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Development of Academic Well-Being during Secondary Education:

Relations to Performance, Motivational Beliefs, and Aspirations

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DEVELOPMENT OF ACADEMIC WELL-BEING DURING SECONDARY EDUCATION

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Abstract

The purpose of this thesis was to investigate the developmental dynamics between academic well-being (school engagement and burnout), academic performance (mathematics and reading tests), and motivational beliefs (domain-specific self-concept and interest) and how these shape adolescent students' educational and occupational aspirations. The aim was addressed in three empirical studies. Study I ($N_{7th\ Grade}$ = 583, $N_{9th\ Grade}$ = 497) focused on the relations between academic well-being, mathematics self-concept, and performance among 7th and 9th graders. Study I applied a person-centered approach (latent profile analysis) and investigated the short-term development and stability of academic well-being and performance profiles during one school year (configural frequency analysis), and how students in different profiles differed in their educational aspirations. Study II ($N_{9th\ Grade}$ = 966) conducted a variable-centered approach to investigate overall cross-domain pathways from mathematics and reading performance, motivational beliefs, and school burnout to boys' and girls' educational and occupational aspirations (structural equation modeling). Lastly, the third study (Study III, N = 1131) utilized a mixture modeling technique (latent growth modeling and latent profile analyses) and focused on individual differences in students' long-term developmental trajectories of academic well-being from 7th grade to upper secondary education, and how different developmental profiles of academic well-being were related to students' concurrent mathematics performance and educational aspirations.

Overall, Study I and III revealed four distinct configurations of academic well-being, performance, motivational beliefs, and educational aspirations among the sample. Approximately one third of adolescent students seemed to be highly engaged and valued their studies, did not show signs of school burnout, and they also performed well in school, were confident in their abilities, and held high educational aspirations. They were also likely to continue to thrive in school over time and seemed to be able to handle possible challenges and changes in the educational context as they transitioned through lower- and upper secondary school. However, some students also belonged to a rather opposite profile of academic and emotional functioning in school. Approximately 15% in Study I and 30% in Study III of students were rather disengaged and felt exhausted and inadequate in school, performed low in mathematics, did not believe in their competence, nor did they aspire for high educational degrees. These students continued to show maladaptive patterns of academic well-being throughout the lower-secondary school years and were unlikely to change these patterns.

Furthermore, in line with previous person-centered studies, some students showed asynchronous patterns of academic well-being and

performance, and these students also seemed to experience slightly more changes in their well-being trajectories over time. In Study I, a group of students was identified, being moderately engaged in their studies but who also showed increased feelings of school burnout. These students performed rather well in school and aspired to relatively high educational degrees. In Study III, a similar but smaller group of students was identified, but whose initially positive academic well-being significantly decreased throughout the lower-secondary school years. The fourth profile identified in the present work was students who showed low/average levels of school engagement but also, no signs of school burnout, despite performing rather poorly in mathematics and expressing low mathematics self-concept. This student profile was relatively stable throughout the adolescent years.

Lastly, Study II revealed that performance, motivational beliefs, and school burnout were all related to the educational degrees and occupational choices students aspired to. Nevertheless, girls´ aspirations seemed to be steered by several different factors across academic domains, whereas math-related performance and motivation seemed to be more important for boys. The results also indicated that girls' math-related occupational aspirations may be negatively affected by their reading self-concept, whereas no negative cross-domain effects between mathematics and reading-related variables were detected among boys. For both genders, higher levels of educational aspirations were related to higher levels of school-related exhaustion, whereas feelings of cynicism and inadequacy in school were related to lower levels of aspirations, demonstrating that resources are needed to, not only support students' performance but their motivation and well-being as well, to help them to set up desirable goals for themselves.

To conclude, one of the most important implications of this work is the realization that students' show various patterns and trajectories of academic well-being during the adolescent years, and that these are related in meaningful ways to students' performance and motivational beliefs, and seem to have some impact on their aspired educational degrees and occupational choices for their future as well. Recognizing that both academic performance, motivational beliefs, and aspirations for future education and occupation are related to how students feel, view, and experience school and schoolwork is important to better be able to identify students with varying needs, and effectively consider alternative ways of confronting them.

Keywords: academic well-being, school burnout, school engagement, performance, motivation, educational aspirations, development, person-centered approach

Abstrakt

Syftet med denna avhandling var att undersöka utvecklingsdynamiken mellan akademiskt välbefinnande (skolengagemang och skolrelaterad utmattning), skolprestationer (matematik- och lästest), och motivation (ämnesspecifik självuppfattning och intresse), samt hur dessa formar elevers utbildnings- och yrkesrelaterade målsättningar. Syftet besvaras genom tre empiriska studier. Studie I ($N_{Åk\ 7}$ = 583, $N_{Åk\ 9}$ = 497) fokuserade på relationen mellan akademiskt välbefinnande, matematisk självuppfattning och skolprestationer band elever i årskurserna 7 och 9. Studien antog en person-fokuserad approach (latent profilanalys) och utredde hur stabila elevers välbefinnande- och prestationsprofiler var under ett läsår (konfigurell frekvensanalys), och hur elever inom olika profiler skiljde sig i de mål de satt upp gällande sin framtida utbildningsnivå. Studie II ($N_{Åk\ 9}$ = 966) antog en variabel-fokuserad approach för att undersöka hur skolrelaterad utmattning, skolprestationer och motivation i både matematik och läsning generellt påverkar flickors och pojkars utbildnings- och yrkesrelaterade målsättningar (strukturekvationsmodell). Slutligen, i den tredje studien (Studie III, *N* = 1131) användes både latent tillväxt- och profilanalys (s.k. *growth mixture modell*) för att undersöka individuella skillnader i hur elevernas akademiska välbefinnande utvecklades från årskurs 7 till andra stadiets utbildning, samt hur olika utvecklingsprofiler var relaterade till elevers skolprestationer och utbildningsmålsättningar.

Resultaten från Studie I och III avslöjade fyra olika konfigurationer av akademiskt välbefinnande, skolprestationer, motivation och utbildningsmålsättningar bland eleverna. Ungefär en tredjedel av ungdomarna var relativt högt engagerade, värderade studierna, visade inga tecken på skolrelaterad utmattning och de presterade bra i skolan, trodde på sina förmågor, och hade höga utbildningsmålsättningar. Det var sannolikt att elever med en sådan positiv profil fortsatte att trivas i skolan under ungdomstiden, och de tycktes klara av eventuella utmaningar och förändringar som förekom i skolkontexten i samband med övergången till andra stadiets utbildning väl. Däremot identifierades även en elevprofil som uppvisade ett ganska motsatt mönster av akademiskt- och emotionell utveckling. Ungefär 15% av eleverna i Studie I och 30% av eleverna i Studie III var relativt oengagerade och kände sig utmattade och otillräckliga i skolan, de hade relativt låga matematikprestationer, en relativt låg självuppfattning och de strävade inte efter en högre utbildning. Dessa elever fortsatte att tillhöra denna negativa profil under årskurserna 7–9, och det var osannolikt att det skedde någon förändring i detta mönster.

Vidare, i linje med tidigare person-fokuserade studier, uppvisade några elever även icke-linjära mönster i deras välbefinnande och skolprestationer, och dessa elever tycktes även uppvisa något större

förändringar i deras utveckling av akademiskt välbefinnande över tid. I Studie I identifierades en grupp elever med medelhöga nivåer av skolengagemang, men som också uppvisade något förhöjda nivåer av skolrelaterad utmattning. Trots detta presterade dessa elever väldig bra i skolan och strävade efter högre utbildningsnivå. Inom Studie III hittades en liknande, men något mindre grupp elever som inledningsvis uppvisade ett väldigt positivt akademiskt välbefinnande, men vars välbefinnande försämras signifikant under årskurserna 7–9. Den fjärde elevprofilen som kunde identifieras i studierna var elever som uppvisade låga/medelhöga nivåer av skolengagemang, låga skolprestationer, låg självuppfattning och lägre utbildningsmålsättningar, men som trots det inte var utmattade i skolan. Denna elevprofil var relativt stabil under ungdomsåren.

Slutligen visade Studie II att skolprestationer, motivation och skolrelaterad utmattning alla är relaterade till elevers utbildnings- och yrkesmålsättningar. Trots det verkade flickornas målsättningar vara styrda av många olika faktorer från både matematik- och läsrelaterade ämnen, medan pojkarnas målsättningar främst formades av deras prestationer och motivation (självuppfattning och intresse) i matematik. Resultaten visade även att flickors matematikrelaterade yrkesmålsättningar eventuellt påverkas negativt av deras självuppfattning i läsning, medan inga negativa associationer mellan skolämnen kunde identifieras bland pojkar. Vidare konstaterades att höga utbildningsmålsättningar var relaterade till högre känslor av utmattning i relation till skolan, medan känslor av otillräcklighet och cyniska inställningar till skolan påverkade elevers målsättningar för framtida utbildning och yrke negativt. Dessa resultat tyder på att det inte är ändamålsenligt att endast stödja elevers prestationer i skolan, men att också fokusera resurser till att stödja elevers välmående och motivation för att hjälpa dem att sätta upp önskvärda mål för dem själva.

Sammanfattningsvis kan man konstatera att en av de främsta implikationerna av denna avhandling är insikten i att elever uppvisar varierande mönster och utveckling av akademiskt välbefinnande under ungdomstiden, och att dessa är relaterade till deras skolprestationer och motivation på ett betydande sätt, och att de tycks ha en inverkan på de utbildnings- och yrkesrelaterade mål de strävar efter. Det är viktigt att inse att både skolprestationer, motivation och målsättningar är relaterade till hur elever upplever, känner sig och ser på skola och utbildning för att kunna identifiera elever med varierande behov, och för att effektivt kunna överväga alternativa sätt att möta dessa.

Nyckelord: välbefinnande, skolrelaterad utmattning, skolengagemang, skolprestationer, motivation, utbildningsmålsättningar, utveckling, person-centrerad approach

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List of Original Publications

Study I:

Widlund, A., Tuominen, H., & Korhonen, J. (2018). Academic well-being, mathematics performance, and educational aspirations in lower secondary education: Changes within a school year. *Frontiers in Psychology*, *9*, 297. https://doi.org/10.3389/fpsyg.2018.00297

Study II:

Widlund, A., Tuominen, H., Tapola, A., & Korhonen, J. (2020). Gendered pathways from academic performance, motivational beliefs, and school burnout to adolescents' educational and occupational aspirations. *Learning and Instruction*, *66*, 101299. https://doi.org/10.1016/j.learninstruc.2019.101299

Study III:

Widlund, A., Tuominen, H., & Korhonen, J. (2021). School engagement and burnout across lower and upper secondary education: Trajectory profiles, progressions, and educational outcomes. *Contemporary Educational Psychology, 66,* 101997. https://doi.org/10.1016/j.cedpsych.2021.101997

Author Contribution

Anna Widlund is the first and corresponding author of all three articles that are included in this doctoral thesis. Widlund is responsible for all the analyses used in this dissertation study and has written all manuscripts under the supervision of Associate Professor Johan Korhonen and Docent Heta Tuominen.

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1. Introduction

School is a central developmental context in adolescents' lives, and adolescence is often characterized by several co-occurring changes and challenges (e.g., entering puberty, changes in social and educational contexts) (Roeser & Eccles, 2011). During this time period, as the level of education increases, students face greater academic demands and their academic performance becomes more important, as grades present a prerequisite to enter further education and widen career choices. Consequently, increasing pressure to achieve and concerns and uncertainty about one's future education and occupation may likely cause study-related strain for some students, compromising their school-related well-being. In fact, although the majority Finnish adolescents generally perform well in school and manage adolescence without any severe problems (OECD, 2019), recent reports from Finland have, also, revealed some concerning trends in students´ feelings of exhaustion and inadequacy in school, that seem to be particularly prevalent among girls (Finnish Institute for Health and Welfare, 2019). Empirical studies have also identified some general declines in students' motivation and well-being during the adolescent years, particularly occurring around educational transitions (Roeser et al., 1999). However, significant individual variations have been detected in these trajectories, indicating that not all students follow the same developmental trends (Engels et al., 2017; Salmela-Aro & Upadyaya, 2014).

Nevertheless, signs of declining feelings towards school and studying, and experiences of school-related strain are something that should be taken seriously, as positive academic well-being is thought to be important for various educational outcomes and academic adjustment. For example, students who are emotionally engaged in their studies generally perform better in school (Bae et al., 2020), are highly motivated (Tuominen-Soini et al., 2012), and aspire for higher educational degrees (Wang & Eccles, 2012). Conversely, students who are exhausted by school might become at risk for lower academic achievement (Madigan & Curran, 2020), school dropout (Bask & Salmela-Aro, 2014; Korhonen et al., 2014), lower educational aspirations (Korhonen et al., 2016), and overall negative well-being (e.g., depressive symptoms: Gerber et al., 2015; Salmela-Aro et al., 2009). However, although the general trend seems to be that academic well-being, performance, motivational beliefs, and educational aspirations are positively associated, an increasing number of person-centered studies have demonstrated that students show various patterns of academic and emotional functioning, and that school-related strain may not only be found among low-performing students, but also, among high-achieving and motivated students as well (Korhonen et al., 2014; Tuominen-Soini & Salmela-Aro, 2014; Salmela-Aro & Read, 2017).

Considering these trends, and the importance of academic well-being for various outcomes, still relatively little is known about the complex developmental dynamics between academic well-being and educational outcomes during adolescence. For example, relatively few studies have used longitudinal designs to investigate the development of academic well-being (i.e., school engagement and burnout) over time. There is also a lack of research involving younger adolescents and studies investigating academic well-being during educational transitions, despite previous indications that negative changes in motivational beliefs seem to take place in the earlier years of adolescence and also around changes in the educational context (Eccles & Roeser, 2011). Further, as there seem to be significant individual variations in how academic well-being develops and how it is associated with educational outcomes among adolescents (e.g., Engels et al., 2017; Salmela-Aro & Upadyaya, 2014a), it seems highly relevant to address these questions by acknowledging the heterogeneity among students instead of solely focusing on overall mean-level trends.

To address these gaps in prior research, the focus of the present work was to adopt both variable- and person-centered approaches to investigate the developmental dynamics between academic well-being and educational outcomes among adolescent students from 7th grade to upper secondary education, and also, to study how these factors jointly shape important predictors of future educational and occupational success (i.e., educational and occupational aspirations). Investigating the emotional aspects of studying and how it develops over time seems important in order to gain a better understanding of what enables young people to thrive, especially in today's society that is often characterized by increasing demands and uncertainty in educational transitions and employment. Although cognitive skills are important, considering, for example, academic performance alone when trying to explain important predictors of students' future education and occupation would be seriously limited. Taken that academic and emotional factors seem to be rather interdependent, and recent findings suggesting that how students feel about school and themselves as students is important for their future educational and occupational success (Korhonen et al., 2016; Watt et al., 2006) and for staying motivated in school (Tuominen-Soini et al., 2012; 2014), it seems necessary to study such factors together to gain a more holistic view of adolescents' academic and emotional functioning over time. Of the various constructs associated with such processes, this study focuses on academic well-being (school engagement and burnout), academic achievement (in key academic domains: mathematics and reading), motivational beliefs (domain-specific self-concept and interest), and educational and occupational aspirations (aspired educational degree, math- and reading-related career aspirations).

1.1 Academic Well-Being

There is no clear consensus around the definition of adolescents' well-being, and there have been many approaches to conceptualizing it, each with different implications for how well-being should be measured. However, initially, there have been prominently two perspectives on conceptualizing well-being: the hedonic perspective (Diener, 1984) and the eudaimonic perspective (Ryff, 1989). The hedonic perspective often defines well-being as the presence of positive affect, the lack of negative affect, and as also including a cognitive aspect (e.g., global life satisfaction or domain-specific aspects, see Tov, 2018). Thus, the hedonic perspective prioritizes a person's own assessment of how well their life is going and is often referred to as subjective well-being (Tov, 2018). The eudaimonic perspective, however, assumes that there are certain needs or qualities that are essential for one's psychological growth and development and that the fulfillment of these needs (commonly i.e., autonomy, positive relations, environmental mastery, self-acceptance, purpose in life, and personal growth) enables an individual to reach their full potential (Ryan & Deci, 2001). This view of well-being is often referred to as psychological well-being and is rooted in the pursuit of goals and activities that are consistent with one's values and identity (see e.g., Tov, 2018). However, researchers have also proposed additional well-being concepts that are not directly included in either hedonic or eudaimonic conceptions of well-being (e.g., flow: Csikszentmihalyi, 1990), and also, conceptualizations that include mixtures of both perspectives, that is, the combination of feeling good and functioning well, for example, flourishing (Diener et al., 2014; Huppert & So, 2013; Keys, 2002), the well-being profile (positive mental health, i.e., the opposite of common mental disorders) proposed by Marsh et al. (2019), and the PERMA model (Positive emotion, Engagement, Relationships, Meaning, and Achievement) proposed by Seligman (2013).

Although the definitions and conceptualizations vary in previous research, most researchers agree that well-being is a complex phenomenon consisting of cognitive as well as emotional dimensions and that it cannot be fully represented by any one construct. Considering the multidimensionality of well-being, it has also been recommended to define and operationalize well-being within a specific domain, or by incorporating the environmental context (Polland & Lee, 2013). When approaching and investigating adolescent students' well-being and given the centrality of school in their lives (Eccles & Roeser, 2009), it seems reasonable to define and operationalize well-being in relation to the educational context (i.e., academic well-being). Although there is no clear consensus around the definition or measurements of academic well-being either, measures have often included both positive and negative indicators. For example, Hascher (2003, 2008) described well-being in school as representing subjective,

emotional, and cognitive evaluations of school that can be seen as an imbalance of positive and negative aspects. Consequently, Hascher (2008) defined academic well-being as the presence of three positive indicators: positive attitudes towards school, enjoyment of school, and positive academic self-concept, and the absence of three negative indicators: worry about school, physical complaints in school, and social problems at school (see also Grob et al., 1996; Ryff & Keyes, 1995). Similarly, other empirical studies have conceptualized academic well-being with, for example, academic self-concept, perceived learning difficulties, and school burnout (Korhonen et al., 2014), school burnout, school engagement, school value, and satisfaction with educational choice (Tuominen-Soini et al., 2012), and school burnout and engagement (Fiorilli et al., 2017).

In the present study, in line with recent studies (e.g., Fiorilli et al., 2017; Korhonen et al., 2014; Tuominen et al., 2020) and previous recommendations (Hascher, 2008; Huppert & So, 2013; Polland & Lee, 2013), academic well-being was operationalized as a multidimensional construct, covering both positive and negative aspects of students' well-being in relation to school and schoolwork. Consequently, school engagement and school burnout were chosen as indicators of academic well-being in this work, comprising both cognitive (i.e., students´ thoughts about school and themselves as students) as well as affective (i.e., students´ feelings about school and themselves as students) components of students´ subjective well-being in school (Diener et al., 2018, see also Putwain et al., 2020).

Initially, both engagement and burnout have been looked at as work-related states of mind but, based on the rationale that school is a place where students work – they attend classes and complete structured activities with specific performance goals (e.g., passing courses, acquiring degrees) – the concepts of engagement and burnout have also been extended to educational contexts (Walburg, 2014). School engagement and school burnout have been studied across different age samples, educational contexts (Parviainen et al., 2020; Salmela-Aro & Read, 2017; Tuominen-Soini & Salmela-Aro, 2014) and in relation to various outcomes (Salmela-Aro et al., 2009; Salmela-Aro & Upadyaya, 2012; Wang et al., 2015) and when combined, they represent relevant indicators of students' school-related well-being (Salmela-Aro, 2017), and have been shown to provide a good indicator of their academic and socioemotional functioning in school (Salmela-Aro, 2017; Salmela-Aro & Upadyaya, 2020; Upadyaya & Salmela-Aro, 2013). Findings also show that both school engagement and burnout are important for later general ill- and well-being: school engagement predicts later life satisfaction, whereas school burnout predicts subsequent depressive symptoms (Salmela-Aro & Upadyaya, 2014; Upadyaya & Salmela-Aro, 2017).

1.1.1 School Engagement and Burnout

School engagement has been viewed as fundamentally important for understanding positive youth development, as high school engagement has been found to be influential for students' educational success and adjustment in academic settings (Fredricks et al., 2004). Although the definitions and conceptualizations of school engagement vary in the literature, there have been prominently two lines of research. One approach, more commonly adopted in North America, describes school engagement as a multidimensional construct comprised by an affective, a cognitive, and a behavioral component (e.g., Appleton et al., 2006; Fredricks et al., 2004). The affective component describes students' enjoyment and interest in school and schoolwork, whereas cognitive engagement refers to schoolwork investment and willingness to learn. The behavioral component of engagement encompasses being present at school and complying with school disciplines and rules (Appleton et al., 2006; Fredricks et al., 2004). These components describe rather different aspects of school engagement, but they are positively correlated with each other (Fredricks et al., 2004).

However, grounding on work-related engagement (e.g., Schaufeli et al., 2002; 2006), researchers in Europe have often described school engagement as a more focused construct, emphasizing the affective component of school engagement. In this framework, school engagement is viewed as a persistent cognitive-affective state defined as a positive, fulfilling, study-related state of mind comprised by energy, dedication, and absorption (Salmela-Aro & Upadyaya, 2012; Schaufeli et al., 2002). Energy is described as having high mental resilience, high levels of vigor and energy while studying, interest and willingness to invest in schoolwork as well as having effective strategies for coping with difficulties. Dedication is described as a positive cognitive attitude towards school and being dedicated and enthusiastic about the learning processes and outcomes, whereas absorption is characterized by behavioral accomplishments and flow-like experiences, such as being fully concentrated and involved in one's studies. These dimensions are separate constructs but are highly correlated with each other (Salmela-Aro & Upadyaya, 2012). The composition of school engagement studied across different ages have shown that it is better described as an overall engagement construct among younger students, whereas it seems to become more differentiated and similar to work engagement later on, for example, among university students (Salmela-Aro & Upadyaya, 2012, see also Schaufeli et al., 2002).

Although the two lines of school engagement research share some similarities, one of the main differences between them is that the European approach describes students' psychological engagement in greater detail, focusing on students' feelings about studying rather than their behavior at

school (e.g., school attendance, adherence to school rules). Therefore, considering that the present study aims to investigate the emotional aspects of studying (i.e., academic well-being), school engagement was conceptualized as vigor, dedication, and absorption in the present work. This theoretical framework of school engagement has been found to be a significant factor in promoting academic performance, motivational beliefs, and aspirations, and choices for future studies (Cadime et al., 2016; Salmela-Aro & Upadyaya 2013; Vasalampi et al., 2009), but also, a protective factor of overall well-being and youth development (e.g., from school drop-out, substance use, and depressive symptoms: Archambault et al., 2009; Li & Lerner, 2011; Salmela-Aro, 2017).

