oriented*) reported lower global levels of anxiety than those corresponding to Profiles 2 (*High on all Goals*) and 4 (*Low Mastery Goals*), although these levels did not differ between Profiles 1 (*Low on all Goals*) and 2 (*High on all Goals*). These results largely support Hypothesis 6.¹

Discussion

Children's achievement goals emerge over time through interactions with their primary caregivers (e.g., Friedel et al., 2007, 2010; Kaplan & Maehr, 2002, 2007; Maehr & Braskamp, 1986; Maehr & Pintrich, 1991). In particular, children's own domain-general approach goals are influenced by their *perceptions* of the goals held *for them* by their caregivers (Kahraman & Sungur, 2013; Meece et al., 2003, 2006). Despite the recognition that caregiver goals matter, this study is the first to test the nature of elementary students' achievement goal profiles while simultaneously accounting for their own goals and their perceptions of the goals held *for them* by their parents and teachers. Furthermore, our study provides evidence of longitudinal within-sample and within-person stability of these achievement goal profiles, thereby supporting their robustness and highlighting their suitability as potential guides for intervention. Lastly, by showing that children's perceived competence predicted their profile membership, which in turn predicted their levels of achievement and anxiety, this study lends support for the construct

¹ To test whether profile membership could predict changes in outcomes over time, the longitudinally invariant preliminary measurement models used to estimate factor scores for the outcomes were converted to a latent change model, allowing us to explicitly model changes in outcome levels over time. Profiles were then compared to one another in relation to these changes. These additional results, available upon request from the authors, were consistent with a lack of impact of profile membership on changes in outcome levels. Our results are thus consistent with the presence of time-specific profiles-to-outcomes associations.

validity of our profiles and offers avenues for intervention.

Profiles Combining Students' Perceptions of Own, their Parents, and their Teachers Achievement Goals

Our results revealed four distinct achievement goal profiles that partially matched our expectations, as expressed in Hypotheses 1 and 2. More precisely, the High on all Goals profile and the Mastery-Oriented profile both align with profiles consistently found in previous studies of elementary students (Hornstra et al., 2017; In De Wal et al., 2016; Schwinger & Wild 2012; Schwinger et al., 2016; Zhang et al., 2016). Likewise, although we did not anticipate a Low on all Goals profile this early in students' educational trajectories, this study is not the first to identify a similar profile among elementary students (i.e., Schwinger et al., 2016). The proportion of students corresponding to this profile in our sample (18%) was more important than the 2%–4% found in other studies of elementary students (Schwinger et al., 2016) or older students (Wormington & Linnenbrink-Garcia, 2017). The Low Mastery Goals profile (i.e., low levels of mastery goals and average levels of performance goals) comprising 40% of students was also surprising, especially given that a single study had identified a similar profile with 27% of its sample (Zhang et al., 2016). The fact that our sample included a majority of first and second-generation immigrants from low SES backgrounds, whereas most previous studies focused on students from higher SES backgrounds, could possibly explain these findings. Typically, studies describe students from low-SES backgrounds as less likely to endorse approach goals (i.e., mastery and performance) or to report lower overall levels of goal endorsement relative to higher SES students (Berger & Archer, 2015, 2016), which shares similarities with the Low on all Goals profile. However, it is important to acknowledge the complex reality of low SES schools. Notably, students from immigrant backgrounds are more likely to attend schools in low SES neighborhoods, even if their parents are often highly educated (Archambault et al., 2017). Immigration is often seen by parents as a vehicle for building a better future for their children (Portes & Rumbaut, 2001), leading some students to have a stronger desire to succeed as a way to please their family (i.e., performance goals; Urdan et al., 2007), which could explain that 40% of our participants corresponded to the Low Mastery Goals profile.²

² Based on reviewers' suggestions, we conducted additional analyses to contrast the SES levels and immigration backgrounds of students corresponding to the different profiles. These analyses revealed a single difference in SES at T2, suggesting that students corresponding to the Low Mastery Goals profile had a slightly lower SES than those corresponding to the Low on All Goals profile. In terms of immigration background, our results showed that first-generation immigrant students (relative to second- or third-plus generation students), were less likely to correspond to the Low on All Goals profile at T1 than to the three other profiles (i.e., High on All Goals, Mastery-Oriented, and Low Mastery Goals). These results further reinforce that, even when sharing low

Unexpectedly, our results did not reveal any profiles marked by discrepancies between student perceptions of their own, their parents', and their teachers' achievement goals. Rather, all four profiles reflected a strong degree of alignment between students' personal goals and their perceptions of the goals held for them by their parents and teachers. Previous variable-centered studies revealed moderate to high levels of correspondence between personal, teacher, and parental goals (e.g., Bardach et al., 2020; Gonida et al., 2014, 2009), which is consistent with our results. Conversely, research has also shown that parents seem to play a larger role than teachers in predicting students' goals (Friedel et al., 2007), particularly amongst immigrant students (Kim et al., 2020).

One possible explanation for this high level of goal alignment is that younger students may struggle to differentiate between the various goal-related messages in their environments (Bardach et al., 2020). Indeed, individuals develop their ability to properly perceive and differentiate various social perspectives throughout childhood and into adolescence (e.g., Burnett et al., 2011; Symeonidou et al., 2016; Tamnes et al., 2018). From a developmental perspective, it is thus possible that the elementary student participants in our study could simply not imagine their parents' and teachers' achievement goals differing from their own (Stipek & Iver, 1989). This aligns with the striving for self-consistency that characterizes every human being (Swann, 1983), coupled with normative attempts to avoid cognitive goal conflicts (Festinger, 1957; Harmon-Jones, 2019). In any case, the high level of goal alignment that we found points to an interesting avenue for future researchers to more thoroughly examine the mechanisms involved in this convergence of goals (i.e., striving for cognitive consistency vs true influence of the caregivers).

Replicability Over Time

Consistent with Hypothesis 3, our results confirmed the robustness of these profiles by supporting their within-sample stability over a 1-year interval. More precisely, we identified the same number of profiles, characterized by the same shape and within-profile variability, and corresponding to the same proportion of our participant group, at both time points. This observation confirms that our profiles were unlikely to reflect random sampling variations or to reflect ephemeral phenomena (Morin et al., 2016; Spurk et al., 2019).

Consistent with Hypothesis 4, our results revealed moderate to high levels of within-person stability (58.7%–79.4%), suggesting that profile membership was not highly likely to

SES, students from more recent immigrant backgrounds tend to be slightly more driven toward achievement than their peers. This also applies to the Low Mastery Goals profile, in which first-generation students perceived that parents and teachers value a slightly above-average level of performance goals.

change on its own, while remaining flexible enough to make change possible. In combination, these two observations further reinforce the possible utility of our results as a guide for intervention. More concerning was the fact that the Low Mastery Goals profile was not only the largest (40% of sample), but also the most stable (79.4%). Moreover, when students transitioned out of this profile, it was often toward the Low on all Goals profile (9.8%), suggesting a clear need for intervention designed to help students move away from this problematic profile. Fortunately, some students also transitioned from this profile to the more desirable Mastery-Oriented (7.4%) or High on all Goals (3.5%) profiles, suggesting that improvement is possible.

Unfortunately, the High on all Goals profile was the least stable (58.7%). Many students who transitioned out of this profile over time did so in favor of the Low Mastery Goal (23.2%) profile, whereas others transitioned toward the most adaptive Mastery-Oriented (16.2%) profile. These results suggest that it might be hard to jointly sustain high levels of mastery and performance goals over time, and that efforts should be made to help students presenting with this achievement goal configuration to prioritize mastery, rather than performance, goals over time. These observations correspond with previous research suggesting that as students get older their goals tend to become more differentiated (Meece et al., 2003; Schwinger & Wild, 2012; Schwinger et al., 2016).

Lastly, our results align with previous studies demonstrating that students rarely transition from mastery- toward performance-oriented profiles (Schwinger et al., 2016), but are more likely to transition toward profiles characterized by low or moderate levels of all goals (In De Wal et al., 2016). Indeed, for students initially corresponding to the Mastery-Oriented profile (with a stability of 78.8%), the most likely transition involved the Low on all Goals profile (13.0%). Interestingly, the opposite type of transition seemed equally likely, as 12.7% of the students initially corresponding to the Low on all Goals profile (with a stability of 77.1%) transitioned toward a Mastery-Oriented profile over time. However, some of them also transitioned toward the Low Mastery Goals profile (10.2%). These results suggest that even if mastery-oriented students are highly likely to retain this profile over time, they may not be immune to losing their academic drive and may also benefit from intervention. Alternatively, these results also suggest that even students who appear to completely lack a drive to achieve could improve if supported in the right manner.

Perceived Competence and Achievement Goal Profiles

Consistent with Hypothesis 5, our results supported the idea that students who felt more competent in math and French (i.e., main language) were more likely to belong to profiles

characterized by high rather than low levels of mastery goals (i.e., High on all Goals or Mastery-Oriented vs. Low Mastery Goals). This result is consistent with AGT (Cury et al., 2006; Duchesne & Larose, 2018; Elliot & Church, 1997; Greene et al., 2004; Schunk, 2003; Schunk & DiBenedetto, 2016, 2020) and with empirical person-centered results (Fortunato & Goldblatt, 2006; Luo et al., 2011; Wormington & Linnenbrink-Garcia, 2017), suggesting that students who feel more competent academically are more likely to adopt mastery goals, and to a lesser extent performance goals, as a result of viewing school tasks as achievable challenges that they wish to master.

Furthermore, and consistent with the fact that students' perceptions of their own academic perceived competence vary across domains (Bandura, 1986; Bong, 2002; Jiang et al., 2014; Schunk & Mullen, 2012; Schunk & Pajares, 2009; Usher 2009), we found additional associations that were limited to students' perception of math perceived competence. Students with higher perceptions of math perceived competence were more likely to belong to the High on all Goals and Mastery-Oriented profiles relative to the Low on all Goals profile. The relatively low correlations observed between student perceived competence in these two domains (r range = .351–.460; see Table S5 of the Supplementary Materials) suggest an effect that is unique to the math domain, rather than the estimation of multivariate associations involving highly correlated predictors. One possible explanation for this finding is that math knowledge builds upon itself and, as a result, tends to be particularly anxiety-provoking for students, leading to a cycle of avoidance, low performance, and low perceived competence (e.g., Chiu et al., 1990; Harter, 1982; Hembree, 1990; Jansen et al., 2013; Krinzinger et al., 2009; Marsh & Martin, 2011). Future studies should explore the unique mechanisms involved in the association between math and achievement goals, as our results suggest that efforts to enhance math perceived competence may be particularly beneficial. Additionally, as achievement goals often progressively transition from being global (i.e., across subjects) to being domain specific (Józsa et al., 2017), these associations might not be the same in older students for whom there might be a clearer alignment between subject-specific perceived competence and achievement goals.

Achievement Goal Profiles: Implications for Students' Achievement and Anxiety

Consistent with Hypothesis 6 and previous research (e.g., Hornstra et al., 2017; Jang & Liu, 2012; Liu et al., 2020; Pahljina-Reinić & Kolić-Vehovec, 2017; Schwinger et al., 2016), we found that Mastery-Oriented students displayed higher levels academic achievement according to teachers' normative assessment and lower levels of anxiety than their peers corresponding to the other profiles. Furthermore, although some previous studies suggest that

performance goals could be adaptive when held alongside mastery goals (Hornstra et al., 2017; Schwinger et al., 2016; Schwinger & Wild, 2012; Zhang et al., 2016), our findings did not strongly support this idea. Indeed, students displaying a High on all Goals profile did not fare better than those displaying Low on all Goals or Low Mastery Goals profiles on any of the outcomes and fared significantly worse than their Mastery-Oriented peers. In sum, these results indicate that students who are predominantly driven by the desire to *develop* their competence tend to experience less anxiety and higher academic achievement than students who are driven either by a desire to *demonstrate* their competence, or not driven at all.

These results demonstrate that achievement goal profiles, defined entirely from students' self-reports, shared relations with teacher reports of academic achievement and with general levels of anxiety (i.e., not specific to the academic domain). In doing so, our results provide strong evidence for the construct validity of these profiles, showing that the implications of our profiles generalize to more objective reports of achievement and spread beyond the academic domain. These results thus reinforce the importance of children's achievement goals by showing that they not only influence how children *do in school*, but also how they feel *more generally*. In this regard, our results indicate that Low Mastery Goals students seem to be the most "at risk" in terms of academic achievement and anxiety, which is worrisome given the high prevalence (40%) and stability (79.4%) of this profile. This finding suggests that, without proper intervention, most of those students may be more likely to maintain their maladaptive goal configuration from one school year to the next.

Achievement Goal Profiles: Practical Implications

Our results have practical implications for educators and school psychologists alike. First, the reliance on a person-centered approach benefits the practice of school psychology by enriching and fine-tuning our understanding of how multiple forms and sources of achievement goals combine to influence academic and emotional wellbeing among distinct categories of students. In this regard, the identification of discrete types of students differing in their unique achievement goal configurations allows for the creation and implementation of a holistic, targeted, and thus potentially more effective interventions tailored to the unique reality of different types of students (Morin & Marsh, 2015).

Moreover, given the high prevalence of the Low Mastery Goals profile and the clear benefits of mastery goals, it seems appropriate for school psychologists to consider the development of school-wide interventions and recommendations focused on increasing mastery in the classroom. For instance, encouraging teachers to prioritize formative assessment procedures, emphasize individual growth over grades, avoid enabling comparison between

students, and design course materials that are personally meaningful for students may be beneficial avenues for intervention (Cauley & McMillan, 2010; Nadon et al., 2020; Yeager et al., 2016). At-risk students (i.e., those with low mastery goals) may benefit from individualized support from school psychologists, like mindset-based interventions aimed at increasing mastery and promoting growth (DeBacker et al., 2018; Yeager et al., 2016). Additionally, goal framing interventions could help students develop personally relevant reasons for learning, which have been linked to increased intrinsic motivation and academic performance (Hardre & Reeve, 2003; Vansteenkiste et al., 2004). Finally, these efforts should also be communicated to parents in a culturally sensitive manner aimed at increasing their awareness of the importance of promoting mastery goals at home, both for student achievement and emotional wellbeing.

Limitations and Future Directions

Despite its strengths, this study is not without limitations. A first limitation stems from our reliance on a dichotomous representation of achievement goals (i.e., mastery versus performance approach goals), rather than a more complex conceptualization (i.e., see Elliot & McGregor, 2001, for approach-avoidance; see Elliot et al., 2011, for task, self, and other approach and avoidance). This decision was intentional given our interest in what drives elementary school students *towards* learning, which is anchored in Maehr and colleagues' social-cognitive perspective on AGT (e.g., Kaplan & Maehr, 2002, 2007; Maehr & Braskamp, 1986; Maehr & Pintrich, 1991). Likewise, this decision was also connected to the age of our sample given previous indications that the approach-avoidance distinction may be less *practically* important for children among whom these types of goals tend to be highly entwined (Schwinger et al., 2016). This decision reflected our desire to consider not only students' goals, but also their perceptions of their parents' and teachers' goals among a sample of roughly 500 students (making it difficult to incorporate additional profile indicators). However, it would be important to replicate the present results among larger samples of children and adolescents, while relying on a more differentiated operationalization of achievement goals. Additionally, by focusing exclusively on achievement goals, the present study offers a relatively narrow examination of students' overall motivation. As such, future person-centered studies may wish to incorporate other motivational processes to derive richer motivational profiles (e.g., task values, mindsets).

A second limitation stems from our reliance on a domain-general representation of achievement goals. This decision was rooted in the fact that, among young children, goals and motivation do not first arise in a domain-specific manner, but rather become more differentiated over time as children develop specific academic interests (Józsa et al., 2017). Additionally,

given that students had the same teacher across subjects, we expected that student motivation in one domain would be highly related to their motivation in other domains (Dietrich et al., 2015). However, it would be interesting for future studies to consider how the present results would generalize to domain-specific goals.

Third, by focusing on students' perceptions, we were unable to clearly identify the source of the similarity between students' goals and their perceptions of their teachers' and parents' goals. This similarity suggests a connection between caregivers and children, consistent with the idea that children's perceptions of caregiver achievement goals are important when considering their achievement goal profiles. However, it is difficult to estimate how much of this similarity truly reflects caregivers' influence on children's goals, and how much of it reflects children's self-consistency biases in reporting the goals held for them by their caregivers. In this regard, it would be particularly informative for future studies to also consider teachers' and parents' own reports of the goals they hold for each target child. Doing so would allow for an investigation of the distinction, overlap, and mechanisms at play between these different perspectives.

Fourth, this study is limited by our inability to document the generalizability of our findings beyond the current sample of French-Canadian, low SES, and first/second generation immigrant students. The fact that demographic characteristics (i.e., sex, grade level, and immigration status) did not influence profile membership lends credence to the robustness of our findings but does not offset the homogeneity of our sample. Indeed, it remains possible that the lack of associations found between our demographic predictors and profile membership could be due to the relative homogeneity (end of primary school, low-SES neighborhoods) of our sample rather than reflect a true null effect. However, it is encouraging to note that most of our results align with those from previous person-centered studies (e.g., Hornstra et al., 2017; In De Wal et al., 2016; Schwinger & Wild, 2012; Schwinger et al., 2016; Zhang et al., 2016). Nonetheless, the Low Mastery Goals profile remains somewhat unique to our study and may reflect the specific background of our sample. Clearly, future studies would need to assess the generalizability of our results more systematically to other samples of students and to more specifically assess the role played by SES and immigration status.

Lastly, our study presents some methodological limitations, such as the reliance on self-report measures and teacher reports of student achievement. In this regard, it would have been beneficial to include more objective measures of our variables, such as parental and teacher reports of their own goals, objective school grades, and even standardized diagnoses of anxiety. In terms of achievement goals, one promising avenue for future research would be to include

observational measures of teacher motivational practices to see if students' perceptions match what teachers are actually doing in the classroom (Pintrich et al., 2003). In addition, our reliance on a year-long, two time-point, longitudinal design only captures a relatively short period of time. Although this design allowed us to examine stability and change in profile membership between school years, it makes it challenging to fully grasp how achievement goal profiles truly evolve over the elementary school years and across the transition into secondary school. We know that students' achievement goals tend to become more differentiated as they get older while their endorsement of performance goals tends to increase (e.g., Meece et al., 2003; Schwinger & Wild, 2012; Schwinger et al., 2016). The inclusion of additional measurement points encompassing a longer time interval would have made it possible to consider longer-term change in profile membership and provide an even more rigorous test of their within-sample stability. Future studies would need to consider longer, and more numerous time intervals, possibly even across educational transitions.

