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Elina Ketonen

The Role of Motivation and Academic Emotions in University Studies

The short- and long-term effects on situational experiences and academic achievement

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Abstract

This dissertation examined how different motivational and emotional aspects of studying (i.e., students' beliefs, expectancies, interests, values and academic emotions) contribute to university students' academic engagement and achievement and how they are related to students' daily situational experiences during the first years at university. The first overall aim of the dissertation was to identify university students' motivational-emotional profiles, representing the more general dispositions in studying. The second aim was to examine how the student profiles and other general motivational dispositions are related to students' contextual and situational experiences. Finally, the third aim was to investigate the consequences of both general student dispositions and situational academic emotions for short- and long-term educational outcomes.

This dissertation consists of five original studies, which investigated students' experiences and achievement on different contextual and temporal levels of specificity. Study I examined whether situational academic emotions predict short-term study success. Studies II and III investigated students' motivational-emotional profiles that were based on their overall study-related beliefs and expectancies, the perceived meaning of studying and their emotional experiences. These studies further examined how the student profiles differed, in Study II, in terms of course-specific experiences, self-study time and study success and, in Study III, in terms of long-term academic achievement. Studies IV and V focused on students' daily situational experiences. Study IV investigated how autonomous and controlled motivation was related to daily educational goals and further to situational academic emotions during the same day. Study V examined the short- and long-term effects of the first-year study engagement on the daily experiences of task-specific value and emotions. Both questionnaire data and intensive longitudinal experience sampling data as well as achievement data from the student register were used. Variable- and person-oriented analytical approaches as well as intra-individual statistical methods were used to construct a more comprehensive understanding of the complex nature of university students' engagement and achievement.

Utilizing a person-oriented approach, distinct groups of students with different motivational-emotional profiles were found with clear differences in contextual experiences and short- and long-term achievement (Study II: *committed*, *dysfunctional*, *unstressed*; Study III: *engaged*, *disengaged*, *undecided*, *alienated*). Dysfunctional and disengaged students expressed the most negative experiences and performed the most poorly, whereas engaged and committed students had the most favourable outcomes. Undecided and unstressed students displayed less engagement but had no serious problems in studying and they improved their performance after the first academic year. Despite the motivational and emotional problems, alienated students performed relatively well. A variable-oriented analytical approach further revealed that students' situational academic emotions were related to study success in a lecture course. Finally, studies using an intra-individual approach showed that daily autonomous and controlled goal motivation was related to students' situational academic emotions and that first-year study engagement was related to daily situational experiences both short- and long-term.

In conclusion, the present dissertation indicates that even highly selected university students show various motivational-emotional patterns of engagement already at the beginning of their studies. These dispositions are related not only to students' immediate, everyday experiences and study success but also their long-term academic achievement. The findings demonstrate the importance of investigating university students' experiences and achievement on various contextual and temporal levels of specificity.

Keywords: motivation, academic emotions, engagement, academic achievement, higher education

Helsingin yliopisto, Kasvatustieteellinen tiedekunta
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Elina Ketonen

Motivaatio ja akateemiset tunteet yliopisto-opinnoissa
Lyhyen ja pitkän aikavälin vaikutukset tilannekohtaisiin kokemuksiin ja opintomenestykseen

Tiivistelmä

Tämä väitöstutkimus tarkasteli sitä, kuinka motivaatio ja opiskeluun liittyvät tunteet (ns. akateemiset tunteet) edistävät yliopisto-opintoihin sitoutumista sekä miten ne ovat yhteydessä opiskelijoiden tilannekohtaisiin kokemuksiin ja opintomenestykseen ensimmäisten opiskeluvuosien aikana. Tutkimuksen ensimmäinen päätavoite oli tarkastella opiskelijoiden yleisempää opiskeluun liittyvää motivaatiota ja tunnekokemuksia ja tunnistaa näiden perusteella erilaisia opiskelijaprofiileja. Toinen päätavoite oli tutkia, miten opiskelijaprofiilit ja yleinen opiskelumotivaatio ovat yhteydessä opiskelijoiden tilannekohtaisiin kokemuksiin. Kolmantena tavoitteena oli tutkia, miten opiskelijaprofiilit ja tilannekohtaiset akateemiset tunteet ovat yhteydessä lyhyen ja pitkän aikavälin opintomenestykseen.

Väitöstutkimus perustuu viiteen osatutkimukseen, joista ensimmäinen selvitti, ovatko tilannekohtaiset akateemiset tunteet yhteydessä tenttimenestykseen luentokurssilla. Toinen ja kolmas osatutkimus tarkastelivat, minkälaisia yleiseen opiskelumotivaatioon ja tunnekokemuksiin liittyviä opiskelijaprofiileja voidaan tunnistaa sekä miten profiilit eroavat toisistaan tilannekohtaisten kokemusten ja opintomenestyksen suhteen. Toinen osatutkimus tarkasteli luentokurssiin liittyviä kokemuksia, itseopiskeluun käytettyä aikaa ja kurssiarvosanaa, kun taas kolmas osatutkimus tarkasteli profiileja pitkän aikavälin opintomenestyksen suhteen. Neljännessä ja viidennessä osatutkimuksessa paneuduttiin opiskelijoiden päivittäisiin tilannekohtaisiin kokemuksiin. Neljäs osatutkimus seurasi sitä, kuinka aamulla asetettuihin opintotavoitteisiin liittyvä motivaatio oli yhteydessä saman päivän aikana koettuihin akateemisiin tunteisiin. Viides osatutkimus tarkasteli ensimmäisenä opiskeluvuotena koetun opiskeluinnon yhteyttä sekä ensimmäisen että toisen opiskeluvuoden tilannekohtaisiin kokemuksiin. Aineisto koostui kyselylomakeaineistosta, kokemusotantamenetelmällä kerätystä intensiivisestä pitkittäisaineistosta ja opiskelijarekisteristä saaduista opintomenestystiedoista. Tutkimuksessa hyödynnettiin erilaisia tilastollisia menetelmiä, kuten muuttuja- ja henkilösuuntautunutta lähestymistapaa sekä yksilön kokemusten tilannekohtaiseen vaihteluun perustuvaa analyysitapaa.

Henkilösuuntautuneen lähestymistavan avulla löydetyt opiskelijaprofiilit olivat yhteydessä opiskelijoiden tilannekohtaisiin kokemuksiin, mutta myös sekä lyhyen että pitkän aikavälin opintomenestykseen. Opiskelijat, jotka olivat sitoutuneimpia, myös menestyivät parhaiten. Sen sijaan opintoihin liittyvä merkityksen puute oli yhteydessä negatiivisiin kokemuksiin sekä heikompaan opintomenestykseen. Alun perin uravalinnastaan epävarmat opiskelijat eivät kokeneet suuria ongelmia opinnoissaan ja paransivat opinnoissa edistymistään ensimmäisen vuoden jälkeen. Opinnoistaan vieraantuneet opiskelijat pärjäsivät kiinnostuksen puutteestaan huolimatta opinnoissaan melko hyvin. Muuttujalähtöinen analyysi paljasti lisäksi, että opiskelijoiden tilannekohtaiset akateemiset tunteet, erityisesti kiinnostus ja väsymys, olivat positiivisesti yhteydessä opintomenestykseen luentokurssilla, kun taas ahdistuksen yhteys menestykseen oli negatiivinen. Yksilön sisäiseen, tilannekohtaiseen kokemukseen liittyvä analyysi osoitti, että aamulla ilmaistu opintotavoitteisiin liittyvä motivaatio oli yhteydessä päivän aikana koettuihin akateemisiin tunteisiin (ulkoinen kontrolli oli yhteydessä negatiivisempiin tunteisiin). Ensimmäisen vuoden opiskeluinto selitti päivittäisiä tilannekohtaisia kokemuksia myös pitkällä aikavälillä.

Tämä väitöstutkimus osoittaa, että jopa yliopistoon tarkoin valikoituneiden opiskelijoiden akateemisissa tunteissa, opiskelumotivaatiossa sekä opintoihin sitoutumisessa on vaihtelua ja yksilöllisiä eroja jo opintojen alussa. Tutkimus osoittaa myös, että motivaatiolla ja akateemisilla tunteilla on merkitystä opintomenestyksen, yliopisto-opintoihin sitoutumisen sekä niissä etenemisen kannalta. Näitä ilmiöitä on tärkeää tarkastella yleisen tason ohella myös tilanne- ja kurssikohtaisesti, huomioiden sekä pidemmän aikavälin vaikutukset että opintoihin liittyvät päivittäiset kokemukset.

Avainsanat: opiskelumotivaatio, akateemiset tunteet, sitoutuminen, opintomenestys, yliopisto-opinnot

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Helsinki, November 2017

Elina Ketonen

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I Ketonen, E., & Lonka, K. (2012). Do situational academic emotions predict academic outcomes in a lecture course? *Procedia - Social and Behavioral Sciences, 69*, 1901–1910. doi:10.1016/j.sbspro.2012.12.144

II Ketonen, E., & Lonka, K. (2013). How are situational academic emotions related to teacher students' general learning profiles? In K. Tirri & E. Kuusisto (Eds.), *Interaction in Educational Domains* (pp. 103–114). Rotterdam: Sense Publishers. doi:10.1007/978-94-6209-395-9_9

III Ketonen, E., Haarala-Muhonen, A., Hirsto, L., Hänninen, J., Wähälä, K., & Lonka, K. (2016). Am I in the right place? Academic engagement and study success during the first years at university. *Learning and Individual Differences, 51*, 141–148. doi:10.1016/j.lindif.2016.08.017

IV Ketonen, E., Dietrich, J., Moeller, J., Salmela-Aro, K., & Lonka, K. (2017). The role of daily autonomous and controlled educational goals in students' academic emotion states: An experience sampling method approach. *Learning and Instruction.* Advance online publication. doi:10.1016/j.learninstruc.2017.07.003

V Ketonen, E., Malmberg, L. E., Salmela-Aro, K., Muukkonen, H., Tuominen, H., & Lonka, K. (manuscript submitted for publication). *The role of study engagement in university students' daily experiences: A multilevel test of moderation.*

1 Introduction

In their everyday lives, students may juggle such questions as *'What is the academic goal I wish to achieve? Can I master it, do I have the abilities needed? Why am I striving for this goal, does it matter for me? How does it feel?'*. The ways in which these questions are responded to may be fundamental in terms of explaining the level of students' commitment and engagement in their studies. For example, consider the hypothetical two university students enrolled in a statistics course. For Kevin, statistics is a challenging subject and he lacks confidence that he will do well. He also feels anxious, since passing the statistics courses is extremely important in terms of gaining his future dream profession as a psychologist. Besides lacking confidence in his statistics ability, Kevin has always experienced strong negative affective reactions towards math-related subjects. Susan, in contrast, enjoys statistics for its own sake; she loves calculus and has always perceived math as being easy for her. Susan is not certain whether she will need statistics in the future, but still experiences such a strong interest and enthusiasm towards statistics that she has enrolled in the courses just for fun. Both Susan and Kevin are engaged in their studies, but in different ways; consequently, their experiences, effort and later achievement are likely to differ.

Studying is more than pure cognitive processing or attaining a degree. It also involves affective and motivational dispositions to work in particular courses and tasks. When students enter lectures and classes, they arrive with various subjective dispositions and may entertain a range of beliefs, concerns, values, interests and emotions. These dispositions may contribute to engaged or disengaged interaction with the academic activity in question. The pursuit of a better understanding of these interactions and promoting students' commitment and engagement in their studies, has led to a growing interest in student motivation (e.g., Boekaerts & Martens, 2006; Entwistle, 1988; Pintrich, 2004; Wentzel & Wigfield, 2009) as well as students' emotional experiences within educational settings (e.g., Boekaerts, 2007; Linnenbrink, 2006; Meyer & Turner, 2006; Pekrun, Goetz, Titz, & Perry, 2002; Pekrun & Linnenbrink-Garcia, 2014; Schutz, Hong, Cross, & Osbon, 2006). This dissertation investigates the role of motivation and academic emotions in university students' engagement in their studies and, further, in students' daily situational experiences and academic achievement during the first years at university.

In the long history of traditions examining student learning and achievement in higher education, the focus has been on students' cognitive strategies, metacognition and motivation (for reviews, see Vermunt & Donche, 2017; Vermunt & Vermetten, 2004). For instance, the Student Approaches to Learning (SAL) tradition focused on university student learning, which was mainly conceptualized in

terms of cognitive strategies (i.e., surface and deep approach) and motivation (i.e., the general meaning and purpose for studying; e.g., Biggs, 1987; Entwistle & Ramsden, 1983; Marton & Säljö, 1984; Pask, 1988; Schmeck, 1988). Another body of work on student learning focused on metacognition (e.g., Brown, 1987; Flavell, 1987; Friedrich & Mandl, 1986; Palincsar & Brown, 1984), that later developed into a framework of Self-Regulated Learning (SRL; e.g., Boekaerts, Pintrich, & Zeidner, 2005; Schunk & Zimmerman, 1994). The SAL and SRL traditions have long been the two dominant conceptual frameworks for assessing motivation and self-regulated learning in university students (see Lonka, Olkinuora, & Mäkinen, 2004; Pintrich, 2004). In addition, students' epistemological beliefs (i.e., conceptions of knowledge) and conceptions of learning have been of interest to many scholars investigating higher education students' learning (e.g., Hofer & Pintrich, 1997; Lonka & Lindblom-Ylänne, 1996; Pintrich, 2004; Schommer, 1990). The line of research where the attempt is to combine the above-mentioned dimensions is referred to as a student learning patterns perspective, in which the interactions between cognitive strategies, metacognitive regulation strategies, conceptions of learning and learning motivations are united (see Vermunt & Donche, 2017).

Within the student learning patterns perspective, *motivational aspects of studying* have mainly been investigated through learning orientations, which can be more intrinsic (e.g., personal interest) or extrinsic (e.g., profession oriented) in nature, or clear study motives are lacking overall (Vermunt & Donche, 2017). In addition to learning orientations, motivational constructs like self-efficacy, ability beliefs and expectancies for success (Ferla, Valcke, & Schuyten, 2008; Fryer, Ginns, & Walker, 2016; Heikkilä, Niemivirta, Nieminen, & Lonka, 2011; Liu et al., 2014), autonomous and controlled motivation (Baeten, Dochy, & Struyven, 2012; Catrysse, Coertjens, Donche, Van Daal, & Van Petegem, 2015; Donche, Maeyer, Coertjens, Van Daal, & Van Petegem, 2013; Kyndt, Dochy, Struyven, & Cascallar, 2011) and task value (Fryer et al., 2016; Liu et al., 2014; Minnaert, 1999) have been shown to be related to university students' cognitive strategies and self-regulation.