Recently, studies have increasingly begun to approach students' emotional disaffection with school from the perspective of school burnout (see e.g., Fiorilli et al., 2014; Salmela-Aro & Upadyaya, 2014b; Tuominen-Soini & Salmela-Aro, 2014). Similarly, to engagement, burnout has traditionally been considered a work-related state of mind but based on the rationale that school, like work, requires individuals to face several achievement pressures, it has increasingly been studied also within the school context (Walburg, 2014). In school, burnout emerges as a negative response to students' ongoing difficulties in coping with these pressures (Di Chiacchio et al., 2016; Fiorilli et al., 2017; Schaufeli et al., 2002). In other words, school burnout can be seen as representing a stress response as a result of an imbalance between students' personal resources and their own or others' expectations and demands of success in school. It is considered a continuous phenomenon, ranging from school-related stress to major burnout (Salmela-Aro et al., 2009).

Following the theoretical framework of work burnout (Schaufeli et al., 2002), school burnout has typically been approached as a multidimensional construct consisting of three highly correlated, but conceptually distinct factors: exhaustion, cynicism, and inadequacy (Bresó et al., 2007; Salmela-Aro et al., 2009). Exhaustion at school can be defined as school-related feelings of strain, particularly chronic fatigue due to overtaxing schoolwork and high school demands. Cynicism is manifested as detached attitudes toward school in general, loss of interest in one's schoolwork, and not perceiving it as meaningful. Inadequacy, in turn, refers to diminished feelings of one's competence, achievements, and accomplishment as a student (Salmela-Aro et al., 2009). These dimensions have been found to be differently associated with various school-related outcomes (e.g., achievement: Salmela-Aro & Upadyaya, 2014a; motivation: Tuominen-Soini et al., 2012), and it is suggested that exhaustion and cynicism are initial predictors of inadequacy (Parker & Salmela-Aro, 2011).

Prior research has shown that the lower the level of school engagement, the more school burnout adolescents experience (Salmela-Aro et al., 2009). However, although the dimensions of emotional engagement and those of

school burnout are negatively associated, they are not considered to be opposite sides of the same coin (Leiter & Maslach, 2017). Research has suggested that school burnout does not simply reflect the absence of school engagement, and vice versa, but rather, that these are separate and distinct psychological processes that contribute uniquely to student outcomes in school (Skinner et al., 2008).

Recently, a few studies have investigated school engagement and burnout by person-centered approaches, focusing on identifying distinct homogeneous groups of students with similar patterns of engagement and burnout. For example, Tuominen-Soini and Salmela-Aro, (2014) found groups of students with high school engagement and low levels of burnout (Engaged), students who were disengaged from school and report elevated levels of burnout (Burned-out), but they also found some asynchronous student profiles, showing various patterns of school engagement and burnout. They found that approximately 28% of their sample belonged to a group that showed, simultaneously, both high engagement and exhaustion in school (Engaged-Exhausted), whereas 14% of the students expressed signs of disengagement in school, without experiencing school burnout (Cynical). Recently, others have conducted similar person-centered studies, and have identified largely similar profiles of school engagement and burnout. For example, Virtanen et al. (2016) and Salmela-Aro and Upadyaya (2020) identified three school engagement and burnout profiles among their samples of lower and upper secondary students, namely, students with high engagement and low burnout, students with low engagement and high burnout, and also, the largest groups in both studies, representing approximately half of both samples, students with elevated levels of both engagement and burnout in school. In addition, Salmela-Aro and Read (2017) and Salmela-Aro et al. (2016) also identified a fourth profile: students with lower levels of school engagement, and elevated/moderate levels of school burnout. Thus, these results clearly demonstrate that school engagement and burnout are differently associated among students, highlighting both the importance of conducting a person-centered approach when investigating students' academic well-being, and the importance of studying positive and negative aspects of academic well-being together, as high engagement might not always be a completely positive experience, but for some students, also rather exhaustive.

1.1.2 Development of Academic Well-Being

Adolescence is a phase characterized by many individual and environmental changes and challenges, and although the majority of students manage adolescence without any severe problems, some seem to experience rather negative shifts in their motivational beliefs during this time period (Roeser et al., 1999). Although much of the research on school

engagement and burnout have been cross-sectional (see Fredricks et al., 2004), some longitudinal studies have shown that similar trends occur in students' school engagement and burnout trajectories (e.g., Wang & Eccles, 2012). For example, Wang et al., (2015) investigated, simultaneously, the development of overall school engagement and burnout among Finnish adolescents from 9th to 11th grade and found an overall decline in students' emotional engagement with school, whereas school burnout increased over the school years.

While some declines in students' motivation and well-being may be viewed as a consequence of both the nature and pace of changes related to adolescence (e.g., pubertal development, social role redefinitions, cognitive development), some changes might also be related to the school environment. Schools play a central role in adolescents' lives, and it is thought that schools provide both opportunities and resources for engagement, as well as risks for burnout to occur. When investigating developmental aspects of academic well-being, it is therefore important to consider the educational context. There have been prominently two frameworks seeking to explain the formation and changes occurring in adolescents' school engagement and burnout, mainly the demands-resources model in education, and the stage environment fit theory.

Demands-Resources Model in Education

One way of understanding the underlying processes of the co-occurring developmental patterns of engagement and burnout is offered by the job demands-resources theory (DR: Demerouti et al., 2001; Bakker & Demerouti, 2006). According to the DR theory, characteristics of the environment can be differentiated into both demands and resources. Demands imposed by the context require sustained physical and/or psychological (cognitive and emotional) effort from the individual and are therefore associated with certain psychological and/or physiological costs, such as increased strain and, if prolonged, burnout. Resources, on the other hand (e.g., positive self-evaluation, social support, autonomy), are aspects that may be functional in achieving high engagement and performance. The DR theory has recently also been adapted to the educational context based on the assumption that students, like adults, encounter many different study-related demands (e.g., from learning activities, time pressures, and achievement expectations) but also hold both personal and contextual resources (Akkermann et al., 2018; Lesener, 2020; Salmela-Aro & Upadyaya, 2014b). The demands-resource model in education, in which school engagement and burnout are key outcomes (Salmela-Aro & Upadyaya, 2014b), assumes that academic well-being is mainly formed through two distinct processes. One is an effort-driven energetic process of overtaxing and wearing out as a result of perceived study demands, such as high workload and pressure to achieve. This process might exhaust

students, leading first to stress and then to burnout and later, possibly, more severe problems in their mental health. The other is a motivational process in which the availability of resources, such as support from school and teachers, leads to higher school engagement and, later, higher life satisfaction. According to the DR-model, optimal development takes place when there is a good fit between the personal resources and the perceived study demands (Bakker & Demerouti, 2007; Salmela-Aro & Upadyaya, 2014b).

However, although high study demands are thought to directly predict school burnout, and resources are related to high school engagement (Hodge et al., 2019), they seem to also have joint effects on students´ academic well-being. In fact, resources are important means to either cope with or "buffer" the effects of high demands (Bakker & Demerouti, 2017). Studies have also found that resources seem to gain salience in the context of high demands. In other words, resources seem to influence engagement and motivation, particularly when they are needed, that is, when demands are high (Bakker et al., 2007). Thus, although some students perceive heightened study demands, they may still be highly engaged in school and might not always develop high levels of burnout if they are surrounded by several contextual or personal resources. Furthermore, the DR model also proposes that there are reversed causal effects between resources and engagement, suggesting that individuals who are highly engaged in their work or studies are more motivated to stay engaged and also create their own resources, thus creating a "gain spiral" (Bakker & Demerouti, 2017; Hobfoll et al., 2018; Xanthopoulou et al., 2009). However, similar causal and reciprocal effects have been found in the energy-depleting process as well, indicating that individuals who experience high strain or burnout caused by high demands, might also undermine the benefits of study resources. Individuals who perceive more stress and burnout are more likely to engage in self-undermining behavior and are therefore more likely to create more demands over time, risking creating a "loss spiral".

Although the majority of studies testing the assumptions proposed by the DR theory have been conducted in the job context and among adults, studies have confirmed the main effects of study demands and resources on school engagement and burnout among students in the educational context as well (Hodge et al., 2019; Salanova et al., 2010; Salmela-Aro & Upadyaya, 2014b) while there is also some evidence of buffering effects of study resources on students´ well-being when study demands are high (Hoferichter et al., 2021; Sonmark & Modin, 2016). Studies investigating the development of school engagement and burnout simultaneously have also concluded that their longitudinal trajectories function as separate and distinct psychological processes and that they are differently associated with students' academic and psychological outcomes (Wang et al., 2015). Furthermore, Salmela-Aro and Read (2017) also found corresponding

configurations of demands and resources among different student profiles of school engagement and burnout as proposed by the DR framework: students in profiles characterized by high engagement and low burnout perceived the highest resources (suited to study field, someone to talk to about problems) and the lowest demands (loneliness, internet dependency), whereas students who were the least engaged and the most burned out experienced the lowest resources and the highest demands. Further, students who were both engaged and exhausted also experienced relatively high levels of resources, but also, more study demands than the engaged students who did not experience school burnout. Thus, it seems that the underlying processes of demands and resources may be reflected in students´ school engagement and burnout profiles, and could potentially explain some shifts in their respective trajectories over time.

In order to gain a deeper understanding of the developmental processes of academic well-being during adolescence, the DR model clearly demonstrates the importance of studying both the motivational (school engagement) and the energy-depleting (school burnout) processes simultaneously (Demerouti et al., 2001; Salmela-Aro et al., 2014b). Although the aim of the present work was not to identify specific demands and resources that may predict such processes, but rather, to investigate individual differences in how school engagement and burnout co-exist and develop among adolescents, the DR framework may function as a lens through which changes and shifts in students' academic well-being is understood. As demands and resources seem to be reflected in students' school engagement and burnout profiles (Salmela-Aro & Read, 2017), the DR model may contribute to our understanding of potential underlying factors of changes in students' academic well-being profiles as well.

Stage-Environment Fit Theory

Furthermore, considering the importance of the educational environment for students' academic well-being, schools play an important role in providing the kind of social environment that will continue to engage students as they transition through adolescence (Eccles & Roeser, 2009). If schools do not change in developmentally appropriate ways, meeting the changing needs (e.g., cognitive, biological, physical) of adolescents during this time period, students might disengage from school and start to develop symptoms of burnout. In fact, previous studies have found that negative shifts in students' academic well-being and motivation seem to occur particularly around educational transitions (Engels et al., 2017; Salmela-Aro & Tynkkynen, 2012; Wang et al., 2015). Thus, it seems that changes in the school context may be reflected in students' engagement and burnout trajectories as well, and educational transitions should therefore be acknowledged when approaching students' well-being in school.

Similarly, to the DR model, the stage-environment fit theory (Eccles & Midgley, 1986) assumes that changes in students' academic motivation and well-being during educational transitions might be due to a misfit between the needs of the individual (student) and the opportunities offered by the environment (school). Positive youth development, such as positive perceptions of themselves as students and the educational environment, occurs if the environment is responsive to the changing needs of the individuals and continues to stimulate students as they develop. In contrast, negative developmental patterns occur if students transition into an educational environment that affords fewer opportunities for continued growth than the previous educational stage. Such changes in students' developmental patterns may be determined, for example, by the match between students' need for autonomy and classroom decision-making opportunities (Patall et al., 2010), and the contribution of teacher- and peer relationships for autonomy, competence, and relatedness (Olivier et al., 2021; Zimmer-Gembeck et al., 2006). As educational transitions are often associated with emphasized competition, increased social comparison, academic demands, performance goal orientation, and disruptive social relations (e.g., changing peer groups and teachers), these may easily be at odds with the changing needs of the students, as adolescence is often characterized by, for example, several biological changes associated with pubertal development, heightened self-awareness, and an increased desire for autonomy and relatedness (Eccles & Roeser, 2009). Consequently, during this time period, the stage-environment fit is repeatedly reassessed, and the risk of an imbalance between the student's needs and the school opportunities increases. A negative developmental fit can lead to alienation from school and increase the risk of school burnout, whereas a good fit will result in continued high school engagement. Thus, although educational transitions might be disruptive for some students, they may be experienced as opportunities for positive change for others (Salmela-Aro & Tynkkynen, 2012). Therefore, considering that adolescents' academic well-being is largely determined by the extent to which schools provide educational and social environments that meet the students' needs (Eccles et al., 1993), it seems important to consider educational transitions when investigating the development of academic well-being during adolescence as well.

Individual Pathways: A Person-Centered Approach

Although previous studies examining general mean level development of school engagement and burnout during adolescence have concluded that engagement generally decreases during the adolescent years (e.g., Wang & Eccles, 2012), whereas school burnout and emotional disaffection with school seem to remain slightly more stable (Engels et al., 2017; May et al., 2020; Salmela-Aro et al., 2008), there has been an increasing number of person-centered studies examining individual differences in these

trajectories, suggesting that not all students follow the same developmental paths. The results show that students' school engagement and burnout do not necessarily decrease across the school years, but that different subgroups of students with varying levels and developmental trends in school engagement and burnout can be identified.

For example, studies focusing on school engagement have identified several groups of students with stable engagement trajectories (affective, cognitive, and behavioral components) that vary in their initial mean levels of engagement over the course of lower-secondary education, but also, groups with both increasing and decreasing trajectories (Janosz et al., 2008). Li and Lerner (2011) on the other hand, examined emotional school engagement trajectories among students in the same age group and found mainly decreasing school engagement trajectories, with varying mean levels.

Similarly, substantial heterogeneity has been detected in students' trajectories of school burnout, particularly around the transition to post-comprehensive education. For example, Salmela-Aro and Upadyaya (2014a) found that approximately one third of Finnish adolescent students belonged to groups characterized by an increase in school burnout during the transition to post-comprehensive education, although many students also displayed low initial mean levels of school burnout and followed a rather stable development. After the transition to post-comprehensive education, however, school burnout seems to become more stable; both Salmela-Aro and Upadyaya (2014a) and Sorkkila et al. (2020) found mostly stable trajectories among Finnish students in upper secondary education, that mainly differed in the initial mean levels of burnout. But, nevertheless, in both studies, a small group of students whose levels of school burnout continued to increase during upper secondary education, was identified as well. Mainly stable trajectories have been found among university students: May et al. (2020) found that 66% of US university students displayed relatively stable trajectories of school burnout, but also, that a third of the students showed a slowly increasing school burnout trajectory over time.

Only a few studies exist that have investigated individual differences in developmental patterns by focusing simultaneously on both school engagement and burnout. However, as an exception, Tuominen-Soini and Salmela-Aro (2014) investigated profiles of both school engagement and burnout among upper secondary school students, and later, among the same participants in young adulthood. They found that students belonging to a profile characterized by high school engagement and low burnout in upper secondary education, were likely to belong to the same engaged group six years later in young adulthood, whereas students who were identified as being both engaged and exhausted seemed to show more

negative development, as they typically moved to a more negative engagement and burnout profile.

1.2. Academic Well-Being and Educational Outcomes

School engagement and burnout seem to not only spill over to later general well-being (e.g., life satisfaction and depressive symptoms) but also, to further achievements, competence-beliefs, interests, educational pathways, and choices. In the following chapters, the relations between academic well-being and some highly relevant predictors of future educational and occupational success (i.e., academic performance and motivational beliefs) will be discussed.

1.2.1 Academic Well-Being and Performance

Recent meta-analysis investigating the relationship between school engagement and performance, containing cross-sectional data from 69 independent studies, revealed that the emotional aspect of school engagement had a positive, moderate association with academic performance, suggesting that students who are highly emotionally engaged also perform better in school (Lei et al., 2018). Similar positive associations have been found in studies using the European framework as well, and these have been found particularly between the energy aspect of school engagement and performance (Cadime et al., 2016; Shaufeli et al., 2002).

Regarding school burnout, on the other hand, Madigan and Curran (2020) conducted a meta-analysis of the relation between school burnout and performance, containing 29 mainly cross-sectional studies, and found a negative association between school burnout examined as one overall factor and academic performance, and also between all three sub-constructs of school burnout and performance, indicating that students who are exhausted and feel inadequate in schools, and students who do not value school, also have lower academic performance.

Longitudinal studies investigating causality between school engagement and burnout and performance are rather scarce, but some have found performance (grade point averages, GPA) to positively predict emotional school engagement, whereas it has been found to negatively predict school burnout (Wang et al., 2015). This association was also found in a cross-lagged study by Palos et al. (2019) among university students, as they found that performance (GPA) predicted both school engagement and burnout (both studied as one factor) over the course of one academic semester, but not the other way around.

Studies using achievements tests instead of overall GPA to investigate the relationship between academic well-being and performance are scarce, but as an exception, Parviainen et al., (2020) investigated the longitudinal

relation between students´ arithmetic and reading skills and school burnout and found that lower arithmetic skills in 6th grade indirectly predicted higher levels of exhaustion and cynicism in upper secondary education, mediated by exhaustion in 6th grade and the development of cynicism in lower secondary education. Interestingly, they found an opposite relation for reading: better reading skills in 6th grade directly predicted higher levels of cynicism in upper secondary education. However, this association may reflect the heterogeneity in the association between academic well-being and performance among students. In fact, studies investigating this relation by the means of a person-centered approach have demonstrated that students seem to show various patterns of academic well-being and performance.

For example, Korhonen et al. (2014) conducted a person-centered approach to investigate profiles of both mathematics, spelling, and reading performance (test scores), school burnout, and also, academic self-concept and perceived learning difficulties among students in 9th grade. In line with previous variable-centered findings, they identified a group of students with overall high performance and self-concept, and low levels of school burnout, a group with low performance and self-concept, and high levels of school burnout, and a group with average levels on all measures. However, interestingly, they also found a group of students who expressed relatively high mathematics, spelling, and reading performance, but who still expressed high levels of school burnout, perceived learning difficulties, and low competence beliefs. Tuominen-Soini and Salmela-Aro (2014) identified largely similar patterns while investigating school engagement and burnout profiles among upper secondary students. They found that students who were highly engaged in school and who did not report high levels of burnout, also performed well in school, whereas, conversely, students with negative academic well-being patterns also had the lowest academic performance. However, in line with the results found by Korhonen et al. (2014), Tuominen-Soini and Salmela-Aro (2014) also identified some asynchronous academic well-being and performance patterns: some students who were highly engaged and performed well in school, also reported elevated levels of exhaustion, whereas some students expressed elevated levels of cynicism and low performance but were still not exhausted by school.

There seem to be some differences in the developmental patterns of school engagement and burnout with respect to educational outcomes as well. Both Janosz et al. (2008) and Li and Lerner (2011) found that stable trajectories of school engagement, or trajectories with higher mean levels of engagement, were beneficial for overall academic achievement, whereas students belonging to unstable and decreasing engagement groups were more likely to drop out of school (Janosz et al., 2008) and experience depressive symptoms (Li & Lerner, 2011).

1.2.2 Academic Well-Being and Motivational Beliefs

Furthermore, school engagement and burnout seem to not only be related to academic performance, but to several aspects involving students' motivational beliefs as well. Both competence-beliefs, task values, and academic interest have been found to positively predict later emotional school engagement (Bakadorova & Raufelder, 2017; Wang & Eccles, 2013), while they have been found to be negatively related to school burnout (Korhonen et al., 2016) and attitudes toward school (Green et al., 2012). Similar associations have been found by person-centered studies. Tuominen-Soini and Salmela-Aro (2014) found that students who were highly engaged in school and showed no signs of burnout also reported high school value and reported the lowest levels of academic withdrawal and work avoidance orientation, whereas disengaged and burned out students expressed the opposite academic well-being and motivational patterns. However, they also found some patterns that deviated from these general trends: students who were both engaged and exhausted in school expressed relatively high school value, but were also more afraid of failures in school, more willing to give up when faced with demanding school tasks and expressed lower self-esteem than students who were engaged but not exhausted. Similar asynchronous patterns of well-being and motivation were found by Parhiala et al. (2018), as they found a group of adolescents with rather negative well-being (i.e., school burnout, internalizing and externalizing problems, low self-esteem), but who were still highly motivated in school (i.e., high math and reading task values and school enjoyment).

Furthermore, it seems that academic well-being is related to students educational aspirations for their future as well: students with more positive academic well-being patterns seem to aspire for higher educational degrees and also be more satisfied with their educational choices (Tuominen-Soini & Salmela-Aro, 2014; Upadyaya & Salmela-Aro, 2015), whereas negative well-being patterns seem to be related to lowered educational aspirations and school drop-out (Bask & Salmela-Aro, 2013; Korhonen et al., 2014; Tuominen-Soini & Salmela-Aro, 2014). Salmela-Aro and Upadyaya (2014a) also found that it was more typical for students with lower educational expectations to belong to a high and decreasing school burnout trajectory-profile during the transition to post-comprehensive education, whereas students following a low and increasing burnout trajectory were more likely to achieve their educational goals in comparison to students with more average and stable trajectories, and to students in high and decreasing groups.

To summarize, the general trend seems to be that high school engagement is associated with higher academic performance and more positive motivational beliefs, and educational aspirations (Le et al., 2018;

Tuominen-Soini & Salmela-Aro, 2014; Wang & Eccles, 2013), whereas school burnout seems to be linked with low academic performance, lowered motivation and aspirations for future studies, and higher risks of dropping out of school (Bask & Salmela-Aro, 2013; Madigan & Curran, 2020; Korhonen et al., 2014). However, investigating academic well-being by a person-centered focus seems to be useful, as heterogeneous groups of individuals who deviate from these general patterns have been detected: high-achieving, committed, and motivated students who value schoolwork and aspire for higher educational goals seem to, also, be receptive to some emotional distress and exhaustion at school (see e.g., Daniels et al., 2008; Parhiala et al., 2018), whereas, some students might disengage and have cynical attitudes towards school, but may not necessarily be exhausted by school (Tuominen-Soini & Salmela-Aro, 2014).

1.3 The Formation of Educational and Occupational Aspirations

Students' decision-making processes about their future are important considering that educational and occupational aspirations have been found to be significant predictors of actual educational and career attainment (Armstrong & Crombie, 2000; Schoon & Parsons, 2002) which, in turn, have implications for later occupational success and psychological well-being (Eccles, 2009; Gottfredson, 2002). Although previous findings have demonstrated the importance of academic well-being for several educational and motivational outcomes (see chapter 1.2 in this thesis) students' educational and occupational aspirations have mostly been predicted by socioeconomic status (Garg et al., 2007), academic performance (e.g., Korhonen et al., 2016), and different motivational beliefs (e.g., competence and value beliefs; Nagy et al., 2006; Korhonen et al., 2016; Watt et al., 2012) in previous studies. Thus, students' academic well-being has largely been ignored, despite indications that positive academic well-being seems to be related to higher educational aspirations, and school burnout may increase the risk of dropping out of school (Bask & Salmela-Aro, 2013; Gutman & Schoon, 2018).