Conclusions

It is well-established that mastery goals promote healthy development, that children can hold multiple goals at once, and that children's motivation evolves through interactions with caregivers. Despite these facts, our study is the first longitudinal person-centered examination of how children's personal achievement goals combine with their perceptions of the goals held for them by their parents and teachers. First and foremost, these findings contribute to our understanding of the nature and stability of achievement goal profiles amongst elementary students. Our study also provides new insight into how children perceive the goals held for them by their parents and teachers and offers a first person-centered look into how interconnected these goals seem to be for children. Moreover, the Low Mastery Goals profile inspires several questions for future studies – namely to what extent do socio-cultural factors influence children's achievement goal profiles, and would our profiles generalize to other samples from diversified SES and ethnic backgrounds? The fact that our profiles appeared to be both stable and malleable suggest that they do represent potentially useful guides for interventions. Such interventions should specifically target the low-mastery students who display an elevated risk of academic and socioemotional problems. Students corresponding to the High on All Goals profile could also benefit from interventions designed to help them cope with anxiety, as they reported feeling as anxious as those corresponding to the Low Mastery profile. Also, even if they did not seem to feel more anxious than others, students who are not driven toward any specific achievement goal (Low on All Goals profile) could also benefit from targeted interventions to prevent potential academic difficulties. To this end, we hope that

our study highlights the importance of enhancing perceived competence and mastery goals in the classroom and at home. Ultimately, we hope that this study can facilitate further person-centered research and intervention efforts aimed at improving the academic and socioemotional development of children.

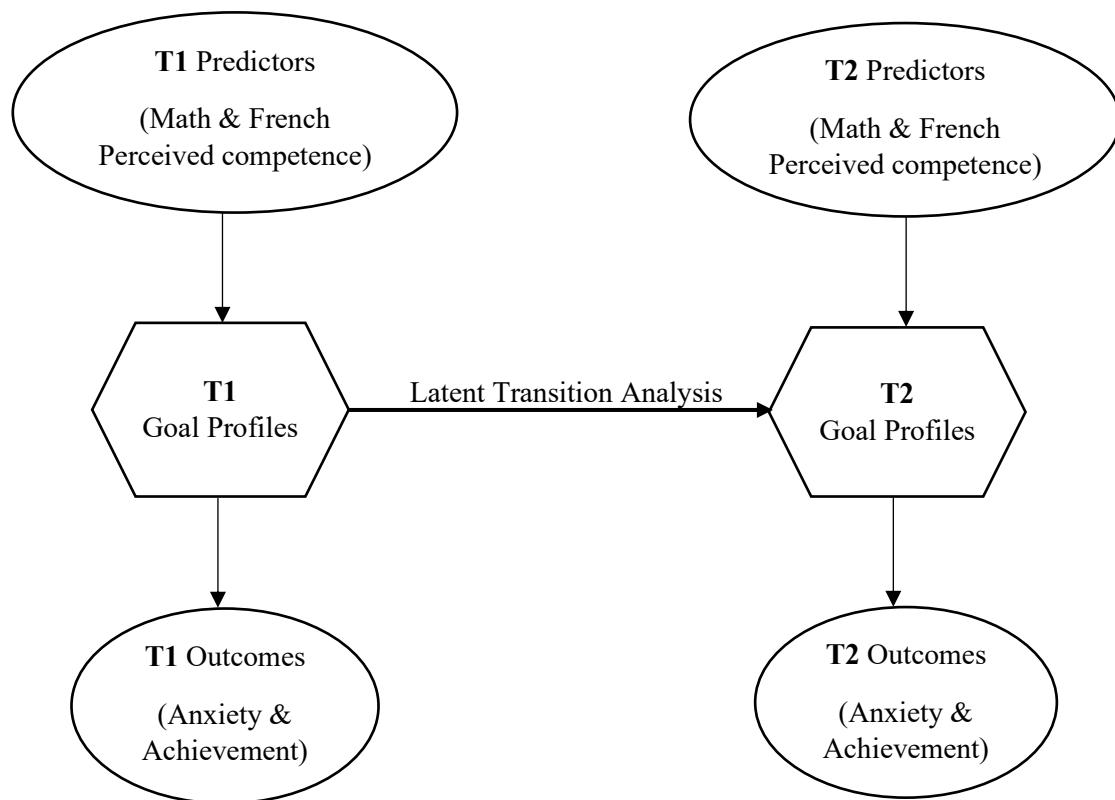


Figure 2. 1 Theoretical Model

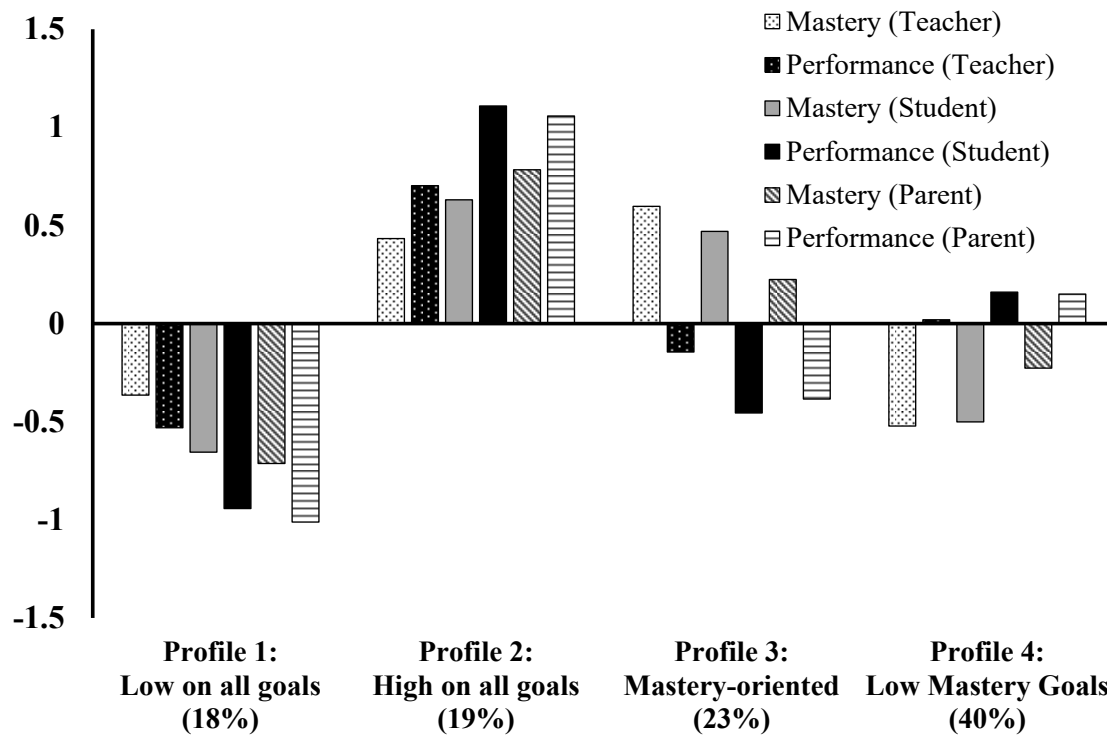


Figure 2. 2 Final 4-Profile Solution (Distributional Similarity).

Note. Profile indicators are factor scores with mean of 0 and a standard deviation of 1.

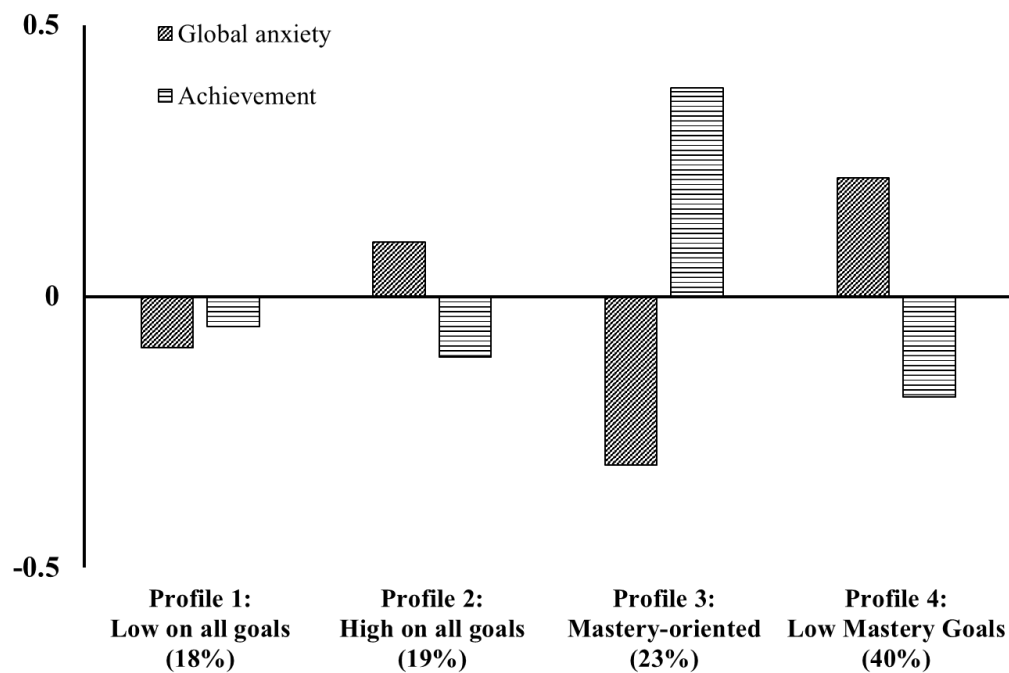


Figure 2. 3 Profile-Specific Outcome Means for the Final 4-Profile Solution (Explanatory Similarity).

Note. Profile indicators are factor scores with mean of 0 and a standard deviation of 1

Table 2. 1

Results from the Latent Profile Analyses

	<i>LL</i>	<i>#fp</i>	<i>S.C.</i>	<i>AIC</i>	<i>CAIC</i>	<i>BIC</i>	<i>ABIC</i>	<i>Entropy</i>	<i>aLMR</i>	<i>BLRT</i>
<i>Latent Profile Analysis Time 1</i>										
1 Profile	-4310.926	12	1.010	8645.851	8710.269	8698.269	8660.174	Na	Na	Na
2 Profiles	-3915.630	25	1.437	7881.260	8015.465	7990.465	7911.099	.902	.004	<.001
3 Profiles	-3716.580	38	1.602	7509.161	7713.152	7675.152	7554.516	.889	.256	<.001
4 Profiles	-3569.277	51	1.367	7240.555	7514.332	7463.332	7301.426	.866	.037	<.001
5 Profiles	-3490.208	64	1.333	7108.416	7451.980	7387.980	7184.804	.874	.229	<.001
6 Profiles	-3417.226	77	1.276	6988.451	7401.802	7324.802	7080.355	.886	.074	<.001
7 Profiles	-3360.543	90	1.217	6901.087	7384.223	7294.223	7008.507	.891	.133	<.001
8 Profiles	-3306.610	103	1.116	6819.221	7372.144	7269.144	6942.157	.877	.156	<.001
<i>Latent Profile Analysis Time 2</i>										
1 Profile	-4013.764	12	.982	8051.527	8115.946	8103.946	8065.850	Na	Na	Na
2 Profiles	-3699.353	25	1.738	7448.705	7582.910	7557.910	7478.544	.802	.208	<.001
3 Profiles	-3488.673	38	1.285	7053.346	7257.337	7219.337	7098.702	.839	.015	<.001
4 Profiles	-3355.468	51	1.249	6812.936	7086.714	7035.714	6873.808	.820	.036	<.001
5 Profiles	-3268.290	64	1.139	6664.580	7008.144	6944.144	6740.968	.847	.017	<.001
6 Profiles	-3197.086	77	1.209	6548.172	6961.522	6884.522	6640.076	.867	.223	<.001
7 Profiles	-3134.990	90	1.269	6449.979	6933.116	6843.116	6557.400	.881	.454	<.001
8 Profiles	-3078.357	103	1.231	6362.715	6915.638	6812.638	6485.651	.878	.216	<.001
<i>Longitudinal Latent Profile Analyses: Tests of Profile Similarity</i>										
Configural Similarity	-6924.746	102	1.308	14053.491	14601.046	14499.046	14175.234	.843	Na	Na
Structural Similarity	-6991.665	78	1.393	14139.331	14558.049	14480.049	14232.428	.828	Na	Na
Dispersion Similarity	-7002.673	54	1.584	14113.347	14403.229	14349.229	14177.799	.828	Na	Na
Distributional Sim.	-7010.290	51	1.665	14122.580	14396.357	14345.357	14183.451	.828	Na	Na
<i>Latent Transition Analysis with Demographics</i>										
Effects Free - Time & Profiles	-2756.265	78	.757	5668.530	6093.420	6015.420	5767.779	.777	Na	Na
Effects Free - Time	-2774.668	42	.983	5633.336	5862.122	5820.122	5686.777	.757	Na	Na
Predictive Similarity	-2782.514	33	.940	5631.028	5810.789	5777.789	5673.018	.754	Na	Na
Null Effects Model	-2806.219	24	.929	5660.438	5791.173	5767.173	5690.976	.750	Na	Na
<i>Latent Transition Analysis with Predictors</i>										
Effects Free - Time & Profiles	-3479.911	65	.914	7089.823	7438.755	7373.755	7167.404	.818	Na	Na
Effects Free - Time	-3496.507	41	1.063	7075.014	7295.110	7254.110	7123.950	.800	Na	Na
Predictive Similarity	-3499.660	35	1.059	7069.319	7257.206	7222.206	7111.094	.796	Na	Na
Null Effects Model	-3530.538	29	1.049	7119.076	7274.753	7245.753	7153.689	.792	Na	Na
<i>Latent Transition Analysis with Outcomes</i>										
Effects Free - Time & Profiles	-6300.182	50	1.031	12700.365	12971.689	12921.689	12762.948	.771	Na	Na
Explanatory Similarity	-6313.593	30	1.280	12687.186	12849.98	12819.980	12724.736	.771	Na	Na

Note. LL: loglikelihood; #fp: free parameters; S.C.: scaling correction; AIC: Akaike information criterion; CAIC: consistent AIC; BIC: Bayesian information criterion; ABIC: sample-size adjusted BIC; aLMR = Lo-Mendel and Rubin's likelihood ratio test; BLRT = bootstrap likelihood ratio test; Na = not applicable

Table 2. 2

Transition Probabilities for the Final Latent Transition Analysis Model

	Transition Probabilities to Time 4 Profiles			
	Profile 1	Profile 2	Profile 3	Profile 4
Time 1 profiles				
Profile 1	.771	.000	.127	.102
Profile 2	.020	.587	.162	.232
Profile 3	.130	.034	.788	.047
Profile 4	.098	.035	.074	.794

Note. Profile 1: Low on all Goals, Profile 2: High on all Goals, Profile 3: Mastery-Oriented, Profile 4: Low Mastery Goals.

Table 2. 3

Results from the Multinomial Logistic Regressions Predicting Profile Membership

Predictors	Profile 1 vs Profile 4		Profile 2 vs Profile 4		Profile 3 vs Profile 4	
	<i>Coeff</i> (SE)	<i>OR</i>	<i>Coeff</i> (SE)	<i>OR</i>	<i>Coeff</i> (SE)	<i>OR</i>
Math Perceived competence	-.034 (.155)	0.967	.428 (.136)**	1.534	.436 (.135)**	1.547
French Perceived competence	.137 (.171)	1.147	.421 (.125)**	1.523	.477 (.137)**	1.611
Predictors	Profile 1 vs Profile 3		Profile 2 vs Profile 3		Profile 1 vs Profile 2	
	<i>Coeff</i> (SE)	<i>OR</i>	<i>Coeff</i> (SE)	<i>OR</i>	<i>Coeff</i> (SE)	<i>OR</i>
Math Perceived competence	-.471 (0.168)**	0.624	-.008 (.154)	0.992	-.463 (.170)**	0.629
French Perceived competence	-.340 (0.183)	0.712	-.056 (.146)	0.946	-.284 (.176)	0.753

Note. **: $p < .01$; *: $p < .05$. SE: standard error of the coefficient; OR: Odds Ratio. The coefficients and OR reflects the effects of the predictors on the likelihood of membership into the first listed profile relative to the second listed profile; Predictors are factor scores with mean of 0 and a standard deviation of 1; Profile 1: Low on all Goals, Profile 2: High on all Goals, Profile 3: Mastery-Oriented, Profile 4: Low Mastery Goals.

Table 2. 4

Time-Invariant Associations between Profile Membership and the Outcomes (Explanatory Similarity)

	Profile 1		Profile 2		Profile 3		Profile 4		Summary of Significant Differences
	M	CI	M	CI	M	CI	M	CI	
Global anxiety	-.095	-.261;.071	.100	-.076;.276	-.311	-.480;-.142	.218	.108;.327	1=3<4;
Achievement	-.056	-.278;.166	-.111	-.285;.064	.385	.208;.561	-.185	-.317;-.053	3<2=4; 1=2
									1=2=4<3

Note. M: Mean; CI: 95% Confidence Interval; Outcomes are factor scores with mean of 0 and a standard deviation of 1; Profile 1: Low on all Goals, Profile 2: High on all Goals, Profile 3: Mastery-Oriented, Profile 4: Low Mastery Goals.

CHAPTER 3:

Developmental Heterogeneity of School Burnout Across the Transition from Upper Secondary School to Higher Education: A Nine-Year Follow-Up Study

Introduction

Although most 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, 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 (moving out, living in a new city with a new peer group, etc.), and a greater need for academic and life subsistence autonomy (Bask & Salmela-Aro, 2013; Caspi, 2002; Dietrich et al., 2012; Salmela-Aro et al., 2008; Salmela-Aro & 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 (Salmela-Aro et al., 2009a; Maslach et al., 2001). In turn, burnout increases their risk of experiencing a variety of detrimental consequences, including academic underperformance, school dropout, and substance misuse (Bask & 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 & Roeser, 2009; Luo et al., 2016; Parhiala et al., 2018; Parviainen et al., 2021; Tuominen-Soini et al., 2008, 2012, 2020).