A growing number of researchers recognize not only motivational factors, but also the relevance of understanding and examining the rich variety of emotions present in academic activities, often called *academic emotions* (Pekrun et al., 2002). These can include enjoyment of learning, test-related anxiety or curiosity when facing cognitive incongruity. The existing research suggests that such emotions not only strongly influence students' learning, achievement and long-term academic development, but also form part of their psychological well-being; thus, they are important facilitators of successful studying in various ways (e.g., Efklides & Volet, 2005; Linnenbrink, 2006; Linnenbrink-Garcia & Pekrun, 2011; Pekrun et al., 2002; Pekrun & Linnenbrink-Garcia, 2014; Schutz & Lanehart,

2002; Schutz & Pekrun, 2007). However, the affective component has only recently been addressed in the field of higher education research. For instance, academic emotions have been shown to be related to university students' learning strategies (Muis et al., 2015), approaches to learning (Postareff, Mattson, Lindblom-Ylänne, & Hailikari, 2017; Trigwell, Ellis, & Han, 2012) and self-regulation (Asikainen, Hailikari, & Mattson, 2017; Pekrun, Goetz, Frenzel, Barchfeld, & Perry, 2011; Shell & Husman, 2008).

The present dissertation focuses on both motivational and emotional aspects of university students' learning, such as students' beliefs, expectancies, values, interests and academic emotions. Since existing literature has consistently shown that the first years of university are the most decisive for students' future development and success in studies (e.g., Astin, 1993; Gale & Parker, 2014; Mäkinen, Olkinuora, & Lonka, 2004; Pascarella & Terenzini, 2005; Reason, Terenzini, & Domingo, 2006; Tinto, 1996), the focus here is on students' experiences during the crucial first years at university. Next, by drawing on the previous, broader motivational and emotional literature on students' behaviour, the aim is to review relevant parts of the literature concerning university students' motivational and emotional experiences and to build a sound theoretical background for the present study. Three broad perspectives on student learning are presented. The first chapter focuses on motivational aspects in studying, that is, students' competence beliefs and expectations for success, as well as the reasons why students are (or are not) engaged in their studies, including interests and values. The second chapter focuses on academic emotions. The third chapter draws possible links between these motivational and emotional aspects, presents previous studies that combine them and discusses the consequences of these aspects on educational outcomes. After that, Chapter 1.4 gives a conceptualization of the different levels of contextual and temporal specificity that can be used to investigate student learning. Finally, the Introduction concludes with Chapter 1.5, which represents the adapted perspective to investigate the role of motivation and academic emotions in university studies.

1.1 Motivational aspects of studying

The motivational aspects of studying may be viewed through modern theories of motivation, focusing on students' expectancies, values and goals (for a review, see Eccles & Wigfield, 2002). Next, by drawing on the previous, broader motivational literature on students' behaviour, the aim is to conceptualize and examine literature that could strengthen the viewpoints on motivational aspects in higher education student learning. The goal is not to review these related literatures comprehensively and in detail but to give examples of how insights gained from them may contribute to understanding what engages university students. Since the proliferation of motivational constructs and measures, duplication of concepts and

lack of differentiation in definitions across various theories is inevitable. To improve the conceptual clarity, previous research is divided on the following two broad perspectives on students' motivation. The first chapter focuses on students' beliefs about their competence and expectancies for success. The second describes the reasons why students are (or are not) engaged, including students' interests and values. This theoretical approach taken is congruent with modern theories integrating expectancy and value constructs (e.g., Eccles, 2009; Heckhausen, 2012; Pekrun, 2006; Watt et al., 2012) and with theories investigating one or the other individually (e.g., Bandura, 1997; Hidi & Renninger, 2006). Despite the subtle differences among the theories that are presented, all can be divided into the categories of either expectancies or values (or both).

1.1.1 Students' beliefs and expectancies ('Can I?')

Students' beliefs and expectancies refer here to the appraisals of competence and the related success expectancies in educational contexts; thus, they respond to the question '*Can I master it?*'. Several theories focus on individuals' beliefs about their competence and self-efficacy (e.g., Bandura, 1997; Marsh, 1990; Weiner, 1992), expectancies for success or failure (e.g., Eccles, 2009), and sense of control over the outcomes (e.g., Perry, 1991; Skinner, 1995). The common thread for all these theories is that students who believe that they have the skills and abilities to succeed at academic tasks, will perform better and are also motivated to select more challenging tasks (Eccles & Wigfield, 2002).

Bandura (1997) defined *self-efficacy* as individuals' perception of their ability to carry out and accomplish a certain task. In this definition, the construct is seen as multidimensional, varying in terms of strength and generality, and relative to the difficulty of the given task. Thus, some students may have a strong overall sense of efficacy in their studies, while others may have more narrow competence beliefs that encompass only certain situations. Furthermore, students may believe they are competent even on the most difficult tasks, whereas others may believe they can only master the easier ones. Another theory that focuses on ability beliefs and probabilities of success is the expectancy-value theory of achievement motivation (Eccles, 2009; Eccles et al., 1983). In the model, *success expectancies* are defined as individuals' beliefs about how well they will do in a particular, either present or future, task, influenced by task-specific beliefs such as difficulty of the task and usually indistinguishable or highly related to the more broader ability beliefs. The definition is quite analogous to efficacy expectations suggested by Bandura (1997).

Overall, both competence beliefs and success-related expectancies are rather more dependent on people's own interpretations of their (past) achievement situations and outcomes than reality itself (Eccles, 2009). Thus, closely related to the

above-presented line of research are the attribution theories, emphasizing that individuals' interpretations or explanations for outcomes, rather than motivational dispositions or actual outcomes, determine their achievement strivings (e.g., Weiner, 1992). For instance, the research tradition of cognitive and attributional strategies represents *optimistic strategy* as a typical strategy leading to success (e.g., Cantor, 1990; Jones & Berglas, 1978; Martin, Marsh, & Debus, 2001; Norem, 1989; Nurmi, Aunola, Salmela-Aro, & Lindroos, 2003). People applying this strategy have high performance expectations throughout the task, work hard to do well and then protect their self-esteem by denying control when confronted with a failure outcome; thus, they create a positive attribution about succeeding (Cantor, 1990; Norem, 1989). On the other hand, students may develop so called *failure avoiding strategies* to avoid appearing to lack ability. These may include procrastination, task avoidance, excuse making and lack of effort. Rather than try to deal with a challenging task, students may deliberately avoid challenging goals to maintain their self-integrity and sense of competence or others' impressions of their competence (Nurmi et al., 2003).

Finally, as proposed by the theories above, students' efficacy beliefs and expectancies may be more generic in nature or related to a certain aspect of learning, such as the ability to self-regulate one's learning. Based on the broader literature on self-regulated learning (see Boekaerts & Cascallar, 2006; Boekaerts et al., 2005; Schunk & Zimmerman, 1994; Zimmerman, 2002), particularly relevant in terms of university students' competence beliefs might be the *self-efficacy for self-regulation*, reflecting an individual's beliefs in his or her capabilities to use a variety of learning strategies, resist distractions and complete study-related tasks (Klassen, Krawchuk, & Rajani, 2008). Furthermore, the body of literature focusing also on *problems in self-regulation* seem to be particularly interesting from the standpoint of university students' engagement and achievement, since at this point, studying often requires a lot of independent work and teachers offer little external regulation (see Vermunt, 1998; Vermunt & Donche, 2017). Previous research indicates that even highly selected and well-motivated students may perceive themselves to lack the readiness to regulate their own learning (Donche, Coertjens, & Van Petegem, 2010; Donche & Van Petegem, 2009; Heikkilä et al., 2011; Heikkilä, Lonka, Nieminen, & Niemivirta, 2012; Lonka & Lindblom-Ylänne, 1996; Nieminen, Lindblom-Ylänne, & Lonka, 2004). For instance, students may find it difficult to assess whether they master the subject matter sufficiently or do not find it clear what they should remember (Vermunt, 1998). Such incompetence to regulate study activities has been shown to be related to the above-described failure-avoiding strategies among freshmen (Minnaert, 1999).

1.1.2 Students' interests and values ('Will I?')

Students' interests and values refer here to the incentives and reasons for studying; thus, they are directly related to the questions of '*Does it matter for me?*' and '*Why?*'. Theories focused on values (e.g., Eccles, 2009), intrinsic motivation (e.g., Deci & Ryan, 1985; 2000), and interest (e.g., Hidi & Renninger, 2006) deal with the reasons individuals have for engaging in different activities. Thus, these theories expand the above-presented expectancy perspective, since even if students are certain that they can handle the task, they may have no compelling reason to do so.

In addition to focusing on an expectancy component, the expectancy-value theory (Eccles, 2009; Eccles et al., 1983) emphasizes the importance of having a value or reason to perform the activity. To conceptualize the latter, the theory outlines three components of *task value*: intrinsic, attainment and utility. Intrinsic value is the enjoyment the person receives from performing the activity or the subjective interest he or she has in the subject. Attainment value is defined as the personal significance of doing well in the task, usually confirming one's self-schema (e.g., tendency to maintain a positive self-image or sense of self-worth). Utility value displays how useful the activity is in terms of facilitating either current or future goals (even if the task is not valued for its own sake); thus, this value captures the more instrumental or external reasons for engaging in a task. Thus, the *type of value*, that is, the more intrinsic and extrinsic reasons for valuing activity, is acknowledged in the expectancy-value model. Finally, *cost* (i.e., perceived benefit or harm of engaging in an activity) is often considered in achievement settings besides values. It is conceptualized in terms of the negative aspects of engaging in the activity, such as performance anxiety or fear of failure, the amount of effort needed in order to succeed, as well as the lost opportunities resulting from making one choice rather than another (Eccles, 2009).

However, students' initial reasons for pursuing certain activities or goals are not always related to their own values. The classification of incentives into intrinsic and extrinsic is proposed in several theories to explain the divergent reasons individuals may have to engage in the activity (see Sansone & Harackiewicz, 2000). For instance, the goal-pursuit literature suggests that students' strivings can be divided into autonomously and controlled motivated incentives (e.g., Sheldon & Elliot, 1998). *Autonomous motivation* comes in two forms: in line with the self-determination theory (Deci & Ryan, 1985; 2000), in the most intrinsic form of autonomous motivation individuals engage in the activity because they are interested in or purely enjoy the activity, resembling the component of intrinsic value as defined by expectancy-value theory. However, autonomously motivated behaviour may also be motivated for other than intrinsic reasons. For instance, students may consciously and without any external pressure select a specific major because it will help them to aspire to a certain profession. They might choose biology be-

cause they want to be a doctor. These students are autonomously motivated, although the choice of major is based on reasons extrinsic to the major itself (Sheldon & Elliot, 1998). This identified form of autonomous motivation is somewhat comparable to utility or attainment value in expectancy-value theory, since after all, the activity is undertaken with a sense of full willingness, accomplished for one's own sake and usually for positive reasons. Overall, in all forms of autonomous goal pursuit the activities are self-initiated and freely chosen; thus, they are well-aligned with the individual's personality and inner needs (Sheldon & Elliot, 1999).

Controlled motivation, in contrast, means that an activity is pursued either for external rewards or to avoid guilt, shame or anxiety (Deci & Ryan, 2000; Sheldon & Elliot, 1998). For instance, the task is completed because someone else insists or the student would feel guilty for not accomplishing the task. Although controlled goals are felt to be compelled either by external or internal forces or pressures, students may still see incentive value in putting effort into controlled motivated activities to meet someone else's expectations or to gain advantage or reward from them (Vansteenkiste, Lens, Witte, & Feather, 2005). Therefore, while expectancy-value theory rather indicates how motivated people are by examining whether they value an activity (i.e., the amount of motivation), theories focusing on autonomous and controlled motivation distinguish between *type of motivation*, that is, not only the self-integrated, but also the extrinsic reasons for doing the activity (see Vansteenkiste et al., 2004).

Finally, the concept of interest, defined as a psychological state that is characterized by an affective component of positive emotion and a cognitive component of concentration (e.g., Hidi & Renninger, 2006; Tsai, Kunter, Ludtke, Trautwein, & Ryan, 2008) is quite like the above-presented constructs of intrinsic value (Eccles, 2009) and intrinsic motivation (e.g., Deci & Ryan, 2000). Some forms of interest may be primarily based on feelings (such as involvement, stimulation and flow), while others are likely to consist of more value-related valences, that is, the attribution of personal significance or meaning of the activity to the self (Schiefele, 1999). However, while task values may be instrumental as described above, both feeling- and value-related aspects of interest are directly related to the object or activity (Schiefele, 1999). That is, if a student associates statistics with high personal significance because statistics may help him or her to get the required diploma to work as a psychologist, this is not considered as interest. Furthermore, interest is often examined by differentiating between a situational and a more general disposition of individual interest (e.g., Alexander, Kulikowich, & Jetton, 1994; Hidi & Renninger, 2006; Krapp, Hidi, & Renninger, 1992). While situational interest may be considered as more of an emotional state aroused by a specific activity or task-related features (see next chapter), *individual interest* is perceived as a relatively stable evaluative orientation towards a certain domain, in

which prior knowledge and cognitive processing are more pronounced (Hidi & Renninger, 2006).