There is no clear definition of or unified measurement to assess students' aspirations. However, educational aspirations have often been described as students' goals and plans within an academic setting (Trebbels, 2015). The operationalization of occupational aspirations also varies, but, commonly, studies have focused on occupational aspirations in a specific domain of study or career type and, also, on the level of prestige associated with the aspired occupation (Gottfredson, 1981; e.g., Watt et al., 2012). A majority of existing studies examining either educational or occupational aspirations and choices have focused on one specific domain, most commonly the mathematics domain (Chow et al., 2012; Watt et al.,

2006). There has also been a focus on identifying predictors of adolescents' aspirations in the STEM (science, technology, engineering, and mathematics) fields (Guo et al., 2015b; Watt et al., 2012), as there has been a decline in advanced STEM participation, particularly among girls, in many western countries (National Science Board, 2014).

1.3.1 The Role of Motivation: Expectancy Value Theory

Expectancy-value theory (EVT: Eccles et al., 1983; Eccles, 2009) is one of the most influential motivational theories explaining students' educational choices and aspirations. According to expectancy-value theory, educational choices are directly influenced by students' expectancies of success (e.g., self-concept) in a specific task or in a given academic domain and also, by their value-laden motivational beliefs (e.g., interest) they attach to the task or domain. If students view a specific task or study-related goal as impossible, expectations are lowered (Eccles & Roeser, 2009). Moreover, even if one feels competent to achieve one's study-related goals, they might not be pursued if they are not valued. If students are interested in and value their educational choices and aspirations, they are also more likely to adhere to them, even when faced with difficulties. Therefore, high competence- and value-beliefs of a given task are key to having high educational aspirations (Eccles et al., 1983).

Eccles and her colleagues defined expectancies for success as students' beliefs about how well they will do on a specific task (e.g., Eccles & Wigfield, 2002). Expectancies are conceptually related to other constructs that refer to competence-related beliefs, such as academic self-concept (i.e., the mental representation of one's personal competencies in general or in a specific academic domain, Marsh, 2007). Although expectancies of success and competence-beliefs are theoretically differentiated, they are very highly correlated (Eccles & Wigfield, 2002, Wigfield & Eccles, 2000) and have therefore been used interchangeably in previous studies (e.g., Guo et al., 2017; Nagengast et al., 2011; Trautwein et al., 2012).

Value-beliefs on the other hand refer to how much a student wants to pursue a task, and it has commonly been divided into four components: intrinsic value (enjoyment of a given task or domain), attainment value (perceived personal importance of a given task or domain), utility value (perceived usefulness of a given task or domain), and cost (perceived negative consequences of engaging in a task or domain) (Eccles & Wigfield, 2002). Although there has been evidence for the distinction of four value components (Conley, 2012, Trautwein et al., 2012), researchers have commonly focused on one specific component or combined measures to represent overall value-beliefs or interest in a specific domain. Students' interest in an academic domain develops when they perceive the engagement with it to be rewarding (Renninger & Su, 2012) and becomes

intervened with their personal values as it deepens (Renninger, 2009; Renninger & Hidi, 2011).

Competence-beliefs and interests are positively related to each other: students who believe that they will do well on a task, are also likely to value it more, whereas students with lower competence-beliefs might devalue the task to protect their own self-worth (Eccles et al., 2019). In fact, although both competence-beliefs and interests have been found to be strong predictors of educational and occupational choices, studies have revealed that there is a stronger predictive effect of students' competence-beliefs if they hold high levels of values or interest (Guo et al., 2016; Lauermann, Tsai, & Eccles, 2017; Nagengast et al., 2011; Trautwein et al., 2012). Similarly, Marsh et al., (2005) found, while investigating self-concept and interest in the mathematics domain, that self-concept was a stronger predictor of interest, than vice versa, and also, that students' competence-beliefs were better predictors of their achievement, whereas their values or interests were more related to their educational choices (see also Nagy et al., 2006; Perez, Cromley & Kaplan, 2014). Furthermore, both competence-beliefs and interest have been found to be highly domain-specific (Gaspard et al., 2018; Trautwein et al., 2012), and particularly between math and verbal domains.

Internal/External Frames of Reference and the Role of Gender

Previous research shows that most students tend to report higher motivation in either math or verbal domains (Möller et al., 2009). However, many students who perform well in one domain, tend to be successful in the other domain as well. Marsh (1986) developed the internal/external frame of reference model to explain these patterns of rather low correlations between math and verbal self-concepts, despite rather high correlations between math and verbal achievement. According to the I/E model, students form their domain-specific self-concepts as a function of two underlying processes: social (external) comparison, but also, dimensional (internal) comparison, in which achievement in one academic domain is evaluated in reference to another domain.

Using the external frame of reference, students compare their own performance in a specific domain to other students' performances, leading to positive or negative predictions from performance and self-concept within a domain. Internal frames of references, however, indicate that one's performance in a specific domain (e.g., math) is evaluated in reference to one's performance in another domain (e.g., verbal), leading to negative cross-domain predictions (Möller & Marsh, 2013; Möller et al., 2009). Hence, although some students perform well in both math and verbal domains, they tend to consider themselves to be good at one or the other subject. If students consider themselves to be good at mathematics, they tend to have lower verbal self-concept due to internal comparison

processes, whereas if they consider themselves to perform better in verbal domains, they tend to lower their mathematics self-concept. Several studies have found these cross-domain comparisons affecting students' values-beliefs as well (Gaspard et al., 2018; Guo et al., 2017).

Furthermore, these cross-domain comparison processes are assumed to be one of the main reasons behind gender differences in students' educational and occupational choices. For example, studies have found that boys are more likely than girls to aspire to math-related careers (e.g., Watt, 2006, 2008), whereas girls seem to aspire to humanistic fields or careers that appear to be socially meaningful and important (e.g., Parker et al., 2014; Wigfield & Eccles, 2002). These gender differences may illustrate that both self-concept and interest represent personal beliefs and values that are prone to stereotypical identifications and biases (Eccles, 2009). Students' beliefs about what they should be good at, and which values are desirable within their reference group are shaped by stereotypical expectations and values of their culture, education, family, and peer groups (Cvencek et al., 2011; Tomasetto et al., 2015). One of the most influential reference groups that students identify with is gender, which seems to influence their aspirations and motivational beliefs as well (Cvencek et al., 2015). Several studies have also found that boys tend to report higher self-concept and interest in mathematics, whereas girls tend to value verbal domains more (e.g., Jacobs et al., 2002; Marsh et al., 2005), and there seem to be similar gender differences in the pathways leading to students´ aspirations as well (Korhonen et al., 2016). There are also indications that these gender-stereotypical self-evaluations mediate the effects from performance to educational aspirations (Korhonen et al., 2016; Eccles & Wang, 2016).

1.3.2 The Role of Performance

According to the EVT, both expectancies and values are impacted by several other factors (Eccles et al., 2019) and empirical studies have shown that not only motivational beliefs but also, students' academic performance have significant effects on their educational and occupational aspirations (Guo et al., 2015a; Korhonen et al., 2016; Wigfield & Eccles, 2000) and other achievement-related choices (e.g., university entry: Schoon, 2008). These effects have been found in both mathematics (Shapka et al., 2006) and verbal domains (e.g., reading, Savolainen, et al., 2008), and seem to be related to students' aspirations both directly and indirectly, mediated by their motivational beliefs.

For example, Korhonen et al., (2016) investigated pathways to adolescent students' educational aspirations in both mathematics and reading and found that reading performance predicted educational aspirations indirectly through reading interest for both boys and girls, and

that mathematics performance was a direct predictor of educational aspirations, but only for boys. Also, the total effect of reading performance and interest in reading on educational aspirations was only significant for girls. Guo et al., (2017) also found similar relations between students' performance, self-concept, intrinsic value, and aspirations in different science-related domains (biology, physics, earth science, and chemistry), suggesting that high academic performance in one domain, enhance students' intrinsic value through self-concept in the same domain, which in turn predicts domain-specific aspirations. Overall, these results indicate that performance not only predicts students' educational aspirations directly, but also, that motivational beliefs have a mediating role in the link between academic performance and educational choices and aspirations (Eccles, 2009; Nagy et al., 2006). Also, it seems that mathematics performance might be slightly more important in the shaping of boys' educational aspirations, whereas reading performance might be more important for girls (Korhonen et al., 2016). It has also been identified that despite girls' high mathematics and science grades and performance, they are still underrepresented in many STEM fields (OECD, 2017).

1.3.3 The Role of School Burnout

Although students' academic well-being is a highly relevant resource to include, especially during adolescence and given its' relation to various other educational outcomes (see e.g., Tuominen-Soini et al., 2012; Fiorilli et al., 2017), only a few studies have considered psychological factors when investigating educational or occupational aspirations. However, within EVT, researchers have argued that additional factors, such as self-perceived drawbacks, also influence students' expectancies and values, and contribute to explaining students' educational choices and aspirations. Students set their goals and make decisions in complex social environments where one choice might entail giving up another (Wigfield et al., 2017). Therefore, acknowledging solely positive predictors (such as self-concept and interest) when trying to understand students' aspirations, may offer a rather limited perspective of their decision-making processes.

The concept of cost has been one of the least examined constructs within EVT, despite its relevant role for enhancing our understanding of why students might lower their aspirations or opt out of pursuing a goal. Overall, cost has been described as a maladaptive motivator, reflecting students' perceived negative consequences of engaging with a task (Eccles, 2015, Flake et al., 2015) and, it is suggested to be particularly important for identifying groups of students with maladaptive patterns of motivational beliefs and goals (Conley, 2012). Recently, cost has often been divided into three sub-dimensions: effort cost (students' perception of the required effort to complete a task), opportunity cost (students' perceptions of what

they must give up in order to engage in and complete a task), and emotional cost (a negative emotional or psychological state as a consequence of engaging and putting effort in a task) (Gaspard et al., 2015). However, although these are the most commonly studied dimensions of cost, some researchers have argued that there are other important aspects of cost, such as students' perceived cost as a result of not meeting one's own or other people's expectations (Johnson & Safavian, 2016) and perceptions of threats to one's ego as a result of academic failure (Wigfield et al., 2017). Furthermore, although cost has initially been viewed as a component of task values, some scholars have proposed that cost represents a distinct and separate facet of the EVT that separately predicts educational outcomes (see Barron & Hulleman, 2015; Jiang et al., 2018).

School burnout shares some similar features with cost, and school burnout and emotional exhaustion have recently been examined also within the EVT framework in empirical studies (see Korhonen et al., 2016; Salmela-Aro et al., 2020). Particularly, the exhaustion component of school burnout shares similarities to both the effort and emotional aspects of cost, whereas inadequacy and cynicism slightly resembles emotional cost (Flake et al., 2015; Gaspard et al., 2015; Salmela-Aro et al., 2009). School burnout and cost have also been found to be positively associated within different groups of students: students experiencing elevated levels of perceived cost (effort, opportunity, emotional) also tend to report elevated levels of school burnout (Tuominen et al., 2020). They are however differentiated, as school burnout is a more general negative feeling toward school that develops over a longer time-period (Salmela-Aro et al., 2009), whereas cost is often described to be more domain-specific and situational (Wigfield & Eccles, 2000). Nevertheless, school burnout could be regarded as a consequence of experiencing prolonged cost (Schaufeli & Bakker, 2004; Tuominen-Soini et al., 2008). Despite their conceptual differences, both school burnout and cost seem to hinder students' engagement and motivation by using up their personal resources and lowering their school values (Barron & Hulleman, 2015; Jiang et al., 2018; Salmela-Aro & Upadyaya, 2014; Tuominen et al., 2020). As a consequence, both school burnout and cost seem to, at least to some extent, lower students' educational and occupational aspirations (Korhonen et al., 2016; Watt et al., 2019)

However, although the general assumption is that school burnout and aspirations are negatively associated, some previous studies have interestingly found that school burnout relates to educational aspirations in varying ways. For example, Korhonen et al., (2016) found that school burnout (studied as one factor) positively predicted educational aspirations for girls, whereas it was found to be a negative indirect predictor for both genders, mediated by interest in mathematics and reading. Salmela-Aro and Upadyaya (2017) on the other hand, investigated the co-development of school burnout and educational aspirations and

attainment while considering the three sub-constructs of school burnout separately, and found that study-related exhaustion positively predicted students' educational aspirations, whereas higher levels of cynicism and feelings of inadequacy lowered students' aspirations. Similarly, educational attainment was also predicted by feelings of exhaustion, and of low levels of cynicism toward education.

Studies investigating the association between school burnout and occupational aspirations seem to be exceptionally scarce. However, studies investigating other constructs related to students' psychological well-being have found career goals to be negatively affected by depressive symptoms (Salmela-Aro et al., 2014) and, that students who report lower levels of career aspirations, also experience higher levels of hopelessness and lower levels of self-esteem (Dudovitz et al., 2017).

1.4 Summary: The Present Work

Considering the centrality of school in the lives of adolescents and the importance of academic well-being for various educational outcomes and academic functioning in school, it seems important to further investigate how academic well-being develops during the lower- and upper secondary school years, particularly as there seem to be some declines in both students' well-being and motivation during this time period. As previous research suggests that students' academic and emotional functioning are somewhat inter-dependent, it seems important to consider such factors simultaneously in order to get a more holistic view of the person, and to better understand the complex interplay of such factors and how they shape important indicators for students' future educational and occupational success. As the majority of previous research on academic and emotional functioning has studied only a few concepts at a time, or focused only on one specific domain, studying several aspects of academic and emotional functioning simultaneously is therefore, in itself, a contribution to the research field. Also, studying the developmental dynamics of academic well-being and educational outcomes seems particularly important during the critical time period of adolescence, as several co-occurring changes are taking place (changes in social and environmental context, biological and emotional changes), making students at greater risk for developing maladaptive well-being patterns. Next, I will summarize the gaps in prior research, and present the contribution of the present work.

1.4.1 Research Gaps and Contributions

First, previous research has approached students' well-being by a variety of different concepts and empirical operationalizations, making it difficult to integrate findings from different studies. Many studies have, for example,

focused on one specific aspect of students' well-being (e.g., depressive symptoms, life satisfaction) or focused inclusively on either positive or negative indicators to approach students' well-being. However, considering the multidimensional nature of well-being and indications that positive and negative aspects may coexist within the individual, studying solely one perspective offers a rather limited understanding of the persons' emotional functioning. Therefore, to get a more comprehensive view of the development of students' well-being in school, the present study followed previous recommendations (Huppert, & So, 2018) and theory (DR model: Diener et al., 2001) and coherently included both positive (i.e., engagement) and negative (i.e., burnout) indicators, and related these to the specific context of study (i.e., school) to represent students' academic well-being. There is growing evidence that the processes of school engagement and burnout are conceptually and methodologically distinct (e.g., Leiter & Maslach, 2017; Salmela-Aro, 2017), and theory (DR model: Diener et al., 2001; Salmela-Aro & Upadyaya, 2014) has emphasized the importance of studying them together during adolescence.

Second, although there is evidence of shifts in students' motivation and well-being during adolescence, surprisingly few studies have investigated the development of academic well-being (i.e., school engagement and burnout) during the lower secondary school years and over longer time periods. Considering the importance of adolescents' academic well-being for later educational success and psychological well-being, it seems important to clarify the developmental processes of their academic well-being early on, and try to identify critical time points when shifts might occur. Studying adolescents' academic well-being already in lower secondary education is highly relevant: Finnish students in 7th grade have recently transitioned from elementary to lower secondary school and are required to adjust to the new educational environment while simultaneously experiencing the turmoil of puberty, whereas 9th graders are standing before the important decision of choosing an upper secondary education (i.e., academic or vocational track). Furthermore, prominent theories (stage environment fit theory: Eccles & Midgley, 1986) suggest that educational transitions are particularly influential for students' well-being, as simultaneous changes are occurring both in the educational environment and within the individual (e.g., changes related to adolescence). Therefore, the present work aimed to investigate both short-term development of students' academic well-being within an academic school year (within 7th and 9th grade), and also, long-term development by following students over the course of lower secondary education and across the critical transition to upper secondary education.

Third, evidence show that school engagement and burnout are differently associated among students: some seem to be highly engaged in their schoolwork and do not show signs of school burnout, some might

emotionally disengage from school and express elevated levels of burnout, whereas some students seem to, simultaneously, be highly engaged in their schoolwork and experience exhaustion due to school demands (e.g., Tuominen-Soini & Salmela-Aro, 2014). The person-centered focus seems to be useful with longitudinal data as well, as heterogeneity has been detected in students' developmental trajectories of both school engagement and burnout. However, to my knowledge, no study has investigated both inter- and intraindividual differences in students' long-term trajectories of school engagement and burnout. Thus, the present work aimed to fill in these gaps by applying a person-centered approach to identify individual differences in students' developmental patterns of academic well-being (school engagement and burnout) during the adolescent years, both within the school year (short-term) and during lower- and upper secondary education (long-term).

Fourth, the review of the literature in previous chapters informs us that school engagement and burnout are important for several educational outcomes: students who are emotionally engaged in their schoolwork generally perform better in school (Korhonen et al., 2014), have positive motivational beliefs (Tuominen-Soini et al., 2012) and obtain better job possibilities later in life (Li & Lerner, 2011; Wang & Eccles, 2013). Conversely, students who are burned out by school might become at risk for lower academic achievement (Madigan & Curran, 2020), school dropout (Bask & Salmela-Aro, 2013), and lower educational aspirations (Salmela-Aro & Upadyaya, 2017). However, many of the existing studies are cross-sectional and have used variable-centered approaches and, thus, focused on the whole sample average. Studies adopting a person-centered approach are few but indicate that not only students who disengage from school and experience school burnout, but also, those who are simultaneously engaged and exhausted in school, might be receptive to some less favorable educational outcomes (e.g., inferior academic performance regarding the first group and lowered educational aspirations regarding the latter). Thus, it seems that a person-centered focus provides a more accurate description of such associations, and therefore, the present study aimed to conduct a person-centered approach to further expand our understanding of the developmental dynamics of academic well-being, motivational beliefs, academic performance, and educational aspirations during adolescence. More specifically, this study aimed to investigate what kinds of academic well-being, self-concept and performance profiles can be identified among lower-secondary school students and how students in different profiles differ with respect to their educational aspirations. Also, as no study to my knowledge has investigated individual differences in the longitudinal associations between academic well-being, performance, and aspirations, this study also aimed to further complement our understanding of the developmental dynamics between academic well-being and educational

outcomes, by investigating how students with distinct longitudinal academic well-being trajectories differ in their concurrent trajectories of mathematics performance and educational aspirations.

Fifth, although previous studies have found associations between negative academic well-being, school drop-out and low educational aspirations and, considering also the importance of high aspirations for students' actual educational and career attainment and future well-being, surprisingly few studies have included factors representing students' psychological strain that might hinder their decision-making processes when investigating students' educational pathways. Previous empirical findings (Korhonen et al., 2016) and theory (EVT: Eccles et al., 1983) suggests that both competence-beliefs, values and performance play important roles in shaping students' aspirations. However, the majority of existing studies have focused on students' aspirations only in the mathematics domain, even though theory and empirical studies have demonstrated the usefulness of investigating students' decision-making processes across several domains, as there might be some negative cross-domain effects between students' performance and motivational beliefs (e.g., self-concept), particularly between mathematics- and reading-related variables. Therefore, to reach a more comprehensive understanding of the complex interplay of factors that help shape students' aspirations, this study aimed to complement prior work by investigating how performance, competence beliefs, and values jointly shape students' educational and occupational aspirations across two key academic domains (mathematics and reading), and whether students' perceived emotional strain (i.e., school burnout) plays a role in shaping them.

Lastly, a relevant factor to consider when investigating the developmental dynamics of students´ academic well-being, and particularly, in relation to their educational and occupational aspirations, seem to be gender. Overall, some studies have found girls to be more engaged in their studies than boys, but, they have also consistently been found to report higher levels of inadequacy and feelings of exhaustion in school (Salmela-Aro & Tynkkynen, 2012; Tuominen-Soini & Salmela-Aro, 2004). There seem to be some gender differences in the association between school burnout and educational aspirations as well: burnout has been found to be positively related to girls' educational aspirations, but also, negatively related to both boys' and girls' aspirations when mediated by interest (Korhonen et al., 2016). Furthermore, in Finland, girls are significantly underrepresented in many math-related fields, and they also hold lower competence-beliefs in mathematics, despite the fact that both boys and girls consistently achieve top scores in mathematics and reading (OECD, 2013, 2019). Thus, in order to gain a better understanding of the role of gender in the developmental dynamics of academic well-being and performance, and to better understand persistent stereotyped gender

differences in both aspirations and career attainment and of the factors underlying them, the present study aimed to investigate whether boys and girls differ in i) their developmental patterns of academic well-being, ii) in their academic well-being and performance profiles, and also, iii) in their pathways leading to educational and occupational aspirations.

1.4.2 Concepts of Study

Although the main concept of the present study is academic well-being, operationalized as school engagement and burnout, the overall aim of this thesis was to better understand the complex developmental dynamics of adolescent students´ academic and emotional functioning within the school context. In order to provide a more holistic view of such processes, several relevant factors that have been found to be influential for students' later well-being and educational and occupational success were included in the study. In addition to academic well-being (i.e., school engagement and burnout), this study focuses on factors indicating students' 1) motivational beliefs (i.e., domain-specific self-concept and interest), 2) performance (i.e., mathematics and reading), and 3) educational and occupational aspirations (i.e., students' highest aspired educational degree, and math- and reading-related occupational aspirations). In the chapters below, I argue for the conceptual choices and the empirical perspectives on which the present study is founded.

Academic Well-Being

As previously stated, scholars have defined and operationalized students' subjective well-being in various ways, but it has often been described as the presence of positive emotions as well as the absence of negative emotions (Diener et al., 2018; Huppert & So, 2013). Moreover, considering the multidimensional nature of well-being, it has also been recommended to operationalize well-being in relation to a specific context (Polland & Lee, 2013). Therefore, as the overall aim of this thesis was to investigate students' well-being in school and in relation to educational outcomes, it seemed relevant to operationalize well-being in relation to the educational context (i.e., academic well-being).