The experience and development of burnout is not, however, homogenous for all students (e.g., Demerouti et al., 2001; Eccles & Midgley, 1989; Salmela-Aro & Upadaya, 2014a). For instance, some may experience a drastic change in burnout level after leaving secondary school, others may stay on a trajectory already marked by increasing burnout levels prior to the transition, whereas 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 (for a review, see Mäkikangas & Kinnunen, 2016).

Despite this recognition, relatively few studies have systematically tried to understand this developmental heterogeneity, its drivers, and its consequences across critical life transitions. Moreover, while 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 (for a review, see Vansoeterstede et al., 2023). To address these gaps, we investigate the developmental heterogeneity of burnout amongst a sample of youth followed between 17 and 25 years of age, as they completed their upper secondary education and transitioned to the next stage of their educational trajectories. We also consider how their global self-esteem and achievement goals relate to their burnout trajectories, and how these trajectories relate to their risk of experiencing school dropout, their academic achievement levels, and their use or misuse of drugs and alcohol.

School Burnout

It is now well-established that burnout can occur amongst 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, 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 (Demerouti & Bakker, 2008). School burnout is typically defined along three dimensions, very similar to those 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), so that burnout can be considered as a global construct varying in severity (e.g., Salmela-Aro & Upadyaya, 2014a).

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, 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 (Vansoeterstede et al., 2023; Eccles & Roeser, 2009; 2011). Although these changes may suit most students, other students might perceive their evolving environment as becoming more competitive and 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 (age 13-17) is accompanied by increases in school burnout (for a review, see Vansoeterstede et al., 2023). However, after this early transition, research shows that burnout levels become more stable in the upper secondary school years (age 17-19) 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 3 to 5 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 favourable 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., Vansoeterstede et al., 2023; Salmela-aro & Upadyaya, 2014a). Among older students followed three times over a period of one year (i.e., medical students), Chae et al. (2022) also identified similar profiles of burnout trajectories (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., lower to upper secondary school: Salmela-Aro & Upadyaya, 2014a and Widlund et al., 2021; changes following exposure to the Wenchuan earthquake: Zhou et al., 2019). These studies confirmed the idea that transitions can be accompanied by desirable or undesirable changes in the shape of burnout 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.

Unfortunately, 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 aforementioned studies in which students were followed for one time-point after this transition suggest 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.

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 validated, the self-equilibrium hypothesis. This hypothesis assumes that the presence of a strong core sense of identity should result not only in more desirable 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).

More directly relevant to the present investigation, Gillet et al. (2022) recently found evidence that similar self-equilibrium processes were at play in teachers' burnout trajectories. More precisely, they found that more desirable trait-like burnout trajectories (i.e., persistently low or decreasing) tended to display more state-like stability than less desirable (i.e., persistently high or increasing) burnout trajectories. From a theoretical perspective, these results thus suggested that the ability to maintain persistently low or decreasing levels of burnout seemed to involve the presence of strong core sense of identity consistent with those at play in achievement, self-esteem, body image, and affective commitment to the occupation. The present study represents the first attempt to validate the self-equilibrium hypothesis in relation to school burnout. Importantly, by considering upper secondary schooling, 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.

Predictors of Students' Burnout Trajectory Profiles

According to the Job-Demand Resources model (Demerouti & Bakker, 2008), students, just like employees, face environmental demands that increase their risk of developing burnout by forcing them to expend valuable personal resources (Salmela-Aro et al., 2009b; Salmela-Aro & Upadaya, 2014b). The logical counterpart of this proposition is that access to sufficient personal

resources is likely to help students better cope with these demands, resulting in a lower risk of experiencing burnout (Demerouti et al., 2001; Salmela-Aro et al., 2009b; Salmela-Aro & Upadaya, 2014b; Schaufeli & Bakker, 2004). In this study, we focus on the possible role of two types of individual characteristics likely to act as personal resources: global self-esteem and achievement goals.

Global self-esteem is the overall subjective evaluation of one's worth as a person which, when in the positive direction, involves self-acceptance and a positive attitude toward oneself (Baumeister et al., 2003; Donnellan et al., 2011; Marsh & O'Mara, 2008; MacDonald & Leary, 2012; 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 this 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 (McCall & Simmons, 1978; Rosse et al., 1991). In contrast, a strong self-esteem has been proposed to help people maintain a coherent sense of identity (Ryan & Deci, 2017), supporting their ability to successfully face demanding or changing circumstances (Craven & Marsh, 2008). Moreover, this association is also 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.

Achievement Goal Theory (AGT; Elliot, 1999; Elliot & Trash, 2001; Kaplan & Maehr, 2007) further suggests that achievement goals, reflecting students' reasons for engaging in their studies, could also represent another driver of burnout. The original AGT highlighted the distinction between mastery (i.e., striving to *develop* competence) and performance (i.e., striving to *demonstrate* competence relative to peers) goals (Elliot & Dweck, 1988). 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 types of achievement goals: mastery-intrinsic, mastery-extrinsic, performance-approach, and performance-avoidance.

Students driven by mastery-intrinsic goals strive for personal growth and the internal

validation associated with learning new contents (Heyman & Dweck, 1992; Niemivirta, 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 & Thrash, 2002; Elliot et al., 2011; Hulleman et al., 2010; Senko & Dawson, 2017).

The self-equilibrium hypothesis (Morin et al., 2013, 2017), which is itself anchored in the broader self-determination theory framework (Ryan & Deci, 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 (for other, similar, theoretical perspectives, see Crocker & Park, 2004; Kernis, 2003; Oyserman et al., 2012; Zeigler-Hill & Wallace, 2012). 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 & Lee, 2020; Madjar et al., 2012; Nadon et al., 2020; Salmela-Aro et al., 2009b; Tuominen-Soini et al., 2020; Tuominen-Soini et al., 2012). There is, unfortunately, 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) which identified trajectory profiles of depressive symptoms amongst 2,696 Finnish adolescents transitioning from lower to upper secondary school is particularly relevant to the current investigation. Indeed, although burnout and depression are not equivalent, they share similarities making this study a valuable source of indirect information (Parviainen et al., 2021; Nadon et al., 2022). 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 (high and stable levels of depression). These results seem to provide more support to the assumptions of the initial version of AGT (mastery

versus performance goals) than to the later iteration (mastery intrinsic, mastery extrinsic, performance approach, performance avoidance). Nonetheless, it is important to keep in mind that depression remains a far more generalized phenomenon than burnout, which might be more intimately related to one's motivational orientation specific to the school setting (e.g., Nadon et al., 2022). Our study will thus investigate whether and how Olivier et al.'s (2023) results generalize to older students' burnout development.

Outcomes of Students' Burnout Trajectory profiles

Previous research has shown that school burnout predicts various undesirable educational and developmental outcomes among students (for reviews, see Vansoeterstede et al., 2023; Wang et al., 2015). To document the true practical meaningfulness and utility of the burnout trajectory profiles identified in this study, we thus consider their implications in relation to a variety of personal (alcohol and drug use and misuse) and educational (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.

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 amongst 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.

Academic Achievement. A recent meta-analysis reported a significant negative association between school burnout and academic achievement (Madigan & Curran, 2020). 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 in math overall. These results highlight the importance of considering academic achievement as a possible outcome of burnout among students attending higher levels of education.

Alcohol and Drug Use. In the face of 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 expand upon these previous results by considering students' levels of alcohol and drug use and misuse.

The Present Study

Our first objective is to identify, amongst a sample of Finnish youth followed from general upper secondary education across the transition into post-secondary education (roughly from 17 to 25 years of age), the most commonly occurring burnout trajectory profiles. Based on previous research (Chae et al., 2022; Lee & Lee, 2018; Salmela-Aro & Upadyaya, 2014a; Widlund et al., 2021; Zhou et al., 2019), we expect 3 to 5 distinct trajectory profiles (Hypothesis 1; H1). More precisely, we expect 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*) are also possible (H2). However, given that some students might experience the school transition positively, whereas others might perceive it as challenging, we also postulate 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 expect 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 (H4).

Our second objective is to determine whether the likelihood of profile membership, as well

as the shape of the within-profile burnout trajectories will 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 expect high initial levels of self-esteem and mastery goals (intrinsic and extrinsic) to act as personal resources, thereby increasing students' likelihood of corresponding to more desirable profiles (H5) and of experiencing decreasing levels of burnout over time within their profile (H6). In contrast, we expect performance goals (approach and avoidance) to act as personal risk factors, thereby increasing students' likelihood of corresponding to less desirable profiles (H7) and of experiencing increasing levels of burnout over time within their profile (H8).

Importantly, these predictive analyses will be realized while 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 share intimate relations with students' risk of burnout (Bask & Salmela-Aro, 2013; Herrmann et al., 2019; Salmela-Aro et al., 2008; Salmela-Aro & Tynkkynen, 2012; Salmela-Aro & Upadaya, 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 to follow more problematic burnout trajectory profiles (Salmela-Aro & Upadaya, 2014a; Widlund et al., 2021). Similarly, University students have also been found to display higher levels of burnout and less desirable 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 is to investigate whether and how students' burnout trajectory profiles will 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, 2020; Oller-Perret & Walburg, 2018; Widlund et al., 2021), we expect that students corresponding to less desirable trajectory profiles will 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).

Method

Participants and Procedures

We rely on Cohort B (general upper secondary school) of the Finnish Educational Transitions project (FinEdu; Salmela-Aro & Nurmi, 2003-2020), which includes students recruited in their second year of general upper secondary school³ at the initial time point in the 2003-2004 academic year (age 17-18; $N = 614$). The FinEdu project was approved by the research ethics committee of the Department of Psychology, University of Jyväskylä, Finland. More precisely, we rely on the first five measurement points of the 513 participants (67.6% females) who reported being enrolled in a formal education program after transitioning out of general upper secondary school (between Time 2 and Time 3)⁴. These participants completed questionnaires in 2003-2004 (Time 1; age 17-18; $N = 438$), 2005 (Time 2; age 18-19; $N = 463$; participants could enter the study at Time 1, as well as Time 2), 2006 (Time 3; age 19-20; $N = 387$), 2008/2009 (Time 4; age 22-23; $N = 390$), and 2011 (Time 5; age 24-25; $N = 433$). Of them, 91% ($N = 467$) reported attending university after this transition, while 9% ($N = 46$) reported attending another type of educational program (e.g., vocational or adult education).

Measures

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 three dimensions of burnout: exhaustion (3 items; e.g., *I feel I am drowning in school work*; $\alpha_{t1} = .591$; $\alpha_{t2} = .726$; $\alpha_{t3} = .655$; $\alpha_{t4} = .739$; $\alpha_{t5} = .722$), cynicism (3 items; e.g., *I constantly ask myself if studying for school has any meaning*; $\alpha_{t1} = .822$; $\alpha_{t2} = .816$; $\alpha_{t3} = .889$; $\alpha_{t4} = .873$; $\alpha_{t5} = .843$), and feelings of inadequacy (3 items; *I feel I have less and less to give in my studies*; $\alpha_{t1} = .739$; $\alpha_{t2} = .712$; $\alpha_{t3} = .768$; $\alpha_{t4} = .792$; $\alpha_{t5} = .778$). These dimensions can also be used to obtain a single score of school burnout ($\alpha_{t1} = .827$; $\alpha_{t2} = .849$; $\alpha_{t3} = .853$; $\alpha_{t4} = .870$; $\alpha_{t5} = .875$), which is the approach taken in this study. All items were rated on a 6-point scale (1-*completely disagree* to 6-*completely agree*).

Achievement Goals. At Time 1 (pre-transition) and 3 (post-transition), participants completed an instrument developed by Niemivirta (2002a; 2002b; 2004) to assess their endorsement of performance-approach goals (3 items; e.g., *An important goal for me in studies is to succeed better than other students*; ; $\alpha_{t1} = .742$; $\alpha_{t3} = .756$), performance-avoidance goals (2

³ In Finland, students attend nine 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).

⁴ 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.

items; e.g., *It is important to me that I don't fail in front of other students*; $\alpha_{t1} = .739$; $\alpha_{t3} = .746$), mastery-intrinsic goals (3 items; e.g., *I study in order to learn new things*; $\alpha_{t1} = .873$; $\alpha_{t3} = .902$), and mastery-extrinsic goals (3 items; e.g., *It is important to me that I get good grades*; $\alpha_{t1} = .863$; $\alpha_{t3} = .894$). These items were rated on a 7-point scale (1-*does not describe me at all* to 7-*describes me completely*).

Self-Esteem. At Time 1 (pre-transition) and 3 (post-transition), participants completed a short version (Tuominen-Soini et al., 2008; Tuominen-Soini & Salmela-Aro, 2014) of the Rosenberg (1965) Self-Esteem Inventory (5 items; $\alpha_{t1} = .780$; $\alpha_{t3} = .842$; e.g., *I have a positive view of myself*) using a 7-point response scale (1-*does not describe me at all* to 7-*describes me completely*).

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).

Academic Achievement. Academic achievement was assessed at Time 1, 2 (pre-transition), and 3 (post-transition). At each timepoint, participants' grade point average 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 (1 = <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; 8 = 9.5-10)

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

Drug Use. At Time 1, 3, and 4, participants self-reported the frequency of their use of drugs other than alcohol [*Have you ever tried or used drugs or medication for a narcotic purpose (e.g., hashish, ecstasy, heroine, cocaine, amphetamine, LSD, thinner, glue)?*] using a 5-point scale (1-

Never to 5-5 times or more). At Time 5, this item was separated in two to separately assess the frequency of use of hard drugs [*Have you ever tried or used hard drugs (ecstasy, amphetamine, cocaine, heroine, LSD) or medication for narcotic purpose?*] versus milder drugs [*Have you ever tried or used mild drugs (cannabis products) for a narcotic purpose?*] using the same response scale.

Analyses

Preliminary Analyses

Preliminary analyses were conducted to assess the psychometric properties (factor structure, composite reliability, and measurement invariance over time) of all the multi-item measures used in this study (i.e., global levels of burnout, achievement goals, self-esteem). Factor scores were saved from the most invariant of these preliminary measurement models (to ensure comparability over time; Millsap, 2011) and used in our main analyses. These factors scores were estimated with a mean of 0 at Time 1 and a *SD* of 1 for the burnout measure, and with a grand mean of 0 (over time) and a *SD* of 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 (Tables S1 to S3), as well as correlations among variables and reliability (Table S4) are reported in the online supplements.

Growth Mixture Analyses (GMA)

All analyses were conducted in the Mplus 8.8 (Muthén & Muthén, 2022) statistical package using the maximum likelihood robust (MLR) estimator. Models including one to eight latent trajectory profiles of burnout were estimated using 10000 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 whole 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).

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 rely on piecewise linear GMA. Piecewise linear GMA estimate profile-specific (1) random intercepts representing initial levels of burnout (the loadings of the time-specific measures on the intercept factor are all fixed to 1), (2) pre-transition random slopes reflecting the rate of change occurring in pre-transition burnout trajectories (i.e., upper general schooling: T1 to T2), and (3) post-transition random slopes reflecting the rate of change occurring in post-transition burnout trajectories (i.e., next education stage: T3 to 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 transition⁵.

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, as well as time-specific residuals; Diallo et al., 2016; Morin et al., 2011a). However, analysts are also cautioned that this completely free estimation often results in improper or nonconverging solutions, which indicates overparameterization and the need to rely on simpler models (e.g., Diallo et al., 2016; Morin & Litalien, 2019). This was the case in this 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 (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

⁵ When participants differ in age, Metha and West (2000) demonstrated that it was still appropriate to rely on uniform time codes when: (1) the regression of the intercept of a latent curve model on age is equal to the slope(s), and (2) the regression of the slope(s) on age is equal to zero. In the present study, participants are close in age, and both conditions were met, as shown by a non-significant χ^2 difference test between a baseline model without these constraints and one incorporating both constraints ($\Delta\chi^2 = 2.820$, $df = 4$, $p = .588$).

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). The following statistical indicators were considered: the Akaike Information Criterion (AIC) and its consistent counterpart (CAIC), the Bayesian Information Criterion (BIC) and its sample-size adjusted counterpart (ABIC), the Lo-Mendel-Rubin (Lo et al., 2001) adjusted likelihood ratio (ALMR) test, and the 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, ICL-BIC, 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; Tofighi & Enders, 2008). We thus only report these two indicators to ensure transparency.

Predictors

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, 2017). In a 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). 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.⁶ Each model was compared with the previous one from the sequence based on the aforementioned information criteria (CAIC, BIC, and ABIC), and the model with the lowest value on two out of three of those indicators was retained (Diallo et al., 2017; Morin, Meyer et al., 2016).

Outcomes

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).

Results

Identifying the Number of Burnout Trajectory Profiles

Results from the solutions including 1 to 8 profiles are reported in the top section of Table 3.1. The CAIC reached its lowest point almost equivalently for the 3- and 4- profile solutions (which differed by only one point), the BIC reached its lowest point for the 4-profile solution, the ABIC reached its lowest point almost equivalently for the 5- and 6- profile solutions (which differed by less than one point), and the BLRT supported the five-profile solution. Solutions including 3 to 6 profiles were thus thoroughly examined. In relation to the four profiles illustrated in Figure 3.1 (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 which also supported this solution, the 4-profile solution was retained for interpretation, thus supporting H1. 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., 2011a). The resulting model was statistically proper and had a level of fit to the data (see Table 3.1) consistent with that of the

⁶ We also tested for the possible presence of two- and three- way interactions between self-esteem, achievement goals, and sex and found no evidence of moderation. These results are available upon request from the authors.

initial solution. Consistent with the moderate entropy of this solution (.633), it resulted in a reasonably accurate classification of participants into their most likely profiles (ranging from 75.4% to 84.4% across profiles, as shown in Table S5 of the online supplements).

The final 4-profile solution is illustrated in Figure 3.1, and detailed parameter estimates from this solution are reported in Table 3.2. This solution resulted in the identification of four qualitatively distinct profiles, which were generally consistent with H2 and were labeled: (a) *High and Decreasing* (representing 14.89% of the sample); (b) *Moderate and Decreasing* (27.19%); (c) *Low and Increasing* (22.16%); (d) *Low and Stable* (35.77%). When interpreting these results, it is important to keep in mind 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, thus supporting H3. 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 and is consistent with previous reports of self-equilibrium processes associated with burnout trajectories among teachers (Gillet et al., 2022).