In the higher education context, interest has been found to be one of the most typical explanations for disciplinary career choices (Mikkonen, Heikkilä, Ruohoniemi, & Lindblom-Ylänne, 2009). However, undergraduate students' interest in their subject has been found to clearly decrease during the first year of studies (Van der Veen, De Jong, Van Leeuwen, & Korteweg, 2005). Thus, instead of only being engaging, studying can also be alienating (see Mann, 2001). Another sign of alienation is a *lack of personal meaning* or value for studies, which can lead to lower achievement levels and even increase the risk of dropping out of university (Mäkinen et al., 2004). While interest is usually defined as always having a target and not a predisposition that applies generally across all activities (e.g., Krapp, 2002; Renninger & Hidi, 2011), experienced personal meaning (or lack of it) can be considered as a more general motivational disposition related to studying and the choice of major, which may consist of various agents such as the above-outlined intrinsic incentives or more external determinants. For instance, orientations such as personally interested (students are motivated through personal interest in the subject matter), or vocation oriented (students want to prepare themselves for an occupation or they want to become better in their professional skills), have both been found to describe such general preferences among higher education students (see Vermunt & Donche, 2017). Furthermore, obtaining a certificate or a degree, to test one's own capabilities and to prove that one can cope with the demands of higher education, have been proposed as incentives for university students' motivation. Combinations of these motives may also exist (Mikkonen et al., 2009). Finally, an ambivalent orientation refers to problems in motivation, a doubtful, uncertain attitude toward the studies, one's own capabilities and/or the chosen subject area and career. This kind of uncertainty about the choice of study has also been shown to be related to a lack of self-regulatory skills among freshmen (Minnaert, 2000).

1.2 Academic emotions ('How does it feel?')

In addition to having an expectation of being successful and having a reason for doing a task, the students' answer to the question '*How does it feel?*' is relevant in terms of their engagement in the activity, since emotions and affects are also seen as part of the rational decision-making processes in educational contexts (Efklides, 2006; Humphrey, Curran, Morris, Farrell, & Woods, 2007). Even complex cognitive activities are emotionally charged experiences (D'Mello & Graesser, 2012) and emotions may influence the type of learning strategies used (Muis et al., 2015). Furthermore, students' emotions can profoundly influence their motivational engagement with academic tasks (Pekrun & Linnenbrink-Garcia, 2012; Schutz & Pekrun, 2007). Emotions that are directly linked to academic activities

such as studying and learning (or instruction), are called *academic emotions* (Pekrun et al., 2002; Shutz & Lanehart, 2002).

Pekrun's (2006) control-value theory of achievement emotions introduces different types of emotions experienced in situations involving learning and achievement and the contextual and individual factors that influence these. According to the theory, two types of academic emotions with different object focuses can be distinguished: *activity emotions* pertaining to an ongoing academic task itself (e.g., enjoyment during learning) and *outcome emotions* pertaining to the emotional reactions in response to the outcomes of an academic activity (e.g., hope for success or shame from failure). Outcome emotions may refer either to retrospective emotions (in response to past failure or success) or prospective emotions (in anticipation of upcoming failure or success; Pekrun, 2006; Pekrun, 2012; Pekrun & Linnenbrink-Garcia, 2014; Pekrun & Stephens, 2009). Both activity and outcome emotions can be further characterized based on their positive or negative *valence* (i.e., whether the emotional state is pleasant or unpleasant) and *activating or deactivating nature* (i.e., whether the emotional state is arousing or pacifying; e.g., Barrett, Mesquita, Ochsner, & Gross, 2007; Larsen & Diener, 1992; Pekrun, 2006; Russell, 1980; Yik, Russell, & Barrett, 1999; Watson & Tellegen, 1985). For instance, anxiety and enthusiasm are activating, whereas boredom and relief are deactivating emotions. Differentiating academic emotions especially by activation dimension has the potential to yield a more nuanced understanding of the ways in which students' emotions relate to various educational outcomes (see Chapter 1.3).

As most investigators differentiate between so-called momentary or state emotions and long-term trait levels of affect (e.g., Diener, 1999), academic emotions can also be considered as more habitual and recurring affective dispositions (i.e., trait-like conceptualizations) or as momentary task-specific states (Pekrun, 2006). For instance, students may feel hopelessness in relation to general failure but not as a short-lived emotion related to a specific task; thus, they experience a *trait academic emotion*. On the other hand, triggered situational interest can be described as a pleasant and activating *state academic emotion*. Unlike more developed individual interest (see previous chapter), it appears to be fuelled by affect and often takes place without effort, since it is aroused by specific activity or task-related features (Hidi & Renninger, 2006).

Task-specific academic emotions and more enduring affective dispositions

One related concept that commonly arises in the emotion literature is mood, which is considered an affective state that has a longer duration and is less discrete than the experience of a specific emotion (Oatley, Keltner, & Jenkins, 1996; Russell & Barrett, 1999). In addition, mood is not directed at a particular event or object (Frijda, 1993; Russell & Barrett, 1999). However, experienced positive emotions

during or after the learning task may be a combination of positive feelings about the task at hand and a general, positive mood that is not related explicitly to the task (Pekrun, 2012). In their empirical study, Hirt, Melton, McDonald, and Harackiewicz (1996) found that participants already in a positive mood before working on a task, perceived the task as more interesting than the participants in a negative or neutral mood did, whereas Efklides and Petkaki (2005) found that a positive mood predicted retrospective interest and a feeling of liking a task.

Other relatively general affective dispositions such as tendency for depression may also influence studying. Depending on the interactions with students' depressive symptoms, anger experienced before an academic exam either hindered or facilitated performance in a study by Lane, Whyte, Terry, and Nevill (2005). In those students who did not feel depressed, anger was associated with improved performance, likely indicating increased effort and readiness to perform instead of feeling threatened. Besides the effects on performance, the overall balance of peoples' positive to negative emotions has been shown to contribute to their subjective well-being, such as life satisfaction (Diener, Sandvik, & Pavot, 1991). Thus, task-specific emotions may be related to more general affective dispositions in different ways. More general affective patterns such as moods or depressive episodes may influence the likelihood and consequences of situational emotions as addressed above. On the other hand, situational emotions may repeat across situations and form a more general and enduring pattern: for instance, individuals who often feel pleasant emotions also tend to be satisfied with their lives (Lucas, Diener, & Suh, 1996; Watson, Clark, & Tellegen, 1988).

In educational settings, a rather common, more or less enduring affective state is *study-related exhaustion*, which can be defined as repeated feelings of strain, particularly chronic fatigue, resulting from taxing study (Schaufeli, Martinés, Pinto, Salanova, & Bakker, 2002). When compared to older students, freshmen have been found to experience greater stress due to numerous changes, conflicts, and frustrations (Misra, McKean, West, & Russo, 2000). Experiencing such stress during the first academic year has even been shown to be a substantial barrier to obtaining a degree two years later (Vaez & Laflamme, 2003) or ultimately, a reason to drop out of school (Law, 2007). A reasonable amount of stress, however, may be a sign of study commitment (Kember & Leung, 2006; Litmanen, Hirsto, & Lonka, 2010; Litmanen, Loyens, Sjöblom, & Lonka, 2014) and exhaustion can be also experienced by engaged and dedicated students (Daniels et al., 2008; Lonka & Ketonen, 2012; Salmela-Aro, Moeller, Schneider, Spicer, & Lavonen, 2016; Schaufeli et al., 2002; Tuominen-Soini & Salmela-Aro, 2014). Students who study hard are susceptible to high exhaustion because they place high personal demands on themselves and may worry about mastering the knowledge needed in their future profession, reflecting high standards and working morale (Litmanen et al., 2014). Furthermore, constant concerns about outperforming others and fear of failure may induce exhaustion and negative affect (Daniels et al.,

2008; Fortunato & Goldblatt, 2006; Grant & Dweck, 2003). This kind of external incentive to succeed may also been seen as representing relatively controlled motivation and is also therefore likely to be associated with feelings of pressure and stress (Deci & Ryan, 2000). When prolonged, exhaustion and stress may begin to affect one's well-being (Misra et al., 2000), predicting postgraduate exhaustion as well (Dahlin, Fjell, & Runeson, 2010).

1.3 Motivation, academic emotions and educational outcomes

Some assumptions indicating the possible places of convergence among students' success expectancies, interests and emotional experiences can be made based on previous literature. Pekrun's (2006) control-value theory provides an integrative framework for analysing the antecedents and effects of academic emotions, assuming that emotions are closely and reciprocally linked to their cognitive and motivational antecedents, as well as to their cognitive and motivational effects. Motivational appraisals are seen as the central antecedent for academic emotions in the model (Pekrun, 2006). As in the expectancy-value model by Eccles (2009), the perceived controllability (i.e., expectancy for success) and the subjective value of activities and outcomes play an important role in Pekrun's model; in particular, they are theorized to give rise to students' emotions. The model suggests that subjective personal control and high levels of personal relevance are related to greater positive affect. In the empirical studies, the perceptions of control have been constantly found to be positively associated with positive emotions and negatively related to negative emotions (e.g., Pekrun, 2000), while the role of value, particularly on negative emotions, seems to be more ambiguous. The correlation between perceived value and negative emotions has been found to be either positive (e.g., Pekrun, 2000), negative (e.g., Goetz, Pekrun, Hall, & Haag, 2006) or the constructs have been found to be unrelated (e.g., Ahmed, Werf, Minnaert, & Kuyper, 2010; Bieg, Goetz, & Hubbard, 2013).

In addition, doing educational tasks for intrinsic reasons has been shown to be positively correlated with students' positive affect and vitality (e.g., Miquelon & Vallerand, 2006; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000), enjoyment and interest, and decreased anxiety (Black & Deci, 2000). Furthermore, learning-related enjoyment presupposes that the student has a sense of being able to master the task. On the other hand, anxiety is assumed to be triggered when expectations imply possible failure (Pekrun et al., 2002). The intensity of these emotions may be related to the perceived difficulty of the task at hand. For instance, students often report high positive affects, such as engagement and enthusiasm, when perceived high challenge is combined with high self-efficacy beliefs, whereas more intense negative affects are reported when there is a mismatch between challenges and competencies (Delle Fave & Massimini, 2005; Inkinen et al., 2014; Lonka & Ketonen, 2012; Tolvanen et al., 2011). Finally, situational emotions may also be

central to the arousal and maintenance of students' more enduring motivation, volition, interest and effort (Ainley, Corrigan, & Richardson, 2005; Pekrun, 2005; Pekrun et al., 2002). For example, scholars investigating the interest construct emphasize the importance of positive emotions in the development of interest (e.g., Hidi & Renninger, 2006).

A relevant question is also how are students' beliefs, values and emotions related to educational outcomes. Regarding students' beliefs, previous literature indicates that in general, students whose perceptions related to their skills and competencies are positive, also perform better (see Eccles & Wigfield, 2002). High personal academic efficacy and success expectancies have been shown to predict students' occupational aspiration choices, expended effort and persistence and overall performance (Bandura, 1997; Eccles & Wigfield, 2002). Studies conducted in a higher education context have indicated that university students' success expectancies or optimism to master the task predicted academic achievement and satisfaction, which, in turn, increased their subsequent success expectancies. In contrast, task-avoidance predicted low academic achievement and dissatisfaction, which again was predictive of subsequent task-avoidance (e.g., Heikkilä et al., 2012; Nurmi et al., 2003).

In addition, Klassen et al. (2008) showed that self-efficacy for self-regulation promotes academic success. Furthermore, those university students who report having insufficient self-regulatory skills also tend to have lower study success (Donche, Coertjens, Van Daal, De Maeyer, & Van Petegem, 2014; Fryer et al., 2016; Heikkilä et al., 2011; 2012; Heikkilä & Lonka, 2006; Lonka & Lindblom-Ylänne, 1996; Vanthournout, Gijbels, Coertjens, Donche, & Van Petegem, 2012). In their review consisting of 13 years of research into the correlates of tertiary-level grade point average (GPA), Richardson, Abraham and Bond (2012) actually indicated that academic self-efficacy emerged as one of the strongest correlates of GPA, along with the traditional assessments of cognitive capacity and previous performance (see also, Robbins et al., 2004). Although not as strongly related, optimism, academic intrinsic motivation and self-regulatory skills were also significantly related to better performance, whereas test anxiety and either general or study-related stress were negatively related to GPA in the meta-analysis (Richardson et al., 2012).

As in the meta-analysis by Richardson et al. (2012), the positive influence of students' intrinsic motivation, interests and values on task choice, persistence and performance is suggested across various previous studies (see Eccles & Wigfield, 2002). For instance, autonomously or intrinsically motivated students have been shown to receive higher grades, be more persistent, learn more, and experience more satisfaction and positive emotions compared to those who are motivated by control (for a review see, Guay, Ratelle, & Chanal, 2008). However, controlled-motivated goals also have some positive effects; namely, they lead to higher persistence over the short term than not pursuing any goal (Vansteenkiste, Lens, &

Deci, 2006). Theoretically, it has been suggested that controlled forms of motivation can elicit desired behaviour, at least in the short term and that negative behavioural repercussions may manifest over an extended period (Deci & Ryan, 2000).

In addition, interest has repeatedly been recognized to have many positive effects on both the process and results of learning (Krapp, 2002). For example, situational interest has been shown to influence positively cognitive performances such as focused attention, higher cognitive functioning and overall learning (Hidi & Renninger, 2006) and to be more strongly related to deep-level than surface-level cognitive strategies in learning (Schiefele, 1999). Furthermore, the positive emotions associated with interest have been found to contribute to cognitive performance (Ainley, Hillman, & Hidi, 2002; Krapp, 2002). Interest has been found to predict academic outcomes also among college students (e.g., Harackiewicz, Barron, Tauer, & Elliot, 2002). One possible mechanism that has been proposed is that situational interest makes students to work harder and become engaged, which again leads to better learning outcomes (Harackiewicz et al., 2002). On the other hand, lower achievement has been shown to be more typical of students reporting lack of interest (Mäkinen et al., 2004). For instance, students uncertain or undecided about their career choice exhibit both lower academic performance and lower persistence rates (Leppel, 2001) and are less committed to studying (Germeijs & Verschueren, 2007), whereas students whose majors are congruent with their skills and interests are the most likely to persist and succeed (Allen & Robbins, 2008; Porter & Umbach, 2006; Tracey & Robbins, 2006).

In addition to intrinsic incentives, the role of students' values in academic achievement has been acknowledged in previous research. However, when examined simultaneously with success expectancies, values were actually better predictors of students' continuing interest, academic effort and future course and career choices (Nagengast et al., 2011; Trautwein, Lüdtke, Kastens, & Köller, 2006; Wigfield & Eccles, 2000), whereas expectancy was more predictive of performance outcomes (Trautwein et al., 2012; Wigfield & Eccles, 2000; Wigfield, Tonks, & Klauda, 2009). Furthermore, the synergetic influence of expectancies and values on different outcomes has been found: achievement among students in a pre-university class was particularly high when both value and expectancy beliefs were estimated as high (Trautwein et al., 2012). Incidentally, combined high value and expectancy had positive effects on both engagement in science activities and intentions of pursuing scientific careers across various countries (Nagengast et al., 2011). Trautwein et al. (2012) suggest that a student may excel way beyond expectations when both expectancy and value beliefs are high, but if either expectancy or value is very low, the other cannot compensate for it. Furthermore, they suggest that low expectancy coupled with high value beliefs is even more detrimental to achievement than is low expectancy coupled with low value beliefs. Thus, it can be speculated that the motivational situation is especially problematic

for students with low expectancy beliefs but high value beliefs; they may be more frustrated than other students because they are well aware of the importance of the academic activity in question, but they do not believe they can accomplish the goals. Students may even reduce the value they attach to those activities or tasks in which they expect to fail in order to maintain their sense of self-worth (e.g., Eccles, 2009).