Previously, commonly used indicators of academic well-being have included different aspects of students' positive emotions towards school (e.g., school-related value, satisfaction with school, competence beliefs, and engagement) and negative emotions (school-related stress, anxiety, cynicism and burnout) (see e.g., Kiuru et al., 2020; Korhonen et al., 2014; Pietarinen et al., 2014; Scrimin et al., 2016; Torppa et al., 2020; Tuominen-Soini & Salmela-Aro, 2014). Considering the closely mirroring multidimensional frameworks of school engagement (energy, dedication, absorption) and school burnout (exhaustion, cynicism and inadequacy) and taken that these have been commonly combined indicators of academic

well-being in previous research (e.g., Tuominen-Soini et al., 2014; Salmela-Aro et al., 2016; Wang et al., 2015) and, seem to be influential for several important educational outcomes, school engagement and burnout were chosen to represent academic well-being in the present study. Both school engagement and burnout fit well within theory on the development of academic well-being, as the demands resources theory (Diener et al., 2001; 2018) emphasize the importance of studying both the motivational process of school engagement and the energy-depleting process of school burnout in parallel, as these are thought to function as distinct processes over time. Furthermore, school burnout shares several similarities with the cost-component of the EV-theory (Eccles et al., 1983), which is the framework used in this study to explain students educational and occupational aspirations. Therefore, it seems to be a relevant indicator to consider when trying to understand students' decision-making processes regarding their future.

Although there seem to be slightly different definitions and operationalizations of school engagement, the framework most commonly studied within Europe, emphasizing how students' feel about school rather than their behavior at school, was chosen in the present study. Consequently, school engagement was defined as a positive, fulfilling, study-related state of mind comprised by energy, dedication, and absorption. The definition of school-related burnout has commonly been described as a psychological syndrome comprised by exhaustion, cynicism, and inadequacy. These frameworks of school engagement and burnout have commonly been studied together, as the sub-constructs of school engagement mirror those of school burnout (see e.g., Salmela-Aro, 2016; Salmela-Aro et al., 2016).

Previous studies have applied both one and three factor solutions to both frameworks, but the one-factor solution for school engagement seems to be more commonly applied among lower- and upper secondary students, as the factors representing school engagement seem to become more separated later on in young adulthood (see e.g., Salmela-Aro & Upadyaya, 2012; Salmela-Aro et al., 2016). Therefore, in the present work, the sub-constructs were combined to represent one overall school engagement factor. The three dimensions of school burnout, on the other hand, have been found to be differently associated with various school-related outcomes (e.g., achievement: Salmela-Aro and Upadyaya, 2014; motivation: Tuominen-Soini et al., 2008, 2012) and have been commonly studied as three separate factors also among younger adolescents (see e.g., Tuominen-Soini & Salmela-Aro, 2014; Salmela-Aro et al., 2016). Therefore, exhaustion, cynicism and inadequacy were examined as distinct constructs to represent school burnout in all studies of this work.

Academic Performance

Previously, many of the existing studies investigating the relationship between academic well-being and performance, have used self-reports of students' grades or grade point averages as a measure of academic performance. The present work addressed this limitation of prior research by using standardized mathematics and reading tests to assess students' performance. More specifically, both mathematics and reading-performance was included in Study II of the present work, when investigating gendered pathways to students educational and occupational aspirations across domains, whereas Study I and II, in which the focus is on the developmental aspects of academic well-being and educational outcomes, only mathematics performance was included. Overall, both mathematics and reading are considered to represent key academic domains that have been found to be related to both motivational beliefs and well-being (Korhonen et al., 2014) in previous studies. These domains are relevant to consider when investigating gendered pathways to educational and occupational aspirations and choices, as there seem to be some persistent gender differences in both domains. Overall, in many countries, boys tend to perform slightly better in mathematics, whereas there seem to be larger gender gaps in reading, favoring girls (Else-Quest, Hyde, & Linn, 2010; Marks, 2008). Although Finland is among the highest-ranking countries in both students' mathematics and reading performance, similar gender gaps exist with regard to reading (OECD, 2019). In mathematics, however, gender differences are exceptionally small, and Finnish girls have even been found to outperform boys (OECD, 2013, 2019; Reilly, 2012).

When focusing on the developmental dynamics of academic well-being and performance, only mathematics performance was included. Overall, mathematics performance could be regarded as slightly more important for Finnish students, as high grades in mathematics generates the highest points out of all academic domains for entry into many higher education study programs, also in fields that are not directly related to mathematics. Bae et al., (2020) also found that only mathematics was related to adolescents' school engagement profiles, whereas reading was not. Studying the concurrent development of academic well-being and performance over a longer time period is also challenging because there is a lack of adaptive performance tests that enable such analysis. To my knowledge, no such test exists in Finland, for this age group, for reading.

Motivational Beliefs

Prominent motivational theories identify competence-beliefs and values as important determinants of students' motivation and subsequent academic outcomes. Considering also that previous empirical findings have found both competence-beliefs and values to be highly domain specific, self-concept and interest in mathematics and reading were included to

represent students' domain-specific motivational beliefs in the present study. Both self-concept and interest fit well within the theoretical frameworks (Expectancy-value theory, Internal/external frame of references model) that were used in this study to explain gendered pathways to students´ educational and occupational aspirations

Academic self-concept is defined as the mental representation of one's personal competencies in general or in a specific academic domain, in this case, mathematics and reading (Marsh, 2007). Although competence-beliefs are conceptually distinct from the expectancy-construct of the EVT framework, the two concepts are highly correlated and often overlap empirically (Eccles & Wigfield, 1995; Wigfield & Eccles, 2000). It has also been argued that competence-beliefs function as a larger constellation, and that expectancies may be seen as a part of this constellation. Nevertheless, self-concept is seen as a major psychological construct that leads to success in educational settings (Chen et al., 2013), and studies have even found it to be a stronger predictor of long-term occupational aspirations and educational attainment than IQ or intrinsic and utility-value motivation (Guo et al., 2015). Furthermore, domain-specific self-concept is also the key concept used within the Internal/External frame of reference model, which functions as the theoretical framework in the present study to explain gendered cross-domain pathways to students educational and occupational aspirations in the mathematics and reading domains.

Interest on the other hand, is described as a psychological state that develops as students engage with a content and, as a motivation to work with that content over time (Renninger & Hidi, 2019). Thus, it is thought to include both cognitive and affective components that exist in the interaction between the individual and the environment and is thought to always be domain specific. In the present study, the focus is on individual interest that have been described as a motivational disposition that is seen as relatively stable and sustained in a given area (see Linnenbrink-Garcia & Wormington, 2019), in this case, mathematics and reading. Individual interest can reasonably represent the task value component within the EVT framework, given that both task values and individual interest include an interest/enjoyment component and a meaning/value component (Linnenbrink-Garcia & Wormington, 2017; Wigfield & Eccles, 2000). Although task values and individual interest are theoretically distinct concepts, they overlap in the literature and are similarly related to educational outcomes.

Lastly, it should be noted, that although the present work distinguishes between how students´ *feel* about school and themselves as students (i.e., academic well-being) and what they *believe* and *value* (i.e., motivational beliefs) in the attempt to explain their academic and emotional functioning, these should not be considered as completely distinct constructs, but rather, parts that form a dynamically interacting entity. Previous studies

have, in fact, also considered students´ competence-beliefs, interest, and values to represent their well-being in school (see e.g., Korhonen et al., 2014; Tuominen-Soini et al., 2012) and, in the first study of the present work, self-concept is also described as representing students´ academic well-being, together with school engagement and burnout.

Educational and Occupational Aspirations

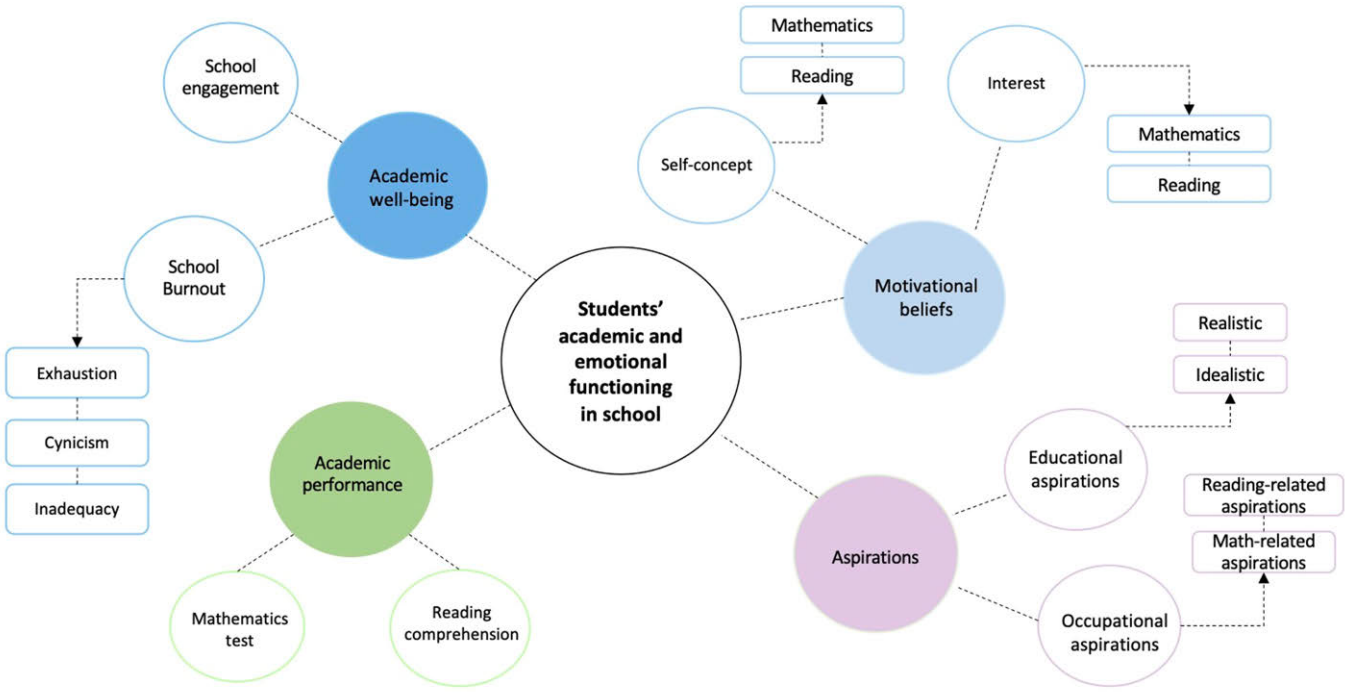
The operationalization of educational aspirations has commonly been theorized as being either idealistic or realistic (Chow et al., 2012, Durik et al., 2006, Guo et al., 2015b); idealistic aspirations referring to students' desired attainment level, whereas realistic aspirations refer to students' actual perceived likelihood of success as well as more pragmatic expectations of completing the aspired level of education (Rojewski, 2005). Although both realistic and idealistic alternatives of educational aspirations have been included in previous studies, no clear distinction between them has been made (Chow et al., 2012; Guo et al., 2015a). Therefore, both an idealistic and a realistic component were combined to represent overall educational aspirations in the present study.

Regarding occupational aspirations, the present study followed the line of research focusing on domain-specific occupational aspirations, and thus, related students' occupational aspirations to the mathematics and reading domains (i.e., math- and reading-related occupational aspirations). Investigating gendered pathways to students´ math- and reading-related occupational aspirations seems relevant considering the apparent gender differences that still exist in these fields. For example, girls seem to consistently underestimate their abilities in mathematics (e.g., Parker et al., 2014) and, recent PISA findings from Finland indicate that amongst high-performing students in mathematics or science, one in eight boys expected to work in a STEM (science, technology, engineering, mathematics) related field whereas only about one in ten girls expected to do so (OECD, 2019).

An overview of all study variables is visualized in Figure 1.

Figure 1

Students´ Academic and Emotional Functioning in School



2. Method

2.1 Main Aims

The aim of this work is to investigate the developmental dynamics between academic well-being, performance, and motivational beliefs and, further, to examine how these shape adolescent students' educational and occupational aspirations. Accordingly, the following research questions were addressed:

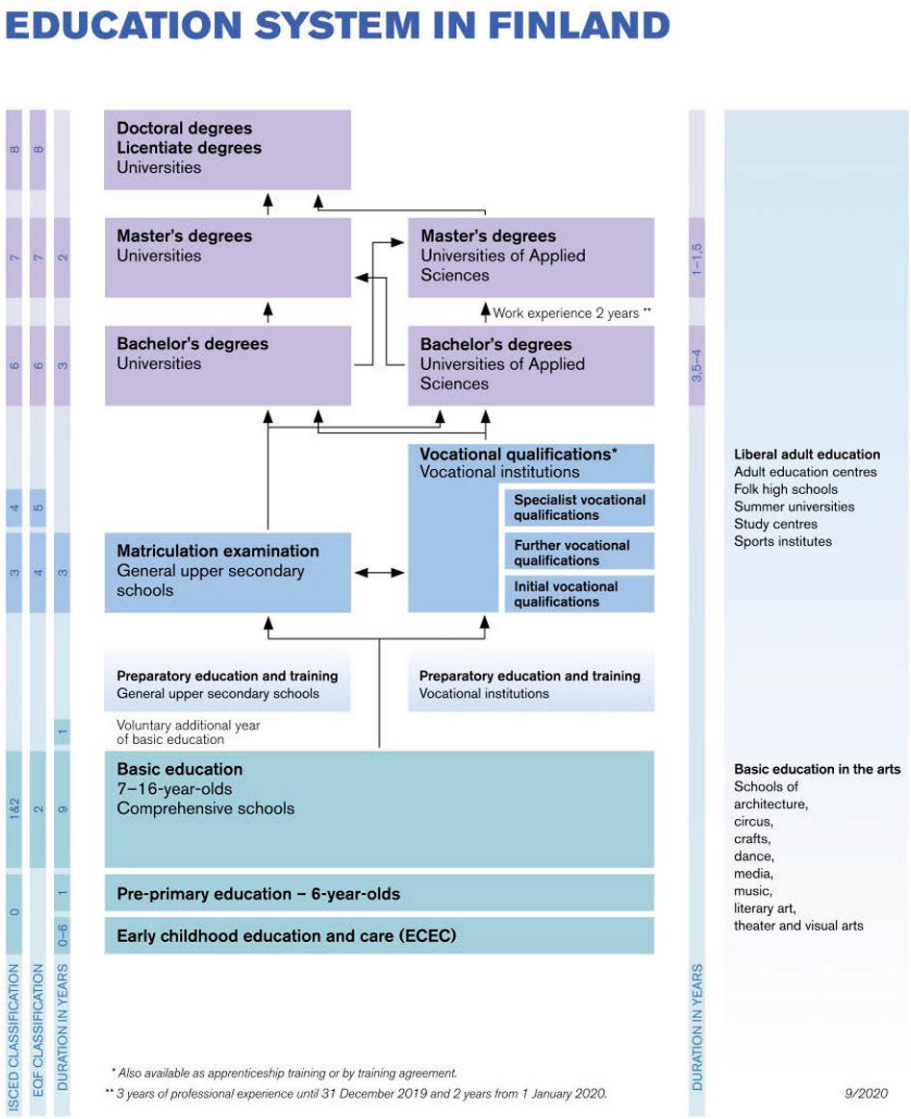
1. How does academic well-being develop among adolescent students?
2. How are academic well-being, performance, and motivational beliefs related among adolescent students?
3. How can academic well-being, performance, and motivational beliefs explain adolescent students' educational and occupational aspirations?

2.2 Context: The Finnish Educational System

The Finnish education system consists of early childhood education and care, pre-primary, compulsory education, general or vocational upper secondary education and training and higher education (see Figure 2) (Finnish National Agency for Education, 2021). Education is provided free of charge as a universal right all the way through school and higher education. The large majority of all students attend publicly funded schools. Compulsory schooling consists of one-year pre-primary education for 6-year-olds and nine-year basic education for children aged 7–16, comprising primary school (grades 1–6) and lower secondary school (grades 7–9). During primary education, instruction is mainly given by the class teacher, and during lower secondary school, by subject teachers. During the compulsory school years, students receive free learning materials, daily school meals, health and welfare services, and transport from home to school if the way to school is long. Every student attend a nearby school, but they can also choose another school with some restrictions. All schools follow a national core curriculum.

After completing compulsory schooling, students face the important decision of choosing an upper secondary education: general education (the academic track) or vocational upper secondary education (the vocational track). In Finland, the transition to upper secondary education is considered a key educational transition in adolescence and is viewed as challenging and sometimes stressful for students, due to the many simultaneous changes occurring during this time period. Also, students

Figure 2
The Finnish Education System



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may feel particularly pressured to perform during the ninth grade, as high grades are required to be able to enter academic upper secondary school and some vocational schools. Moreover, for students opting for vocational schools, the educational transition also entails selecting an occupational field.

Whereas student selection for academic upper secondary schools is mainly based on previous academic performance, selection for vocational schools may also include work experience and, for example, entrance and aptitude tests. Both academic and vocational upper secondary education last three or four years. Academic upper secondary education leads to matriculation examination that gives students a wide choice of further education options, whereas vocational school, leading to a vocational qualification, provides students with a broad vocational education and training and the skills required for working life. There is also a possibility to combine and attend both academic and vocational school. Although the structure of compulsory schools and academic upper secondary schools are rather similar, they differ in that academic upper secondary schools offer students more freedom regarding course selection, making it possible to form one´s own individual study program. Study demands and expectations also significantly increase during upper secondary education, which can be challenging and stressful for some students (Salmela-Aro & Tynkkynen, 2012).

In 2017 and 2019 when students in the two cohorts of the present work completed compulsory education, only 2-3% of students who completed compulsory education did not continue to further education. Altogether, 53-54% of students continued in academic upper secondary education, whereas 40-41% continued in vocational schools. The remaining students continued eighter in an additional, optional year of basic education or in other guidance or preparatory education, which may, for example, offer students the opportunity to supplement their knowledge and improve their grades (Official Statistics of Finland, 2020a).

After completing either academic or vocational upper secondary school students can move into higher education, which is offered in universities of applied sciences and universities. Universities commonly select students on the basis of entrance examinations and previous academic performance, and the competition for study places is rather fierce. Student selection for universities of applied sciences is usually based on academic performance, work experience, and entrance examinations.

2.3 Participants and Procedure

The data that was used in all of the three original studies in this dissertation was drawn from the Ungdomars välbefinnande och kunskap i framtidens samhälle (FRAM, 'Students' well-being and learning in future society') longitudinal project, led by Johan Korhonen (Åbo Akademi University). The project has been mainly funded by the Swedish Cultural Foundation in Finland and Högskolestiftelsen i Österbotten. The overall aim of the project is to investigate the relations between students' academic well-being, achievement, and educational pathways among Swedish-speaking

adolescents in Finland, throughout lower- and upper secondary education (Grades 7–11). The project started in 2016, and I have been involved in the planning and implementation of the data collection from the beginning. Data was initially collected by two trained research assistants from five lower secondary schools, located in different Swedish-speaking geographical areas of Finland[1]. Participation in the study was voluntary, informed consent forms were collected from the students' parents, and the participants were assured of the confidentiality of their responses.

2.4 Study Design

The research project followed an accelerated longitudinal study design, following students over a period of 4 years, by combining cohort data. Accelerated designs are useful, as they enable researchers to study individual development over a longer time period, but by gathering data during a comparatively short interval of time (see Raudenbush & Chan, 1995). In the present study, data from two cohorts were first collected in fall (T1) and spring (T2) of the school year of 2016–2017, when the participating students in Cohort 1 were studying in 7th grade, and students in Cohort 2 were in 9th grade. The same participants were followed up two years later, in fall (T3) and spring (T4) of the school year 2018-2019, when they were in Grade 9 (Cohort 1) and Grade 11; that is, studying the second year in upper secondary education (Cohort 2), respectively. Hence, the data reflect a 4-year accelerated longitudinal design, having two overlapping timepoints (fall and spring in 9th grade of each cohort), permitting the estimation of a range of trajectory points from 7th to 11th grade (see Table 1). Timepoints for which we did not have data were entered as incomplete data and were handled with the full information maximum likelihood approach implemented in Mplus (Graham, 2008). This approach takes all available information into account when estimating model parameters. Information on participants, time points, cohorts, main aims, measures, and analyses included in each study are summarized in Table 2, and an overview of the study design is visualized in Figure 3.

[1] Swedish is the minority language in Finland, where 5.2% the population is Swedish speaking (N = 289 540) (Official Statistics of Finland, 2020b).

Table 1

The Accelerated Study Design of the Present Work

	Fall Grade 7	Spring Grade 7	Fall Grade 9	Spring Grade 9	Fall Grade 11	Spring Grade 11
Cohort 1	X	X	X	X	x	x
Cohort 2	x	x	X	X	X	X

Note. X = measured values. x = estimated values.

2.5 Measures

2.5.1 School Engagement

School engagement was measured by the Schoolwork Engagement Inventory (Salmela-Aro and Upadyaya, 2012). The inventory consists of items were assessed through a seven-point Likert-type scale ranging from 0 (*never*) to 6 (*every day*). Both one- and three-factor solutions of school engagement are applicable when using the inventory (Salmela-Aro & Upadyaya, 2012). However, it has been suggested that among younger students, the sub-dimensions of school engagement are better described as an overall engagement construct, whereas later, for example, among university students, they seem to become more separated (Salmela-Aro & Upadyaya, 2012, see also Schaufeli et al., 2002). Accordingly, a one-factor solution was used to represent overall school engagement in this dissertation. The Swedish version of the inventory was obtained from the PISA2015 questionnaire (OECD, 2016).