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 3.1. Relative to the null model, the next model 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 3.3.

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) one. 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) one. 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) ones. Neither performance approach goals, nor mastery intrinsic goals, shared any associations with participants' likelihood of profile membership. These results support H5 and H7 in relation to self-esteem, mastery extrinsic goals, and performance avoidance goals, although they fail to support these hypotheses in relation to mastery intrinsic and performance approach goals. Finally, and failing to support H6 and H8, none of the predictors was found to be associated with within-profile variability in the shape of students' burnout trajectories.

Outcomes of the Burnout Trajectory Profiles

Comparison of the burnout trajectory profiles in relation to the outcomes are reported in Table 3.4. 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 seem 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, right 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.

Discussion

Academic transitions are critical periods of human development when exposure to a variety of co-occurring biopsychosocial transformations is likely to increase youth's risk of experiencing school burnout (Caspi, 2002; Eccles & Roeser, 2009; Salmela-Aro & Tynkkynen, 2012; Tuominen-Soini & Salmela-Aro, 2014; Vansoeterstede et al., 2022; Walburg, 2014; Wang et al., 2015). While most students transition from upper secondary to post-secondary education without facing major problems, some have difficulty adjusting to the new demands of higher education and early adulthood (Vansoeterstede et al., 2022; Wang et al., 2015; Tuominen-Soini & Salmela-Aro, 2014). The current 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.

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 (1) was the smallest (14.89%) and displayed initially high levels 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 as a result of exposure to a slightly more adaptive learning environment or improved personal resources (e.g., Demerouti et al., 2001; Salmela-Aro et al., 2009; Schaufeli & Bakker, 2004). However, despite experiencing a reduction in burnout levels over time, these students remained those with 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 (2) displayed initially 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 as a result 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 demands 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 which kept on decreasing over time. These students thus seem generally well-adjusted to the demands of post-secondary education (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., Vansoeterstede et al., 2022; Wang et al., 2015; Tuominen-Soini & Salmela-Aro, 2014). 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' basic 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 result in a learning environment that is relatively well-suited to the needs of 40% of the students, among whom it seems to help reduce, or stabilize already reduced, levels of burnout (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' basic developmental needs (Eccles & Midgley, 1989; Eccles & Roeser, 2009, 2011; Tuominen-Soini et al., 2012). Thus, our *Low and Increasing* (3) profile, corresponding to 22.16% of the sample, displayed initially low levels of burnout which 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, 2014; 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). From the theoretical perspective of the Job Demands-Resources model, it is conceivable that these students may have struggled with the progressive increase in academic demands which characterize higher levels of education (e.g., academic load, too much autonomy, pressure to excel), without being able to develop the social or personal resources needed to adequately cope with these demands (Demerouti et al., 2001; Salmela-Aro et al., 2009; Salmela-Aro & Upadyaya, 2014b; Schaufeli & Bakker, 2004).

Our *Low and Stable* 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, 2014; 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 should not only display more desirable trait-like trajectories over time (low and stable or decreasing trajectories), but 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 undesirable 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.

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 for students. Indeed, according to the Job Demands-Resources model (Demerouti et al., 2001; Salmela-Aro et al., 2009b; Salmela-Aro & Upadyaya, 2014b; Schaufeli & Bakker, 2004), personal resources can be particularly valuable in helping students navigate changes in their exposure to the educational demands of their post-secondary transition 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* (4) burnout profile 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* (2) profile (which 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*; *Low and Increasing*).

In relation to self-esteem, these results are consistent with the idea that self-esteem is a core component of one's identity (Ryan & Deci, 2017) 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), 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. On the one hand, 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 & Trash, 2001; Kaplan & Maehr, 2007), which is consistent with the benefits of these goals observed in the present study. On the other hand, students pursuing mastery extrinsic goals also tend to focus on grades and success, 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, from the theoretical perspective of self-determination theory (Ryan & Deci, 2017) within which the self-equilibrium hypothesis is anchored, 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 (for other theoretical perspectives converging on similar conclusions, see Crocker & Park, 2004; Kernis, 2003; Zeigler-Hill & Wallace, 2012). 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 focus 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 the emergence of burnout, whereas seeking a sense of mastery anchored in external validation might be more beneficial. 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* (3) profile relative to the *High and Decreasing* (1) one, 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, which were associated with membership into the two profiles displaying the highest initial levels of burnout (i.e., *High and Decreasing* and *Moderate and Decreasing*). This finding supports the well-established association between performance avoidance goals and

student burnout (Nadon et al., 2022; Sorkkila et al., 2018; Tuominen-Soini et al., 2008; Tuominen et al., 2020). Moreover, it is also consistent with the idea that students who rely on the avoidance of failure relative to their peers should display more problematic burnout trajectories, characterized by more numerous and pronounced state-like fluctuations (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 (for a review, see Wormington & Linnenbrink-Garcia, 2017). 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 (for a review, see Monni et al., 2020). 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., 2011b, 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.

Outcomes of Students' Burnout Trajectory Profiles

In terms of academic outcomes, we found that students from the *High and Decreasing* (1) profile 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 also highest in the two profiles displaying the lowest pre-transition levels of burnout (*Low and Stable* and *Low and Increasing*), 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 school burnout tends to be particularly harmful to student's academic trajectories (Bask & Salmela-Aro, 2013; Madigan & Curran, 2021; Widlund et al., 2021). It would, however, be interesting for future studies to test whether and how the present results would generalize to post-secondary levels of achievement. 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 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., Times 3 and 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 to help cope with their distress (Labouvie, 1986; Patterson & McCubbin, 1987; Wagner et al., 1999).

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 of students (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 since these students display 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, which 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 schooling, this difficult transition seems to have resulted from their already progressively increasing levels of burnout, which continued to increase after the transition. Fortunately, early intervention efforts seeking to cultivate mastery goals and self-esteem could possibly help these students presenting low levels of burnout in upper secondary school to maintain similarly low levels of burnout after the post-secondary transition (i.e., these two personal resources were found to support membership into the *Low and Stable* profile relative to the *Low and Increasing* profile). 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, 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 (Canfield, 1990; King et al., 2002; Bruno & Njoku, 2014).

Limitations and Future Directions

The current 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 (i.e., 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, so 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, as well as 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 & Upadyaya, 2012), we were not able to test this assumption in the current 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 relying 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, etc.). Likewise, it may be fruitful to consider a broader range of outcomes (e.g., mental health, occupational satisfaction, etc.).

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 sheds light on the developmental heterogeneity of school burnout and the importance of enhancing self-esteem and mastery goals to support students' academic attainment and mental health.

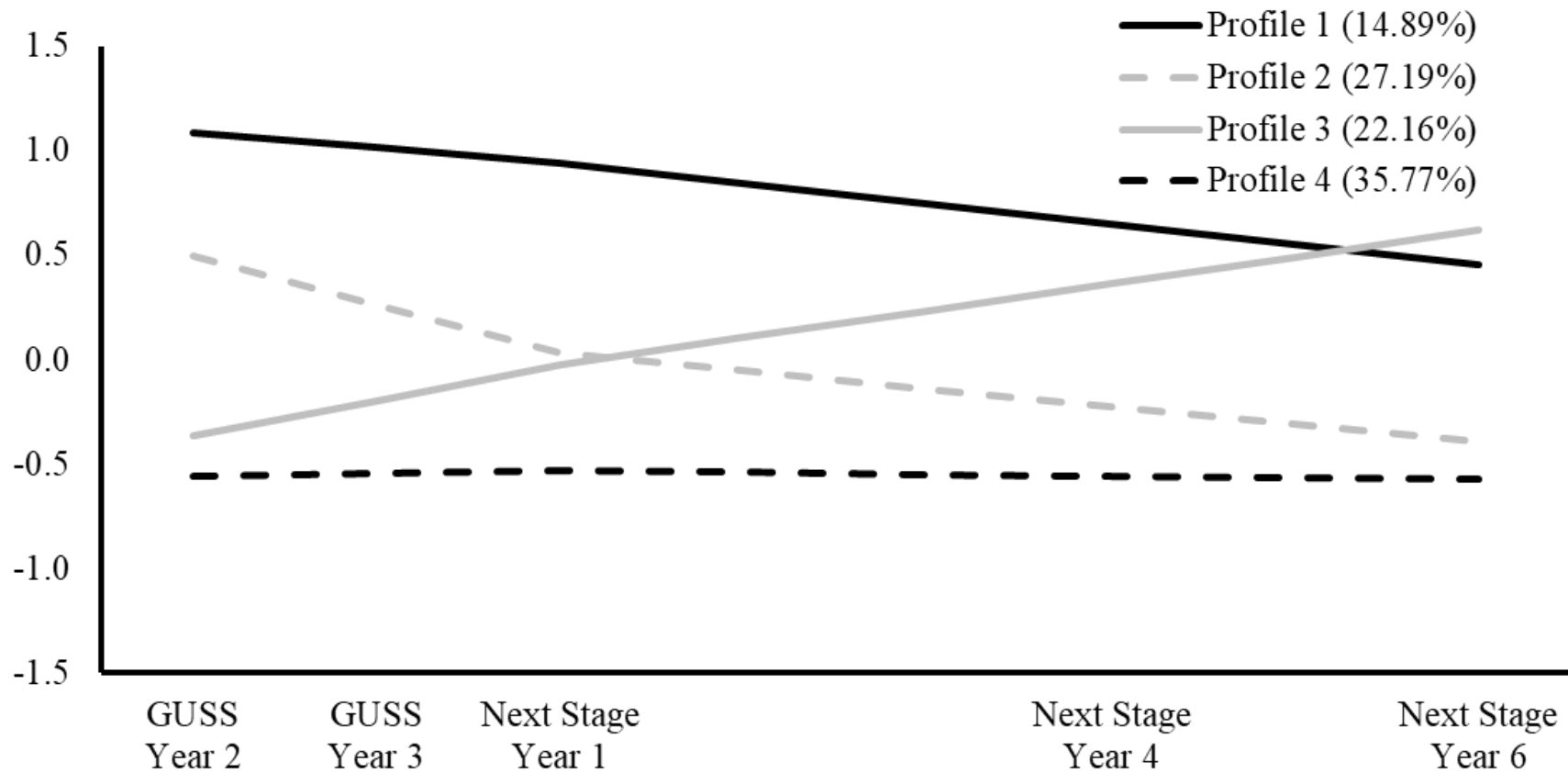


Figure 3. 1. Burnout Trajectory Profiles

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

Table 3. 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	.675	.000	.000
3 Profiles	-2693.698	23	1.163	5433.397	5553.923	5530.923	5457.917	.669	.015	.000
4 Profiles	-2672.458	29	1.175	5402.916	5554.884	5525.884	5433.833	.626	.216	.000
5 Profiles	-2657.415	35	1.106	5384.829	5568.239	5533.239	5422.143	.672	.135	.000
6 Profiles	-2648.590	41	1.012	5379.179	5594.030	5553.030	5422.890	.676	.107	.060
7 Profiles	-2648.590	47	.883	5391.179	5637.472	5590.472	5441.286	.701	.056	.000
8 Profiles	-2645.634	53	.838	5397.267	5675.002	5622.002	5453.771	.743	.212	.000
<i>Final 4 Profiles</i>	-2679.945	27	1.228	5413.889	5555.377	5528.377	5442.674	.633	.250	.000
<i>Predictions</i>										
Null	-6496.490	117	1.391	13226.980	13840.092	13723.092	13351.715	.633	NA	NA
C ON T1	-6426.389	138	1.319	13128.779	13851.937	13713.937	13275.902	.679	NA	NA
C ON T1 + T3	-6407.730	153	1.314	13121.459	13923.221	13770.221	13284.575	.693	NA	NA
C I ON T1	-6407.014	145	1.384	13104.028	13863.868	13718.868	13258.614	.708	NA	NA
C S1 ON T1	-6421.328	145	1.313	13132.655	13892.495	13747.495	13287.241	.677	NA	NA
C ON T1 + S2 ON T3	-6422.933	145	1.312	13135.866	13895.706	13750.706	13290.452	.678	NA	NA

Note. #fp: Number of Free Parameters; Scaling = scaling factor; AIC: Akaike Information Criteria; CAIC: Constant AIC; BIC: Bayesian Information Criteria; ABIC: Sample-Size adjusted BIC; ICL-BIC: entropy-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.

Table 3. 2

Parameter Estimates for the Final Unconditional Growth Mixture Solution

Parameter	Profile 1 (High Decreasing) Estimate (<i>t</i>)	Profile 2 (Moderate Decreasing) Estimate (<i>t</i>)	Profile 3 (Low Increasing) Estimate (<i>t</i>)	Profile 4 (Low Stable) Estimate (<i>t</i>)
Intercept mean	1.086 (4.456)**	.495 (1.685)	-.367 (-3.510)**	-.558 (-7.618)**
Pre-Transition Slope Mean	-.072 (-.646)	-.232 (-4.634)**	.172 (5.115)**	.013 (.474)
Post-Transition Slope Mean	-.097 (-3.153)**	-.085 (-3.871)**	.128 (3.374)**	-.008 (-.755)
Intercept variability (SD = $\sqrt{\sigma}$)	.379 (4.483)**	.379 (4.483)**	.379 (4.483)**	.379 (4.483)**
Pre-Transition Slope Variability (SD = $\sqrt{\sigma}$)	.122 (2.005)*	.122 (2.005)*	.122 (2.005)*	.122 (2.005)*
Post-Transition Slope Variability (SD = $\sqrt{\sigma}$)	.045 (1.476)	.045 (1.476)	.045 (1.476)	.045 (1.476)
Intercept vs. Pre-Transition Slope Correlation	-.512 (-3.454)**	-.512 (-3.454)**	-.512 (-3.454)**	-.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(ϵ_{yi})_T1-T2	.817 (2.962)**	.624 (4.791)**	.414 (5.007)**	.298 (4.295)**
SD(ϵ_{yi})_T3-T5	.919 (3.118)**	.485 (2.117)*	.867 (7.953)**	.318 (8.570)**

Note. * $p \leq .05$; ** $p \leq .01$; *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(ϵ_{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 a $M = 0$ at Time 1 and $SD = 1$ over time); T1-T2: Pre-transition; T3-T5: Post-transition.

Table 3. 3

Associations between the Predictors and the Participants' Likelihood of Profile Membership

<i>Predictors</i>	Profile 1 vs. Profile 4		Profile 2 vs. Profile 4		Profile 3 vs. 4	
	Coeff (s.e)	OR	Coeff (s.e)	OR	Coeff (s.e)	OR
Sex (0=male;1=female)	.779 (.524)	2.178	.042 (.508)	1.043	.340 (.408)	1.405
Program (0=Voc./Tech; 1=University)	-.316 (.719)	.729	.306 (.797)	1.357	1.938 (1.118)	6.947
Performance Approach	.550 (.441)	1.733	.085 (.396)	1.089	.152 (.314)	1.164
Performance Avoidance	1.324 (.382)**	3.760	.774 (.373)*	2.168	.141 (.292)	1.152
Mastery Intrinsic	.065 (.324)	1.067	-.097 (.261)	.907	.261 (.279)	1.299
Mastery Extrinsic	-2.080 (.447)**	.125	-1.419 (.391)**	.242	-.722 (.353)*	.486
Self-Esteem	-1.335 (.287)**	.263	-.786 (.286)**	.456	-.607 (.265)*	.545
<i>Predictors</i>	Profile 1 vs. Profile 3		Profile 2 vs. Profile 3		Profile 1 vs. 2	
	Coeff (s.e)	OR	Coeff (s.e)	OR	Coeff (s.e)	OR
Sex (0=male;1=female)	.438 (.572)	1.550	-.298 (.476)	.742	.736 (.495)	2.088
Program (0=Voc./Tech; 1=University)	-2.255 (1.375)	.105	-1.633 (1.325)	.195	-.622 (.664)	.537
Performance Approach	.398 (.452)	1.489	-.067 (.378)	.935	.465 (.422)	1.592
Performance Avoidance	1.183 (.383)**	3.264	.633 (.303)*	1.882	.551 (.378)	1.734
Mastery Intrinsic	-.196 (.384)	.822	-.359 (.280)	.699	.163 (.265)	1.177
Mastery Extrinsic	-1.359 (.430)**	.257	-.697 (.395)	.498	-.661 (.377)	.516
Self-Esteem	-.728 (.298)*	.483	-.179 (.280)	.836	-.549 (.223)*	.578

Note. **: $p < .01$; *: $p < .05$. 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; β : 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 a M of 0 over time and a SD of 1; and a Profile 1: *High and Decreasing*; Profile 2: *Moderate and Decreasing*; Profile 3: *Low and Increasing*; Profile 4: *Low and Stable*.

Table 3. 4

Associations between Profile Membership and the Outcomes

	Profile 1 (High Decreasing)	Profile 2 (Mod. Decreasing)	Profile 3 (Low Increasing)	Profile 4 (Low Stable)	Summary of Sig. Differences
<i>Dropout (0=No; 1=Yes)</i>	.418 [.302; .534]	.279 [.201; .357]	.279 [.195; .363]	.262 [.195; .329]	1>2=3=4
<i>Achievement (1=Low 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 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 Reduce (1=High 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 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 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 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 [.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 [.984; 1.074]	1.069 [1.008; 1.130]	1>2=3=4

CHAPTER 4: General Discussion

Summary of Findings

Despite the well-documented associations between students' achievement goals and their psychosocial functioning (e.g., Baudoin & Galand, 2022; Hornstra et al., 2017; Huang, 2011; 2012; Liu et al., 2020; Pahljina-Reinić & Kolić-Vehovec, 2017; Scherrer et al., 2020; Schwinger et al., 2016; Tuominen-Soini et al., 2020), the AGT literature remains limited by a primary focus on cross-sectional variable-centered studies. As such, there is a dearth of research examining (1) the various configurations of achievement goals held by distinct subpopulations of students; (2) how these configurations influence psychosocial functioning, and (3) students' own developmental heterogeneity over time. The aim of this thesis was to address these limitations by providing person-centered longitudinal insight into the relation between achievement goals, academic functioning, and socioemotional functioning for students at different educational stages.