The congruence or incongruence between expectancies and values may appear as a variety of academic emotions, which again are closely related to different educational outcomes (for reviews see, Pekrun & Linnenbrink-Garcia, 2012; 2014). Specifically, positive activating emotions have been shown to enhance students' performance. For instance, the enjoyment of learning has been found to be related to increased interest, effort, self-regulation and elaboration of the learning material, thus likely facilitating overall performance (Pekrun & Linnenbrink-Garcia, 2014). The underlying patterns of negative activating emotions may be more complex. For instance, anxiety has been shown to produce task-irrelevant thinking in some situations; thus, it reduces the cognitive resources available for task purposes and may therefore undermine overall achievement (Pekrun et al., 2002; Pekrun, Lichtenfeld, Marsh, Murayama, & Goetz, 2017). However, it may also induce the motivation to study harder and facilitate overall learning in those who are more resilient to the devastating aspects of anxiety (Pekrun et al., 2002). Negative deactivating emotions, such as boredom or apathy, may generally be detrimental because they reduce motivation and direct attention away from the task (Pekrun et al., 2002). On the other hand, the effect of positive deactivating emotions, such as satisfaction, relaxation or relief may be equivocal, since they may have both positive effects but may also make effort expenditure seem unnecessary by signalling that everything is going well (Pekrun & Linnenbrink-Garcia, 2012).

The role of effort and persistence (i.e., behavioural indices of engagement) seems to be central in terms of academic outcomes (e.g., Pintrich, 2004). There is general support that positive activating emotions, such as enjoyment of learning, are positively associated with effort (Ainley et al., 2005; Efklides & Petkaki, 2005; Pekrun et al., 2002; Pekrun, Frenzel, Goetz, & Perry, 2007), whereas negative deactivating emotions, such as hopelessness and boredom, are negatively associated with effort (Linnenbrink, 2007; Pekrun et al., 2002; Pekrun, Goetz, Daniels, Stupnisky, & Perry, 2010). Furthermore, the findings by Efklides and Petkiki (2005) suggest that positive affect may also ease the person's experience of effort exertion and increase interest and a feeling of liking, which could support future engagement with the same or similar tasks. In this sense, positive emotions may enrich students' resources; they may allow people to go beyond their current goals, be creative, use divergent and unusual associations, elaborate more and thus increase cognitive flexibility (Fredrickson, 2001).

In contrast, for negative activating emotions, such as anxiety, the effects have been shown to be more variable. These emotions often show negative overall correlations with effort, but in some cases, they may support behavioural engagement as they may also signal that more effort is needed (Pekrun & Linnenbrink-Garcia, 2012; Turner & Schallert, 2001) and narrow attentional focus so that resources are used to face the problematic situation (Fredrickson, 2001). Overall, it seems that especially activating emotions, both positive and negative ones, may be central in terms of engagement and triggering effort. Thus, simplistic conceptions of negative emotions as bad and positive emotions as being good when predicting academic outcomes do not apply (Pekrun, 2012). A study by Barker, Howard, Galambos and Wrosch (2016) even suggested that university students who reported high trait-like positive affect combined with bouts of negative emotions received higher grades during their studies than students who experienced positive (or negative) emotions alone. The role of both positive and negative academic emotions in university students' purposeful study progression has also been acknowledged (Postareff et al., 2017). However, the linkages between academic emotions and educational outcomes are reciprocal rather than unidirectional in causation (Pekrun & Linnenbrink-Garcia, 2012).

Although previous literature already quite exhaustively presents how certain motivational and emotional aspects are related to student learning and performance, most studies test the impact of a single aspect of student learning on outcome of interest (see Richardson et al., 2012). In contrast, the present dissertation examines particularly the *combined and simultaneous effects* of motivational and emotional aspects on university students' short and long-term academic achievement and asks how beliefs, interests and emotions are consolidated to arrive at success.

Studies that combine motivational-emotional aspects of studying and identify different university student profiles

Over the last few decades, many studies on higher education student learning have explored the associations among various aspects of learning and different research traditions by detecting *student learning patterns*, for instance (for reviews, see Vermunt & Donche, 2017; Vermunt & Vermetten, 2004). While the student learning pattern approach is mainly grounded in a variable-oriented research perspective (Vermunt & Donche, 2017), identifying *student profiles* can be another way to investigate patterns of interrelations among different aspects of studying (e.g., Heikkilä & Lonka, 2006; Lindblom-Ylänne, Haarala-Muhonen, Postareff, & Hailikari, 2017). Rather than contrasting with the variable-oriented perspective, in this kind of person-oriented approach, the aim is often not only to describe *individual differences* in student learning by detecting subgroups of students but also to examine how different aspects of studying are associated with each other. How-

ever, in these attempts to form more integrative, multidimensional models of university students' learning, motivational aspects of studying are usually included or combined with the cognitive factors and emotional aspects are lacking overall. Also the studies identifying different university student groups or profiles often ignore emotional factors (for examples in other contexts, see Dina & Efklides, 2009; Ganotice, Datu, & King, 2016; Liu et al., 2014).

In their study, Mäkinen et al. (2004) examined differentially motivated subgroups of university students, not only based on the general meaning given to studying (i.e., the various reasons for engaging in one's studies) but also including the level of experienced anxiety (see Inventory of General Study Orientations, Mäkinen et al., 2004). Furthermore, they investigated whether they could predict students' later study success and probability of changing their major or dropping out based on these different study orientations at the beginning of university studies. Mäkinen et al. found that students who most likely changed their major subject or abandoned their studies lacked study-related goals, gave low importance to social relationships and experienced high anxiety (i.e., noncommitted students). Interestingly, students who were work-life-oriented proceeded faster in their studies than those students who were primarily interested in studying and the content matter, although both student groups performed better in terms of grades and the number of earned credits compared to noncommitted students.

Heikkilä et al. (2012) were among the first to look at the interrelations between cognitive-motivational factors and well-being among university students by profiling students (see also, Lonka et al., 2008 for a variable-oriented approach). Heikkilä et al. showed that students' cognitive-motivational dispositions, based on their approaches to learning, self-regulatory skills and cognitive-attributional strategies, differed among the student groups and were related not only to learning outcomes but also to the general well-being of students. Optimistic and self-regulated students did better in terms of experienced stress, exhaustion and lack of interest, as well as study success, than those who suffered regulatory problems and task avoidance (Heikkilä et al., 2012). Lonka et al. (2008) also identified a dysfunctional orientation even in a highly selected student population of medical students, in which exhaustion, lack of regulation, lack of interest and task avoidance were all related. These studies indicate that emotional and motivational problems in studying may pose a risk for both academic achievement as well as students' psychological well-being (see also, Heikkilä et al., 2011).

Finally, although researchers have predominantly examined academic emotions from a variable-oriented perspective (Pekrun & Linnenbrink-Garcia, 2014), Robinson et al. (2017) identified university students' affective profiles based on students' course-related emotions (see also, Lonka & Ketonen, 2012). Students who experienced mainly positive emotions or deactivating emotions of both valences were more engaged and earned higher grades in the course exam than those

who experienced negative emotions or had more neutral emotional profile (Robinson et al., 2017). Furthermore, Postareff et al. (2017) adopted a mixed-method approach to explore first-year students' emotion profiles based on student interviews and further investigated how the profiles were related to academic achievement. Only those students who felt incompetence in addition to negative emotions had the lowest grades and study progress after the first academic year, while the other two groups experiencing either positive emotions or negative emotions (but not incompetence) performed equally well (Postareff et al., 2017). These studies suggest, again, that students' negative emotions may not be harmful altogether.

In their study, DeCuir-Gunby, Aultman and Schutz (2009) actually combined motivational and emotional factors in their profile classification by investigating the relations among university students' achievement motives (i.e., the motive to approach success and the motive to avoid failure), emotional regulation and academic emotions in the context of test taking. They explored how different achievement approach-avoidance motivated groups of students differed in terms of various academic emotions related to testing. DeCuir-Gunby et al. found that the more optimistic and success-oriented students showed low test anger and anxiety while exhibiting high test hope and pride. On the other hand, the more failure and task-avoiding students expressed high test anger and anxiety along with low hope and pride. Similar kind of *multidimensional and integrative approach* is taken in the present dissertation. One aim is to investigate the interrelations between various motivational and emotional aspects related to university studying by identifying different subgroups of students (i.e., motivational-emotional profiles) and further, to examine profile differences in terms of students' academic emotions and achievement.

Point of convergence with research on student engagement

An important connection can be made here with adjacent theories and research literature of *student engagement* (e.g., Appleton, Christenson, & Furlong, 2008; Fredricks, Blumenfeld, & Paris, 2004; Jimerson, Campos, & Greif, 2003; Salmela-Aro & Upadyaya, 2012; Schaufeli et al., 2002). For instance, many of the aforementioned studies identifying different subgroups of university students may be seen as reflecting aspects of student engagement, although they do not use the term explicitly (e.g., Mäkinen et al., 2004). Student engagement is a central concept in understanding optimal learning motivation, behaviour and achievement. It is an integrative construct that combines various cognitive, motivational and behavioural factors with emotional states; thus, the term covers various aspects of student learning (Fredricks et al., 2004). However, even in its relatively short history starting from the 1980s, the definitions, naming and operationalization of the construct contains substantial variation (see Appleton et al., 2008). Consequently, the concept is somewhat messy.

While all conceptualizations agree on the multidimensionality of engagement, the number and types of the dimensions vary across studies. However, usually all definitions include *behavioural* aspects (i.e., effort, persistence, participation) and many also contain *emotional* components (i.e., positive and negative reactions to school, learning, teachers and peers, sense of belonging), also labelled as affective or psychological engagement (e.g., Appleton et al., 2008; Skinner, Furrer, Marchand, & Kindermann, 2008). In addition to behavioural and emotional aspects, a *cognitive* component (i.e., perceptions, beliefs, strategies for learning, preference for challenge) is also included in many definitions (e.g., Fredricks et al., 2004; Jimerson et al., 2003). Although motivation does not exist as an independent dimension in the conceptualisations, in many of the definitions *motivational aspects* (such as interest, relevance of academic work, value of learning, personal goals, autonomy) are often combined with the cognitive aspects or included in the affective component of engagement (see Appleton et al., 2008). Points of convergence and overlap with the motivation literature can obviously be made here, but distinction from engagement seems to remain a subject to debate (see Chapter 6.5 in the Discussion).

Engagement is presumed to be malleable, responsive to contextual features and environmental change and can be both short-term or more stable (Fredricks et al., 2004). Overall, student engagement is an important condition for performance and persistence in educational tasks and institutions (see Appleton et al., 2008; Fredricks et al., 2004). In addition to grades and other performance related outcomes, students' engagement is associated with behavioural outcomes that can be defined as observable action (e.g., Jimerson et al., 2003) and time on task (Christenson & Anderson, 2002). Consequently, student engagement has been the focus of a substantial amount of research in recent years and has received much attention in varying educational contexts (e.g., Fredricks et al., 2004; Schaufeli et al., 2002). University and college students' engagement has been investigated particularly in the United States (Fredricks et al., 2004; Kuh, 2001) and Australia (Coates, 2010; Krause & Coates, 2008). For instance, engaged students have been shown to earn higher grades and be less likely to leave their studies (Hughes & Pace, 2003; Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008; Lonka & Ketonen, 2012; Salanova, Schaufeli, Martínez, & Bresó, 2010; Schaufeli et al., 2002).

In the European tradition, the concept of *study engagement* has been used to examine student's psychological engagement in greater detail, emphasizing the affective component of engagement (Salmela-Aro & Upadyaya, 2012, see also Schaufeli et al., 2002). The concept has mainly been applied in a school context (e.g., Tuominen-Soini & Salmela-Aro, 2014) but has also been used to examine university students' engagement (e.g., Heiskanen & Lonka, 2012; Salmela-Aro & Kunttu, 2010; Schaufeli et al., 2002). For instance, in a study by Heiskanen and Lonka (2012), university students valuing either reflective learning (i.e., theorists) or both reflective learning and practical knowledge (i.e., reflective professionals)

displayed higher study engagement than those preferring directly applicable templates. However, studies particularly identifying students' study engagement profiles have been mainly conducted in a school context (e.g., Salmela-Aro et al., 2016; Tuominen-Soini & Salmela-Aro, 2014).

Besides examining what promotes engagement, it may be important to also consider the emotional and motivational problems students may face during the decisive first years at university. In previous literature *student disengagement* is often defined in terms of cynicism, feelings of inadequacy as a student and experiences of exhaustion (Salmela-Aro, Kiuru, Leskinen, & Nurmi, 2009; Salmela-Aro & Näätänen, 2005; Schaufeli et al., 2002). These actually reflect quite well the negative and problematic sides of motivational and emotional aspects presented before: questioning one's own competencies and chance of succeeding (inadequacy), lacking value or losing interest in studying (cynicism) and having negative emotional experiences (exhaustion). Furthermore, recent studies have shown that even high engagement may co-occur with negative experiences (Salmela-Aro et al., 2016; Tuominen-Soini & Salmela-Aro, 2014; Wang & Peck, 2013).

In the present dissertation, it is proposed that emotional experiences (either positive or negative) that are combined and interact with students' beliefs, interests and values (or lack of them) could contribute to students' achievement and engagement (or disengagement). Thus, the level of interest is here in the motivational and emotional sources of university students' engagement and particularly, in a student's inner experiences. Although the broader processes of engagement (e.g., questions about teachers, extracurricular activities or social relationships) are addressed in many studies investigating students' engagement and achievement, they are beyond the scope of the present study.