2.5.2 School Burnout

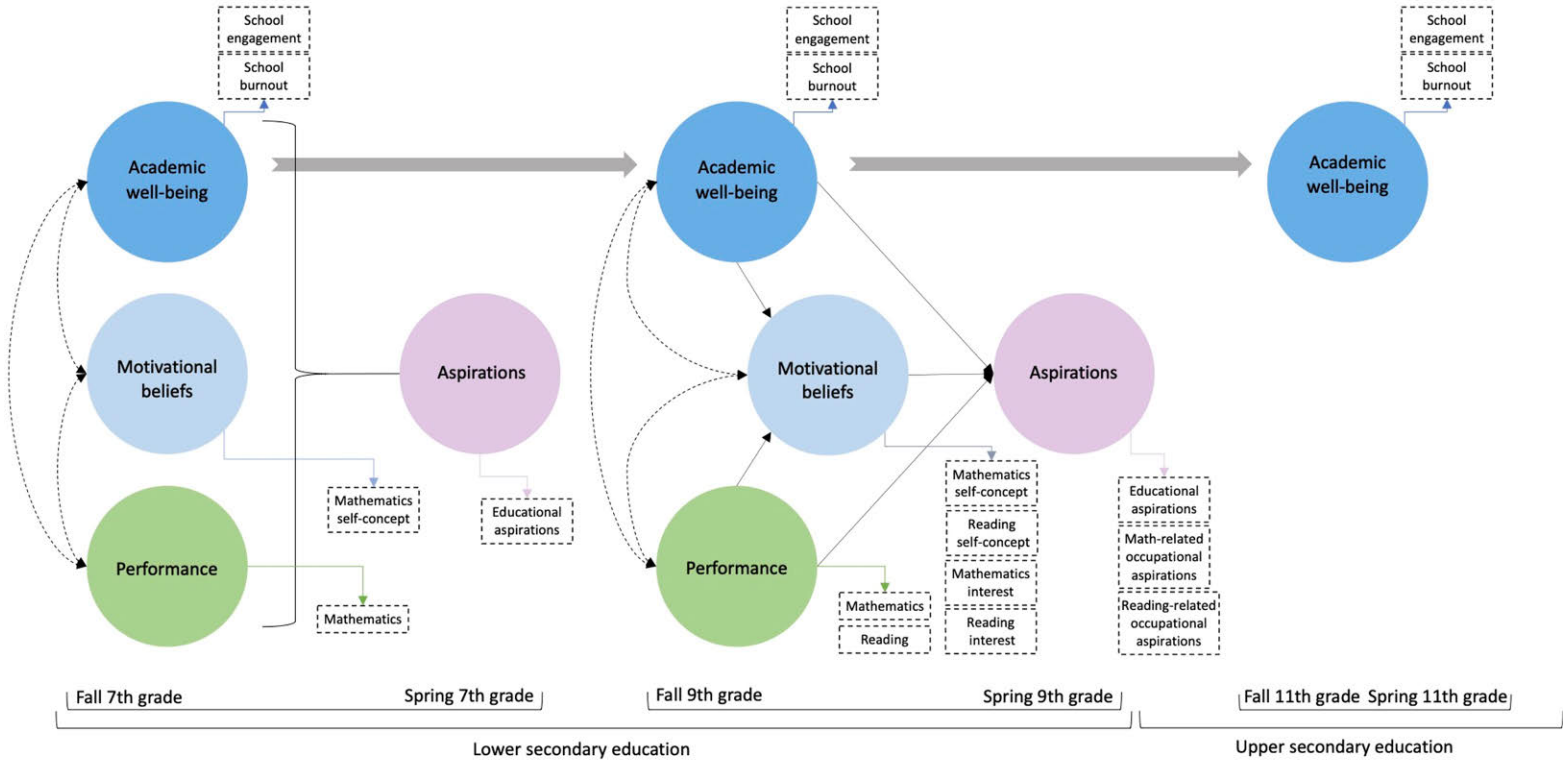
School burnout was assessed by the nine-item School Burnout Inventory (SBI; Salmela-Aro et al., 2009a). The SBI scale is divided into three subscales: four items measuring emotional exhaustion (e.g., *I feel overwhelmed by my schoolwork*), three items measuring cynicism toward the meaning of school (e.g., *I feel that I am losing interest in my schoolwork*), and two items measuring the sense of inadequacy at school (e.g., *I often have feelings of inadequacy in my schoolwork*). This three-factor structure has been confirmed in several previous studies (see Salmela-Aro et al., 2009a; Fiorilli et al., 2014; Tuominen-Soini & Salmela-Aro, 2014). All items were assessed using a six-point Likert-type scale ranging from 1 (*completely disagree*) to 6 (*completely agree*). The Swedish version of the inventory was obtained from the PISA2015 questionnaire (OECD, 2016).

Table 2

Summary of the Participants, Aims, Measures, and Data Analyses

Study	Participants	Main aims	Measures	Data analyses
Study I	Cohort 1 & 2: Time 1 & Time 2 • 7th graders (*N* = 583) • 9th graders (*N* = 497) Measurement period ≈ 9 months	To investigate lower secondary school students' academic well-being and mathematics performance profiles, the stability of the profiles during one school year, and their relations to educational aspirations.	• Mathematics performance • Mathematics self-concept • School engagement • School burnout • Educational aspirations	• Longitudinal confirmatory factor analysis • Latent profile analysis • I-States as Objects Analysis procedure • Configural frequancy analysis • Analysis of variance • Chi-square tests
Study II	Cohort 1: Time 3 Cohort 2: Time 1 • 9th graders (*N* = 966)	To investigate gendered pathways from performance, motivational beliefs, and school burnout to students' educational and occupational aspirations concidering two academic domains: mathematics and reading	• Mathematics performance • Reading performance • Mathematics self-concept and interest • Reading self-concept and interest • School burnout • Educational aspirations • Occupational aspirations	• Confirmatory factor analysis • Multiple group confirmatory factor analysis • Multi-group structural equation modeling • Wald chi-squaire test
Study III	Cohort 1 & 2: Time 1, 2, 3, & 4 7^{th} – 11^{th} grade (*N* = 1131) Measurement period ≈ 4 years	To investigate inter- and intraindividual differences in adolescents' trajectories of school engagement and burnout and their associations with students' concurrent progression in mathematics performance and educational aspirations	• School engagement • School burnout • Mathematics performance • Educational aspirations	• Confirmatory factor analysis • Longitudinal confirmatory factor analysis • Growt mixture modeling • Analysis of variance • Chi-squaire tests

Figure 3
Overview of the Study Design



2.5.3 Mathematics Performance

The students' mathematical skills were assessed with a standardized First, the candidate items with known difficulty level were selected from mathematical tasks originally used in the national assessments. Second, the item bank of 130 items were selected to be used in the test based on a sample of Finnish speaking students (N = 1157). All subjects solved subsamples of 40 items (with 10 anchor items in each test). The Cronbach alpha reliability was 0.89 (Räsänen & Leino, 2005). In our project, the Finnish-Swedish translation of the battery was used. In this version, the norms (IRT-values) were calculated from a sample of Finnish-Swedish speaking students (N = 1140) from grade levels 7–9 representing a national sample at that age.

The online assessment has three steps. First, the student is asked to evaluate the difficulty of a single calculation task (easy, average, difficult). Based on the student's answer, the system randomly selects the first item from a pool of items from easy, average, or hard items defined by their IRT delta value (difficulty parameter). In the second step, the system gives additional four items randomly from the pool of the items. In the third step, the system starts to recalculate a theta value (the estimated level of skill in the logit scale) after each given solution and selects the most informative item to be presented based on the delta and beta values (difficulty and discrimination parameters) from the remaining pool of items. The termination rule of the third step is that the theta value changes less than 2% from the current skill estimate after presenting a new item or that the subject has reached the maximum number of items (20) to be presented. To help the interpretation of the results the system transforms the student's theta value automatically into a more familiar scale for educational practitioners using the test with a mean of 100 points (SD = 15). Likewise, the results in the studies of this thesis are presented using these transformed values.

2.5.4 Reading Performance

Reading performance was assessed through the *Klassdiagnoser i läsning och skrivning för högstadiet och gymnasiet* (LS) reading ability test (Johansson, 2005). LS is a standardized test for Grades 7 through 9 (13–16 years) and Grade 1 in upper secondary school (16–17 years). The test identifies students with reading difficulties. In this thesis, the subtest measuring reading comprehension was used to represent reading performance in Study II. The items measuring students' reading comprehension skills in Swedish consist of five short texts that the students must read. Then they must choose the correct title for each text from four suggestions and subsequently choose the correct statements out of six statements about the content of the text.

2.5.5. Self-Concept and Interest

Items measuring self-concept and interest in mathematics and reading came from Marsh's (1992) Self Description Questionnaire I (SDQ I, see also Arens & Hasselhorn, 2015; Pinxten, Marsh, De Fraine, Van Den Noortgate, & Van Damme, 2014). Three items were used to assess both interest (e.g., *I like mathematics/reading*) and self-concept (e.g., *I learn things quickly in mathematics/Swedish*) in both domains. The items were assessed by a five-point Likert-type scale ranging from 1 (*completely false*) to 5 (*completely true*).

2.5.6 Educational Aspirations

Two statements representing students' idealistic and realistic educational aspirations were combined to represent overall educational aspirations (see e.g., Korhonen et al., 2016): *highest academic degree I want to achieve* and *highest academic degree I will probably achieve*, assessed using a 4-point ordinal scale (1 = *comprehensive education,* 2 = *vocational upper secondary education*, 3 = *university of applied sciences*, and 4 = *university*).

2.5.7 Occupational Aspirations

Participants were asked to list their dream job by an open-ended question. Their aspired occupation was then coded based on how much mathematics- or reading-skills each job requires by using the O*NET (Occupational Information Network) database (National Center for O*NET Development, n.d.). The math- and reading-importance scores, each ranging from 0 (*not mathematics/reading-related)* to 100 (*completely mathematics/reading-related*) in the O*NET database were used to quantify the aspired occupation for math- and reading-relatedness.

2.5.8 Socioeconomic Status

Participants were asked to list their parents' education and current occupation. The answers were then coded according to Official Statistics of Finland's (n.d.) social classification based on education and occupation. A new variable was created based on the mean score of each parents' education and occupation, to represent SES.

2.6 Analytical Approaches

2.6.1 Variable-Centered Approach

Variable-centered approaches, such as regression, factor analysis and structural equation modelling, are conducted to understand general principles that connect variables on a larger scale (Laursen & Hoff, 2006).

One of the main aims with variable-centered approaches is to identify significant predictors of outcomes and describe how dependent and independent variables are related. In other words, they are useful for addressing relative contributions that predictor variables have on an outcome, focusing on the identification of relationships between variables (e.g., regression or correlational analyses) or investigation of mean differences (e.g., analysis of variance). For example, in Study II, the relations between academic performance, motivational beliefs, academic well-being and educational and occupational aspirations were studied with variable-centered approaches by using structural equation modeling. Thus, we were, for example, able to examine the way school burnout predicts educational and occupational aspirations while also controlling for performance and motivational beliefs. Furthermore, variable-centered approaches were also used in combination with person-centered approaches in Study III, as we used growth curve modeling-analyses in combination with person-centered approaches to identify longitudinal trajectory-profiles among students, and also, in Study I and III to determine mean-level differences between student profiles by using analyses of variance and chi-square tests. Overall, variable-centered analyses are well-suited for isolating unique effects and generalizing the findings across the whole sample of students and, thus, provide findings that would apply, on average, across the entire grade. However, considering that previous findings suggest that students´ do not all express the same patterns of academic well-being, motivational beliefs and performance, there might be some challenges to translating variable-centered findings to, for example, the classroom, as the results may not align with students' complex multifaceted patterns of academic- and emotional functioning.

2.6.2 Person-Centered Approach

The person-centered approach bypasses some of the challenges with variable-centered analyses. The focus in person-centered approaches is to identify groups of individuals who share particular attributes or relations among attributes. In contrast to variable-centered approaches, person-centered approaches focus on describing differences between individuals and thus, do not assume that the sample can be described by a single set of averaged parameters. Instead, the person-centered approach assumes that the sample might reflect several subgroups of individuals characterized by similar variable values (Lubke & Muthén, 2005). In the present work, person-centered analyses were applied in Study I and III, to examine what kinds of academic well-being and performance profiles can be identified among 7th and 9th graders, and also to investigate how students differ in their longitudinal trajectories of academic well-being. Although some students appear to share the same levels of, for example, performance,

person-centered analyses might place them in different profiles if they differ in their levels of school burnout. Thus, the goal is to classify individuals into distinct groups based on individual response patterns so that individuals within a group are more similar than individuals between groups (Jung & Wickrama, 2008). By comparing students in different profiles, researchers might be able to better answer which types of academic well-being and performance patterns might be most beneficial for their educational aspirations. The person-centered approach is also beneficial for practice, as this information might provide recommendations for teachers on how to identify and support students with different needs, strengths and challenges in the classroom.

2.7 Data Analysis

2.7.1 Missing Data

In Study I, the missing data were handled by imputing missing values with the expectation-maximization (EM) algorithm implemented in SPSS (Dempster et al., 1977). In Study II and III, the full information maximum likelihood (FIML) approach implemented in Mplus, which takes all available information into account when estimating model parameters, was used to deal with the missing data (Graham, 2008).

2.7.2 Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) is a type of structural equation modeling (SEM) that focus specifically on the relationships between observed measures or indicators (e.g., test items, test scores) and latent variables or factors (Brown, 2015). In the present work, CFAs were used to examine the latent structure of all measurements that were conducted, that is, to verify the number of underlying dimensions of the instruments (factors), and how well each item loads on the corresponding factors. CFA is useful whenever the researcher has prior knowledge, based on past evidence and theory, of the number of factors that exist in the data, as CFA, unlike exploratory factor analysis, requires the researcher to specify all aspects of the model. Furthermore, a strength of CFA approaches to construct validation is that the resulting estimates of convergent (i.e., evidence that items measuring the same construct are strongly interrelated) and discriminant (i.e., evidence that items measuring distinct constructs are not strongly intercorrelated) validity are adjusted for measurement error (Brown, 2015).

In the present work, all CFAs were carried out in the Mplus statistical program, and the maximum likelihood estimation with robust standard errors was used to estimate model parameters in Study I and II, while

maximum likelihood estimation was used in Study III. In all analyses, chi-square ($\chi 2$), the comparative fit index (CFI), the Tucker–Lewis Index (TLI) and the root mean square error of approximation (RMSEA) were used as model-fit indicators. CFI and TLI are incremental fit indices that compare the fit of a hypothesized model with that of a baseline model (i.e., a model with the worst fit), whereas RMSEA is an absolute fit index, in that it assesses how far a hypothesized model is from a perfect model. The CFI and TLI vary along a 0-to-1 continuum, and values greater than 0.90 and 0.95 reflect acceptable and excellent fit to the data, respectively. RMSEA values of less than 0.05 and 0.08 reflect a close fit and a reasonable fit to the data (Marsh et al., 2004).

Multiple Group and Longitudinal Confirmatory Factor Analysis

Another strength of CFA is its ability to determine how well measurement models generalize across different groups of individuals or across timepoints (Brown, 2015). Both multiple group CFA and longitudinal CFA are extensions of the CFA model, where the goal is to determine whether measurements are invariant across groups (Multiple group CFA: if they measure the same underlying constructs in both groups) or across time (i.e., Longitudinal CFA: if they measure the same underlying constructs at all time points). In the present work. Multiple group CFAs were performed in Study II and III to test for measurement invariance across cohorts, and also, in Study II, to test for measurement invariance across genders as this enables reliable group comparison of latent constructs under study. Longitudinal CFAs, on the other hand, were conducted in Study I and III to ensure that the constructs under study were invariant over time, to rule out the possibility that changes in the measurement model, or measurement error, would account for temporal changes in the constructs.

The invariance testing for both multiple group and longitudinal CFA follow similar steps. A series of nested models are specified, where the endpoints are the least restrictive model with no invariance constraints, and the most restrictive model that constrains all parameters to be equal across groups or time (Brown, 2015). First, a baseline model is specified, imposing no invariance constraints on the factor loadings and indicator intercepts. If the goal is to compare groups in structural relations between constructs, the baseline model is compared to a model imposing metric invariance, where the requirement is that the factor loadings are constrained to equality. Lastly, if the goal is to compare groups in latent means, or to study changes over time, the metric model is compared to a model imposing scalar invariance, as these require that both factor loadings and indicator intercepts are strained to equality (Brown, 2015). To test the statistical significance between nested models, one can use chi-square difference testing or compare fit indices (CFI, RMSEA) between models. It is suggested that support for the more parsimonious model requires a

change in the CFI of less than 0.01 and in the RMSEA of less than 0.015 (Chen, 2007).

Structural Equation Modeling

Structural equation modeling (SEM) combines CFA and multivariate regression analysis and is used to analyze the structural causal relationship between measured variables and latent constructs (Byrne, 2013). Thus, the SEM model can be composed as having two steps: (a) specifying a measurement model (i.e., CFA) that defines the relation between the observed and unobserved variables, and (b) specifying a structural model that defines relations among the unobserved (or latent) variables. Accordingly, it is used to determine whether some latent variables directly or indirectly influence changes in the values of some other latent variables in the model. To determine whether the estimated SEM model fit the data, model-fit indices can be used in similar ways as in CFA, that is, by evaluating chi-square (χ^2), the comparative fit index (CFI), the Tucker–Lewis Index (TLI) and the root mean square error of approximation (RMSEA). In the present work, multiple group SEM was conducted in Study II to examine gendered pathways to educational and occupational aspirations.

2.7.3 Latent Profile Analysis

Latent profile analysis (LPA) is a categorical latent variable modeling approach that aims to identify latent subgroups within a population based on a certain set of variables (Lubke & Muthén, 2005). Thus, LPA assumes that individuals can be identified that have different configural profiles of personal and/or environmental attributes. Compared to traditional, non-latent clustering methods (e.g., k-means clustering), LPA treats profile membership as an unobserved categorical variable, where its value indicates which profile an individual belongs to with a certain degree of probability. The focus is on identifying the smallest number of groups of individuals sharing similar patterns of variables and comparing these with each other. (Muthén & Muthén, 2000). The final solution of latent profiles and the sizes of them are not known prior to analysis. Instead, LPA provides fit indices that enable a comparison between different profile-solutions. Profiles are added stepwise until the model optimally fits the data.

Although there is no single commonly accepted statistical indicator for deciding on the number of classes in a study population, researchers often use a combination of criteria to guide the decision on the number of classes. In the present work, the Bayesian Information Criterion (BIC) and the Vuong–Lo–Mendell–Rubin (VLMR) were used as the statistical criteria. A decrease in BIC when an additional class is added is indicative of a better model fit. The VLMR (Lo, Mendell, & Rubin, 2001) compares the improvement in fit between neighboring class models. Resulting *p* values

can be used to determine whether there is a statistically significant improvement in fit for the inclusion of one more class. Thus, *p* values less than .05 indicate that the estimated model is preferable to the reduced model. In addition, classification quality (i.e., entropy value), the usefulness and interpretableness of the latent classes (e.g., the number of individuals in each class), as well as the reasonableness of the solutions in relation to theory and prior research were also considered when choosing the best-fitting model (see Marsh et al., 2009; Pastor et al., 2007).

2.7.4 Growth Mixture Modeling

Conventional growth modeling (GM) assumes that the growth trajectories of all individuals can be adequately described using a single estimate of growth parameters. Thus, GM approaches give a single average growth estimate and an estimation of variance of the growth parameters and assumes a uniform influence of covariates on the variance and growth parameters (Muthén & Muthén, 2000). However, there may exist a subset of individuals whose growth trajectories are significantly different from the overall estimate. Growth mixture modeling (GMM) allows for differences in growth parameters across unobserved subpopulations. The term "mixture" refers to the assumption that the data are not being sampled from a population that can be described by a single probability distribution, but instead, from a population composed of a mixture of distributions, one for each subgroup. This is accomplished using latent trajectory classes which allow for different groups of individual growth trajectories to vary around different means. The results are separate growth models for each latent profile, each with its unique estimates of variances and covariate influences (Muthén & Muthén, 2000).

In Study III of this work, GMM was performed as a multistep process to examine trajectories of school engagement and burnout (exhaustion, inadequacy, and cynicism). The steps encompassed (a) examination of the functional form of change across the whole sample using latent growth models and then (b), class identification using latent profile analysis (LPA, see Petras & Masyn, 2010, and also Gaspard et al., 2019). Furthermore, multiple group growth models were also conducted to examine how students in different academic well-being trajectory profiles differed in their concurrent trajectories of mathematics performance and educational aspirations in Study III.

2.7.6 Analysis of Variance

Analysis of variance (ANOVA) is used to investigate group differences in a dependent variable. In the present work, one-way ANOVAs were used in both Study I and III to validate the profile solutions and to examine in detail how students in different profiles differed across clustering variables (e.g.,

academic well-being and/or performance). ANOVAs were also performed to examine how students in different profiles differed with respect to external variables (i.e., variables not used to determine profile membership). The examination of the relationships between profile membership and external variables is often performed to offer validity evidence for the profile solution (see Pastor et al., 2007). In the present work, after having established the different academic well-being and/or performance profiles, one-way ANOVAs were conducted to examine how students in distinct profiles differed with respect to educational aspirations (Study I) and socioeconomic status (Study III).

2.7.7 Chi-Square Tests and Adjusted Residuals

Independent samples chi-square test (χ^2) is used to determine if there is an association between two categorical variables. The chi-square test was used in Study I to examine the association between the academic well-being and performance profile membership and gender. Similarly, chi-square tests were conducted to examine differences between genders and cohort within the academic well-being trajectory profiles in Study III. In both studies, observed frequencies were compared to expected frequencies in a crosstabulation, and the chi-square test determined whether the differences were statistically significant. To determine which cells' observed frequencies differed from the expected frequencies, the adjusted residual in each cell were examined. If the residual exceeded the critical value of 1.96 in a z-distribution, the observed frequencies differed significantly from the expected frequencies.

2.7.8 Configural Frequency Analysis

Configural frequency analysis was conducted to examine the stability and change of academic well-being and performance profiles over one academic school year in Study I (Bergman et al., 2003; von Eye, et al., 1996). This approach enables identification of patterns of change (or stability) that are more frequent (type) or less frequent (antitype) than would be expected based on some chance model. The first order configural frequency analysis, which assumes that variables under study may show main effects but no interaction effects, was selected as the baseline model for expected frequencies. The observed frequencies from the cross classification of the first (T1) and second (T2) profile grouping were compared to the expected frequencies to identify types and antitypes of change and stability in the profiles. Cells that contain more cases than expected constitute types, while cells that contain fewer cases than expected constitute antitypes. The Bonferroni method was used for alpha adjustment in the analyses.

3. Overview of Original Studies

The overall aim of this thesis was to investigate the developmental dynamics between academic well-being, performance, and motivational beliefs and how these shape adolescent students' educational and occupational aspirations. The thesis consists of three empirical studies. The first study (Study I) focused on the relations between academic well-being and mathematics self-concept and performance among 7th and 9th graders by utilizing a person-centered approach (LPA), the stability of these profiles during one academic school year, as well as how students in different profiles differed in their educational aspirations. In the second study (Study II), we used a variable-centered approach (SEM) to investigate overall cross-domain pathways from performance, motivational beliefs and school burnout to boys' and girls' educational and occupational aspirations in mathematics and reading. Lastly, the third study (Study III) focused on both inter and intra-individual development of academic well-being from 7th grade to upper secondary education, and how different developmental profiles of academic well-being were related to students' concurrent progression in mathematics performance and educational aspirations.