In Study 1 (Chapter 2), we focused on younger students' achievement goals. Specifically, we examined how elementary school students' approach achievement goals (i.e., mastery and performance-approach goals) combined with their *perceptions* of the goals held *for them* by key caregivers to form distinct profiles. In turn, we examined how such profiles differentially related to students' perceptions of their academic competence, to their teacher-reported academic achievement, and to their self-reported symptoms of anxiety.

Using Latent Profile Analysis, our results revealed four distinct profiles of students. In alignment with previous person-centered results, we found a *High on all Goals* and a *Mastery-Oriented* profile (Hornstra et al., 2017; In De Wal et al., 2016; Schwinger & Wild 2012; Schwinger et al., 2016; Zhang et al., 2016). Less expected, but not unheard of (i.e., Schwinger et al., 2016) was a *Low on all Goals* profile. Lastly, we also identified a *Low Mastery Goals* profile, which unexpectedly represented the largest proportion (40%) of students and had only been identified once in previous research conducted among elementary school students (Zhang et al., 2016). It was also surprising to find that none of these profiles demonstrated discrepancies between students' own goals and their perceptions of the goals held for them by parents and teachers. However, this finding did correspond with some previous variable-centered studies revealing moderate to high levels of correspondence between personal, teacher, and parent goals (e.g.,

Bardach et al., 2020; Gonida et al., 2014, 2009). Consistent with our hypotheses and previous person-centered research conducted among elementary school students (e.g., Hornstra et al., 2017; In de Wal et al., 2016; Schwinger et al., 2016; Tuominen et al., 2020), we identified the same number of profiles from one school year to the next. These profiles maintained the same shape, size, and within-profile variability (i.e., within-sample stability) over time, and noted that students were moderately to highly likely to remain in the sample profile over time (i.e., within-person stability). These results support the robustness of our solution, and the relevance of these profiles as a potential guide for intervention. Overall, the *Low Mastery Goals* profile was not only the largest, but also the most stable over time, thus further reinforcing the relevance of this profile.

Furthermore, we found that students reporting higher perceived competence in Math and French were more likely to belong to profiles characterized by high rather than low mastery goals. This observation was consistent with AGT (Cury et al., 2006; Duchesne & Larose, 2018; Elliot & Church, 1997; Greene et al., 2004; Schunk, 2003; Schunk & DiBenedetto, 2016, 2020) and with previous results (Fortunato & Goldblatt, 2006; Luo et al., 2011; Wormington & Linnenbrink-Garcia, 2017). Finally, and as expected (e.g., Hornstra et al., 2017; Jang & Liu, 2012; Liu et al., 2020; Pahljina-Reinić & Kolić-Vehovec, 2017; Schwinger et al., 2016), our results revealed that *Mastery-Oriented* students fared best in terms of academic achievement (i.e., higher) and anxiety (i.e., lower) relative to students corresponding to the other profiles. However, our results did not strongly support the adaptive nature of performance approach goals when held alongside mastery goals, thus contradicting previous results alluding to potential benefits of this goal combination (Hornstra et al., 2017; Schwinger & Wild, 2012; Schwinger et al., 2016; Zhang et al., 2016). Taken together, Chapter 2 elucidates the nature and stability of elementary students' achievement goal profiles and provides novel insight into how children interpret the goal-related messages from their primary caregivers, in addition to reinforcing the importance of perceived competence.

In Study 2 (Chapter 3), we shifted our emphasis to older students' psychosocial functioning. Specifically, we examined the developmental heterogeneity of school burnout across the transition from upper secondary school to higher education. We then examined how students' global self-esteem and achievement goals predicted this developmental heterogeneity (i.e., burnout trajectory profiles), and how burnout trajectory profiles differentially related to students' academic achievement, school dropout, and alcohol and drug use.

Using Growth Mixture Analyses, we identified four trajectory profiles: *High and Decreasing* (Profile 1), *Moderate and Decreasing* (Profile 2), *Low and Increasing* (Profile 3), and *Low and Stable* (Profile 4). These profiles were generally aligned with those identified in previous research (Chae et al., 2020; Lee & Lee, 2018; Salmela-Aro & Upadyaya, 2014a; Sorkkila et al., 2019; Widlund et al., 2021; Zhou et al., 2019), supporting the relevance of these profiles across the post-secondary school transition, a critical developmental period that had been neglected in previous studies. Partially in line with our hypotheses, we found that high self-esteem and mastery goals served as personal resources for students, helping to protect them from the most problematic burnout profiles. Likewise, students presenting high levels of global self-esteem and endorsing mastery extrinsic (but not mastery intrinsic) goals were most likely to belong to the most adaptive *Low and Stable* profile (Craven & Marsh, 2008; Elliot, 1999; Elliot & Trash, 2001; Kaplan & Maehr, 2007; Ryan & Deci, 2017). Conversely, our results contributed to the wealth of evidence showcasing the harmful nature of performance avoidance goals (e.g., Nadon et al., 2022; Sorkkila et al., 2018; Tuominen-Soini et al., 2008; Tuominen et al., 2020), which were related to a higher likelihood of presenting a profile displaying high initial burnout levels (i.e., *High and Decreasing*, *Moderate and Decreasing*). Interestingly, our results also revealed that neither initial, nor post-transition self-esteem or achievement goals were related to within-profile changes in students' burnout trajectories over time, highlighting the need for early intervention and prevention efforts.

Furthermore, we found that the *High and Decreasing* profile was the smallest (14.89%), the least stable, and the most problematic. This profile thus represented a minority of highly burned-out secondary school students whose burnout levels started to improve slightly after the transition to higher education, but nonetheless remained the highest by the end of the study. As expected, (e.g., Bask & Salmela-Aro, 2013; Madigan & Curran, 2021; Oller-Perret & Walburg, 2018; Widlund et al., 2021), students in this profile were at higher risk of dropout, displayed lower academic achievement, greater alcohol use and problems, and more drug use compared to the students from the other profiles. In contrast, the *Low and Stable* profile was the largest (35.77%), the most stable, and the most adaptive - reflecting a significant number of students who seemed immune from burnout and its consequences. In sum, Chapter 3 offers novel insight into the developmental heterogeneity of school burnout across the transition into higher education and underscores the importance of enhancing self-esteem and mastery goals for early burnout prevention and intervention.

Implications for Theory

The importance of theory cannot be understated. Theory affords researchers with common language and principles, provides a framework for explaining past, present, and future phenomena, and allows us to systematically test important hypotheses. Without a guiding theory, we run the risk of relying on disjointed facts with limited meaning for research and practice (Ryan & Deci, 2017). Thus, our findings should be contextualized within AGT's core assumptions.

A first assumption worthy of consideration is that achievement goals, and motivation more broadly, are assumed by AGT to be part of a multidimensional process influenced by a combination of personal and social factors. This process catalyzes unique achievement-related scenarios, which then impact human behaviour (Ames, 1992; Maehr & Nicholls, 1980; Maehr & Zusho, 2009; Schunk et al., 2008). With regards to personal factors, both studies included in this thesis suggest that grade level, program type, and sex had no significant impact on profile membership. These findings do not imply that personal factors are unimportant with regards to students' achievement goals and psychosocial functioning. Rather, they suggest that profile membership is seemingly robust enough to be largely unaffected by these specific individual characteristics. In other words, the profiles identified in both studies seem to reflect youth's functioning in a way that is independent from their own individual characteristics, thus indirectly reinforcing the role of potentially modifiable psychosocial factors as likely drivers of profile membership. Yet, saying that personal characteristics are likely to play only a minimal role does not extend to psychological characteristics. Indeed, as shown in Chapter 2, children's perceptions of their competence in core academic subjects proved to represent an important predictor of their achievement goals profiles. We come back shortly to the theoretical underpinnings of this result.

With regards to social factors, our results first highlight the importance of considering the sociocultural context when interpreting empirical findings involving students' achievement goals. In Chapter 2, we unexpectedly found a *Low Mastery Goals* profile (i.e., low mastery goals combined with average performance goals), which corresponded to the largest proportion of students in our sample. Although this profile had only emerged in one previous study of elementary school students, it is important to note that most previous studies have relied on samples of predominantly white economically advantaged students (Zusho & Clayton, 2011; Zusho & Pintrich, 2003). This unexpected finding makes sense when considering that our sample was comprised mainly of first and second-generation immigrant students from low SES backgrounds

and suggests that these children may present a particularly high risk of displaying a profile characterized by a low level of mastery goals. Due to systemic barriers facing new immigrants, immigrant students are more likely to attend schools located in low SES neighbourhoods, regardless of their parents' often advanced educational level (Archambault et al., 2017). For parents, immigration is often seen as a means to enhance their children's future opportunities (Portes & Rumbaut, 2001). Therefore, some students' motivation to succeed academically may stem from a desire to please their parents, as they are acutely aware of their parents' sacrifices, hopes, and goals for their future (Urdan et al., 2007). Through this lens, it is unsurprising that our largest profile of students tended to be less mastery-oriented and more performance-oriented. However, it is important to acknowledge that our interpretation of the socio-cultural underpinnings of this profile remain inferential and tentative, at least pending more systematic investigations of the associations between immigration, SES, and achievement goals profiles.

Furthermore, results from Chapter 3 shed light on how the educational system itself might influence students' achievement goals. Upper secondary school in Finland is known to be particularly academically rigorous, with a lot of pressure on grades for admission to post-secondary schooling (Salmela-Aro et al., 2008; Tuominen-Soini et al., 2012). As such, our surprising finding that mastery-extrinsic goals were more important and adaptive than mastery-intrinsic goals with regards to students' burnout trajectories should be considered in this light. Students in our sample were all embarked on the most rigorous Finnish academic track, where seeking mastery for its own sake (i.e., mastery-intrinsic goals) may not have been possible, and thus not as helpful as mastery-extrinsic goals in preventing burnout.

Still in relation to social factors, Chapter 2 highlighted that students' goals do not exist in a vacuum. Specifically, our findings suggest that younger students may have a more generalized goal framework, where they cannot easily distinguish their own goals from the different goal-related messages they receive from their parents and teachers (Bardach et al., 2020). Developmentally, this makes sense. Indeed, our ability to accurately perceive and differentiate various social perspectives develops throughout childhood and into adolescence (e.g., Burnett et al., 2011; Symeonidou et al., 2016; Tamnes et al., 2018), and we are hard-wired for self-consistency and to avoid cognitive goal conflicts (Festinger, 1957; Harmon-Jones, 2019; Swann, 1983).

A second assumption worthy of consideration is that AGT has always positioned feelings of competence as a core driver of achievement goals and positive functioning (Hulleman et al.,

2010; Maehr & Zusho, 2009; Pintrich, 2003). Achievement goals are conceptualized as mental representations of desired competence-based outcomes (Hulleman et al., 2010), where mastery goals involve striving to develop competence, and performance goals involve striving to demonstrate competence (Elliot, 1999). Students who feel competent academically are more likely to see school tasks as feasible challenges, making them more likely to persevere academically, and to do so for its own sake rather than to achieve externally imposed benchmarks (Cury et al., 2006; Duchesne & Larose, 2018; Schunk, 2003; Schunk & DiBenedetto, 2016; Schunk & DiBenedetto, 2020). In Chapter 2, we found evidence to further support the intimate association between perceptions of competence and achievement goals (Fortunato & Goldblatt, 2006; Luo et al., 2011; Wormington & Linnenbrink-Garcia, 2017), by demonstrating that students who felt more competent in core subjects were more likely to belong to profiles characterized by high mastery goals. This makes sense, as perceived competence helps promote students' tendency to move *towards* (i.e., approach goals) academic challenges (Duchesne & Larose, 2018; Elliot & Church, 1997; Greene et al., 2004). In Chapter 2, when students felt capable of using their internal resources to navigate academic challenges, their achievement goals reflected an underlying desire to learn, grow, and develop their competence.

A third critical assumption of AGT is that achievement goals should contribute to generating motivational systems encompassing human cognitions, emotions, and behaviours (Dweck, 1992; Maehr & Nicholls, 1980). The overarching associations between students' self-concept, achievement goals, and academic and socioemotional outcomes uncovered in the current thesis can be readily situated within this assumption. In Chapter 2, achievement goals were at the center of a system involving elementary school students' perceived competence (i.e., cognition rooted in self-concept), their anxiety (i.e., an emotion), and their teacher-reported academic performance (i.e., a behavioural indicator of academic functioning). Specifically, students in the *Mastery-Oriented* profile displayed higher perceived competence in core subjects, lower levels of anxiety, and higher academic achievement, and the opposite was true for students in the *Low-Mastery* profile. In Chapter 3, the achievement goals youth endorsed early in upper secondary school were important, alongside their self-esteem, in predicting how their school burnout developed over time. Importantly, burnout is a multifaceted experience itself encompassing emotional (i.e., exhaustion, stress), cognitive (i.e., cynicism regarding school), and behavioural (i.e., reduced efficacy at school) components. In this study, high initial levels of mastery-extrinsic

goals served as personal resources, making students more likely to belong to desirable (i.e., *Low and Stable*) profiles, which in turn protected students from adverse academic and personal outcomes. Conversely, high performance goals served as a personal risk factor, making students more likely to belong to more problematic trajectory profiles (e.g., *High and Decreasing*), which were in turn associated with a higher risk of dropout, lower grades, greater alcohol use and problems, and higher drug use compared to the other profiles. Overall, results from both studies lend support for the assumption that achievement goals can represent the motivational centerpiece unifying students' emotions, cognitions and behaviours.

Our findings also have theoretical implications that are broader than AGT, although these broader considerations remain relevant for AGT. One such consideration involves the state vs. trait debate, which relates to the stability and malleability of achievement goals over time and across contexts. In Chapter 2, the within-sample stability of our profiles suggests that they were not likely a reflection of transient experiences or random sampling variations (Morin et al., 2016; Spurk et al., 2019). Their moderate to high within-person stability also suggested that students were not highly likely to change profiles without intervention, while the presence of at least some transitions also suggested that profile membership is indeed flexible enough for change to be possible. Together, these two forms of stability suggest that, within a one-year period, children's achievement goals tend to be quite stable (i.e., more trait-like), that changes sometimes happen organically, but that these changes are largely unlikely to occur without intervention. Furthermore, in Chapter 3, we found that initial levels of achievement goals were critical for students' burnout development. That is, the goals that students endorsed early in their upper secondary school years (Time 1) had a longstanding and unchanging impact on their burnout trajectory over time, even across their transition into higher education. These findings are consistent with the idea that achievement goals may reflect largely dispositional tendencies (Monni et al., 2020). Taken together, findings across both studies imply that students' achievement goals may be more trait-like than state-like and that, although changes may occur on their own, early intervention and prevention efforts aimed at enhancing students' mastery goals are critical. Consistent with this perspective, the results obtained in Chapter 3 also highlighted the complementary role played by achievement goals to that already played by self-esteem in helping to support the emergence of a strong sense of identity that remains resilient to temporary fluctuations. This finding aligns with

the self-equilibrium hypothesis (Morin et al., 2013, 2017) as extended to burnout development (Gillet et al., 2022).

A final important consideration entails the concept of multiple goal pursuit, where students are expected to simultaneously endorse multiple goals (Dowson & McInerney, 2003; Litalien et al., 2017a, 2017b; Pintrich, 2000), with some combinations being more adaptive than others (Barron & Harackiewicz, 2001; Senko et al., 2011). From this point of view, performance-approach goals are often seen as adaptive, particularly for academic achievement, when endorsed jointly with mastery goals (Harackiewicz et al., 2002). Interestingly, findings from Chapter 2 did not support this proposition, at least in our sample of elementary school students. Not only did students in the *High on all Goals* (i.e., high in both performance and mastery-approach goals) profile fare worse than those in the *Mastery-Oriented* profile, but they also did not fare better than those in the *Low on all Goals* or *Low Mastery Goals* profile. Overall, our results suggest that elementary school students displaying high levels of mastery goals alone (*Mastery-Oriented*) experience the most adaptive outcomes in terms of both anxiety and academic achievement. This finding by no means discredits the multiple goals perspective, but rather underscores the overwhelmingly adaptive nature of mastery goals, especially for children.

Implications for Research

This thesis also has important implications for research on student motivation and psychosocial functioning. First, it expands upon the largely variable-centered literature by relying on advanced person-centered methodologies. Although variable-centered research is considered parsimonious and easily interpretable, it runs the risk of overgeneralizing and oversimplifying the complex multidimensional phenomena that form a normative part of the human reality (Howard & Hoffman, 2018). Person-centered longitudinal methodologies, like the ones employed in this thesis, allow us to tell more nuanced, fine-grained, and holistic stories about the motivational forces driving students' involvement in their schoolwork and the role that motivation plays in various domains of student functioning. Further, person-centered evidence is cumulative in nature, meaning that many studies are needed to confidently glean whether profiles or profile-trajectories are context-specific or if they are generalizable across contexts and populations (Morin et al., 2020). This also relates to the necessity of gathering strong evidence of construct validity in person-centered research. It is important that profiles are replicable over time and across different samples, predicted by theoretically relevant variables, and differentially related to theoretically

meaningful outcomes. This thesis adds to the cumulative person-centered body of evidence on students' achievement goal and school burnout profiles, and of how achievement goals, academic functioning, and socioemotional functioning relate to one another over time.

In Chapter 2, relying on Latent Profile and Latent Transition Analyses allowed us to showcase the heterogeneous and multidimensional nature of children's achievement goals, in terms of goal type (performance, mastery) and perceived source (self, parent, teacher). We demonstrated the relevance of this heterogeneity and offered evidence of construct validity by presenting distinct associations between achievement goal profile membership (from the students' perspective), perceived competence (from the students' perspective), academic achievement (from the teachers' perspective), and general anxiety (i.e., not specific to the school context). Moreover, we replicated the growing body of person-centered evidence consistently identifying *High on all Goals* and *Mastery-Oriented* profiles in elementary school students. Meanwhile, our less common *Low on all Goals* and *Low Mastery* profiles provided a critical avenue for researchers to further examine whether these profiles were specific to our sample, or whether they would emerge systematically among students from similar or distinct socioeconomic and sociocultural backgrounds.