1.4 Inquiry of students' experiences on different levels of specificity

The ways in which students engage in learning are a result of the context on the one hand and students' personal characteristics and preferences on the other hand (Baeten, Kyndt, Struyven, & Dochy, 2010; Vermunt & Vermetten, 2004). However, the specificity of the context may differ: the original phenomenographic studies on university students' approaches to learning by Marton and Säljö (1976) were situated at the task level. Other theoretical models of university student learning were primarily situated at the level of course (e.g., Biggs, 2001; Entwistle et al., 2006). However, these models also acknowledge that students have more general and somewhat more stable preferences regarding learning. These are referred for instance as students' general learning orientations (e.g., Richardson, 1997), predispositions (e.g., Lonka et al., 2004) or learning patterns (e.g., Vermunt & Donche, 2017) and they developed in the dynamic interplay between the students and their learning environment (see e.g., Lindblom-Ylänne & Lonka, 1998).

Furthermore, the reciprocal interaction between different levels, for instance between context-specific factors and general learning preferences has been suggested (e.g., Vermetten, Vermunt, & Lodewijks, 2002).

Overall, it is important to define at what level of contextual or temporal specificity students' experiences are investigated. For instance, expectancies for success can be assessed at the level of specific academic situation or task (e.g., calculating a math problem), at the level of a specific class or course (e.g., statistics) and at the level of academic studies (e.g., general disposition in psychology studies). Lonka et al. (2004) distinguish between three levels of context when analysing the role of motivational factors in higher education student learning: the general, domain- or course-specific and situational level. Within this multi-layered perspective, the *general level* is perceived as an interpretative framework of the way the student is oriented and handling studying. The intention of research on this level is often to analyse how students see the general meaning of their studies (see e.g., Inventory of General Study Orientations, Mäkinen et al., 2004). The argued concerns about the validity and utility of measuring student motivation at a global level (e.g., Pintrich, 2004) are considered in *course level*, which particularly focus on a specific course in which a student is participating in or planning to participate, investigating the domain- or course-specific orientation a student may have. Finally, the need for context sensitivity in research concerning motivation and other context-sensitive behaviour (e.g., Boekaerts, 1996; Volet, 2001) is accounted for on the *situation level*, where the interest is in a specific situation in which the student is approaching the subject matter or learning task at hand. Lonka et al. (2004) argue that most of the aspects describing a certain pattern of higher education student learning can be applied within each of the levels. Similarly, Academic emotions questionnaire by Pekrun et al. (2011) represents three different temporal perspectives to measure *trait* academic emotions, *course-related* emotions and *state* academic emotions.

Lonka et al. (2004) further suggest that it is natural to assume that the levels of context partly overlap and dynamically interact with each other. For instance, daily experiences and consequences of one's actions in different situations, when accumulated in a certain way, may become generalized and lead to some consistency in domain-specific or general orientations. A good example is the process through which situational interests develop into dispositional, relatively stable individual interests (Hidi & Renninger, 2006). On the other hand, the more general dispositions in studying are proposed to influence the contextual and situational experiences (Lonka et al., 2004). In a school context, the factors that have been found to influence students' situational experiences are more stable study engagement measured in terms of energy, absorption and dedication (Salmela-Aro et al., 2016), as well as subject-specific competence and value beliefs (Ahmed, Minnaert, Werf, & Kuyper, 2010) and individual interest (Tapola, Veermans, &

Niemivirta, 2013). In a university context, empirical evidence regarding the relationships between general dispositions in studying and task-specific factors have also been found (see Tanaka & Murayama, 2014).

Applying the multi-layered perspective to also measure students' experiences on different levels of specificity may help to solve some of the methodological problems that have been pointed out in questionnaire-based research on student learning in higher education (see Richardson, 2004). For instance, studies using large student samples at one point in time have been criticized, since they may not capture the effect of contextual and situational determinants and may be confounded with recall bias and distortion, thus reflecting overall cognitive schemas and beliefs about situational factors rather than actual experiences (Bolger, Davis & Rafaeli, 2003; Goetz, Bieg, Ludke, Pekrun, & Hall, 2013; Robinson & Clore, 2002). Although some study-related factors are situation-specific in theory, in the surveys that are administered only once to the students, the respondents are required to aggregate in their minds how often (and how intensively) they experience such states, thus, capturing general tendency rather than context- or situation-specific variation (Moeller, Spicer, Salmela-Aro, & Schneider, 2017). Furthermore, in the general level, the frequency and intensity of experiences are most likely interweaved (e.g., is student *often* anxious or *very* anxious; Goetz, Zirngibl, Pekrun, & Hall, 2003).

In addition, while the theories on expectancies and values and most of the related empirical studies identified patterns of behaviour *between* individuals, there is a growing interest to explore patterns of behaviour *within* a given individual (i.e., identify patterns of within-person functioning; see Voelkle, Brose, Schmiedek, & Lindenberger, 2014). Consequently, an increasing number of studies measure university students' academic emotions (e.g., Goetz, Frenzel, Stoeger, & Hall, 2010), task values (e.g., Dietrich, Viljaranta, Moeller, & Kracke, 2017) and expectancies (e.g., Tanaka & Murayama, 2014) using in-the-moment measurement, with multiple assessments within each student. Besides capturing the effect of situational determinants and emotional and motivational fluctuations over time, studies using multiple data points per person can examine to what extent the findings across students are malleable and hold at the level of situations and within-person functioning (Voelkle et al., 2014). This line of research is called *intra-individual approach* (see Molenaar, 2004; Molenaar & Campbell, 2009; Voelkle et al., 2014).

Especially research on academic emotions has utilized an intra-individual perspective in investigating students' daily experiences. This line of research indicates that the emotions students experience in educational settings are influenced by both personal characteristics and situational events (Ahmed, Minnaert, et al., 2010; Ahmed, Werf, et al., 2010; Goetz et al., 2013; Moeller, Salmela-Aro, Lavonen, & Schneider, 2015; Nett, Bieg, & Keller, 2017). In fact, most of the vari-

ance in emotions occurs between different situations rather than is driven by personal characteristics (Goetz, Sticca, Pekrun, Murayama, & Elliot, 2016; Nett, Goetz, & Hall, 2011; Tanaka & Murayama, 2014). Furthermore, the intra-individual antecedents of students' emotions have been studied (see Ahmed, Minnaert, et al., 2010; Ahmed, Werf, et al., 2010; Bieg et al., 2013; Goetz et al., 2010; Goetz et al., 2016; Tanaka & Murayama, 2014). For example, previous research indicates that high value appraisals *during* educational tasks are related to students' positive and negative emotions (Ahmed, Minnaert, et al., 2010; Ahmed, Werf, et al., 2010; Bieg et al., 2013; Goetz et al., 2010). However, Ahmed, Werf, et al. (2010) also found that the effect of value on anxiety, enjoyment and hope varied substantially across students, that is, the effect was ambiguous and explained by individual differences.

1.5 Summary: The perspective adopted

The motivational and emotional literature presented in the Introduction provides an important theoretical framework that helps to clarify the conceptualization of motivational and emotional aspects of university studies adopted for the present dissertation. These theoretically well-founded motivational and emotional dimensions serve as the lens through which the role of motivation and emotions in university students' achievement and engagement is viewed. Besides examining what promotes engagement, the aim is to also consider the emotional and motivational difficulties students may face during the decisive first years at university. Since the focus is on university students, the motivational and emotional concepts particularly relevant for engagement (or disengagement) in higher education context will be later operationalized (e.g., aspects related to one's career choice).

Using the theoretical perspectives presented in Chapters 1.1 and 1.2, three broad dimensions of students' behaviour are included in the present study: beliefs and expectancies (e.g., sense of competence, optimism, lack of self-regulation), interests and values (e.g., perceived meaning of studies, autonomous and controlled motivation, task-specific value) and academic emotions (e.g., positive and negative activating emotions, exhaustion). However, although these dimensions are seen as different vantage points from which the attempt is to understand and explain university students' achievement and engagement, they are not considered as separate constructs, but rather, parts that form a dynamically interacting entity. As a result, one of the aims of this dissertation is to investigate these points of convergence. That is, how students' beliefs, values and academic emotions relate to each other.

Furthermore, based on previous literature, the motivational and emotional constructs are postulated to influence not only each other but also students' involvement with their studying (i.e., behavioural indices of engagement) and consequently achievement outcomes. Thus, besides combining the various motivational

and emotional aspects of studying, another aim is to examine how these dimensions are related, either individually or combined, to university students' academic achievement. In the present dissertation, the conceptualization and measurement of educational outcomes are broadened beyond academic performance (such as grades) to include behavioural educational outcomes as well (e.g., invested time on studying).

Finally, university students' motivation and emotions are presumed to be malleable: they result from an interaction of the individual with the context and are responsive to variation, for instance, across academic courses, days and situations. Since students' motivational and emotional experiences can be both short-term or more stable, it is also reasonable to measure these aspects of studying at different levels of specificity (see previous chapter). The present dissertation applies the multi-layered view suggested by Lonka et al. (2004) to examine the motivational and emotional aspects of university studies on different contextual and temporal levels of specificity, focusing on both between-person differences and within-person processes (see Fig. 1). Rather than competing, these various levels represent different purposes in the present dissertation. The aim is to move beyond dichotomies and make the best use of these various ways of measuring students' experiences. Furthermore, the aim is to examine the interactions between different levels, for instance, how the broader study-related dispositions relate to context-specific factors.

For example, academic emotions can be regarded as *situational*, since they are experienced in a certain moment (i.e., situation/state level in Fig. 1). This level often captures the *within-person* variation in emotional experiences. The second level highlights the importance of considering, for instance, the different ways students experience concurrent emotions within the same course setting. Thus, academic emotions are also contextual, because a certain *course* or lecture or even a *day*, may have an impact on what kinds of emotions are triggered (i.e., course/day level in Fig. 1). Finally, academic emotions are also likely linked to the more *general dispositions* of students, like the broader meaning given to studying (i.e., general/student level in Fig. 1). At the highest level, student profiles and *individual differences between students* can be examined. However, instead of viewing the student level as a trait, the highest level is rather seen as a representation of more general dispositions students may have that still can change, developed in the dynamic interaction between the students and their learning environment (see e.g., Lindblom-Ylänne & Lonka, 1998; Vermunt & Minnaert, 2003). Even if these dispositions are seen as more stable than the situational experiences, this does not mean that they are unchangeable. It rather means that they do not change from day to day and that there is some stability associated with them. It should also be noted that even if a single state emotion is perceived as situation-specific, it is still assumed to be influenced by the broader contextual determinants and student disposition and the interaction between the student and the situation.

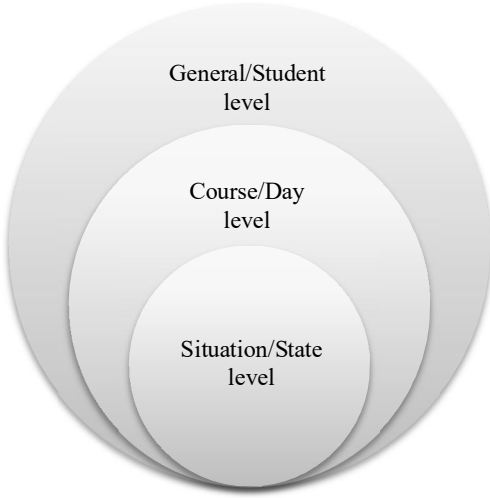

Figure 1. Representation of different contextual and temporal levels of specificity applied in the present dissertation. *Note*: Albeit Figure 1 is adapted based on Lonka, Olkinuora and Mäkinen (2004), the levels has been modified for the present study (e.g., day-level is included).

To conclude, multiple reasons might drive a university student's behaviour, such as spontaneous enjoyment and interest in the learning material, a desire to prove oneself being competent by getting high grades or future professional goals. Therefore, different types of student profiles are likely to exist. Some motives might be of a greater importance for some students or the motives may be combined. Furthermore, both the study-related motives as well as students' emotional experiences may refer either to broader study-related dispositions or more rapidly changing situational experiences. It might be the case that some aspects of studying, such as academic emotions, are more closely related to everyday studying and the given academic situation, while the question of one's expectancies and reasons for studying may be more generic and constant factors, colouring these situational experiences. To test these hypotheses, contextual in-the-moment measurements were used in the present dissertation to complement the cross-sectional questionnaire data. To sum, this dissertation brings together separate lines of motivational and emotional research and provides an opportunity to examine how these subsumed constructs interact. Furthermore, the integrative approach is coupled with a temporal perspective to gain a more holistic understanding of university students' daily experiences and why some students perform better than others during the first years of study at university.

2 Aims

The overall aim of this dissertation was to investigate the complex interplay between motivational and emotional dimensions of studying and further, how these dimensions and their combined effects are related to university students' situational experiences and academic achievement during the first years at university. More specifically, by using different temporal focuses, this dissertation aimed first, to investigate broader study-related dispositions by identifying different student profiles based on students' motivational and emotional experiences on a general level. Second, the aim was to examine the dynamics between the profiles and other general dispositions and students' daily experiences in which academic emotion states are embedded. Finally, the effects of both general and situational factors on the short- and long-term educational outcomes were investigated. The following research questions were addressed:

1) What kinds of motivational-emotional profiles[1] can be identified among university students (Studies II and III)?
2) How are these profiles and other more general motivational dispositions related to students' contextual and situational experiences in the short- (Studies II, IV and V) and long-term (Study V)?
3) How do motivational-emotional profiles and situational academic emotions predict both short- and long-term behavioural outcomes (Studies II and III) and study success (Studies I, II and III)?

Study I examined whether situational academic emotions predicted short-term study success. Study II investigated the motivational-emotional profiles of first-year teacher students, based on students' beliefs and expectancies, perceived meaning of studying and emotional experiences. Study III extended the results obtained in Study II by examining the student profiles including students from five different disciplines. Study II also investigated how the student profiles differed in terms of course-specific experiences and the level of achievement in this context, while in Study III the broader long-term consequences on behavioural and other educational outcomes were examined. Study IV and V focused on students' daily situational experiences, inspecting their relation to the more general

[1] In Study II called general learning profiles and in Study III academic engagement profiles. In the Discussion, both motivational-emotional profiles and academic engagement profiles are applied.

dispositions in studying. In Study IV, daily dynamics between motivational dispositions and situational emotions were investigated and in Study V, the long-term effect of first-year study engagement on situational task value and emotions was examined.