3.1 Study I

Widlund, A., Tuominen, H., & Korhonen, J. (2018). Academic well-being, mathematics performance, and educational aspirations in lower secondary education: Changes within a school year. *Frontiers in Psychology*, *9*, 297. https://doi.org/10.3389/fpsyg.2018.00297

The aim of Study I was to investigate lower secondary school students' academic well-being (school engagement and burnout, mathematics self-concept[2]) and mathematics performance profiles, the stability of the profiles during one school year, and their relations to educational aspirations.

A total of 583 students in seventh grade (293 girls and 290 boys, mean age = 13.29 years, SD = 0.35) and 497 students in ninth grade (261 girls and 236 boys, mean age = 15.23 years, SD = 0.31) participated in the study during one school year, 2016–2017. Students completed self-report questionnaires on school engagement, school burnout, mathematics self-

[2] In Study I, mathematics self-concept was, for clarity, referred to as representing students' academic well-being, although it is categorized as representing students' motivational beliefs in the present work.

concept and educational aspirations during one 45-min class session and a mathematics test during another 45-min class session both at the beginning (T1) and at the end (T2) of the school year.

The missing data in this study were handled by imputing missing values with the expectation-maximization (EM) algorithm. The analyses started by analyzing the structural stability of each measure through longitudinal confirmatory factor analysis (LCFA). We then followed a person-centered approach to identify students with similar patterns of academic well-being, mathematics self-concept, and performance through latent profile analysis. Configural frequency analyses were used to examine the stability of and changes in group memberships from T1 to T2. Finally, analyses of variance were conducted to examine how students within the different profiles differed with respect to their educational aspirations. The MPLUS (version 8) program was utilized to conduct the LCFAs and the LPAs. ANOVAs and chi-square tests were conducted with SPSS (Version 24).

The LCFA was performed simultaneously for seventh and ninth grade data on items representing academic well-being in Times 1 and 2. A model was specified in which all items for each scale were allowed to load on the corresponding factor only. We tested both configural, metric and scalar invariance, and the fully invariant model fitted the data well and did not worsen the model fit, indicating that the levels of the underlying items were equal at both time points. Therefore, the prerequisite for meaningful measurement invariance was achieved. Next, to identify the cluster memberships in longitudinal data, we used the I-States as Objects Analysis (ISOA) procedure (Bergman & El-Khouri, 1999; Bergman et al., 2003), as it is optimal for studying short-term development. The key assumption for the ISOA approach is that the same typical patterns occur at all time points, although the proportion of the sample that belongs to each typical pattern may vary across time, and that some individuals may change the typical pattern they belong to. Since the Study I consisted of two time points, each person was characterized by two I-states. The I-states could therefore be identified despite the time dimension, and the classification can be used to describe individual development. Thus, the longitudinal data were reorganized in a way that the data for each student for both measurement points was coded as a separate case. After that, a series of LPAs (Muthén & Muthén, 2000; Vermunt & Magidson, 2002) was carried out on the reorganized data to identify students with similar patterns of academic well-being and mathematics performance.

The LPA results showed that a three-class solution described the data best for the 7th grade students, whereas a four-class solution was supported among the 9th grade students. The groups in seventh grade were named as *Thriving, Average,* and *Negative academic well-being*. Since three of the groups in ninth grade were very similar to the three groups in

seventh grade, the same names were used for both grades. The fourth group in ninth grade was named as *Low-performing* students.

In both grades, the *Thriving* students scored significantly higher in mathematics performance than the other groups and also had higher scores on mathematics self-concept and school engagement as well as relatively low scores on all dimensions of school burnout. The Thriving group in both grades was also slightly overrepresented by boys, and ANOVAs revealed that these students aspired for higher educational degrees in comparison to the other groups. The largest groups in both grades were the *Average* students, who showed average scores on all measures, both in mathematics performance and in the academic well-being measures. Although the students in the *Average* group had average scores on the measures, in comparison with the other groups, they still had the second highest score on both performance and burnout. Next, students in the *Negative academic well-being* group had significantly higher scores on all dimensions of school burnout in comparison with the other groups. The *Negative academic well-being* group in 7th grade had the lowest scores in mathematics self-concept and engagement as well, whereas the 9th graders' self-concept and engagement did not differ significantly from the *Low-performing* students' scores. Both the 7th and the 9th grade students in this group performed significantly lower in mathematics than the *Average* students, but these groups did not differ in educational aspirations. Also, in both grades, this group was overrepresented by girls. Lastly, the fourth group found in 9th grade was the *Low-performing* students, which was overrepresented by girls. These students performed the lowest in mathematics and had low scores on mathematics self-concept as well. However, interestingly, their scores on all dimensions of school burnout were quite positive and did not differ significantly from the scores of the *Thriving* students. Also, their engagement in school was rather average but they had the lowest educational aspirations of all groups at T2.

Regarding stability over one school year, configural frequency analyses revealed that approximately 64% of the students in 7th grade displayed a stable academic well-being and mathematics performance profiles over time. All remaining configurations represented antitypes, indicating that it was untypical for students in 7th grade to change between profiles during one school year. In 9th grade, approximately 57% of the students displayed a stable academic well-being and mathematics performance profile over time. *Thriving* students were unlikely to move to the *Average* and the *Negative academic well-being* group, and it was also untypical for students in the *Negative academic well-being* group to move to the *Thriving* group.

To summarize, Study I demonstrated the added value of employing a person-centered approach when investigating the relation between academic well-being and mathematics performance among adolescent students, as we found both linear and non-linear relations between

student's academic well-being and performance. Although the majority of students seemed to perform quite well in mathematics and expressed a rather positive pattern of academic well-being and held relatively high educational aspirations, the proportion of students belonging to the *Negative academic well-being* group was more than 15%. The study also indicated that students' academic well-being profiles are relatively stable over one school year. The study contributed to previous knowledge by taking into account students' mathematical skills as well as various aspects of academic well-being simultaneously, as this gives a more comprehensive understanding of students' academic and emotional functioning and of the way it is linked with educational aspirations during critical transition periods, when adolescents are making choices regarding their future education and occupation. With this understanding, we might be able to identify the at-risk students and discover ways to best support students to find suitable educational pathways for themselves and to thrive in school.

3.2 Study II

Widlund, A., Tuominen, H., Tapola, A., & Korhonen, J. (2020). Gendered pathways from academic performance, motivational beliefs, and school burnout to adolescents' educational and occupational aspirations. *Learning and Instruction*, *66*, 101299. https://doi.org/10.1016/j.learninstruc.2019.101299

In Study II, we investigated boys' and girls' pathways to educational and occupational aspirations considering two key academic domains (mathematics and reading) by including i) performance (test scores), ii) motivational beliefs (self-concept and interest), and iii) school burnout (exhaustion, cynicism, and inadequacy) as predictors. We also aimed to complement prior research by iv) investigating cross-domain relations between mathematics and reading domains for boys and girls.

Data used in this study were collected in Fall 2016 (Cohort 1), when 464 students participated (217 boys, 247 girls), and was supplemented in Fall 2018 (Cohort 2), when 502 students participated (244 boys, 258 girls). Altogether, 966 (52% girls) students in 9th grade were included in the final sample. The participating students completed a mathematics test, a reading comprehension test, and a self-report questionnaire on educational and occupational aspirations, motivational beliefs, and school burnout during three 45-min class sessions.

Due to slight non-normality and missing data in some of the items, full information maximum likelihood with robust standard errors that uses all available information, was used as an estimator in the analyses. The structural validity of each measurement was analyzed through confirmatory factor analysis (CFA) and multiple group CFA (for cohorts and

gender). Then, a series of multi-group structural equation models (SEM) were fitted to the data to explore the relations from performance, motivational beliefs, and school burnout to educational and occupational aspirations. All analyses were conducted using the MPLUS (version 8) program (Muthén & Muthén, 1998–2017).

Multiple group CFA revealed that measurement invariance was confirmed for both cohorts, and for boys and girls. Our hypothesized SEM fitted the data well, and explained 34% of the variance in educational aspirations, 10% of the variance in math-related occupational aspirations, and 18% of the variance in reading-related occupational aspirations for boys. For girls, the model explained 33% of the variance in educational aspirations, 10% of the variance in math-related occupational aspirations, and 12% of the variance in reading-related occupational aspirations.

Overall, the findings were in line with our expectations based on the expectancy-value theory and previous empirical studies (e.g., Korhonen et al., 2016; Nagy et al., 2006) and, both similarities and differences between boys' and girls' pathways to educational and occupational aspirations were found. The results revealed that performance in both mathematics and reading were related to girls' aspirations, whereas only mathematics performance was linked to boys' aspirations. However, mathematics performance was related to both math- and reading-related occupational aspirations for both genders, suggesting that it could be regarded as a slightly more important factor in shaping students' career goals in general. Similarly, motivational factors in both mathematics and reading domains were associated with girls' aspired educational degrees, whereas math-related beliefs were clearly more important for boys. It was also revealed that motivational beliefs sometimes mediated the relation between students´ performance and their aspirations. In addition, when examining cross-domain relations, we found that higher levels of reading self-concept for girls was related to lower math-related occupational aspirations.

Regarding school burnout, feelings of exhaustion appeared to be positively related to both boys' and girls' aspired educational degrees, indicating that more ambitious aspirations, at least to some extent, are related to higher levels of exhaustion. However, cynical attitudes towards school and feelings of inadequacy as a student were associated with lower levels of educational aspirations for both genders.

Taken together, the results of Study II can be taken to emphasize the importance of taking into account several factors when supporting students' career-planning. Considering that performance, motivational beliefs, and well-being all clearly matter for students' educational and occupational aspirations, problems in any of these should be recognized and supported. Also, considering that students' domain-specific aspirations may be influenced by their performance, competence beliefs and values in other domains, teachers and parents should acknowledge such cross-

domain patterns when supporting students' decision-making processes. This could be particularly important for girls, as their motivational beliefs and aspirations in different domains seem to be more negatively interlinked and might therefore unnecessarily narrow down their aspired career alternatives. Further, the results emphasize the importance of acknowledging the possible strain students' negative feelings towards school might have on their aspirations, and the potential emotional cost of having ambitious aspirations. Thus, these findings demonstrate that resources are needed to support not only students' performance, but also their motivation and well-being, in order to help them in their goal setting and career planning.

3.3 Study III

Widlund, A., Tuominen, H., & Korhonen, J. (2021). Development of school engagement and burnout across lower and upper secondary education: trajectory profiles and educational outcomes. *Contemporary Educational Psychology, 66,* 101997. https://doi.org/10.1016/j.cedpsych.2021.101997

The aim of Study III was to identify distinct groups of adolescents who follow similar longitudinal trajectories of school engagement and burnout (exhaustion, cynicism, and inadequacy) from lower- to upper secondary education (7th to 11th grade). The aim was also to investigate how students with different trajectories of school engagement and burnout differ with respect to individual factors (gender, SES) and concurrent progressions in educational outcomes (mathematics performance, educational aspirations).

The study utilized an accelerated design and followed the students over a period of 4 years. The participants were initially recruited in lower secondary school in fall (T1) and spring (T2) of the school year 2016–2017 when they were in Grade 7 (Cohort 1) and Grade 9 (Cohort 2). The same participants were followed up two years later, in fall (T3) and spring (T4) of the school year 2018–2019, when they were in Grade 9 (Cohort 1) and Grade 11; that is, studying the second year in upper secondary education (Cohort 2), respectively. The data from the two cohorts were then merged together to enable the estimation of a range of trajectory points from 7th to 11th grade (ages 13 to 17). By doing so, 6 measurements representing school engagement and burnout scores in 7th grade (fall and spring), 9th grade (fall and spring) and 11th grade (fall and spring) were estimated for every student. We used data from all students who had reported on their school engagement and burnout at least once across the four waves of data collection, resulting in a total of 1131 students (50.9% girls) from the original cohorts (n = 622 for Cohort 1 and n = 509 for Cohort 2). Timepoints

for which we did not have data were entered as incomplete data, and the full information maximum likelihood approach implemented in Mplus was used in all analyses to deal with missing data (Graham, 2008). All analyses were carried out in Mplus version 8 (Muthen & Muthen, 1998–2017).

The analyses started by examining the structural validity of each measurement, for each time point, through confirmatory factor analysis, and also, by analyzing the structural stability of each well-being measure through longitudinal confirmatory factor analysis, separately for each cohort. Next, growth mixture modeling (GMM: Muthén, 2004) was performed as a multistep process to examine trajectories in school engagement and burnout (exhaustion, inadequacy, and cynicism). The steps encompassed (a) examination of the functional form of change across the sample using latent growth models (LGM) and (b), class identification using latent profile analysis (LPA, see Petras & Masyn, 2010, and also Gaspard et al., 2019). Differences between classes in student characteristics were examined using ANOVAs and chi-square tests. Lastly, we examined whether students with different school engagement and burnout trajectories differed with respect to their trajectories of mathematics performance and educational aspirations (from 7th to 9th grade) by using multiple group LGMs.

The GMMs revealed four meaningful trajectory profiles among adolescents: *Positive academic well-being, Negative academic well-being, Disengaged,* and *Declining academic well-being*. Students in the *Positive academic well-being* group (34%) expressed the most positive overall mean levels and stable development of both school engagement and burnout overall. These students also performed higher in mathematics, progressed at the fastest rate from 7th to 9th grade, and also, aspired for higher educational degrees in comparison to the other groups. There were slightly more boys than girls in this group.

The second group, namely the *Negative academic well-being* group included 32.4% of all students, and, these students expressed relatively low levels of school engagement, and also, rather high levels of exhaustion, inadequacy, and cynicism in school. The development during lower secondary education was also rather unfavorable, although the trajectories were leveled out by significant quadratic trends, indicating that they became slightly more engaged and less cynical in school as they transitioned to upper secondary education. These students also aspired for lower educational degrees, and performed relatively low in mathematics, although they did manage to progress relatively well over the course of lower secondary school. In this group, girls were slightly overrepresented.

Students in the *Disengaged* group (21.2%) expressed relatively low levels of school engagement, and also, the most pronounced decline in engagement over the course of lower secondary education, of all groups. But, in contrast to students in the *Negative academic well-being* group, these

students exhibited lower and more stable mean levels of school burnout, and even showing some decrease in exhaustion during lower secondary education. Their levels of school burnout remained rather low and stable after the transition to upper secondary school, while their engagement with school increased, although it still remained relatively low in comparison to the other groups. These students also had rather low mathematics performance and educational aspirations, and their performance progressed at the slowest rate of all groups. There were slightly more boys in this group as well.

Lastly, the fourth profile included 15% of all students, naimly, the *Declining academic well-being* group. Although these students expressed rather high levels of school engagement, and one of the lowest levels of school burnout in 7th grade, they also experienced one of the most negative developments of academic well-being out of all groups: their burnout rapidly increased, and their school engagement declined. However, all constructs were leveled out by significant quadratic trends after the transition to upper secondary school, indicating some positive change in their academic well-being during upper secondary education, although their feelings of inadequacy in school remained rather high.

To conclude, although fluctuations were detected in both school engagement and burnout trajectories among adolescents, the results from Study III suggest that the majority of students still hold relatively positive and stable levels of academic well-being throughout the adolescent years. Nevertheless, in line with previous findings (Eccles et al., 1993; Roeser et al., 1999) several students also experienced some decline in their school engagement, and slightly increased symptoms of school burnout during the lower secondary school years. Disengagement, emotional exhaustion, concerns about failure and cynical attitudes towards school are all serious symptoms of maladjustment and might indicate a perceived misfit between either one's own or the environment's resources, expectations, and demands. Therefore, it is something that schools should take seriously.

Furthermore, most students experienced a shift in their school engagement and burnout trajectories as they transitioned to post-comprehensive education, supporting previous assumptions that educational transitions seem to spark both positive and negative changes in students' motivation and well-being (Roeser et al., 1999). However, for the majority of students, the change was rather positive, suggesting that the secondary school environment does relatively well in supporting students as they transition, and that there is a better fit between the needs of the students and the opportunities offered by the school in the upper secondary school environment. Overall, one of the most important implications of Study III is the realization that students' show various patterns and trajectories of academic well-being during the adolescent years, and that these are related in meaningful ways to students' concurrent progression

in mathematics performance and seem to have some impact on their aspired educational degrees for their future as well.

4. General Discussion

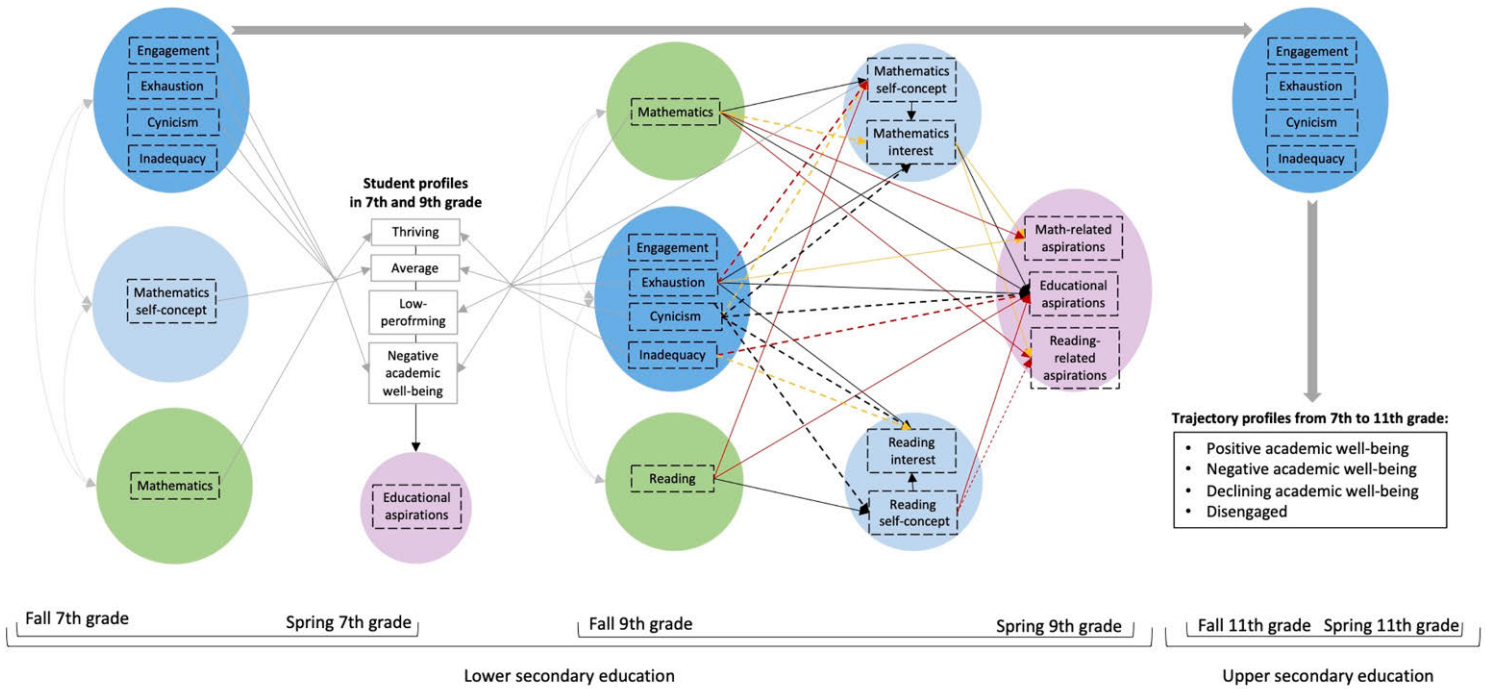
The present work investigated the developmental dynamics of academic well-being, performance, and motivational beliefs, and how these are related to educational and occupational aspirations. Overall, the results demonstrated that students show various patterns and trajectories of academic well-being during the adolescent years, and that these are related in meaningful ways to students' mathematics performance and educational aspirations. The results also demonstrated the added value of considering several factors simultaneously when investigating students' educational and occupational processes, as both between- and within-domain differences in pathways from academic well-being, performance and motivational beliefs to boys' and girls' aspirations were found. An overview of the main results is presented in Figure 4.

4.1 Profiles and Development of Academic Well-Being

The first aim of this thesis was to examine individual differences in how academic well-being (i.e., school engagement and burnout) develops among adolescents during the lower-secondary school years and across the critical transition to upper secondary education. This aim was mainly addressed in Study I and Study III. Study I conducted latent profile analyses to identify distinct academic well-being and performance profiles in 7th and 9th grade, and the short-term stability and change in these profiles during one school year. Study III, on the other hand, used growth-mixture models to investigate long-term development in students´ trajectories of school engagement and burnout across 7th to 11th grade (i.e., second year in upper secondary education). The findings demonstrated that academic well-being seems to be relatively stable within the school year, but also, that adolescent students show significant interindividual variations in their development of academic well-being during the adolescent years. In Study I, three academic well-being and performance profiles were identified in 7th grade (*Thriving*, *Average*, and *Negative academic well-being*), whereas four profiles were found among 9th graders (*Thriving, Average, Negative academic well-being*, and *Low-performing*). In both grades, approximately 60% of the students displayed a stable academic well-being and mathematics performance profile over the course of one academic year. In

Figure 4

Overview of Main Results



Study III[3], four distinct trajectory profiles (*Positive academic well-being, Negative academic well-being, Declining academic well-being,* and *Disengaged*) were detected among the whole sample, each with varying overall mean levels of school engagement and burnout and with varying individual differences in their trajectories over time. These profiles will be described and related to previous findings in the following paragraphs.

4.1.1 Students with Positive Academic Well-Being

First, regarding short-term development, in both 7th and 9th grade (Study I), a profile was identified, showing overall positive levels of academic well-being (i.e., *Thriving* group). More specifically, these students were highly engaged in their studies, and they expressed the lowest levels of school burnout in comparison to the other students. Although both mathematics performance and self-concept were included in the profiles, the results demonstrated that it was typical for students with positive academic well-being to belong to the same profile throughout the school year, and also, that is was untypical for these students to move, for example, to a profile expressing more average or negative levels of academic well-being within the same academic semester. These findings resemble the results of previous investigations regarding short-term stability of and change in patterns of school burnout and engagement (Tuominen-Soini & Salmela-Aro, 2014) as well as patterns of perceived competence, academic value, and mental health (Roeser & Peck, 2003).

Furthermore, these results were largely confirmed in Study III, as almost one third of the participating students expressed both stable and positive levels of more long-term academic well-being as well, that is, across lower and upper secondary education (i.e., *Positive academic well-being group*). Overall, these findings align with previous results, suggesting that students who show signs of initial adaptive academic-well-being profiles seem to express continued positive well-being throughout adolescence (Janosz et al., 2008; Salmela-Aro & Upadyaya, 2014a; Sorkkila et al., 2020). It seems that students with initial positive academic well-being already in 7th grade, might be better equipped to handle possible challenges and changes occurring during adolescence, including transitioning to post-secondary education. A similar result was found by Tuominen-Soini and Salmela-Aro

[3] Study I and Study III included largely the same participants, but the time points had doubled in Study III. Also, in Study I, LPAs were conducted separately for 7th and 9th graders, whereas cohorts were combined in the analyses in Study III.