In Chapter 3, relying on Piecewise Linear Growth Mixture Analyses allowed us to examine how different subpopulations of youth develop school burnout differently over time, and how the transition from secondary to post-secondary school directly impacts the development of burnout for some students. We then showcased how this heterogeneity was differentially associated not only with students' achievement goals, but with their self-esteem, academic achievement, dropout, and substance use. We added to the growing body of person-centered evidence by replicating trajectory profiles commonly found among younger or older student populations, applied to the often-overlooked emerging adulthood range. Rather than making generalized conclusions, we showed that although most students manage the transition to higher education relatively unscathed by school burnout, a smaller proportion of students do not (i.e., *High and Decreasing* profile). Thus, Chapter 3 added to the research literature on school burnout trajectories by explicitly examining how the transition from upper secondary school to higher education impacts students' burnout trajectories and sets the stage for more person-centered research directly examining the impact of this understudied transition.

Implications for Practice

The person-centered results highlighted in this thesis have important implications for the practice of educational psychology, and for the clinicians and educators aiming to support the optimal motivation and psychosocial functioning of all students. Variable-centered findings run the risk of oversimplifying and overlooking students' nuanced patterns and needs, which can potentially lead to interventions that benefit some students but not others (Howard & Hoffman, 2018). Conversely, the person-centered longitudinal findings obtained in this thesis allowed us to identify subpopulations of students that differ in terms of their achievement goals and burnout trajectories over time and that may benefit from differential intervention strategies. Furthermore, we showcase important variables that are associated with achievement goal and burnout profiles and could thus be used as intervention targets. Therefore, our findings are well-suited for informing the development and application of improved school-based and individual interventions (e.g., Morin & Marsh, 2015).

Chapter 2 refined our conception of how elementary school students hold multiple goals at once (i.e., type and source), and how their distinct pattern of goals is associated with perceived competence (predictor), anxiety, and academic achievement (outcomes). The large number of students in the *Low Mastery Goals* profile, combined with the clear benefits of mastery goals for achievement and anxiety, suggest the need for school-wide interventions aiming to enhance mastery goals in the classroom. At the same time, our results also depict at-risk students – those with a profile marked by low mastery goals – who would benefit from individualized support from educators and school psychologists. Findings from Chapter 2 also suggest that children tend to perceive their own, their parents, and their teachers' achievement goals similarly. It is thus important, developmentally speaking, that any school-based efforts seeking to enhance children's mastery goals be endorsed by teachers and communicated to parents in a culturally sensitive way, to enhance their awareness of how mastery goals benefit both the emotional and educational functioning of their children.

Chapter 3 enriched our understanding of how youth develop school burnout differently across the transition to post-secondary school, and how these trajectory profiles are associated with achievement goals, self-esteem (predictors), achievement, dropout, and substance use (outcomes). Although initial levels of self-esteem and achievement goals significantly predicted students' burnout trajectories, changes in achievement goals and self-esteem did not change the trajectory they followed. Hence, educators should aim to cultivate healthy self-esteem and mastery goals

amongst all students, early in the educational trajectory, to prevent burnout in the long run. Students in the *High and Decreasing* profile are clearly the most in need of individualized, tertiary-level intervention. Furthermore, although students in the *Low and Increasing* profile appear academically and emotionally well-adjusted, their high-achieving nature may come at a long-term cost to their wellbeing, and they are likely to slip under the intervention radar. As such, we recommend that these students be closely monitored for less obvious signs of burnout, to prevent mental health issues in adulthood. Together, findings from the current thesis underscore the importance of fostering and maintaining students' self-esteem and mastery goals as early as possible, to offset the risks of academic underperformance and anxiety, as well as burnout and its consequences (i.e., dropout, substance use).

The results of this thesis highlight the importance of developing and maintaining a healthy self-concept, including perceived academic competence as well as global self-esteem. To nurture students' perceived competence and self-esteem in the classroom, teachers can help students set measurable and realistic goals for themselves, model an internal locus of control, acknowledge and praise students' successes, help students identify their own successes and strengths, and promote closeness and collaboration between students (Canfield, 1990; King et al., 2002; Bruno & Njoku, 2014). At an individual level, students exhibiting low self-esteem may benefit from Cognitive Behavioural Therapy, which targets harmful cognitions about oneself and their self-worth (e.g. Kolubinski et al., 2018; Taylor & Montgomery, 2007).

To promote and maintain students' mastery goals, we recommend that teachers aim to facilitate a mastery-oriented goal structure in the classroom. This can be accomplished through implementing components of the TARGET acronym (see review by Braithwaite et al., 2011; Cecchini et al., 2014; Chazan et al., 2020). The TARGET approach involves making **T**asks meaningful, sharing **A**uthority between teachers and students with regards to classroom rules and expectations, **R**ecognizing student progress and effort rather than mistakes and ability, **G**rouping students based on shared interests over ability, **E**valuating students on progress and intraindividual growth, and giving students the flexibility to finish work on their own **T**ime. At the individual level, educators and clinicians could consider drawing from a module and reflection-based intervention by Martin (2008), which has shown to be effective in enhancing students' mastery goals, valuing learning, task-management, and persistence, as well as in reducing their anxiety, avoidance of failure, and self-handicapping behaviours (Chazan et al., 2020; Martin, 2008).

Interventions targeting conceptually similar motivational processes could also be employed. For example, brief Attributional Retraining interventions (e.g., Graham & Taylor, 2016; Perry & Hamm, 2017) can promote more helpful attributions in the face of academic failure (e.g., lack of effort over lack of ability), which are especially helpful for enhancing mastery goals in performance-oriented students (e.g., Hamm et al., 2014). Similarly, mindset-based interventions promote the flexibility of intelligence, making students more likely to focus on personal growth and less on avoiding looking incompetent (Chazan et al., 2020; DeBacker et al., 2018; Yeager et al., 2016). Overall, there are many frameworks from which to enhance students' adaptive motivation (see review by Lazowski & Hulleman, 2016), though individual interventions rooted in AGT are sparse. We hope that findings from this thesis underscore the important relation between mastery goals and optimal psychosocial functioning, and that they can inform the development and refinement of interventions more clearly rooted in AGT.

Limitations and Directions for Future Research

This thesis has several global limitations that can be addressed in future research. First, it is important to acknowledge that despite the advantages of large data archives, there are also inherent restrictions that have impacted the present work. Such restrictions generally boil down to the lack of control over the available variables, as well as how, when, and among whom they are measured. Thus, although the current thesis covers a lot of ground, it still offers a relatively narrow scope of student motivation and functioning. We focused exclusively on individual protective/risk factors, namely students' achievement goals, perceived competence, and self-esteem, whereas contextual factors such as social support, educational climate, and classroom goal structures are also key in understanding student academic and socioemotional functioning. Future researchers should consider the impact of both personal and contextual factors on students' functioning and include a broader range of student functioning indicators (e.g., social functioning).

Another limitation stems from the reliance on self-report questionnaires in both studies. Relying on self-report questionnaires can introduce measurement error, through processes like recall and social desirability biases. Hence, we recommend that future researchers make a conscious effort to incorporate other forms and sources of measurement, to provide a richer and more accurate picture of students' motivation and functioning. For example, researchers could consider incorporating observational data, to examine whether students' perceptions of their teachers and parents' goals correspond with parent and teacher observed motivational practices.

Including more objective measures of student academic functioning, as well as additional sources of information, such as parent and teacher self-reports would be beneficial as well, to gain a more well-rounded understanding of students' experiences.

A third limitation involves the number and spacing of timepoints in longitudinal research. Chapter 2 included only two timepoints over the course of one year. Although this provided valuable information about the stability of profile membership from one school year to the next, it narrowed our understanding of how achievement goal profiles change over the larger course of elementary school. Although Chapter 3 included five measurement points and an educational transition, it would be helpful to capture the entirety of the secondary school and post-secondary education trajectories, to understand the full evolution of school burnout throughout adolescence and young adulthood. Overall, future research should aim to include more measurement points to examine longer term stability/change in profile membership, especially in childhood and adolescence when students are faced with a myriad of developmental shifts and transitions.

This thesis also includes some limitations involving the measurement and conceptualization of our key variables. First, across studies, we relied on different operationalizations of achievement goals. Chapter 2 relied on a dichotomous (i.e., performance vs. mastery) representation of children's goals, whereas Chapter 3 relied on a more nuanced representation of youth's goals (i.e., mastery intrinsic and extrinsic, performance approach and avoidance). This was in part due to the different variables available in the separate datasets, but was also informed by developmental considerations (i.e., children have less differentiated goal frameworks than adolescents and young adults), and by the scope of each study. However, this discrepancy in goal frameworks slightly muddled the theoretical foundation of the current work. Future studies should consider using the same operationalization across a longer developmental period, to provide a more parsimonious theoretical foundation from which to examine how students' goals become more differentiated over time. Additionally, given that both studies included domain-general achievement goals, it would be interesting for future studies to examine whether the present findings generalize to the goals students endorse in specific classes or contexts (i.e., domain-specific achievement goals). In Chapter 3, our reliance on a general representation of burnout, and not on the specific burnout factors (i.e., exhaustion, cynicism regarding school, feelings of inadequacy as a student) could possibly be considered another limitation, although research has also generally supported the current bifactor operationalization of burnout and the

preeminent role of this global component (Barcza-Renner et al., 2016; Doherty et al., 2019; Gillet et al., 2022, 2023a, 2023b, 2023c; Hawrot & Koniewski, 2018; Isoard-Gauthier et al., 2018; Mészáros et al., 2014; Sandrin et al., 2022; Szigeti et al., 2017). Still, future studies relying on a similar operationalization may also wish to consider the evolution of the specific components of burnout. This would also allow for the examination of how different burnout factors differentially relate to important outcomes, like achievement goals, over time.

A final limitation involves the overall reliance on convenience samples. Chapter 2 relied on a sample of French-Canadian students from low SES neighbourhoods and from predominantly immigrant backgrounds. Chapter 3 relied on a sample of Finnish upper secondary school students on a rigorous academic track. As such, it is unclear how generalizable our findings are. More research is needed to replicate our findings amongst samples of students from different countries, cultures, socioeconomic backgrounds, and school systems. Again, person-centered research is cumulative in nature, so the validity of the profiles highlighted in this thesis hinge critically on the work of future researchers.

Conclusion

Student motivation matters. This thesis demonstrated, from a person-centered and longitudinal perspective, that the achievement goals students endorse, whether in elementary school, secondary school, or higher education, have distinct and significant impacts on their academic and socioemotional functioning over time. Chapter 2 sheds light on the nature and stability of achievement goal profiles. It offers insight into how children interpret goal-related messages in their environment, and highlights the critical relation between achievement goals, perceived competence, anxiety, and academic achievement. Chapter 3 offers a novel perspective on how school burnout develops across the transition from upper secondary to post-secondary school. It underscores the importance of enhancing mastery goals and self-esteem as early as possible to prevent burnout and its worrisome consequences down the line. Together, we hope that the results of this thesis contribute meaningfully to the growing body of person-centered research in the domain of educational psychology. Ultimately, it is our hope that this thesis inspires more person-centered longitudinal research and intervention efforts aimed at enhancing the motivational, academic, and socioemotional wellbeing of all students.

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APPENDIX A:

Online Supplements for A Longitudinal Person-Centered Representation of Elementary Students' Motivation: Do Perceptions of Parent and Teacher Achievement Goals Matter?

Preliminary Measurement Models: Specification

These models were estimated in *Mplus* 8.4 (Muthén & Muthén, 2019) using the Weighted Least Square estimator with Mean and Variance adjusted statistics (WLSMV) to account for the mixture of binary and ordinal rating scales used to assess all constructs (Finney & DiStefano, 2013). At each time point, missing responses obtained at the item level (Time 1: 0% to 8.44%, $M = 0.45\%$; Time 2: 0% to 10.54%, $M = 0.43\%$) were handled using the procedures implemented for WLSMV estimation in *Mplus* and allowing us to retain all participants (Asparouhov & Muthén, 2010). Due to the complexity of our complete measurement models, these tests were conducted separately for each construct. For achievement goals, perceived competence, and academic achievement, we relied on correlated factors CFA models where each factor was defined only by its a priori indicators. For anxiety, we relied on a bifactor-CFA solution (e.g., Morin et al., 2020), based on empirical evidence supporting the superiority of this type of representation for various measures of anxiety (e.g., DeSousa et al., 2014; Molde et al., 2017; Osman et al., 2009, 2010). More precisely, this solution made it possible to directly estimate one global anxiety factor (G-factor) from all items included in our measure of anxiety, while accounting for the presence of subscale specificity (S-factors) left unexplained by the G-factor. Tests of measurement invariance over time were conducted for all of these measures in the following sequence, although steps 2 and 3 had to be combined for anxiety due to the binary nature of the response scale (Millsap, 2011): (1) configural invariance; (2) weak invariance (factor loadings); (3) strong invariance (response thresholds); (4) strict invariance (item uniquenesses); (5) invariance of the latent variances and covariances; and (6) invariance of the latent means. In these longitudinal models, a priori correlated uniquenesses were included to account for the parallel wording of the matching indicators used over time (Marsh et al., 2013).

The fit of these models was examined using the comparative fit index (CFI; excellent fit $\geq .95$; acceptable fit $\geq .90$), the Tucker-Lewis index (TLI: excellent fit $\geq .95$; acceptable fit $\geq .90$), and the root mean square error of approximation (RMSEA; excellent fit $\leq .06$; acceptable fit $\leq .08$) with its 90% confidence interval (e.g., Hu & Bentler, 1999; Marsh et al., 2005; Yu, 2002). For tests of measurement invariance, model comparisons relied on an

examination of changes (Δ) in these fit indices, where decreases in CFI/TLI $\leq .01$ and increases in RMSEA $\leq .015$ between one model and the next were taken to support measurement invariance (Chen, 2007; Cheung & Rensvold, 2002). We also report McDonald's (1970) omega (ω) as an estimate of the composite reliability of each factor.

Preliminary Measurement Models: Results

The model fit results associated with the various measurement models estimated for this study are reported in Table S1 of these online supplements. For all constructs, the model of configural invariance was able to achieve a satisfactory level of fit to the data, and no test of measurement invariance resulted in a decrease in model fit superior to the recommended guidelines, supporting the complete equivalence of these measurement models over time. The parameter estimates from these models are reported in Tables S2 (achievement goals), S3 (perceived competence and achievement), and S4 (anxiety). These results further support the adequacy of our measurement models, revealing that all of our main constructs appear to be well-defined by satisfactory factor loadings and estimates of reliability: (a) teachers' mastery goals ($\lambda = .635$ to $.815$; $\omega = .747$); (b) teachers' performance goals ($\lambda = .722$ to $.797$; $\omega = .796$); (c) students' mastery goals ($\lambda = .754$ to $.881$; $\omega = .920$); (d) students' performance goals ($\lambda = .847$ to $.924$; $\omega = .957$); (e) parents' mastery goals ($\lambda = .667$ to $.804$; $\omega = .867$); (f) parents' performance goals ($\lambda = .485$ to $.922$; $\omega = .814$); (g) perceived competence in math ($\lambda = .757$ to $.888$; $\omega = .865$); (h) perceived competence in French ($\lambda = .658$ to $.855$; $\omega = .832$); (i) academic achievement ($\lambda = .803$ to $.914$; $\omega = .924$); (j) global anxiety ($\lambda = .438$ to $.789$; $\omega = .956$).

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Table S1

Goodness-of-Fit Information for the Preliminary Measurement Models

Model	χ^2	df	CFI	TLI	RMSEA	RMSEA 90% CI	$\Delta\chi^2$ (df)
<i>Achievement Goals (6 Correlated Factors)</i>							
Configural	3263.720*	1284	.933	.926	.051	.049, .054	
Weak	3275.135*	1305	.934	.927	.051	.049, .053	22.964 (21)
Strong	3358.634*	1380	.933	.931	.050	.047, .052	107.988 (75)*
Strict	3395.569*	1407	.933	.932	.049	.047, .051	101.487 (27)*
Latent V & CV	3149.934*	1428	.942	.942	.045	.043, .048	35.931 (21)
Latent means	3357.862*	1434	.935	.935	.048	.046, .050	115.106 (6)*
<i>Anxiety (Bifactor: 1 Global Factor and 3 Specific Factors)</i>							
Configural	1773.635*	1384	.974	.971	.022	.019, .025	
Weak/Strong	1834.298*	1432	.973	.971	.022	.019, .025	87.458 (48)*
Strict	1857.309*	1460	.973	.972	.022	.018, .025	38.946 (28)
Latent V & CV	1884.383*	1464	.971	.970	.022	.019, .025	9.888 (4)
Latent means	1899.835*	1468	.971	.969	.022	.019, .025	14.506 (4)*
<i>Academic Achievement (1 Factor)</i>							
Configural	13.179	5	.999	.998	.053	.018, .088	
Weak	14.028	7	.999	.999	.041	.000, .073	0.407 (2)
Strong	17.713	15	1.000	1.000	.018	.000, .044	3.444 (8)
Strict	33.863	18	.999	.999	.039	.017, .058	13.872 (3)*
Latent V & CV	56.635*	19	.997	.998	.058	.041, .076	9.812 (1)*
Latent means	49.776*	20	.998	.998	.050	.033, .068	0.697 (1)
<i>Perceived Competence (2 Correlated Factors)</i>							
Configural	115.325*	40	.988	.980	.057	.045, .069	
Weak	123.643*	44	.987	.981	.056	.044, .067	10.012 (4)
Strong	136.292*	60	.988	.986	.047	.036, .057	16.272 (16)
Strict	171.700*	66	.983	.983	.052	.043, .062	41.517 (6)*
Latent V & CV	176.479*	68	.982	.983	.052	.043, .062	8.083 (2)
Latent means	167.669*	70	.984	.985	.049	.039, .058	2.250 (2)

Note. * $p < .01$; df: degrees of freedom; χ^2 : chi-square; CFI: comparative fit index; TLI: Tucker-Lewis index; RMSEA: root mean square approximation; C.I.: 90% confidence intervals for the RMSEA, $\Delta\chi^2$: Chi-square difference test; Latent V & VC: latent variances and covariances.