Although some of the research questions are rather exploratory in nature (especially the ones concerning student profiles), some general assumptions were made about the expected findings. Overall, it was anticipated that distinct groups of students with different motivational-emotional profiles would emerge and that the profiles and other motivational dispositions are differentially related to students' situational experiences and academic achievement. Based on prior research revealing different student profiles or orientations in higher education (e.g., Heikkilä et al., 2012; Lonka et al., 2008; Mäkinen et al., 2004) and engagement profiles in other contexts (e.g., Salmela-Aro et al., 2016; Tuominen-Soini & Salmela-Aro, 2014), at least two subgroups were expected to be found: engaged/committed and disengaged/dysfunctional students, but possibly also students who were cynical or lacked meaning in their studies along the lines of some prior studies (Mäkinen et al., 2004; Tuominen-Soini & Salmela-Aro, 2014).

According to the previous studies, it was assumed that engaged students would be more academically successful than their disengaged peers (Salanova et al., 2010; Salmela-Aro & Upadyaya, 2012; Schaufeli et al., 2002; Tuominen-Soini & Salmela-Aro, 2014). It was further expected that lower achievement would be more typical of students who reported lacking personal meaning in studying overall and achievement differences would exist even after years of studying (Mäkinen et al., 2004). In addition, situational academic emotions were expected to also predict academic performance as the previous work on academic emotions has exhibited (e.g., Lonka & Ketonen, 2012; Pekrun & Linnenbrink-Garcia, 2012). Finally, as to the differences in contextual and situational experiences, the assumptions were mainly based on the results from Ahmed, Minnaert, et al. (2010), Salmela-Aro et al. (2016) and Tanaka and Murayama (2014). It was presumed that in addition to influencing academic achievement, university students' overall (motivational-emotional) disposition in studying would be related to their daily situational experiences.

3 Context: Higher education in Finland

Finland offers an interesting context in which to examine university students' commitment and academic engagement, since the state provides higher education, there are no tuition fees for regular degree students and everyone is allowed to apply. Moreover, students are also eligible for government-financed study grants. Overall, the Finnish educational system is usually ranked as the most equal in the world. Furthermore, Finnish culture values education and academic achievement and having an academic degree is highly distinguished. For instance, the field teacher education is very popular in Finland and only about seven percent of those who apply are accepted to the five-year Master of Education program for elementary school teachers and the overall acceptance rate is 15.8% at the University of Helsinki (Statistics for admission, 2016).

As a part of the Bologna Process in Europe, Finland launched a reform of its higher education system in 2005. The university considers the 3-year bachelor's degree to be an interim degree towards the 2-year master's degree. The main difference compared to many other Western countries is that students apply directly to study a specific major in a specific university and generally there is no selection process in the transition from the bachelor's level to the master's level studies. Thus, in Finland students choose their field of study before enrolling and are fairly confident about their disciplinary choices (Vuorinen & Valkonen, 2005). The normative time for a combined bachelor's and master's degree is five years (300 ECTS credits) but the median duration is six (Universities, 2005). Since 2005, study time has been limited and the accumulation of credits monitored. Each student should earn at least 55 ECTS credits per academic year and funding is partly allocated to universities based on these requirements. To receive the monthly study grant provided by the state, 45 ECTS credits should be achieved every academic year.

To be accepted into a university in Finland, applicants may have a good diploma from high school which may to some extent be taken into account, but the focus remains mainly on the applicant's performance in the demanding subject-specific entrance examinations. Because of the demanding nature of admission tests, the mean age of students is somewhat higher in Finnish universities compared to countries with a policy of free entrance. Furthermore, it is reasonable to argue that those who are accepted into the university form a highly select group. However, even these highly selected students may experience stress and concerns in their studies. The national Finnish Student Health Survey focuses on Finnish undergraduate students under the age of 35 and is implemented every fourth year. Surveys are conducted to investigate students' physical, mental and social health, as well as a range of factors related to studying. The latest survey (conducted in 2016) showed that, in general, one in three students experiences substantial stress

and stress-related mental symptoms, particularly in the final stretch of studies. One of the causes of stress was the difficulty of gaining control of one's studies. Moreover, while students' lifestyles were in many ways healthier than before, the quality of mental health was found to be on the decline (Kunttu, Pesonen, & Saari, 2017). As for the field of studies, study-related exhaustion and anxieties were common, with one-fourth of students worrying frequently about their studies in their free time. Aspects of study-related exhaustion, cynicism and feelings of inadequacy showed an increasing trend compared to a previous survey. To measure study engagement, students were asked, among other topics, if they found their studies to be highly meaningful. A total of 42% of students agreed and about 25% were clearly enthusiastic or inspired by their studies. However, only every tenth felt energetic and vigorous when studying. Finally, 69% of all students felt they were in the right field, 24% were uncertain about it and as much as 7% thought they were in the wrong field (Kunttu et al., 2017; see also, Salmela-Aro, 2009; Salmela-Aro & Kunttu, 2010). Given these worrying statistics, it is increasingly important to better understand, predict and promote university students' academic engagement in their studies as well as their emotional and psychological well-being.

4 Methods

4.1 Participants and procedures

In all the original studies, the data were collected from first-year Finnish higher education students (except for Study III, in which second-year students were also included; in Study V, the students participated for two consecutive years). Studies I-III were based on cross-sectional questionnaire data and Studies IV and V on intensive longitudinal experience sampling data, where the same individuals were followed over 14 consecutive days. In Study V, students were additionally followed during their second academic year in what has been called measurement-burst design (i.e., faster time-scale nested within slower time-scale; see e.g., Carstensen et al., 2011).

In Studies I and II, I collected the original data under the supervision of Kirsti Lonka for my master's thesis (see Ketonen, 2011). The participants were 107 first-year elementary and kindergarten student teachers who attended an introductory course in educational psychology at the University of Helsinki. The course included 24 hours of student-activating lectures and the assessment was based on two broad essays that called for understanding and application of knowledge (for a more detailed description of the context, see Lonka & Ketonen, 2012). Of those students who attended the course, 77.0% were reached from the last lecture (five days before the course exam) to complete the self-report questionnaire.

In Study III, the data is a part of a larger longitudinal research project 'RYM Indoor Environment' (2011-2015, PI Professor Kirsti Lonka, 462054), funded by the Finnish Funding Agency for Technology and Innovation (TEKES) and focusing on the design of new learning environments. I have been involved in the planning and implementation of the questionnaire data collection from its onset in 2011 in collaboration with the contact persons from other faculties. The data used in Study III included the first measurement point of the yearly longitudinal data collection. The participants consisted of 668 first- and second-year students from four faculties from the University of Helsinki: law, theology, science and teacher education along with electrical engineering students from Aalto University. In this study, the participants also attended an introductory course in their own faculty. The self-report questionnaire was either e-mailed to students registered for the courses or students completed a paper version during a lecture. The overall response rate was 71.5%, calculated based on the number of students who completed the introductory courses in question.

In Studies IV and V, the data were drawn from the Academy of Finland projects 'Becoming a collaborative professional—university education and epistemic agency', a follow-up study that began in 2007 (PI Professor Kirsti Lonka, 116847), and 'Strivings, Transitions, Achievements and Resilience' (PI Professor

Katariina Salmela-Aro, 139168). Thus, the data used in Studies IV and V were collected by other researchers as part of a larger research project for studying academic epistemic practices using a process-sensitive and contextual methodology. A novel idea was to examine university students' emotions with this rich experience sampling data, utilizing an intra-individual approach. The participants were 55 and 72 first-year university students (in Study V, an additional 17 students were included). They studied at the University of Jyväskylä (20/37 psychology majors), the University of Helsinki (15 student teachers majoring in either education or educational psychology) and the Helsinki Metropolitan University of Applied Sciences (20 media engineering majors). In Study V, 56 of the participants (77.8%) continued in the study during their second academic year (i.e., measurement-burst design). For both years, data collection took place using the contextual activity sampling system (CASS) instrument, which is an experience sampling software program that runs on smartphones (for more information about the CASS procedure, see Inkinen et al., 2014). During the 14 days of data collection in each year, the participants' phones beeped five times a day as a signal to complete a short self-report questionnaire (i.e., state assessment). The typical daily sampling schedule was a morning questionnaire at 9 a.m., three daytime questionnaires at 12 a.m., 3 p.m., and 6 p.m., and an evening questionnaire at 9 p.m. In addition, the participants responded to a pre-questionnaire before the two-week experience sampling period began in their first academic year.

In all the studies, the purpose of each study was explained to all participants before the data collection. It was emphasized that involvement was voluntary and that the participants could decide to withdraw at any time. In studies I-III, all participants also signed an informed consent form, including granting permission to gather the course grades or achievement statistics from the student register as a part of the data. Students were assured that their responses were confidential and that the lecturers would not have access to the individual responses. Table 1 illustrates the details of the participants and data collection for each of the original studies.

Table 1. Number, age, gender and discipline of the participants and procedure of data collection in each of the original studies

Study	*N*	Mean Age	Gender	Discipline	Data
Study I and II	107	23.6	Female 85%, male 15%	Teacher education	Questionnaire
Study III	668	24.2	Female 64%, male 36%	Law, theology, science, electrical engineering and teacher education	Questionnaire
Study IV	55	22.4	Female 69%, male 31%	Psychology, media engineering and teacher education	Experience sampling
Study V	72	21.9	Female 76%, male 24%	Psychology, media engineering and teacher education	Experience sampling

Note: The participants of Studies I and II are the same, and there is overlap in the participants of Studies IV and V; that is, the samples of the original studies are not independent.

4.2 Measures

Although the questionnaires in each data collection included a variety of measures of student learning beyond the scope of this dissertation, only the measures relevant to the present study are described next. Students' beliefs and expectancies were assessed in terms of experienced challenge and sense of competence, optimism and task avoidance and lack of self-regulation. Students' interests and values were approached by assessing autonomous and controlled motivation, task-specific value, uncertainty of career choice and lack of interest. To measure emotional aspects in studying, academic emotions (positive and negative activating emotions), stress, exhaustion and study engagement were assessed. Finally, the present study included various indices of academic achievement: self-study time, accumulation of study credits, course-specific grade and grade point average (see Table 2). In addition, control variables of life satisfaction and depressive symptoms were included. A summary of the measures used in each of the original studies is presented in Table 4. Cronbach's alpha reliabilities for all scales are presented in Appendix A.

4.2.1 Measures of students' beliefs and expectancies

Experienced challenge and sense of competence

In Study II, two single-item measures were used to assess perceived course-specific challenge ("How challenging is this course?") and a sense of competence ("How competent do you feel in this course?"; see Inkinen et al., 2014; Litmanen, Lonka, Inkinen, Lipponen, & Hakkarainen, 2012; Tolvanen et al., 2011). Both items were answered using a Likert scale ranging from 1 (not at all) to 7 (very much).

Optimism and task avoidance

In Study II, a shortened version of the Strategy and Attribution Questionnaire (SAQ; Nurmi, Salmela-Aro, & Haavisto 1995; see MED NORD, Lonka et al., 2008) was used to assess students' attributional strategies. Eight items from the inventory were used to reflect two types of strategies: optimism (e.g., "When I get ready to start a task, I am usually certain that I will succeed in it", "I usually do well, even on more difficult tasks") and task avoidance (e.g., "What often occurs is that I find something else to do when I have a difficult task in front of me", "If I have a difficult task before me, I notice that often I do not really try"). The Likert scale ranged from 1 (totally disagree) to 5 (totally agree).

Lack of self-regulation of learning

In Studies II and III, three items from the original five-item scale concerning lack of self-regulation (e.g., "I find it hard to evaluate whether I know the learning material well enough", "I have noticed that I have problems to deal with a large amount of text") were adopted originally from the Inventory of Learning Styles (ILS; Vermunt, 1998; see MED NORD, Lonka et al., 2008). A Likert scale ranging from 1 (totally disagree) to 5 (totally agree) was used to rate each item.

4.2.2 Measures of students' interests and values

Autonomous and controlled goal motivation

In Study IV, the students reported up to three most important goals related to studying that they planned to pursue on that day (open-ended question, see Salmela-Aro & Nurmi, 1997). Then they reported the extent to which they pursued each goal for three autonomous reasons (e.g., "out of pleasure", "because it is important to me"), and three controlled reasons ("because someone else wants me to", "because I would feel guilty or anxious if I didn't do it"; Sheldon & Elliot, 1998; see also, Vasalampi, Salmela-Aro, & Nurmi, 2010). All ratings were given on a seven-point Likert scale ranging from 1 (not at all) to 7 (very much).

Task-specific value

In Study V, a single-item measure was used to assess the perceived value of the activity ("How important is this activity for you?"; see Litmanen et al., 2012). The ratings were given on a seven-point Likert scale ranging from 1 (not at all) to 7 (very much).

Uncertainty of career choice

In Study III, three items were used to measure uncertainty of career choice (e.g., "Another career choice might be more satisfying and consistent with my goals", "I think my current career choice is exactly right [reversed]"; Hirsto, 2012). A Likert scale ranging from 1 (totally disagree) to 5 (totally agree) was used to rate each item.

Lack of interest

In Studies II and III, experienced lack of interest, also referred to studies having little meaning for students was assessed with two items ("I can hardly find any meaning in the studies", "The contents of my studies do not motivate me"), originally from the Inventory of General Study Orientations (IGSO; Mäkinen et al., 2004; see MED NORD, Lonka et al., 2008). A Likert scale ranging from 1 (totally disagree) to 5 (totally agree) was used to rate both items.

4.2.3 Measures of emotional aspects in studying

Academic emotions

In Studies I, II, IV and V, academic emotions were assessed using a modified version of the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988; see Inkinen et al., 2014; Litmanen et al., 2012; Tolvanen et al., 2011). The participants rated "The extent you feel at the moment: …": interested, enthusiastic, determined and active (four emotions measuring *positive activating emotions*) and anxious, nervous, irritable and stressed (four emotions measuring *negative activating emotions*). All ratings were given on a seven-point Likert scale ranging from 1 (not at all) to 7 (very much). In studies I and II, the emotion items were used separately as single item scales, whereas in Studies IV and V, composite scales of positive and negative activating emotions were constituted.

Stress

Stress was measured in Study II with a single-item measure of stress symptoms (Elo, Leppänen, & Jahkola 2003). This measure first gives a definition of stress followed by a question and a rating scale: "Stress means a situation in which a person feels tense, restless, nervous, or anxious or is unable to sleep at night because his/her mind is troubled all the time. Do you feel this kind of stress these days?''. The response was reported on a five-point scale, varying from 1 (not at all) to 5 (very much).