(2014), as they found the highest temporal stability of school engagement and burnout among students who were initially highly engaged in school and exhibited low levels of burnout. These findings could also be taken to reflect the gain spiral as proposed by the DR theory, suggesting that students who are highly engaged in school and do not perceive school burnout, might not only hold more personal resources and thus be able to handle potential demands imposed by changes in the educational context, but also, that they might be more motivated to stay engaged and even create their own resources as study demands are increasing (e.g., during educational transitions) (Bakker & Demerouti, 2017; Hobfoll et al., 2018). Kiuru et al. (2020), for example, found that closeness with peers and less conflict with teachers predicted positive academic well-being (i.e., higher school satisfaction, less school stress) among adolescent students, whereas a positive academic well-being, in turn, further contributed to increased closeness to and decreased conflict with both teachers and peers.

4.1.2 Students with Negative Academic Well-Being

In both Study I and III, a group of students was also identified, expressing a rather reversed, maladaptive profile of academic well-being (i.e., *Negative academic well-being group* in both studies). In Study I, students in the *Negative academic well-being* group in both 7th and 9th grade expressed relatively low school engagement, and significantly higher levels of school burnout in comparison to the other groups, and the profiles were found to be rather stable during the school year, suggesting that students in the *Negative academic well-being* group were likely to belong to the same profile both at the beginning and at the end of the school year.

A profile with largely similar overall mean-level patterns of relatively low engagement and elevated school burnout was identified in Study III as well. Similarly, to the profile found in Study I, these students were found to report high levels of school burnout already at the beginning of 7th grade, after having recently transitioned from primary to lower secondary school. Thus, it might be that these students were already experiencing elevated levels of school burnout in earlier school years, or that they have not received appropriate support in their recent educational transition in combination with entering adolescence and puberty. These changes might have contributed to a potential mismatch in their stage-environment fit, possibly causing negative academic well-being patterns (Eccles & Midgley, 1986).

Furthermore, in line with the short-term stability identified in Study I, their more long-term development of academic well-being was also relatively stable, although small fluctuations in both school engagement and burnout were detected. During lower secondary education, students in the *Negative academic well-being* trajectory profile reported small but

significantly decreasing levels of school engagement and also, slightly increasing levels of school burnout. It could be that continued negative well-being patterns might reflect loss spiral processes as proposed by the DR model (Bakker & Demerouti, 2017; Hobfoll et al., 2018), that is, that students who are less engaged and more burned out might be more likely to engage in self-undermining behavior. Thus, individuals who experience elevated levels of strain or burnout, might undermine the benefits of resources, communicate poorly, make more mistakes, and create more conflicts which, in turn, creates more demands over time (Bakker & Costa, 2014). Previous studies have, for example, detected a reciprocal relationship between school stress and students´ perceived conflicts with teachers (Kiuru et al., 2020).

On a slightly more positive note, students in the *Negative academic well-being* profile in Study III experienced a positive change in both their engagement and burnout trajectories as they transitioned to post-secondary education. These results slightly differ from previous findings, that is, that educational transitions generally result in negative changes in students' well-being, particularly for those who have shown earlier signs of negative school adjustment (Roeser et al., 1999). However, it was also revealed that students belonging to this group performed rather low in mathematics. Therefore, it could be that they were more likely to receive support in school, and thus, gained more contextual resources, and that the Finnish schools, generally, do relatively well in terms of meeting the demands imposed by changes in the educational context, particularly for students with known learning difficulties. Thus, although study demands generally increase over the school years and during educational transitions, an increase in study resources may not only result in higher school engagement but might also make students better equipped to cope with and buffer their elevated levels of school burnout (Bakker & Demerouti, 2017). However, despite positive changes in upper secondary school, these students still reported relatively high overall levels of school burnout, particularly feelings of inadequacy, after the transition. Thus, these results should be taken seriously, considering that approximately 30% of the participating students in Study III, many of whom were girls, belonged to this trajectory profile. In Study I on the other hand, these profiles, including also mathematics performance and self-concept, were significantly smaller (15-20%).

4.1.3 Students with Average/High Engagement but at Risk of Burnout

The largest profile identified in both 7th and 9th grade in Study I was the *Average* group, expressing rather moderate levels of both school engagement and burnout (and, mathematics performance and self-

concept). However, despite their rather average mean levels, it should be acknowledged that students in the *Average* group still perceived significantly more school burnout than, for example, the *Thriving* students. Thus, although the general assumption is that engagement and burnout are negatively associated, these students seemed to be both rather engaged and exhibit slightly elevated levels of burnout. Similar patterns of academic well-being have been detected among students in previous research as well. Tuominen-Soini and Salmela-Aro (2014) for example, found that approximately one third of their sample showed signs of both high engagement and exhaustion, whereas Salmela-Aro and Read (2017) also identified a similar profile among students studying in higher education.

Furthermore, regarding short-term stability and change in profile membership, it was revealed that students belonging to the *Average* group in 7th grade were likely to belong to the same academic well-being and performance profile over the school year. This configuration was revealed not to be a significant type among the 9th graders, although it did come close to reaching significance. It is, however, not surprising that some students experience some change in their academic well-being during this time period: students in the 9th grade are studying their last year in comprehensive school and are also faced with the important decision of choosing an upper secondary education (i.e., academic or vocational track). Previous studies have found that transitional periods can affect students' well-being negatively, while there is also evidence that worries concerning transitional periods dissipate over the first year (McGee et al., 2003).

A somewhat similar profile was identified among students in Study III while investigating long-term development. Students belonging to the *Declining academic well-being* group, expressed largely similar, initial, high levels of engagement and low levels of burnout at the beginning of 7th grade as students in the *Positive academic well-being* group. However, as the students in the *Positive academic well-being* group remained highly engaged in their studies over the school years and did not start to show signs of school burnout, students in the *Declining academic well-being* group experienced a significant decline of school engagement and became increasingly more burned out by school over the course of lower secondary school. Despite this rather negative development, however, their engagement with school remained on a relatively high level, whereas their levels of exhaustion and inadequacy in school had increased from being one of the lowest, to being one of the highest in comparison to the other groups. Thus, in 9th grade, their developmental profile resembled the patterns of academic well-being found within the *Average* groups in Study I, and also, within groups of students found in previous studies, expressing both increased engagement and exhaustion in school (Tuominen-Soini & Salmela-Aro, 2014; Salmela-Aro et al., 2016; Wang & Peck, 2013).

From a DR theory perspective (Demerouti et al., 2001; Salmela-Aro & Upadyaya, 2014b), it could be that their perceived study demands (i.e., high workload, time pressure, high expectations) exceeded their study resources (i.e., support from peers and teachers), which might contribute to increased school burnout. Nevertheless, in comparison to the other groups, it seems that these students fit the least well into the lower secondary school environment (Eccles et al., 1993). However, after entering upper secondary education, the negative trend of academic well-being, except for inadequacy, subsided. It might be that students in the *Declining academic well-being* group experienced the secondary school context as less demanding or that in the new school context, they had better achieved their school-related goals, and thus achieved related resources (Salmela-Aro & Upadyaya, 2014b).

4.1.4 Students with Low/Average Engagement Without Burnout Symptoms

Lastly, a fourth profile was identified, also expressing somewhat asynchronous patterns of academic well-being, that differed slightly between Study I and III. Study I revealed a group of students expressing, despite rather low performance and competence beliefs, relatively average levels of school engagement and, low levels of school burnout. This profile, named *Low performing* in Study I, was only identified among students studying in 9th grade, and it was revealed to be a rather stable profile, indicating that students belonging to this profile were also unlikely to change their academic well-being patterns during the 9th school year.

In Study III, on the other hand, students in the Disengaged group expressed rather similar levels of low school burnout, despite performing relatively poorly in school, but they also expressed rather low levels of engagement. In fact, in Study III, these students displayed an almost identical low and decreasing trajectory of school engagement as students in the Negative academic well-being group, but they also, simultaneously, became less exhausted in school during the lower secondary school years. A similar profile of students expressing rather low school motivation and competence-beliefs, despite average psychological well-being, was identified by both Parhiala and colleagues (2018) and Roeser and colleagues (1998). Tuominen-Soini and Salmela-Aro (2014) also identified a group with slightly lowered engagement and exhaustion, but with increased levels of cynicism towards school. Overall, these results suggest that lower engagement and valuing of school may not necessarily lead to exhaustion and broader patterns of adjustment problems for all students. It might be that some are more psychologically detached from school, and that their well-being is more affected by experiences outside of school, or that their low valuing of school does not make them as stressed out when

faced with different study demands. These patterns of low engagement and low school burnout also reflect the predictions made by the DR theory when both demands and resources are perceived as low (see e.g., Bakker & Demerouti, 2017). Therefore, although these students might not hold appropriate resources to increase their school engagement, they might not perceive high study demands either, that would result in school burnout.

However, after the transition to upper secondary education, students in the Disengaged group, like students in the Negative academic well-being group, experienced a positive change in both school engagement and cynicism, suggesting that the change of educational environment triggered a positive change in their academic well-being. Considering that Finnish students approaching the transition to upper secondary education can, for the first time, choose their academic track, it is possible that these students found a better fit between their individual needs (e.g., need for autonomy and relatedness) and the opportunities offered in the new secondary school environment (e.g., choice of study program, peers with similar interests and values), and that their well-being, particularly engagement and school valuing, thus increased (Eccles & Midgley, 2011; Roeser et al., 1998).

To summarize, it seems that although the majority of Finnish students hold relatively positive and stable levels of academic well-being, students also show significant intra-individual variations in their co-developmental patterns of school engagement and burnout over the course of adolescence. Despite the use of slightly different indicators in the profiles, and different analytical procedures in Study I and III, the results highlighted that both the short-term development of academic well-being and performance within 7th and 9th grade, as well as more long-term development of academic well-being over the course of lower and upper secondary education were relatively positive and stable for most students. Nevertheless, many students still experienced some decline in their school engagement, and slightly increased symptoms of school burnout during the lower secondary school years. These results concur with previous findings, suggesting that negative changes typically occur in students' well-being and motivation during early adolescence (Eccles et al., 1993; Roeser et al., 1999), and is something that schools should take seriously. Disengagement, emotional exhaustion, concerns about failure and cynical attitudes towards school are all serious symptoms of maladjustment and might indicate a perceived misfit between either one's own or the environment's resources, expectations, and demands.

Furthermore, in line with the stage-environment fit model (Eccles & Midgley, 1986), significant changes occurred in the majority of all school engagement and burnout trajectories as students transitioned to post-secondary education, supporting previous assumptions that educational transitions seem to trigger both positive and negative changes in students' academic well-being. However, for most students, these fluctuations were

rather positive, suggesting that students might perceive a rather good fit between their individual needs and the opportunities offered by the secondary school environment.

4.2 Academic Well-being and Educational Outcomes

The second aim of the study was to examine the developmental relation between academic well-being and educational outcomes (performance, motivational beliefs, and educational aspirations). This aim was mainly answered by Study I and Study III, both in which a person-centered approach was applied. Study I focused on the stability and change in profiles of school engagement, burnout, mathematics self-concept and performance among students in 7th and 9th grade, and how students within the profiles differed with respect to educational aspirations. Study III, on the other hand, focused on more long-term development, and particularly, how students with distinct academic well-being trajectories differed in their concurrent progression in mathematics performance and educational aspirations. Study I revealed four groups of students in 9th grade, and three groups of students in 7th grade, with distinct configurations of academic well-being and performance that also differed in educational aspirations. Overall, these profiles largely concurred with similar well-being and performance profiles found in previous research (e.g., Korhonen et al., 2014), despite the use of slightly different indicators for academic well-being. In Study III, we found that students in the four trajectory profiles also differed in their concurrent trajectories of mathematics performance and educational aspirations. Below, I will discuss the different configurations of academic well-being, performance and educational aspirations that were identified among the students in both studies.

4.2.1 Students with Positive Academic Well-Being and Functioning

In Study I, approximately 30% of students belonged to the profile characterized by overall positive levels of both performance, motivation, and academic well-being, and who also aspired for higher educational degrees in comparison to the other students. These results were not surprising, as groups of students who perform well, are highly engaged in school, and show low levels of burnout have been found among adolescents in prior studies as well (Salmela-Aro et al., 2016; Tuominen-Soini & Salmela-Aro, 2014). Korhonen et al. (2014) also found a very similar profile of students with both high performance and academic well-being (i.e., academic self-concept, perceived learning difficulties, and burnout).

Similarly, students in the *Positive academic well-being* group found in Study III exhibited not only the most positive academic well-being, but also

the highest mathematics performance and educational aspirations in comparison to the other trajectory profiles. Interestingly, they also had the fastest progression in mathematics during lower-secondary education (7th to 9th grade), indicating that a positive and stable development of academic well-being during adolescence might be linked to, not only the overall level of one's performance and aspirations, but also the progression of such outcomes. From a stage–environment fit perspective (Eccles et al., 1986), it might be that students who enjoy and value school, believe in their competence and are not burned out by school, are likely to experience continued educational success and well-being during the school years. This, in turn, viewed from a DR theory perspective (Bakker & Demerouti, 2017) likely has recursive effects on the social and educational school environment. Therefore, it would be important to support students' academic well-being in schools as well, to improve educational outcomes.

4.2.2 Students with Negative Academic Well-Being and Functioning

In Study I, students in the *Negative academic well-being* group expressed, not only a negative academic well-being, but also, relatively low performance and low competence-beliefs in mathematics. However, although the performance was lower than average in both grades, it was more closely to average among the 9th graders, and significantly lower among 7th graders. Nevertheless, these results confirm previous findings that lowered performance is related to higher levels of burnout (Madigan & Curran, 2020), disengagement in school (Le et al., 2018), low academic self-concept (Valentine et al., 2004; Guo et al., 2015b) and also, lowered aspirations for their future education (Shapka et al., 2006). Similar patterns were detected among a group of students in Study III, while investigating long-term development. Students in the *Negative academic well-being* group in Study III performed the lowest of all groups in mathematics, and they also had rather low educational aspirations.

Furthermore, findings from Study III also suggested that students with initial maladaptive patterns of academic well-being and performance in 7th grade were likely to show continued lowered mathematics performance and aspirations during the course of lower secondary school. However, it should be noted, that despite having consistently lower performance than the other profiles, students in the *Negative academic well-being* group still progressed at a faster rate in mathematics than the *Disengaged* group. This could reflect the systematic support for learning in the Finnish schools: students with low performance are likely to receive support for their learning, or that the Finnish schools, generally, do relatively well in terms of meeting the demands imposed by changes in the educational context, particularly for students with known learning difficulties. Nevertheless, this positive progression in their performance was not reflected in their

concurrent academic well-being trajectories. Quite the opposite, they became slightly more exhausted and cynical towards school during lower secondary education, which is something that should be taken seriously. Considering also that Study I revealed that both their self-concept and educational aspirations were quite low, it could be that despite potentially receiving some contextual resources, that their personal resources are still relatively low and that their perceived study demands are high, which would, according to the DR theory (Bakker & Demerouti, 2017), result in low engagement and high levels of burnout and, consequently, low academic performance (Salanova et al., 2010). This could be taken to reflect the importance of targeting support towards students´ motivation and well-being as well, while simultaneously supporting them in their learning.

4.2.3 Students with Average/High Academic Functioning but At-Risk of Burnout

The largest profile of academic well-being and mathematics performance identified in both 7th and 9th grade in Study I, was the *Average* group. These students can be seen as representing a "typical" student who performs rather well and displays a rather average academic well-being. A largely similar profile of academic well-being and performance was also found by Korhonen and his colleagues (2014). However, as previously mentioned in chapter 4.1, these students' levels of engagement and exhaustion were rather similar to groups students identified in previous person-centered studies, expressing both relatively high school engagement and burnout (Tuominen-Soini & Salmela-Aro, 2014; Salmela-Aro & Read, 2017). Tuominen-Soini and Salmela-Aro (2014) also found that engaged and exhausted students were slightly more stressed by their educational aspirations, preoccupied with possible failures in school, and more willing to give up when faced with demanding school tasks in comparison to students who were engaged but did not show any signs of school burnout. Salmela-Aro and Read (2017), on the other hand, found that engaged and exhausted students perceived slightly lower study resources, and slightly higher study demands than students who were engaged but not burned out by school.

These findings also concur with one of the academic well-being trajectory profiles that was identified in Study III, showing somewhat similar patterns of both academic well-being and educational outcomes. *The Declining academic well-being* group was smaller (15%), and although students in this profile had a rather positive academic well-being in the beginning of lower secondary education, their well-being had changed into similar overall mean-level patterns of elevated school engagement and burnout when they reached 9th grade. These students also performed well in school and aspired for high educational degrees. However, despite their

relatively high performance and aspirations, their performance progressed at a slightly slower rate in comparison to students who showed more positive and stable trajectories of academic well-being, and the gap between these groups´ educational aspirations grew bigger over time. Tuominen-Soini and Salmela-Aro (2014) found a similar result, as engaged-exhausted students were likely to lower their educational aspirations over time, whereas engaged students, who did not report high school burnout, had significantly higher educational aspirations, and also, the most positive educational outcomes later in young adulthood. Salmela-Aro and Read (2017) also found that engaged-exhausted students felt less suited to their chosen higher education study field than engaged students who did not feel exhausted.

Considering the apparent negative effects of school burnout on both performance and educational aspirations (Madigan & Curran, 2020; Salmela-Aro & Upadyaya, 2017) it might be that increased feelings of exhaustion and inadequacy in school, despite having relatively high school value, engagement and performance, is affecting students' learning processes over time, and makes them downgrade their educational aspirations. According to the DR theory, decreasing school engagement and increasing school burnout could indicate a misfit in their study demands and resources, which might make these students more likely to undermine their personal resources. Also, students who experience exhaustion might not have the energetic resources to reach their study goals and might therefore lower their aspirations for future education (Bakker & Demerouti, 2017). It might also be, that it is, in fact, students' high educational goals that make them more prone to exhaustion and feelings of inadequacy in school. For example, it could be that their perceived study demands (i.e., high workload, time pressure, high expectations) exceeds their study resources (i.e., support from peers and teachers), which might contribute to increased school burnout (Demerouti et al., 2001; Salmela-Aro & Upadyaya, 2014b).

4.2.4 Students with Low/Average Academic Functioning Without Burnout Symptoms

Lastly, in Study I, a rather small profile was identified, but only in 9th grade, representing students with the lowest levels of mathematics performance but still somewhat asynchronous academic well-being patterns. In line with previous research (Guo et al., 2015b; Valentine et al., 2004) the Low-performing students reported low competence-beliefs in mathematics, supporting previous assumptions that students with low performance report low academic self-concept as well. However, despite their low performance and self-concept, these students still showed rather positive levels of school engagement, and no signs of burnout. Overall, it seems like

the students' low mathematics performance and self-concept does not make them feel stressed out over or overwhelmed by schoolwork in general. It might be that some students are more psychologically detached from school than others, and that their well-being is more affected by experiences outside of school (Parhiala et al., 2018). These results resemble those found by Tuominen-Soini et al. (2008), in which students, despite their rather low academic achievement and motivation, still displayed less general distress and stress with their future aspirations than their more committed peers. These results may reflect conservation of resource processes (Hobfoll, 2018), arguing that when valued resources are lost (e.g., energy), some students might try to minimize the risk of losing more by devaluing school and schoolwork. For example, Roeser et al. (1998) identified a group of students with low and decreasing school value but no psychological distress, who also, initially, experienced a decline in their competence-beliefs. These findings may indicate that students who increasingly feel incompetent in school may start to devalue school to protect their self-worth. Such a protective attitude might hinder students from investing in schoolwork, and consequently, function as a buffer from getting exhausted by school. Taken together, although it is suggested that positive performance, motivation, and well-being often go together, these results indicate that this is not always the case.

In Study III, a rather similar pattern was identified, namely among students in the *Disengaged* group. Students in the *Disengaged* group reported relatively low performance and aspirations in 9th grade, expressed consistently lower school engagement but they did not show any signs of school burnout during lower- or upper secondary education. Interestingly, these students' mathematics performance also progressed at the slowest rate of all groups, suggesting that their performance in 7th grade was initially rather average. This could partly explain why we did not identify these patterns of low performance and low burnout among the 7th graders in Study I. It might indicate that negative academic well-being and low performance are not as clearly separated in the earlier years of adolescence, and that these become more separated later on. Nevertheless, taken together, these results indicate that simply the lack of negative school emotions may not necessarily lead to higher performance and aspirations over time, if one does not also value and feel motivated in school (Tuominen-Soini & Salmela-Aro, 2014). These results highlight the importance of not only supporting students with learning difficulties, but also, those with negative school valuing, as it might slow down the learning processes, and possibly hinder them from reaching their full potential. According to the DR theory (Bakker & Demerouti, 2017), low levels of school burnout could indicate that these students do not necessarily perceive high study demands, whereas low school engagement and self-concept might reflect relatively low study resources. Therefore,

interventions and support should be targeted at enhancing contextual and personal study resources rather than, for example, lowering their perceived study demands.

To summarize, although the profiles identified in the studies (i.e., Study I and III) did not include the exact same variables, and not the exact same students and time points, some general recurring patterns of academic well-being, performance and aspirations were still detected that fit well with findings from previous research, particularly those that have adopted a person-centered approach (e.g., Korhonen et al., 2014; Tuominen-Soini & Salmela-Aro, 2014; Salmela-Aro & Read, 2017). Approximately one third of adolescent students seem to simultaneously perform well in school, be highly engaged and value their studies, do not show signs of school burnout and hold high educational aspirations. They are also likely to continue to thrive in school and seem to have the resources to handle possible challenges and changes in the educational context as they transition through lower- and upper secondary school.

However, many students also seemed to express the opposite patterns of academic and emotional functioning in school. Approximately 15% in Study I and 30% in Study III of students performed rather low in mathematics, did not believe in their competence or that school matter, nor did they aspire for higher educational degrees, and they also felt exhausted and inadequate in school. These students continued to show these maladaptive patterns throughout the lower-secondary school years and were unlikely to change these patterns. It might be that these students consistently perceive their study demands to be higher than their resources.