Table S2

Longitudinally Invariant Standardized Parameter Estimates for the 6-Factor Achievement Goals Measurement Model

	Teacher Mastery		Teacher Performance		Student Mastery		Student Performance		Parent Mastery		Parent Performance	
	λ	δ	λ	δ	λ	δ	λ	δ	λ	δ	λ	δ
Item 1	.635	.597	.797	.365	.864	.254	.847	.282	.668	.554	.869	.246
Item 2	.815	.336	.722	.479	.823	.322	.921	.151	.734	.462	.485	.765
Item 3	.656	.570	.737	.457	.754	.431	.923	.148	.679	.539	.922	.149
Item 4	--	--	--	--	.881	.224	.898	.193	.770	.407	.666	.556
Item 5	--	--	--	--	.849	.280	.924	.145	.804	.353	.766	.414
Item 6	--	--	--	--	--	--	--	--	.667	.556	--	--

Note. λ : factor loading; δ : item uniqueness; All coefficients are statistically significant ($p \leq .01$).

Table S3

Longitudinally Invariant Standardized Parameter Estimates for the 2-Factor Perceived Competence and 1-Factor Academic Achievement Measurement Models

	Perceived Competence Math		Perceived Competence French		Academic Achievement	
	λ	δ	λ	δ	λ	δ
Item 1	.888	.212	.855	.269	.803	.355
Item 2	.757	.427	.658	.567	.965	.070
Item 3	.827	.316	.846	.284	.914	.164

Note. λ : factor loading; δ : item uniqueness; All coefficients are statistically significant ($p \leq .01$).

Table S4

Longitudinally Invariant Standardized Parameter Estimates for the Anxiety Bifactor Measurement Model

	Anxiety G- λ	Worry & Hypersensitivity S- λ	Physiological Symptoms S- λ	Social Concerns/Concentration S- λ	δ
Worry & Hypersensitivity					
Item 1	.604**	.030			.634
Item 2	.588**	.030			.653
Item 3	.752**	.040			.433
Item 4	.639**	.031			.591
Item 5	.630**	.029			.602
Item 6	.776**	.036			.397
Item 7	.733**	.030			.462
Item 8	.789**	.040			.375
Item 9	.680**	.029			.537
Item 10	.702**	.028			.507
Item 11	.767**	.031			.411
Item 12	.787**	.040			.379
Physiological Symptoms					
Item 13	.620**		.338**		.501
Item 14	.628**		.263**		.537
Item 15	.488**		.318**		.661
Item 16	.478**		.203**		.730
Item 17	.594**		.246**		.586
Item 18	.589**		.299**		.564
Item 19	.567**		.254**		.614
Item 20	.438**		.196**		.770
Concentration					
Item 21	.575**			.319**	.567
Item 22	.509**			.212**	.696
Item 23	.678**			.331**	.430
Item 24	.702**			.319**	.405
Item 25	.642**			.313**	.490
Item 26	.754**			.368**	.297
Item 27	.580**			.304**	.572
Item 28	.649**			.276**	.502

Note. * $p < .05$; ** $p < .01$; λ : factor loading; δ : item uniqueness; G-: global factor from a bifactor measurement model; S-: specific factor from a bifactor measurement model.

Table S5
Correlations and Reliability Coefficients

Variables	α	ω	1	2	3	4	5	6	7	8	9	10	11	12
1 Teacher Perf. Goals T1	.720	.796												
2 Teacher Mast. Goals T1	.606	.747	.248**											
3 Student Mast. Goals T1	.825	.920	.349**	.729**										
4 Student Perf. Goals T1	.922	.957	.446**	.063	.333**									
5 Parent Mast. Goals T1	.678	.867	.395**	.556**	.533**	.395**								
6 Parent Perf. Goals T1	.814	.866	.423**	.093*	.307**	.846**	.503**							
7 Teacher Perf. Goals T2	.734	.796	.348**	-.117**	.065	.347**	.239**	.435**						
8 Teacher Mast. Goals T2	.606	.747	.243**	.584**	.543**	-.010	.320**	-.015	.088*					
9 Student Mast. Goals T2	.861	.920	.191**	.421**	.679**	.220**	.473**	.228**	.198**	.692**				
10 Student Perf. Goals T2	.937	.957	.238**	.007	.111**	.687**	.369**	.707**	.450**	-.076	.244**			
11 Parent Mast. Goals T2	.690	.867	.233**	.393**	.349**	.270**	.566**	.379**	.331**	.545**	.542**	.371**		
12 Parent Perf. Goals T2	.825	.866	.192**	-.060	.063	.623**	.354**	.805**	.442**	-.014	.250**	.826**	.490**	
13 Perceived Competence Math T1	.759	.865	.028	.229**	.180**	.042	.216**	.025	.034	.215**	.209**	.065	.235**	.061
14 Perceived Competence French T1	.750	.832	.035	.295**	.261**	.051	.201**	.005	.027	.274**	.213**	.009	.174**	-.036
15 Perceived Competence Math T2	.837	.865	.034	.252**	.199**	.039	.240**	.040	.064	.289**	.286**	.069	.276**	.075
16 Perceived Competence French T2	.784	.832	.043	.252**	.202**	.054	.207**	-.001	.066	.303**	.257**	.053	.238**	.011
17 Global Anxiety T1	.901	.956	.094*	-.172**	-.091*	.084*	-.046	.153**	.136**	-.119**	-.075	.096*	-.070	.149**
18 Worry & Hypersensitivity T1	.838	.025	.029	.050	.099*	.066	.023	.100*	.046	.010	.026	.029	-.005	.049
19 Physiological Symptoms T1	.695	.475	.080	.023	.008	.021	.002	.001	.038	-.015	-.038	-.002	-.029	-.006
20 Social Conc. & Concentration Diff. T1	.754	.601	.008	-.154**	-.096*	-.052	-.103*	.005	-.016	-.093*	-.089*	-.021	-.051	.025
21 Global Anxiety T2	.910	.956	.051	-.155**	-.107*	.096*	-.034	.124**	.134**	-.112*	-.060	.107*	-.045	.158**
22 Worry & Hypersensitivity T2	.855	.025	.047	.049	.104*	.095*	.029	.105*	.073	.084	.108*	.084	.008	.095*
23 Physiological Symptoms T2	.695	.475	.086	.079	.007	.116*	.103*	.090	.057	-.038	-.038	.070	.043	.062
24 Social Conc. & Concentration Diff. T2	.787	.601	.000	-.158**	-.085	-.034	-.067	.015	.010	-.109*	-.081	-.039	-.057	.015
25 Academic Achievement T1	.905	.924	-.083*	.213**	.047	-.143**	.057	-.170**	-.099*	.190**	.070	-.069	.104*	-.103*
26 Academic Achievement T2	.890	.924	-.102*	.193**	.052	-.129**	.059	-.142**	-.054	.199**	.077	-.077	.132**	-.073

Note. * $p < .05$; ** $p < .01$; All variables are time invariant factor scores with a mean of 0 and a SD of 1; T1 = first timepoint; T2 = second timepoint; perf. = performance; mast. = mastery; α : alpha coefficient of scale score reliability; ω : omega coefficient of model-based composite reliability (identical across time wave due to the complete invariance of the measurement models)

Table S5 – Continued

Variables	13	14	15	16	17	18	19	20	21	22	23	24	25
13 Perceived Competence Math T1													
14 Perceived Competence French T1	.369**												
15 Perceived Competence Math T2	.840**	.374**											
16 Perceived Competence French T2	.351**	.804**	.460**										
17 Global Anxiety T1	-.235**	-.249**	-.230**	-.178**									
18 Worry & Hypersensitivity T1	.007	-.052	.000	-.004	.189**								
19 Physiological Symptoms T1	-.023	-.001	-.047	.006	.140**	-.236**							
20 Social Conc. & Concentration Diff. T1	-.278**	-.214**	-.220**	-.217**	.150**	-.262**	-.252**						
21 Global Anxiety T2	-.224**	-.171**	-.261**	-.183**	.649**	.050	-.021	.016					
22 Worry & Hypersensitivity T2	.019	.007	.026	.045	.251**	.297**	-.091	-.117*	.280**				
23 Physiological Symptoms T2	-.062	-.011	-.081	-.017	.095*	-.059	.266**	-.168**	.145**	-.199**			
24 Social Conc. & Concentration Diff. T2	-.242**	-.230**	-.287**	-.286**	.176**	-.102*	-.105*	.385**	.189**	-.295**	-.195**		
25 Academic Achievement T1	.448**	.422**	.463**	.442**	-.123**	.038	-.050	-.253**	.005	.111*	-.031	-.247**	
26 Academic Achievement T2	.420**	.412**	.482**	.459**	-.104*	.079	-.076	-.235**	-.012	.119*	-.053	-.250**	.887**

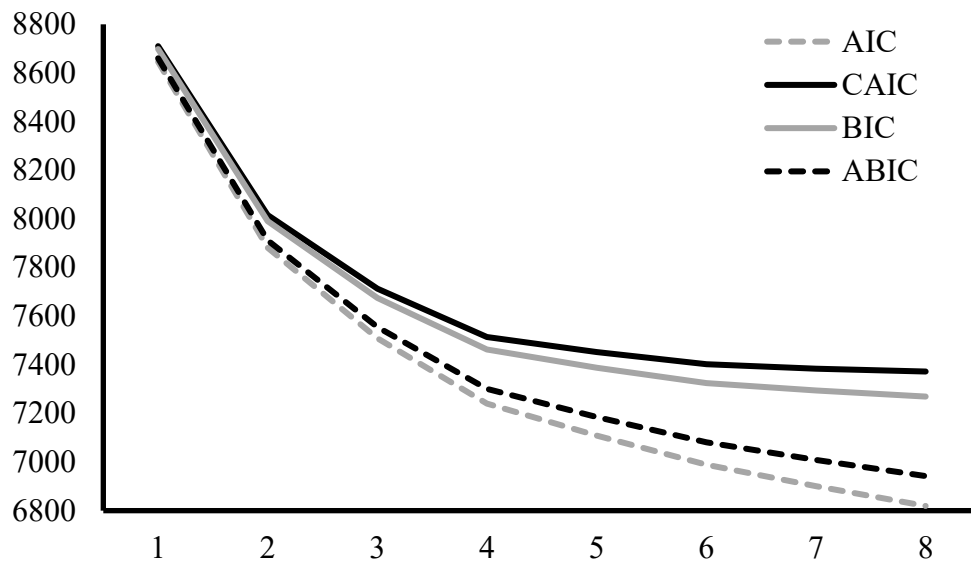


Figure S1. Elbow plot of the information criteria for the Time 1 latent profile analyses.

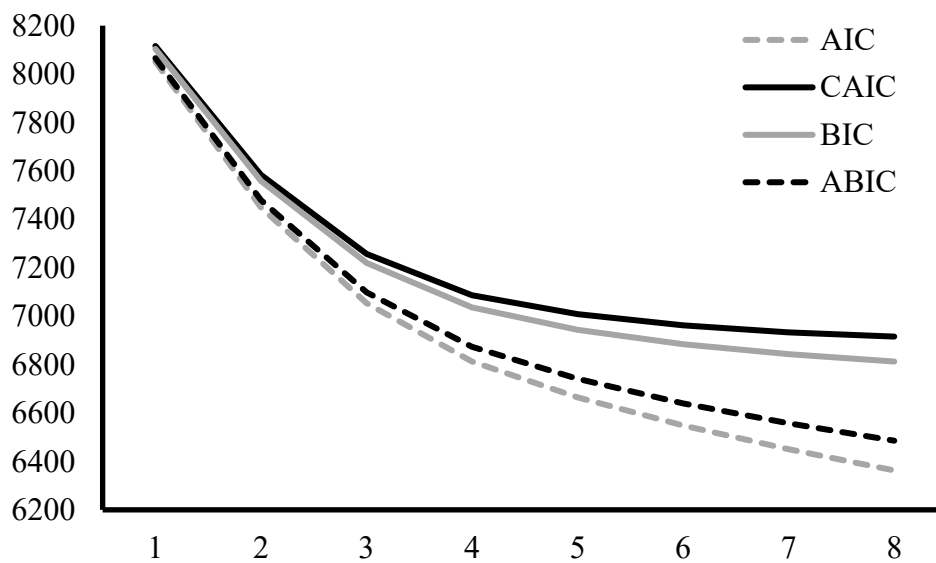


Figure S2. Elbow Plot of the Information Criteria for the Time 2 Latent Profile Analyses.

Table S6*Parameter Estimates from the Final Four-Profile Solution (Distributional Similarity).*

	Profile 1		Profile 2		Profile 3		Profile 4	
	Mean	CI	Mean	CI	Mean	CI	Mean	CI
Teacher Mast.	-.531	[-.762, -.300]	.702	[.557, .848]	-.145	[-.322, .032]	.019	[-.095, .134]
Teacher Perf.	-.365	[-.626, -.105]	.433	[.271, .595]	.597	[.503, .691]	-.522	[-.614, -.430]
Student Mast.	-.655	[-.902, -.409]	.630	[.498, .762]	.469	[.396, .542]	-.501	[-.646, -.356]
Student Perf.	-.943	[-1.290, -.596]	1.108	[.928, 1.288]	-.456	[-.735, -.178]	.160	[-.039, .358]
Parent Mast.	-.713	[-.899, -.528]	.783	[.619, .947]	.224	[.101, .347]	-.227	[-.355, -.099]
Parent Perf.	-1.011	[-1.376, -.646]	1.058	[.883, 1.233]	-.385	[-.674, -.096]	.150	[-.055, .355]
	Var.	CI	Var.	CI	Var.	CI	Var.	CI
Teacher Mast.	.571	[.437, .705]	.579	[.452, .706]	.528	[.411, .645]	.385	[.321, .450]
Teacher Perf.	.505	[.305, .704]	.280	[.153, .407]	.107	[.073, .140]	.309	[.259, .359]
Student Mast.	.544	[.358, .729]	.194	[.106, .281]	.044	[.029, .059]	.345	[.281, .410]
Student Perf.	.244	[.165, .322]	.205	[.109, .300]	.438	[.331, .546]	.264	[.200, .327]
Parent Mast.	.513	[.355, .670]	.530	[.388, .672]	.246	[.180, .312]	.306	[.240, .372]
Parent Perf.	.258	[.189, .326]	.237	[.159, .316]	.493	[.367, .618]	.252	[.189, .314]

Note. CI: 95% Confidence Interval; Profile indicators are factor scores with mean of 0 and a standard deviation of 1; Profile 1: Low on all Goals, Profile 2: High on all Goals, Profile 3: Mastery-Oriented, Profile 4: Low Mastery Goals; Var. : Variance; Mast.: Mastery goals; Perf.: Performance goals

APPENDIX B:

Online Supplements for Developmental Heterogeneity of School Burnout Across the Transition from Upper Secondary School to Higher Education: A Nine-Year Follow-Up Study

Preliminary Measurement Models

Specification

To verify the psychometric properties (factor structure, composite reliability, and longitudinal measurement invariance) of all multi-item measures, preliminary measurement models were estimated using *Mplus* 8.4 (Muthén & Muthén, 2019). These models relied on the Maximum Likelihood Robust (MLR) estimator, which provides parameter estimates, standard errors, and goodness-of-fit indices that are robust to non-normality. To handle missing data, Full Information Maximum Likelihood (FIML; Enders, 2010) procedures were utilized. Due to the complexity of our complete measurement models, these tests were conducted separately for each construct.

For burnout (measured at all timepoints), we relied on a bifactor exploratory structural equation model (bifactor-ESEM; Morin et al., 2016, 2020). This decision was predicated on evidence supporting the value of a bifactor representation of burnout measurement (e.g., Barcza-Renner et al., 2016; Doherty et al., 2019; Gillet et al., 2022, 2023a, 2023b, 2023c; Hawrot & Koniewski, 2018; Isoard-Gauthier et al., 2018; Mészáros et al., 2014; Sandrin et al., 2022; Szigeti et al., 2017), the value of ESEM specifications to achieve a more accurate representation of psychological constructs and of their associations with other constructs (Asparouhov et al., 2015; Mai et al., 2018; Morin et al., 2016, 2020), and of a bifactor-ESEM representation for the specific measure of burnout used in this study (Tóth-Király et al., 2021). In this representation, all burnout items were allowed to jointly estimate a global factor (G-factor) reflecting participants' global levels of burnout across all of the items included in this instrument, as well as one of three specific-factors (S-factors) reflecting the specificity remaining at the subscale level once the global factor was taken into account. In the present study, our main interest was in obtaining a reliable global indicator of burnout, estimated while accounting for subscale specificity (Gillet et al., 2022; Tóth-Király et al., 2021). This model was specified while relying on a confirmatory target rotation

procedure, allowing all cross-loadings among the S-factors to be freely estimated, but “targeted” to be as close to zero as possible (Morin et al., 2020).

Participants ratings on the predictors (achievement goals and self-esteem), at T1 and T3 were represented by correlated factors CFA models, where each factor was defined only by its *a priori* indicators. To account for the methodological artifact resulting from negative wording of two self-esteem items, one *a priori* correlated uniqueness was included to the self-esteem model (Marsh et al., 2010). To account for the fact that one of the achievement goals factor (i.e. performance avoidance) is only defined by two items, essentially tau-equivalent constraints (i.e., equal factor loadings for these two items) were included to the model after having established the weak invariance of this measure to achieve the local identification of this factor (Little et al., 1999). Lastly, to avoid converging on inflated estimates of stability over time, *a priori* correlated uniquenesses were included among the matching indicators of our constructs over time (Marsh, 2007).

For all constructs, longitudinal tests of measurement invariance were conducted in the following sequence (Millsap, 2011): (1) configural invariance; (2) weak invariance (loadings); (3) strong invariance (loadings and intercepts); (4) strict invariance (loadings, intercepts, and uniquenesses); (5) invariance of the latent variances and covariances (loadings, intercepts, uniqueness, and latent variances and covariances); and (6) invariance of the latent means (loadings, intercepts, uniqueness, and latent variances and covariances, and latent means). For the self-esteem models, one step was included between 4 and 5 to test the invariance of our *a priori* correlated uniqueness (negatively worded items).