Exhaustion

In Studies II and III, *general study-related exhaustion* (e.g., "I feel I'm working too hard on my studies", "I feel totally exhausted") was measured with four items taken from occupational health research and modified to fit the higher education context (see MED NORD, Lonka et al., 2008). A Likert scale ranging from (1) totally disagree to (5) totally agree was used to rate each item. In Study I, *situational exhaustion* was measured with a single-item measure. Participants rated "The extent you feel at the moment: exhausted" from 1 (not at all) to 7 (very much).

Study engagement

In Studies III and V, an abbreviated student version of the short Utrecht Work Engagement Scale (UWES-9) originally developed by Schaufeli, Bakker and Salanova (2006; see Salmela-Aro & Upadyaya, 2012) assessed study engagement. The scale consists of nine items that describe the subject's psychological engagement in greater detail, emphasizing the affective component of engagement. Within this framework, study engagement is typically described as a positive, fulfilling, study-related affective state characterized by energy (e.g., "When I study, I feel I'm bursting with energy"), dedication (e.g., "I'm enthusiastic about my studies") and absorption (e.g., "Time flies when I'm studying"). All items were rated on a Likert scale ranging from 1 (totally disagree) to 6 (totally agree). In both studies, a composite scale was calculated from all nine items to indicate the overall level of study engagement.

4.2.4 Measures of educational outcomes

Self-study time

In Studies I and II, the participants were asked to evaluate how many hours they had spent on self-study for the course by the time they completed the questionnaire (five days before the course exam).

Accumulation of study credits

In Study III, the accumulation of credits was retrieved from the universities' records. The Finnish national credit allocation and accumulation system is equivalent to the European Credit Transfer and Accumulation System (ECTS). This means that credits (*opintopiste*) are analogous to those in the ECTS. One year of full-time studies requires about 1,600 hours of work and corresponds to 60 credits (30 credits per semester). Lectures, exercises, seminars, independent studies as well as examinations have been included in this estimate of a student's required work load.

Course grade

In Study I and II, academic achievement was measured by using the course grade (from the same course from which the questionnaire data were collected). The grade was given on the ECTS scale ranging from one (sufficient performance) to five (excellent performance). In the Finnish system, there is no rule or expectation as to how large a proportion of the participants in any given course can be given what grade; each student is graded on his or her individual performance, not in relation to the performance of others.

Grade point average (GPA)

In Study III, the yearly mean of all grades was retrieved from the universities' records. Again, the grading was based on the ECTS scale ranging from one to five, with one indicating an adequate averaged grade and five indicating excellent performance.

Control variables

In Studies IV and V, two indicators of general person characteristics were used as control variables. *Life satisfaction* was assessed with the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), using five items (e.g., "I am satisfied with my life") on a six-point scale ranging from 1 (I totally disagree) to 6 (I totally agree). *Depressive symptoms* were measured using a revised version of the short Beck's Depression Inventory (BDI; Beck & Beck, 1972). The participants were asked to rate 13 items (e.g., "I often feel sad") on a five-point scale ranging from (1) I totally disagree to (5) I totally agree (see Salmela-Aro & Nurmi, 1996).

Table 2. Overview of the main operationalized concepts

Motivational aspects of studying	
Students' beliefs and expectancies • Challenge and competence • Optimism and task avoidance • Lack of self-regulation	Students' interests and values • Autonomous and controlled motivation • Task-specific value • Uncertainty of career choice • Lack of interest
Emotional aspects of studying	
• Academic emotions • Stress • Exhaustion • Study engagement	
Educational outcomes	
• Self-study time • Accumulation of study credits (ECTS) • Course grade • Grade point average (GPA)	

4.3 Analytical approaches

The analytical approaches adopted in this dissertation consist of both variable- and person-oriented methods and an intra-individual perspective.

4.3.1 Variable-oriented approach

Variable-oriented methods help to understand general principles that connect variables on a larger scale (Laursen & Hoff, 2006), usually focusing on a *'whole group'* aspect. The focus is on identification of relationships between variables (e.g., regression or correlational procedures) or investigation of mean differences (e.g., analysis of variance). In Study I, the relation between academic emotions and educational outcomes was studied with a variable-oriented approach using regression analysis (see Chapter 4.4).

4.3.2 Person-oriented approach

In a person-oriented perspective, the individual is seen as the main conceptual and analytical focus of the analyses, whereas in standard traditional statistical analyses, the variable is usually the main unit (Bergman, Magnusson, & El-Khouri, 2003). The focus is on (dis)similarities between individuals in contrast to the variable-oriented approach, which focuses usually on relationships between variables (Muthén & Muthén, 2000). In the person-oriented approach, unobserved heterogeneity in a population is acknowledged by forming latent classes in the analyses, that is, classifying individuals with similar variable values into homogeneous *subgroups* (Lubke & Muthén, 2005).

The person-oriented approach can complement the variable-oriented perspective in many ways (see Bergman & Trost, 2006; Fortunato & Goldblatt, 2006). It may be argued that human behaviour is to a degree unique, and is not caused by one single factor or variable or even by the mere piling up of variables (Magnusson 1998; 2003). Some sort of dynamic interplay between various variables is essential (Bergman & Magnusson, 1997). A person-oriented approach takes into account various aspects of human behaviour and their interrelations, thus focusing on the *'whole person'* instead of separate aspects (Bergman & Trost, 2006; Von Eye & Bogat, 2006). Furthermore, the approach is useful in mapping heterogeneity in individuals' behaviour, rather than restricting the research to the mere analysis of mean level effects of the whole group behind which differently functioning subgroups of individuals may be concealed (Bergman & El-Khouri, 2003; Bergman & Magnusson, 1997; Reizle, 2013).

Translated into the context of higher education, this approach would imply the existence of a number of subgroups comprised of students with similar study profiles. Furthermore, it is argued that considering the complex associations between various dimensions of studying and their combined and simultaneous effects on

outcomes is crucial for understanding academic functioning. Studies adopting variable-oriented approach have indicated how various distinct aspects of student learning are related to educational outcomes (for a review, see Richardson et al., 2012). However, in order to go beyond describing such overall tendencies among students and to explore the complex relations among variables, a person-oriented perspective is needed. Finally, the framework states that the specific meaning of one of the variables in the profiles is derived from its relative position to scores on other variables in the same profile (Von Eye & Bogat, 2006). This would mean that students' scores on a certain dimension of studying could have a different interpretation depending on the profile and the scores of the other dimensions in that particular profile. In other words, the same score may be considered as "high" in one student profile but somewhat low in another. In the present dissertation, two person-oriented techniques were used: in Study II, cluster analysis was used and in Study III latent profile analysis was used (see Chapter 4.4). Both techniques allow the identification of profiles that contain individuals who are most similar to each other and most distinct from other profiles.

Studies II and III were primarily concerned with individual differences between students, which is often the case in a person-oriented approach (Magnusson, 1999). At its extreme, this perspective would necessitate the construction of unique profiles for each individual student, but the approach acknowledges that a limited number of 'typical' profiles exist within a population (Bergman & Trost, 2006; Von Eye & Bogat, 2006). Exploring the subgroups or profiles, instead of individual differences reduces complexity and allows for generalization (Bergman & Trost, 2006). However, consequently the person-oriented approach is still restricted to analyse mean levels of subgroups, although each individual usually scores somewhat differently on various factors even within a particular subgroup (see Fig. 2). The intra-individual approach, which is described next, is one step forward in taking into account each individual's unique functioning in the analysis level.

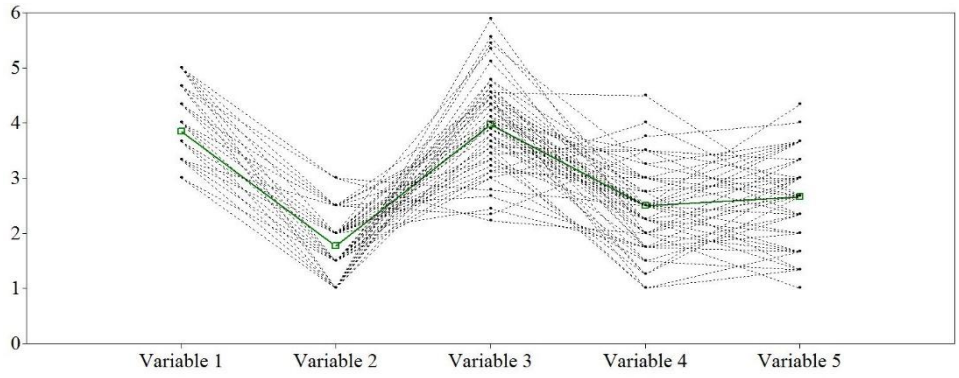

Figure 2. Estimated mean (the green line) and observed individual values (black dotted lines) for one of the profiles of Study III

4.3.3 Intra-individual approach

Extending the person-oriented perspective, the intra-individual approach uses the *individual* as the main analytical unit in the analyses and acknowledges that individuals may have a unique effect that differs from the mean level effects of the whole group (or subgroup). Inter-individual analyses determine the relationship between variables across individuals. Responses are analysed for variation around the group mean, identifying between-person differences. Intra-individual analyses, on the other hand, determine the relationship between variables across situations *within* a given person. Responses are analysed for variation around each individual's mean, rather than the group's; thus, within-person functioning can be identified (Voelkle et al., 2014). This is the benefit of an intra-individual approach: it reveals whether assumptions made by the theory or the relations between variables detected at the student level are analogous with the patterns of behaviour within a given individual (Voelkle et al., 2014). For example, as presented in Figures 3 and 4, on a group level the correlation between two variables may be negative (or non-significant) but on the individual level the opposite may be true concerning (some) individuals (see Molenaar, 2004). In the present dissertation, the intra-individual approach was used in Studies IV and V applying multilevel structural equation modeling (see Chapter 4.4).

It should be noted that variable-oriented techniques (such as regression analysis and structural equation modeling) are often combined with the intra-individual approach. Thus, although Study IV employed intra-individual analytical approach, in this case the analyses may also be described as variable- or whole-group oriented, since the effects of the group of 55 students were still pooled together (i.e., model with *fixed effect*; see Fig. 3). Nevertheless, these effects were compared both in the within- and between individual level, which is in its essence in the intra-individual approach. Study V, however, applied a so-called *idiographic approach* (see e.g., Conner, Tennen, Fleeson, & Feldman Barrett, 2009), since the unique effects of individuals, which may differ from the mean level effects of another individual, were examined (i.e., model with *random slopes*; see Fig. 4). Models with random slopes enable the use of students as their own controls in models exploring the relationship between variables for each individual. Compared to a person-oriented approach that often investigates individual differences using cross-sectional data with one measurement point, here the investigation of individual differences is based on intensive longitudinal data with multiple data points per person.

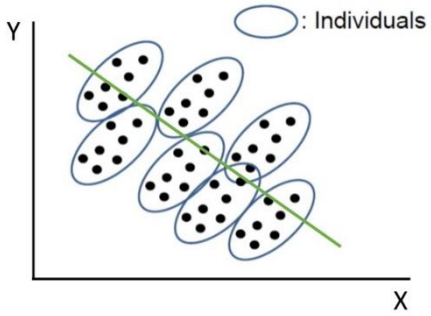

Figure 3. The hypothetical scatter plot for the relation between X and Y in a model with *fixed effects*. Dots present data points and individuals are circled. Within individuals, there is a positive correlation between X and Y. However, the correlation is negative at the between-person level (the green line), indicating a discrepancy of within- and between-person associations.

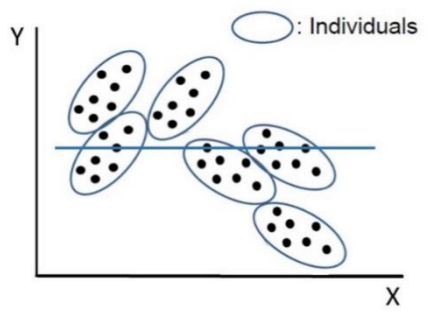

Figure 4. The hypothetical scatter plot for the relation between X and Y in a model with *random slopes*. Dots present data points and individuals are circled. If the individual differences in within-person relations are not addressed, the positive and negative effects may cancel each other out and produce a non-significant overall effect on the between-person level (the blue line).

Experience sampling method

Experience sampling techniques are useful to collect intensive longitudinal data with multiple data points per person and to examine the extent to which students' experiences are a function of more stable and enduring qualities or a function of contextual and situational factors. The experience sampling method (ESM; see Hektner, Schmidt, & Csikszentmihalyi, 2007) is also referred to as the diary method (Bolger et al., 2003), the ecological momentary assessment (Stone & Shiffman, 1994) and the ambulatory assessment technique (Fahrenberg, Myrtek, Pawlik, & Perrez, 2007). Although the names may be different, these methods share three core qualities: they allow the researcher to capture the moments of an individuals' daily life in natural settings, in real-time (or close to real-time occurrence) and on repeated occasions; thus, they yield multiple snapshots of people's experiences over time. Therefore, ESM is well-suited to assess aspects of experiences that are likely to be context and/or situation-specific (Hektner et al., 2007). Furthermore, it is an essential tool for researchers to use to identify patterns of behaviour within a given individual.

Overall, ESM is a way to collect information about both the context and content of students' daily lives, capture the fluctuation in daily experiences, and examine links among these (Hektner et al., 2007). Students' responses to both open- and closed-ended questions at several timepoints throughout the day are usually gathered to receive information about the physical and social context, activities, thoughts, emotions and cognitive and motivational appraisals. Besides enhancing contextual and situational closeness and minimizing retrospective bias, the use of smartphones within experience sampling procedure allows researchers to conduct

more participant-friendly data collection, compared to paper-and-pencil diaries (see e.g., Inkinen et al., 2014; Litmanen et al., 2012; Salmela-Aro et al., 2016; Tolvanen et al., 2011). In the present dissertation, such an ESM procedure was used to investigate students' experiences at the situation/state level of Figure 1 and to utilize an intra-individual approach.