Furthermore, in line with previous person-centered studies, some students seem to also show asynchronous patterns of academic well-being and performance, and these students also seem to experience slightly more changes in their well-being trajectories over time, particularly during the lower-secondary school years. Overall, mainly two recurring asynchronous patterns of academic and emotional functioning were identified in the studies. First, in Study I, a group of students who were performing rather well in school, aspired for relatively high educational degrees and who were moderately engaged in their studies, but who also showed increased feelings of school burnout was identified. In Study III, a smaller group of students were identified, showing similar patterns of academic well-being, performance, and aspirations, but whos' well-being significantly decreased throughout the lower-secondary school years. It might be, that some students are able to handle some elevated levels of school burnout, because they might receive the resources in school to do so (e.g., support from teachers and peers), whereas others might perceive that increased study demands or high expectations exceeds their resources, and that the

secondary school environment is not able to meet their individual needs, and thus, their school burnout increases (Bakker & Demerouti, 2017).

The second asynchronous pattern that was observed among the sample, was students who performed rather poorly and expressed low mathematics self-concept, but who still did not show any signs of school burnout. It seems, that for a minority of students, lower performance, engagement, and valuing of school may not lead to exhaustion and broader patterns of adjustment problems, possibly indicating that their well-being is more affected by experiences outside of school, or that their low valuing of school does not make them as stressed out when faced with different study demands.

4.3 Pathways to Educational and Occupational Aspirations

In line with previous studies, Study I and III confirmed that overall, higher performance, positive school values and the lack of school burnout were related to students´ educational aspirations. However, we also interestingly found that despite high performance and school value, some students who showed increased levels of school burnout, seemed to slightly lower their educational aspirations over time. Considering also that school burnout seems to be more common among girls, and that large gender-gaps still exist in many occupational fields (e.g., STEM fields), it seems important to further investigate how relevant factors such as performance, motivational beliefs, and also, school burnout play a role in boys' and girls' pathways to their educational and occupational aspirations. Thus, the third aim of this thesis was mainly answered in Study II, where we investigated gendered differences in boys' and girls' pathways to their educational and occupational aspirations in two key academic domains: mathematics and reading. Overall, the findings were in line with our expectations based on the EVT and previous empirical studies (e.g., Korhonen et al., 2016; Nagy et al., 2006) and, both similarities and differences between boys' and girls' pathways to educational and occupational aspirations were found. The results will be discussed in more detail below.

Overall, for both genders, we found that students who perform well in mathematics, also aspire for higher educational degrees, but also, interestingly, that mathematics performance seems to be an important predictor of occupational aspirations, regardless of whether the aspired job involves mathematics or reading skills. These results are similar to those found by Parker et al., (2014), as they found that students who performed well in mathematics chose careers in several different fields for example, biological, medical, law- and business-related fields. Reading performance, in turn, did not seem to be as important in shaping students'– and especially boys' – aspirations. These results are partly supported by those found by

Korhonen et al. (2016), as they detected no direct relations between boys' reading performance and their educational aspirations either, but only indirect effects, through interest. Reading did, however, in line with previous findings (Korhonen et al., 2016), have a small effect on girls' aspired educational degrees. Thus, it might be that reading performance only matters for the general level of education girls aspire to, but not necessarily the domain-specific choices they make regarding their future.

Next, in line with the Expectancy value theory (Eccles et al., 1983; Eccles, 2009), we found that motivational beliefs in both mathematics and reading domains were associated with girls' aspired educational degrees, while math-related beliefs seemed to be more important for boys. These gender differences are similar to those found by Korhonen et al. (2016) and Viljaranta et al. (2009), indicating that mathematics, and especially math-specific motivational beliefs, seem to be particularly important in shaping boys' aspirations, both regarding their aspired educational degree and occupational choice, irrespective of the domain. They also align with gender-typical biases (Meece, Glienke, & Burg, 2006), implying that boys typically show more confidence in and place more value on mathematics than, for example, reading. Although previous findings imply that similar gendered stereotypes might exist among girls with respect to reading (Jacobs et al., 2002), we did not find any clear evidence of such patterns in our study, as performance and motivation in both mathematics and reading played a role in girls' educational aspirations. Thus, it seems that the formation of girls' aspirations might be influenced by several different factors across academic domains, while boys' aspirations might mostly be influenced by their math-related performance and motivation, regardless of the aspired occupational domain.

Also, in line with the Internal/External frame of references (e.g., Möller & Marsh, 2013) and gender-typical comparison processes, we found that higher levels of reading self-concept for girls, was related to lower math-related occupational aspirations. Similar negative effects have been found between verbal self-concept and mathematics interest previously as well (e.g., Gaspard et al., 2018), and Parker et al. (2014) found that girls with high levels of English self-concept and low levels of mathematics self-concept were significantly less likely to enter math- and science-related occupational fields, even after controlling for performance. Taken together these results could partly explain why there are significantly fewer women choosing to both study and work in math-related fields, despite their rather high mathematics performance. It could be that girls identify more strongly with the reading domain, which in turn negatively impacts their occupational aspirations in math-related fields. Interestingly, in line with previous studies investigating cross-domain relations between mathematics and language-related performance and jobs (Lazarides and Lauermann, 2019) no negative cross-domain paths were found among

boys. Thus, it seems that girls' domain-specific aspirations might be more influenced by their motivational beliefs in other fields, whereas boys' values and perceptions about competence might not be as negatively linked between domains.

Lastly, concerning school burnout, our results largely concur with those previously found by Salmela-Aro and Upadyaya (2017). Similarly, to what was found in Study I and III, more ambitious aspirations seemed to, at least to some extent, be related to higher levels of exhaustion. Although aspirations for higher educational degrees might "pay off" as they may lead to actual attainment, there might be possible costs of having higher aspirations as well. Students who set more ambitious educational and occupational goals presumably also, work hard to achieve these goals, which might, in turn, result in emotional exhaustion. This possibility should be taken seriously, considering that prolonged feelings of exhaustion may lead to depressive symptoms later on (Salmela-Aro et al., 2009a).

Cynical attitudes towards school and feelings of inadequacy as a student were also, as expected, associated with lower levels of educational aspirations for both genders. However, it seems that the negative aspects of school burnout mostly affected students' more short-term aspirations concerning educational degrees. Nevertheless, the fact that several significant pathways were found from school burnout to both boys' and girls' aspirations even after controlling for performance and motivational beliefs, emphasizes the importance of considering students' socio-emotional strain and feelings towards school when investigating the formation of their aspirations. These results clearly indicate that students' experiences of school burnout may interfere with their thoughts about possible future educational degrees; higher experiences of cynicism and inadequacy seem to be associated with lower academic goals. Considering burnout would be especially important for girls, given that girls express higher levels of school burnout than boys (Salmela-Aro et al., 2009a).

To summarize, the results from all of the three studies largely concurred with previous findings, and demonstrated that performance, motivational beliefs, and school burnout are all related to the educational degrees and occupational choices students aspire to. Study II revealed that girls´ aspirations seemed to be steered by several different factors across academic domains, while math-related performance and motivation were more important for boys. The results also indicated that girls' math-related occupational aspirations may be negatively affected by their reading self-concept, while no negative cross-domain effects were detected among boys. However, for both genders, higher levels of educational aspirations were related to higher levels of school-related exhaustion, whereas feelings of cynicism and inadequacy in school were related to lower levels of aspirations. These findings demonstrate that resources are needed to, not

only support students' performance, but their motivation and well-being as well, in order to help them to set up desirable goals for themselves.

4.4. Strengths and Limitations

In this work, different theoretical starting points were used in the original studies. This can be seen as a strength as the overall results are linked and can be seen as advancing previous research in different ways. However, combining different theoretical frameworks also comes with some challenges. For example, the operationalization of key-constructs (e.g., self-concept versus expectancies, school burnout versus cost, interest versus value-beliefs) do not always match that of previous research in a given field. Self-concept, for example, matches the framework of internal and external references, but does not exactly match the expectancy construct in the EVT, although they are highly similar. Similarly, we focused only on individual domain specific interest in mathematics and reading, and no other value beliefs. This was partly due to the present work being a part of a larger research project, and it was not possible to include all original concepts in the questionnaire due to length and time, and also because the empirical work in this thesis did not use one specific theoretical model as a starting point, but rather, a more data-driven approach.

Further, although the accelerated study design has several strengths, for example, the possibility to examine long-term development during a relatively short time, it also comes with some challenges. As commonly with longitudinal studies, there were rather many students who opted to drop out of the study after transitioning to upper secondary education, which is something that needs to be considered when interpreting the results from Study III. Also, of the students who withdrew their participation, the majority were studying in vocational schools. Previously, several studies have found that the trajectories of school engagement and burnout differ between academic- and vocational students, such that students on the academic track generally perceive lower initial levels of burnout, but that their exhaustion and feelings of inadequacy increases as they transition to academic upper secondary school. Vocational students on the other hand, have been found to perceive more burnout in lower-secondary school, but that it stays rather stable or even decreases as they transition to vocational upper secondary school (Salmela-Aro et al., 2008; Salmela-Aro & Tynkkynen, 2012; Bask & Salmela-Aro, 2013). In this work, due to the study drop-out rates, students in both vocational and academic tracks were combined in the analyses, which is something that should be considered when making conclusions about the findings. However, it should be noted that all of the previous studies on vocational versus academic students have focused on mean-level trends, whereas we considered the individual

variations in their trajectories and found that students from both vocational and academic tracks were represented in all trajectory profiles.

Furthermore, although the overall aim of this work was to examine longitudinal relations between the concepts of study, the data in the second study, investigating gendered pathways to educational and occupational aspirations, was cross-sectional, which should be acknowledged when interpreting the results. In Study II, as the rather complex multiple-group structural equation model required a relatively large sample, students in 9th grade from both cohorts were combined, and thus, we did not have longitudinal data (e.g., 7th grade performance) from all students. Furthermore, it seemed highly relevant to investigate students´ pathways to educational and occupational aspirations within 9th grade, at the time when students were in the process of choosing an upper secondary school.

Also, regarding longitudinal data, only mathematics performance was included to represent students´ performance in both Study I and Study III which could be viewed as a limitation. Although Korhonen et al. (2014) found that students´ mathematics and reading performance did not differentiate among students within the academic well-being and performance profiles, indicating that students who perform well in mathematics generally also perform well in reading, the inclusion of only one subject still offers a rather limited perspective. The main reasons reading-performance was not included in the longitudinal studies were, first, that the achievement test that was used to measure reading-performance was rather lengthy and was therefore only measured once in the school year. Thus, we were unable to investigate stability and change of that measure within a school year (as in Study I). Second, investigating developmental trajectories of performance requires adaptive achievement tests that can be used over a longer time period. To my knowledge, adaptive reading-tests did not exist for this age group (13–17) for the Swedish-speaking population in Finland at the time of data collection. Nevertheless, considering that the majority of previous studies have used self-reports of students' grades or grade point averages as a measure of academic achievement, the fact that adaptive mathematics-test were used in this work to investigate the developmental dynamics of academic well-being and mathematics performance, should be seen as a strength as it provides an important contribution to the research field.

Further, although latent constructs were used to consider measurement error and structural equation modelling techniques were utilized to obtain model fit indices in the analyses, single indicators were used for school burnout and mathematics and reading performance in Study II. This was done partly to reduce the complexity of the models and also because the reading test consisted only of one total score, while the mathematics test was based on an IRT model. However, the disadvantage of this approach is

that not all measurement errors are parceled out in the measurement models.

Lastly, some of the main strengths of this work, in my view, is that both variable-centered approaches (e.g., investigating structural validity and stability through confirmatory factor analyses, correlational analyses, structural equation modeling) and person-centered approaches (i.e., identifying subgroups of students through latent profile analysis and growth mixture modeling) were used and combined in the present work (in Study I and III). As the results concerning both the development of and associations between academic well-being and educational outcomes, the findings clearly demonstrate the importance of combining both variable- and person-centered measures, as the variations in these patterns among students would probably have been masked by solely variable-centered analyses. Second, the use of longitudinal data, particularly by starting at the beginning of adolescence and studying over the transition to upper secondary education, provided important knowledge on when shifts in students' academic well-being occur and how their trajectories change over time. This information is valuable for better identifying possible risk-factors for students' academic well-being in the environment and being able to identify early signs of maladjustment in school.

4.5. Pedagogical Implications

From a practical point of view, the most important implication of the present work is the realization that students' show various patterns and trajectories of academic well-being during the adolescent years, and that these are related in meaningful ways to students' mathematics performance and educational aspirations. Recognizing that both academic performance and aspirations for future educational degrees are related to how students feel, view and experience school and schoolwork is important in order to effectively consider alternative ways of confronting their varying needs. This is important, as negative school values and feelings towards school and themselves as students seem to hinder effective studying and learning and might unnecessarily lower their aspirations for future education. In addition, detecting signs of poor academic well-being in an early stage is important as school burnout might develop into more subsequent depression later on (Salmela-Aro et al., 2009).

In schools, students in need of support are still often defined based on their difficulties in academic performance. However, in light of the findings of the present work, this view seems rather limited, as there clearly is a need to put more effort into identifying and supporting those with negative academic well-being in school as well. In Finnish schools, students are systematically screened for learning difficulties and given adjusted support. However, students' well-being is not supported and followed up in the same

way. As students' academic well-being and performance profiles were found to be relatively stable within the schoolyear, despite significant changes being detected over the whole course of lower secondary education, it might be that changes occur rather slowly and over longer time periods. Therefore, changes might easily go unnoticed in everyday school life, particularly in the Finnish upper- and lower secondary school environment where several teachers are involved in students´ lives and often change during the school years.

Screening students for their academic well-being systematically might be particularly important considering that one of the most pronounced, negative changes occurred among students who, initially, were highly engaged and performed well in school. Students who increasingly feel exhausted by school, while at the same time being motivated and performing well, may likely get overlooked, and their potential problems go unnoticed in the secondary school environment. Therefore, it is also important to realize that high school engagement does not necessarily indicate that the student has an optimal learning motivation or that they are not in need of support. For some students, high engagement and performance might be exhaustive if high effort is required over longer time periods. Therefore, it would be important to develop practical means to support their academic well-being and provide them with adequate coping skills and help them maintain and recuperate their resources, in order to maintain their engagement and handle possible feelings of exhaustion, and to prevent them from developing more serious problems later on.

Furthermore, previous studies suggest that the availability of study resources and support (as perceived by students) may be particularly important for students' school-related exhaustion, whereas teacher instructional behaviour and motivation seem to be more associated with cynicism (Meylan et al., 2020). Thus, schools should, for example, make school counselors available for all students in schools and implement mental health-promotion programs, as they have also been found to make positive changes in student's social- and emotional skills, attitudes, and academic performance (e.g., Durlak et al., 2011; Sklad et al., 2012). These would be important to implement at an early age, as many students seem to express relatively low school values and high levels of burnout already at the beginning of 7th grade and considering that study-related demands are likely to increase over the course of their education.

Attention and support should also be given when the students are facing important educational transitions and making educational and career decisions for themselves, particularly during the last year of comprehensive school as this time period has been found to be a demanding phase for students (Salmela-Aro & Upadyaya, 2014), but also, as educational transitions may offer opportunities for change and possible interventions (Roeser et al., 1999). Given that performance, motivational beliefs, and

well-being all clearly matter for students' educational and occupational aspirations, problems in any of these should be recognized and supported. While schools already acknowledge the importance of supporting students' academic challenges, less attention has been paid to supporting their academic well-being while they are making important decisions about their future. The results of this work indicate, not only, that students' experiences of emotional strain may affect their aspirations and decisions concerning their future education, but also, that some students might experience some emotional costs of having ambitious educational aspirations. Consequently, schools should focus on supporting students as they transition by providing them with appropriate resources and inform students about the opportunities and challenges of further education and work (Salmela-Aro & Vuori, 2015). Previous studies have, for example, suggested that such preparedness enhances students' engagement with and the values they attach to educational goals, and supports them in their educational transitions (Vuori et al., 2008). Furthermore, considering that students' domain-specific aspirations may be influenced by their performance, competence beliefs and values in other domains, teachers and parents should acknowledge such cross-domain patterns while supporting students' decision-making processes. This could be particularly important for girls, as their motivational beliefs and aspirations in different domains seemed to be more negatively linked together and might therefore unnecessarily narrow down their aspired career alternatives.

Although Study II revealed that girls performing well in mathematics aspire for both math- and reading-related careers, the prevalent situation in most STEM fields is that large gender-gaps still exist. It might be that girls opt out of their math-related career aspirations later on as they approach the actual decision, possibly partly due to stereotyped comparison processes. Therefore, resources should be targeted to enhancing girls' aspirations and choices towards math-related fields by strengthening their math-related motivational beliefs. This would be important, considering that girls consistently seem to have lower levels of competence beliefs and values towards mathematics in comparison to boys, despite there being no difference in performance (e.g., Marsh et al., 2005). Although there are no clear instructions for practice, research suggests that explaining the relevance and usefulness of the learning content might be particularly important for girls' aspirations (Gaspard et al., 2015; Watt et al., 2012) together with providing female role-models in math-related fields (Else-Quest et al., 2010).

4.6. Conclusions

In conclusion, the findings of this work demonstrated that although fluctuations were detected in both school engagement and burnout

trajectories among adolescents, the results suggest that the majority of Finnish students still hold relatively positive and stable levels of academic well-being throughout the adolescent years. Nevertheless, many students experienced some decline in their school engagement, and slightly increased symptoms of school burnout during the lower secondary school years. From a stage-environment fit perspective (e.g., Eccles & Roeser, 2011), these findings are not surprising, considering students' recent transition to secondary school. As in many countries, the transition from primary to lower secondary education in Finland involves transitioning into a larger school building, from having a single class-teacher to several subject teachers, changing peer-groups, and often, increased expectations from parents and teachers, while students are simultaneously entering and going through early adolescence. In fact, previous findings have suggested that negative changes typically occur in students' well-being and motivation during early adolescence (Eccles et al., 1993; Roeser et al., 1999), and is something that schools should take seriously. Disengagement, emotional exhaustion, concerns about failure, and cynical attitudes towards school are all symptoms of maladjustment and might indicate a perceived misfit between either one's own or the environment's resources, expectations, and demands. Therefore, it is important for schools to learn to be aware of risks, and attempt to identify groups of students with various types of problems in their well-being, and consequently, support students not only with their learning, but also with their emotional well-being.

Furthermore, most students experienced a shift in their school engagement and burnout trajectories as they transitioned to post-comprehensive education, supporting previous assumptions that educational transitions seem to spark both positive and negative changes in students' motivation and well-being (Roeser et al., 1999). However, for the majority of students, the change was rather positive, suggesting that there might be a better fit between the needs of the students and the opportunities offered by the secondary school environment. When transitioning to upper secondary education in Finland, students are for the first time presented with the choice of choosing their study track (vocational or academic), and students often have an increased possibility to influence their study program, which might better meet adolescents' need for autonomy. Furthermore, upper secondary school buildings are generally smaller, including fewer peer-groups and teachers, often sharing more similar interests, which may also better meet students' need of relatedness (Deci & Ryan, 2008).

Next, although linear relations between academic well-being and educational outcomes (e.g., performance, self-concept, aspirations) were found among the majority of students, non-linear relations were detected as well. However, as only three profiles were identified in seventh grade in Study I, the findings may indicate that students' well-being and

performance are not as clearly separated in the earlier years of adolescence. Nevertheless, realizing that students may express and develop various patterns of academic and emotional functioning during adolescence is important to better find ways to support their varying needs. Some students might need support and interventions targeting their low school values and negative feelings towards school by creating more motivation-enhancing learning environments in schools (i.e., Students with low/average engagement without burnout symptoms), others might benefit more from interventions targeting psychological stress and exhaustion, and be offered student welfare services and school counselling (i.e., Students with average/high engagement but at risk of burnout), whereas some would benefit from both types of intervention (i.e., Students with negative academic well-being) (Maylan et al., 2020; van Loon et al., 2020). As most negative changes in students' academic well-being seem to occur at the beginning of adolescence, such interventions may be particularly important to implement at an early stage, when students are entering adolescence and transitioning from primary to lower secondary education.

Lastly, the results demonstrated that performance, motivational beliefs, and school burnout all contribute to the educational degrees and occupational choices students aspire to. For girls, aspirations might be steered by several different factors across academic domains, whereas math-related performance and motivation seemed to be more important for boys. The findings also indicated that girls' math-related occupational aspirations may be negatively affected by their reading self-concept, while no negative cross-domain effects were detected among boys. However, for both genders, higher levels of educational aspirations were related to higher levels of school-related exhaustion, whereas feelings of cynicism and inadequacy in school were related to lower levels of aspirations. These findings demonstrate that resources are needed to, not only support students' performance, but their motivation and well-being as well, in order to help them to set up desirable goals for themselves.

In sum, one of the most important implications of this work is the realization that students' show various patterns and trajectories of academic well-being during the adolescent years, and that these are related in meaningful ways to students' performance and motivational beliefs and seem to have some impact on their aspired educational degrees and occupational choices for their future as well. Recognizing that both academic performance, motivational beliefs and aspirations for future education and occupation are related to how students feel, view and experience school and schoolwork, and acknowledging that exhaustion and feelings of inadequacy is not solely found among those with lower performance and lower school values, but also among high-performing students, is important in order to better be able to identify students with

varying needs, and effectively consider alternative ways of confronting them.

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Anna Widlund

Development of Academic Well-Being during Secondary Education:

Relations to Performance, Motivational Beliefs, and Aspirations

Transitioning through the lower and upper secondary school years while at the same time going through adolescence often involves several changes and challenges for students. These changes may likely have negative consequences for their well-being in school. Therefore, it seems important to know more about how students' academic well-being develops during the adolescent years, to be able to better identify students with various well-being patterns in school and prevent a negative development in their well-being from taking place. Consequently, this dissertation aimed to investigate the development of students' academic well-being during adolescence. More specifically, this study contributes to our understanding of the individual differences in how students' academic well-being develops during the lower- and upper secondary school years and, also, how changes in students' academic well-being co-occurs with their academic performance, motivational beliefs, and future aspirations.

Overall, the findings of this work showed that most Finnish students displayed relatively positive and stable academic well-being patterns during their adolescent years. Yet, some experienced declines in their well-being during the lower secondary school years, whereas the transition to upper secondary education seemed to spark positive changes for many. One of the most important implications of this work, however, is the realization that students' show various patterns and trajectories of academic well-being during the adolescent years, and that these are related in meaningful ways to students' performance and motivational beliefs and seem to have some impact on their aspired educational degrees and occupational choices for their future as well. It is important to recognize that exhaustion and feelings of inadequacy in school may not solely develop among low-performing students, but also, among high-achieving and motivated students. Considering that changes were found in students' academic well-being during both the lower- and upper secondary school years, it seems important to follow up students' well-being in schools more closely, to be able to notice negative shifts in their well-being and consider alternative ways of meeting their varying needs effectively.

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