Considering the known oversensitivity of the chi-square test (χ^2) of exact fit to sample size, minor misspecifications, and omitted variables (e.g., Hu and Bentler, 1999; Marsh et al., 2005), we relied on sample-size independent goodness-of-fit indices to assess model fit. More precisely, values $\geq .90$ the comparative fit index (CFI) and the Tucker-Lewis index (TLI) supported acceptable fit whereas values $\geq .95$ indicated excellent fit. Moreover, values $\leq .08$ and $.06$ on the root mean square error of approximation (RMSEA) were respectively taken to indicate acceptable and excellent fit (e.g., Hu and Bentler, 1999; Marsh et al., 2005). In tests of measurement invariance, a decrease in CFI or TLI $\geq .010$, and an increase in RMEA $\geq .015$ for one model relative to the previous one in the sequence indicate a lack of invariance (Chen, 2007; Cheung & Rensvold, 2002). Failed tests of invariance were followed by attempts to identify a suitable model of partial

invariance (Byrne et al., 1989). The most invariant of all measurement models were used to extract factor scores (estimated in standardized units with a $M = 0$ at T1 for burnout, with a grand mean of 0 for the predictors, and with a SD of 1 over time for all variables).

Results

The goodness-of-fit results from all measurement models are reported in Table S1. All three configural models resulted in an acceptable level of fit to the data. The results supported the weak, strict, and latent variance invariance of the burnout measure, but not its strong or latent means invariance. However, an examination of the parameter estimates from model of weak invariance, and of the modification indices from the model of strong invariance suggested that the lack of strong invariance seemed limited to the intercept of one cynicism item which was slightly lower at T2 than at the other time points. Relaxing the constraint on this single intercept resulted in a model of partial strong invariance which was supported by the data. Moreover, examination of the parameters estimates from the model of latent variance-covariance invariance, from which the factor scores were extracted for our main analyses, revealed that the lack of latent mean invariance was consistent with a slight decrease in participants global levels of burnout over time. The parameter estimates from this model are reported in Table S2 and reveal a well-defined ($\lambda = .310$ to $.885$; $M_\lambda = .614$) and reliable ($\omega = .910$) global burnout factor.

The results also supported the weak invariance, essential tau equivalence, strict and latent variance-covariance invariance of the achievement goals measure, but not its strong and latent means invariance. However, this lack of invariance was limited to the intercept of one performance avoidance item which was slightly lower at T3 which, once relaxed, resulted in a satisfactory model of partial strong invariance. Moreover, the lack of latent mean invariance was limited to the mean of the mastery intrinsic factor, which was $.408$ *SD* higher at T3 than at T1. Once this mean was relaxed, the resulting model of partial latent means invariance, from which the factor scores were saved for the main analyses, was supported by the data. The parameter estimates form this model are reported in Table S3, and reveal well-defined and reliable performance approach ($\lambda = .670$ to $.676$; $M_\lambda = .707$; $\omega = .750$), performance avoidance ($\lambda = .730$ to $.811$; $M_\lambda = .771$; $\omega = .746$), mastery intrinsic ($\lambda = .782$ to $.906$; $M_\lambda = .845$; $\omega = .883$), and mastery extrinsic ($\lambda = .808$ to $.861$; $M_\lambda = .835$; $\omega = .873$) factors.

Lastly, the results supported the weak, strong, correlated uniquenesses, and latent variance invariance of the self-esteem model, but not its strict and latent means invariance. Examination of

the parameter estimates revealed that the lack of strict invariance was limited to one item uniqueness, which was slightly lower at T3 than at T1 (see Table 3). Relaxing the constraint on this uniquenesses resulted in a satisfactory model of partial strict invariance. The lack of means invariance is related to the fact the participants' average levels of self-esteem were .225 *SD* higher at Time 3 than at T1. The parameter estimates from this model are reported in Table S3, and reveal well-defined and reliable factor ($|\lambda| = .424$ to $.919$; $M_{|\lambda|} = .681$; $\omega_{T1} = .821$; $\omega_{T3} = .831$). Correlations are reported in Table S4.

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Table S1*Goodness-of-Fit Results from Models Estimated in the Present Study*

Models	χ^2	df	CFI	TLI	RMSEA	RMSEA 90% CI	$\Delta\chi^2$ (Δ df)	Δ CFI	Δ TLI	Δ RMSEA
<i>Burnout (Bifactor Exploratory Structural Equation Modeling)</i>										
Configural	835.723*	590	.968	.947	.028	.024; .033	---	---	---	---
Weak	937.713*	670	.965	.949	.028	.024; .032	106.947 (80)	-.003	+.002	.000
Strong	1042.089*	690	.954	.934	.032	.028; .035	75.955 (20)*	-.011	-.015	+.004
Partial Strong	995.431*	689	.960	.943	.029	.025; .033	45.355 (19)*	-.005	-.006	+.001
Strict	1075.920*	725	.954	.938	.031	.027; .035	73.688 (36)*	-.006	-.005	+.002
Latent Variance-Covariance	1143.314*	765	.951	.937	.031	.027; .035	66.491 (40)*	-.003	-.001	.000
Latent Means	1231.821*	781	.942	.926	.034	.030; .037	91.704 (16)*	-.009	-.011	+.003
<i>Achievement Goals (4 Correlated Factors Confirmatory Factor Analytic Model)</i>										
Configural	353.345*	171	.940	.918	.048	.041; .055	---	---	---	---
Weak	353.816*	178	.942	.924	.046	.039; .053	3.681 (7)	+.002	+.006	-.002
ETEC	366.465*	179	.938	.920	.047	.040; .054	13.741 (8)	-.004	-.004	+.001
Strong	417.219*	186	.923	.905	.052	.045; .058	55.045 (7)*	-.015	-.015	+.005
Partial Strong	394.376*	185	.931	.913	.049	.043; .056	30.019 (6)*	-.007	-.007	+.002
Strict	421.777*	196	.925	.912	.050	.043; .056	26.402 (11)*	-.006	-.001	+.001
Latent Variance-Covariance	428.999*	206	.926	.917	.048	.042; .055	8.032 (10)	+.001	+.005	-.002
Latent Means	469.337*	210	.914	.905	.051	.045; .058	38.586 (4)*	-.012	-.012	+.003
Partial Latent Means	437.710*	209	.924	.916	.048	.042; .055	8.744 (3)	-.002	-.001	.000
<i>Self-Esteem (1 Factor Confirmatory Factor Analytic Model)</i>										
Configural	60.695*	27	.979	.965	.051	.034; .068	---	---	---	---
Weak	76.118*	31	.972	.959	.055	.040; .071	14.756 (4)*	-.007	-.006	+.004
Strong	88.703*	35	.966	.957	.057	.042; .072	12.762 (4)	-.006	-.002	+.002
Strict	135.321*	40	.940	.933	.071	.058; .084	47.108 (5)*	-.026	-.024	+.014
Partial Strict	102.340*	39	.960	.954	.058	.045; .072	13.650 (4)*	-.006	-.003	+.001
Correlated Uniquenesses	103.140*	40	.961	.956	.058	.044; .071	1.148 (1)	+.001	+.002	.000
Latent Variance	101.210*	41	.962	.957	.057	.043; .071	.197 (1)	+.001	+.001	-.001
Latent Means	118.829*	42	.952	.949	.062	.049; .075	16.046 (1)*	-.010	-.008	+.005

Note. * $p < .01$; df: degrees of freedom; χ^2 : chi-square; CFI: comparative fit index; TLI: Tucker-Lewis index; RMSEA: root mean square approximation; C.I.: 90% confidence interval for the RMSEA; ETEC: essential tau equivalence; Δ : change in fit from the previous model (including scaled chi square difference tests; Satorra, 2000).

Table S2

Standardized Parameter Estimates for the Bifactor ESEM Burnout Measurement Model (Latent Variance-Covariance Invariance)

	Burnout G- λ	Exhaustion S- λ	Cynicism S- λ	Inefficacy S- λ	δ
<i>Exhaustion</i>					
Item 1	.319	.529	-.100	<i>.036</i>	.608
Item 2	.406	.544	-.042	<i>.005</i>	.537
Item 3	.310	.615	.078	.140	.499
<i>Cynicism</i>					
Item 4	.788	-.070	-.117	-.033	.359
Item 5	.885	-.124	-.159	<i>-.015</i>	.176
Item 6	.811	-.080	.574	-.034	.006
<i>Inefficacy</i>					
Item 7	.548	.390	<i>-.008</i>	.153	.524
Item 8	.818	-.053	.052	.075	.320
Item 9	.638	.071	-.015	.763	.005
ω	.910	.634	.572	.536	

Note. λ : factor loading; δ : item uniqueness; ω : omega coefficient of model-based composite reliability (McDonald, 1970); target factor loadings are in bold; G-: global factor from a bifactor measurement model; S-: specific factor from a bifactor measurement model; All coefficients are statistically significant ($p \leq .05$), unless marked in italics.

Table S3

Standardized Parameter Estimates for the 4-Factor Achievement Goals (Partial Latent Means Invariance) and 1-Factor Self-Esteem (Latent Variance-Covariance Invariance) Measurement Models

	Performance Approach		Performance Avoidance		Mastery Intrinsic		Mastery Extrinsic		Self-Esteem	
	λ	δ	λ	δ	λ	δ	λ	δ	λ	δ
Item 1	.774	.402	.730	.467	.782	.389	.836	.302	.725	.475
Item 2	.670	.551	.811	.342	.846	.284	.808	.347	-.541	.708
Item 3	.676	.543			.906	.179	.861	.258	.919	.156
Item 4									-.424	.820
Item 5									.796	T1: .367 T3: .201
ω	.750		.746		.883		.873		T1: .821 T3: .831	

Note. λ : factor loading; δ : item uniqueness; ω : omega coefficient of model-based composite reliability (McDonald, 1970); T1: time 1; T3: time 3; All coefficients are statistically significant ($p \leq .05$).

Table S4
Correlations and Reliability Coefficients

	α	ω	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Sex	NA	NA															
2. Program type	NA	NA	-.013														
3. Age	NA	NA	-.024	-.122**													
4. Achievement T1	NA	NA	.139**	.294**	-.121*												
5. Achievement T2	NA	NA	.109*	.286**	-.187**	.734**											
6. Achievement 3	NA	NA	.110*	.390**	-.159**	.753**	.897**										
7. Alc. use T1	NA	NA	.028	.027	-.132**	.104*	.170**	.129*									
8. Alc. use T2	NA	NA	.052	.033	-.088	.086	.153**	.175**	.613**								
9. Alc. use T3	NA	NA	.099	-.025	-.041	-.025	.006	.084	.489**	.629**							
10. Alc. use T5	NA	NA	.278**	-.031	.024	-.009	-.007	-.050	.278**	.326**	.440**						
11. Alc. Reduct.	NA	NA	.135*	.020	-.068	.125*	.152**	.127*	.347**	.355**	.468**	.337**					
12. Alc. Critic.	NA	NA	.019	-.021	-.012	.073	.155**	.094	.349**	.309**	.321**	.204**	.598**				
13. Alc. Guilt	NA	NA	.090	-.004	-.013	.027	.163**	.081	.328**	.323**	.333**	.218**	.618**	.607**			
14. Drug use T1	NA	NA	.031	-.036	.146**	-.058	-.108*	-.111	-.327**	-.245**	-.188**	-.114*	-.297**	-.171**	-.149**		
15. Drug use T3	NA	NA	-.066	-.032	.096	-.055	-.103	-.089	-.403**	-.318**	-.293**	-.255**	-.303**	-.252**	-.239**	.724**	
16. Drug use T4	NA	NA	-.070	.058	.132*	.054	-.061	-.042	-.443**	-.326**	-.297**	-.235**	-.358**	-.304**	-.260**	.527**	.791**
17. Drug mildT5	NA	NA	-.117*	-.038	.025	-.070	-.149**	-.119*	-.377**	-.295**	-.257**	-.279**	-.295**	-.266**	-.271**	.436**	.665**
18. Drug hard T5	NA	NA	-.097*	-.054	-.025	.043	-.043	-.026	-.171**	-.172**	-.123*	-.086	-.196**	-.163**	-.207**	.270**	.402**
19. Dropout	NA	NA	-.035	-.038	.098*	.008	.013	-.076	-.005	.017	.079	.069	.001	-.060	-.026	.112*	.064
20. Burnout T1	.827	.910	.044	-.094*	.017	-.153**	-.247**	-.204**	-.154**	-.095*	.033	.073	-.194**	-.205**	-.148**	.066	.105
21. Burnout T2	.849	.910	-.015	-.057	.067	-.184**	-.295**	-.228**	-.091	-.161**	-.050	-.005	-.150**	-.141**	-.131*	.084	.092
22. Burnout T3	.853	.910	-.030	-.007	.040	-.026	-.065	-.068	-.055	-.083	-.025	-.030	-.251**	-.239**	-.202**	.037	.062
23. Burnout T4	.870	.910	.036	-.037	.024	-.032	-.081	-.108*	-.036	-.003	.075	.009	-.135*	-.207**	-.113*	.024	.007
24. Burnout T5	.875	.910	-.004	.072	.009	-.037	-.043	-.005	-.035	-.080	-.046	-.056	-.190**	-.161**	-.089	.146**	.074
25. Perf. Ap. T1	.742	.750	-.065	.086	-.101*	.197**	.248**	.209**	.034	.040	-.004	-.022	-.047	-.058	-.076	-.086	-.040
26. Perf. Av. T1	.739	.746	-.011	.003	-.091*	.105*	.105*	.056	.022	.019	.010	-.004	-.055	-.066	-.057	-.106*	-.015
27. Mast. In. T1	.873	.883	.109*	.085	-.016	.269**	.338**	.362**	.121*	.102*	.104	-.003	.023	.099	.087	-.036	-.086
28. Mast. Ex T1	.863	.873	.117*	.112*	-.033	.302**	.433**	.370**	.083	.029	.026	-.027	.060	.067	.062	-.086	-.081
29. Perf. Ap T3	.756	.750	-.069	.021	-.043	.151**	.187**	.170**	-.002	.026	.084	-.016	.028	.010	-.058	-.045	-.064
30. Perf. Av. T3	.746	.746	-.032	-.073	-.037	.066	.072	.032	-.005	.027	.077	.008	-.001	-.001	-.040	-.066	-.024
31. Mast. In. T3	.902	.883	.082	.061	.007	.190**	.215**	.266**	.095*	.087	.127*	.003	.074	.109	.109*	-.045	-.100
32. Mast. Ex. T3	.894	.873	.087	.020	.041	.193**	.246**	.255**	.040	.037	.148**	-.009	.124*	.122*	.079	-.058	-.127*
33. Self-est. T1	.780	.821	-.094*	.055	.021	.031	.134**	.083	.019	-.018	-.066	-.039	.144**	.192**	.183**	-.001	-.122*
34. Self-est. T3	.842	.831	-.085	.059	.023	.048	.085	.046	-.016	-.027	-.066	-.010	.112*	.133*	.155**	.002	-.102

Note. * $p < .05$; ** $p < .01$; T1 = Time 1, etc.; Sex: 0 = male; 1 = female; Program type: 0 = voc/tech; 1 = university; Alc. Reduct.: attempts to reduce consumption (T4); Alc. Critic.: criticism from others (T4); Alc. Guilt: guilt regarding consumption (T4); Perf. Ap.: performance approach; Perf. Av.: performance avoidance; Mast. In.: mastery intrinsic; Mast. Ex.: mastery extrinsic; Self-est: self esteem; α : alpha coefficient of scale score reliability; ω : omega coefficient of model-based composite reliability (McDonald, 1970).

Table S4 (Continued)

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
15. Drug use T3																		
16. Drug use T4																		
17. Drug mild T5	.731**																	
18. Drug hard T5	.373**	.371**																
19. Dropout	.143**	.069	.112*															
20. Burnout T1	.158**	.128**	.180**	.080														
21. Burnout T2	.120*	.146**	.122*	.051	.641**													
22. Burnout T3	.119*	.137**	.147**	.144**	.493**	.532**												
23. Burnout T4	.036	.048	.019	.043	.352**	.382**	.393**											
24. Burnout T5	.096	.132**	.084	-.029	.154**	.348**	.347**	.412**										
25. Perf. Ap. T1	-.041	-.061	-.085	.059	-.013	-.006	-.005	.051	.000									
26. Perf. Av. T1	-.041	-.082	-.101*	.062	.200**	.158**	.086	.115*	.003	.700**								
27. Mast. In. T1	.000	-.074	-.053	-.029	-.318**	-.204**	-.213**	-.040	-.011	.145**	-.022							
28. Mast. Ex T1	-.070	-.159**	-.142**	.071	-.298**	-.226**	-.224**	-.033	-.064	.604**	.362**	.570**						
29. Perf. Ap T3	-.060	-.038	-.090	-.004	.003	-.025	-.039	.081	.018	.775**	.480**	.096*	.446**					
30. Perf. Av. T3	-.027	-.053	-.099*	-.003	.207**	.173**	.133**	.183**	.052	.508**	.793**	.082	.234**	.627**				
31. Mast. In. T3	-.014	-.034	-.029	-.040	-.254**	-.207**	-.345**	-.102*	-.061	.063	-.081	.805**	.318**	.142**	-.008			
32. Mast. Ex. T3	-.096	-.096	-.106*	.014	-.203**	-.226**	-.372**	-.022	-.061	.238**	.103*	.479**	.570**	.568**	.289**	.587**		
33. Self-est. T1	-.097	-.049	-.060	-.105*	-.370**	-.375**	-.213**	-.262**	-.179**	.011	-.203**	.223**	.157**	.014	-.197**	.214**	.120**	
34. Self-est. T3	-.082	-.050	-.045	-.072	-.251**	-.318**	-.222**	-.268**	-.192**	.029	-.157**	.153**	.162**	.039	-.194**	.197**	.171**	.797**

Note. * $p < .05$; ** $p < .01$; T1 = Time 1, etc.; Sex: 0 = male; 1 = female; Program type: 0 = voc/tech; 1 = university; Alc. Reduct.: attempts to reduce consumption (T4); Alc. Critic.: criticism from others (T4); Alc. Guilt: guilt regarding consumption (T4); Perf. Ap.: performance approach; Perf. Av.: performance avoidance; Mast. In.: mastery intrinsic; Mast. Ex.: mastery extrinsic; SE: self esteem; α : alpha coefficient of scale score reliability; ω : omega coefficient of model-based composite reliability (McDonald, 1970).

Table S5

Classification Probabilities for the Most Likely Latent Class Membership (Row) by Latent Class (Column).

	High and Decreasing	Moderate and Decreasing	Low and Increasing	Low and Stable
High and Decreasing	.812	.145	.043	.000
Moderately High and Decreasing	.112	.754	.053	.081
Low and Increasing	.094	.063	.799	.044
Low and Stable	.002	.094	.060	.844