Table 3. Comparison of variable-oriented, person-oriented and intra-individual approaches in data analysis

Approach	Variable-oriented	Person-oriented	Intra-individual
Main research interest	Relations between variables, predicting outcomes based on variables	Identifying subgroups of individuals, examining patterns among multiple variables	Identifying patterns of behaviour within individual, unique effects of (each) individual
Main unit of analysis	Variable	Individual, subgroups of individuals	Relations between variables across situations *within* an individual
Main idea of analysis	A single score on a dimension is compared to the scores *other individuals* have on the same dimension	A single score on a dimension is compared to the scores the *same individual* has on various other dimensions	A single score on a dimension is compared to the scores the *same individual* has on the dimensions on *multiple occasions*
Example data analyses	Regression analysis, SEM, ANOVA	Cluster analysis, Latent profile analysis	Multilevel modeling

Note: The table has been adapted based on Magnusson (2003) and Laursen and Hoff (2006), but modified to coincide with the aims of the present study.

To conclude, in each of the original studies the primary focus was on using one of the analytical approaches described above. Table 3 summarizes some of the most salient differences between the approaches used in this dissertation. However, the different analytical perspectives provide complementary information, rather than contradictory. In the present research, analyses peculiar to different analytical approaches were often combined and used in order to complement the main approach (see Table 4).

4.4 Data analyses

The empirical data were analysed with the following statistical programs: SPSS (version 18.0 for Studies I and II and version 22.0 for Study III) and Mplus (Muthén & Muthén, 1998-2017; version 5.2 for Study III and version 7.4 for Studies IV and V). In all original studies, common statistical methods were used. For example, descriptive statistics and preliminary results were obtained from the data

by examining the means, standard deviations and correlations of the study variables. The summary of the more specific main data analyses used in each of the original studies is presented in Table 4. These specific statistical analyses are briefly described next.

4.4.1 Regression analysis and mediating and moderating effects

Regression analysis with univariate or multivariate dependent variables is a standard procedure for modeling relationships among *observed* variables, often linear regressions in the case of continuous dependent variables. In simple linear regression, a dependent variable is predicted from one independent variable and in multiple regression by two or more independent variables. Path analysis allows the simultaneous modeling of several related regression relationships (e.g., mediating and moderating effects). For instance, a variable can be a dependent variable in one relationship and an independent variable in another, referred to as a mediating variable. A moderator variable is one that influences the direction and/or strength of the relation between an independent variable and a dependent variable (Baron & Kenny, 1986; Muthén & Muthén, 1998-2017). In Study I, a multiple regression analysis and a path model with a mediating effect were used. In Study V, a path model with a moderating effect (i.e., interaction) was used.

4.4.2 Confirmatory factor analysis

Confirmatory factor analysis (CFA) is used to study the relationships between a set of *observed* variables and a set of continuous *latent* variables. The measurement model for CFA is a multivariate regression model that describes the relationships between a set of observed dependent variables and a set of continuous latent variables. The observed dependent variables are referred to as factor indicators and the continuous latent variables are referred to as factors. The relationships between these are described by a set of linear regression equations (Muthén & Muthén, 1998-2017). In Studies III (not reported in the original article), IV and V, CFA was used to investigate the *validity* of the latent constructs (in Studies IV and V, multilevel CFA was used).

4.4.3 Multilevel structural equation modeling

Structural equation modeling (SEM) combines the confirmatory factor analysis and the multiple regression analysis into a comprehensive modeling framework. SEM includes models in which regressions among the continuous *latent* variables are estimated (Bollen, 1989; Joreskog & Sorbom, 1979). SEM has two parts: a measurement model and a structural model. As in CFA, the measurement model is a multivariate regression model that describes the relationships between a set of

observed dependent variables and a set of continuous latent variables. The structural model describes three types of relationships in a set of multivariate regression equations: the relationships among factors, the relationships among observed variables and the relationships between factors and observed variables that are not factor indicators. These relationships are described by a set of linear regression equations (Muthén & Muthén, 1998-2017).

Multilevel modeling within a SEM framework (MSEM; Muthén & Muthén, 1998-2017) has become common for the purpose of studying intra-individual patterns. MSEM specifies a model for each level of the multilevel data, thereby modeling the non-independence of observations due to cluster sampling, for instance, because of repeated measures of the same individuals across time (see Fig. 5). MSEM adjusts parameter estimates for item uniqueness, sampling error and standard errors in the nested data structure (Marsh et al., 2009; Rabe-Hesketh, Skrondal, & Zheng, 2012). Furthermore, the multilevel extension of SEM allows random intercepts and random slopes to vary across clusters in hierarchical data. These random effects can be specified for any of the relationships of the model for both independent and dependent variables and both observed and latent variables. Random effects represent across-cluster variation in intercepts and slopes (i.e., individual differences). In line with SEM, regressions among random effects, among factors and between random effects and factors are allowed (Muthén & Muthén, 1998-2017). MSEM was used in Studies IV and V, focusing on both fixed (Study IV) and random effects (Study V).

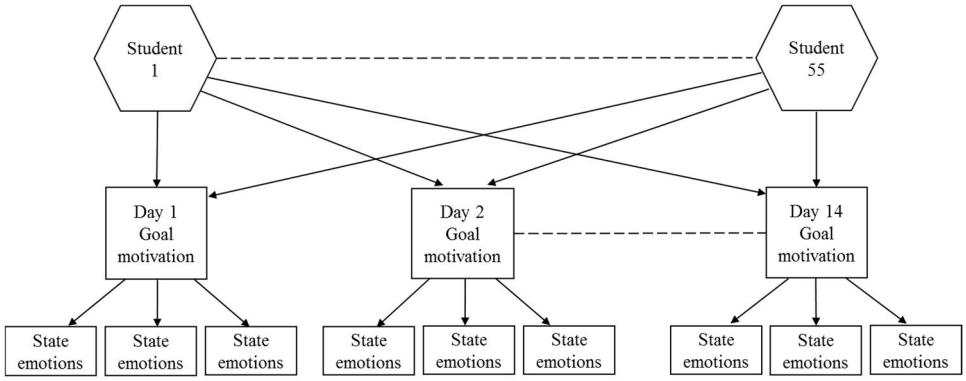

Figure 5. Multilevel data structure of Study IV: Situations (Level 1) nested within days (Level 2) nested within students (Level 3)

4.4.4 Analyses of variance

Analysis of variance (ANOVA) assesses potential differences in a scale-level dependent variable by a nominal-level independent variable having two or more categories. In a sense, an ANOVA model is a special case of a linear regression model in which the independent variable(s) are *categorical*. A one-way ANOVA refers to the number of independent variables in the analysis; that is, having only one nominal-level independent variable. For instance, the attempt may be to determine if there is a statistically significant difference among the different groups of individuals that is not related to sampling error. Furthermore, post-hoc comparisons are often used to examine mean differences between the particular pairs of groups. A multivariate analysis of variance (MANOVA) is an ANOVA with two or more continuous dependent variables. In Studies II and III, one-way ANOVAs and MANOVAs with post-hoc comparisons were conducted as a supplement to the person-oriented analyses (described next). It was examined in more detail how the student groups differed across the clustering variables as well as other external variables (such as criterion variables of academic achievement).

4.4.5 Cluster analyses

In cluster analyses, the aim is to identify *subgroups of individuals* (i.e., clusters). In K-means cluster analysis, an iterative procedure is used to assign cases to clusters and the number of clusters is specified by the researcher. However, a recommended procedure is to use the solution from Ward's (1963) hierarchical method as the starting point for the iterative K-means procedure (see Kamphaus, Huberty, DiStefano, & Petoskey, 1997). In this case, the solution is derived from the priori determined number of clusters and cases are then assigned to the clusters that has the smallest distance to a given centroid. To evaluate which cluster is closest, a similarity index is used (e.g., the squared Euclidean distance; see Aldenderfer & Blashfield, 1984). After each case has been assigned to a cluster, in the K-means cluster analysis new centroid values are computed and the iterative process continues until cases do not change their cluster assignment. Thus, whereas Ward's hierarchical method represents a way to obtain the optimal number of clusters and the cluster centroids as starting seeds for the K-means cluster analysis, K-means analysis is a way to further fine-tune the preliminary cluster solution through an iterative process (Gore, 2000). Unlike in hierarchical methods, in this method, the cases are reassigned to maximize similarity within clusters. Finally, a cluster is usually named by comparing the centroid information to existing theoretical perspectives and prior research (DiStefano & Kamphaus, 2006). In addition, validation procedures may be conducted to determine if there are differences between clusters on external outcome variables (e.g., by means of ANOVA) that were not used in the clustering procedure (Aldenderfer & Blashfield, 1984). Ward's hierarchical method and K-means cluster analysis were used in Study II.

4.4.6 Latent profile analysis

Another statistical technique to identify subgroups of individuals, is latent profile analysis (LPA). LPA, often referred to as mixture modeling in more general terms, is used with continuous (latent) variables that 'represent subpopulations where population membership is not known but is inferred from the data' (Muthén & Muthén, 1998-2017, p. 165). The latent classes (or profiles) explain the relationships among the observed dependent variables like factor analysis. In contrast to factor analysis, however, LPA provides *classification of individuals*. The measurement model for LPA is a multivariate regression model that describes the relationships between a set of observed dependent variables and a set of *categorical latent* variables. The observed dependent variables are referred to as latent class indicators. Again, the relationships are described by a set of linear regression equations (Muthén & Muthén, 1998-2017).

Since LPA is model-based, the researcher can statistically determine the number of profiles. Another advantage is that LPA generates probabilities of group membership (Vermunt & Magidson, 2002). This means that although each object is assumed to belong to one class, it is taken into account that there is uncertainty about an object's class membership. It is also possible to test different models and to analyse their goodness of fit. LPA provides fit indices that enable comparison between different models and decision making regarding the number of underlying classes. For instance, Bayesian Information Criterion (BIC and adjusted BIC), and a Vuong-Lo-Mendell-Rubin and Lo-Mendell-Rubin adjusted likelihood ratio test (VLMR and LMR) can be used as the statistical criteria for choosing the best-fitting model. The LPA model with the smallest information criteria values is the model of choice and a p-value less than .05 for VLMR and LMR indicates that the model with one fewer class should be rejected in favour of the estimated model (Lo, Mendell, & Rubin, 2001). Furthermore, the classification quality (i.e., entropy value) and the reasonableness of the latent classes in relation to theory and previous research are often considered to be criteria for choosing the best-fitting model (Vermunt & Magidson, 2002). LPA was used in Study III.

Table 4. Summary of the main aims, participants, measures and data analyses in each of the original studies

Study	Main aim	Participants	Measures	Data analyses
Study I	To examine whether academic emotions predict study success in a lecture course	Student teachers (N=107)	• Academic emotions • Self-study time • Course grade	• Regression analysis, mediating effect
Study II	To examine students' general learning profiles and profile differences in academic emotions, self-study time and study success in a lecture course	Student teachers (N=107)	• Lack of regulation • Lack of interest • Exhaustion • Optimism and task avoidance • Academic emotions • Competence and challenge • Self-study time • Course grade	• Cluster analysis • MANOVA
Study III	To examine students' academic engagement profiles and profile differences in long-term academic achievement	Law, theology, science, electrical engineering and student teachers (N=668)	• Lack of regulation • Lack of interest • Exhaustion • Study engagement • Uncertainty of career choice • GPA • ECTS credits	• Confirmatory factor analysis • Latent profile analysis • ANOVA
Study IV	To examine whether autonomous and controlled motivation in the morning predicts students' emotional states during the day	Psychology, media engineering and student teachers (N=55)	• Autonomous and controlled motivation • Academic emotions • Life satisfaction • Depressive symptoms	• Multilevel confirmatory factor analysis • Multilevel structural equation modeling
Study V	To examine how first-year study engagement predicts university students' daily task-specific value and situational emotions	Psychology, media engineering and student teachers (N=72)	• Study engagement • Task-specific value • Academic emotions • Life satisfaction • Depressive symptoms	• Multilevel confirmatory factor analysis • Multilevel structural equation modeling, moderating effect

5 Overview of original studies

The overall aim of the dissertation was to examine the roles of motivation and academic emotions in university studies and their short- and long-term effects on situational experiences and academic achievement. The dissertation consists of five empirical studies, each of which focused on investigating: 1) general student profiles and dispositions, 2) antecedents of students' contextual and situational experiences and/or 3) the consequences of general student dispositions and academic emotions for educational outcomes. In this chapter, I will present the main findings of each of the original studies. Further details are available in the original publications. The main results of Studies I-V are summarized in Table 5.

5.1 Study I

Ketonen, E., & Lonka, K. (2012). Do situational academic emotions predict academic outcomes in a lecture course? *Procedia - Social and Behavioral Sciences, 69*, 1901–1910. doi:10.1016/j.sbspro.2012.12.144

The main aim of Study I was to investigate which single situational academic emotions predict academic outcomes in a lecture course by using a variable-oriented approach. In addition, it was examined whether academic emotions would predict course grades even if self-reported self-study time was included in the model. Finally, it was tested whether one of the academic emotions, namely interest, mediated the relationship between self-study time and course grades.

The participants were 107 Finnish first-year student teachers who attended an introductory course in educational psychology. Academic emotions (i.e., interest, enthusiasm, determination, energy, exhaustion, anxiety, nervousness and irritation) were measured five days before the course exam by using a questionnaire during a lecture situation. Following the variable-oriented approach, regression analyses (both stepwise and hierarchical) and mediational analysis were conducted.

The results revealed that of the eight single academic emotions assessed, interest and exhaustion were positively related to course grade and anxiety was negatively related. These three situational academic emotions explained overall 29% of the course grade and they remained as significant predictors even in the second model, where self-study time was included as an additional predictor of grade. In this second model, self-study time was first entered in the model without the emotions and it significantly predicted course grades. However, when those three academic emotions that were proven to be significantly related to grade in the first

model were added (i.e., interest, exhaustion, anxiety), self-study time did not remain as a significant predictor. Thus, in the final model, only academic emotions significantly predicted course grades and accounted for 35% of the explained variance in students' course grades. Finally, it was shown that interest partially mediated the relationship between self-study time and course grades. Although the direct effect of self-study time on grades was stronger than the indirect path through interest, the mediating path was still significant.

Overall, the findings of Study I point out that academic emotions seem to play a notable role when explaining short-term study success, even beyond the invested self-study time. The findings demonstrate that positive activating emotions (such as interest) are decisive in terms of successful studying in a course context, but exhaustion may also relate to success. While in Study I, mean level associations between academic emotions and study success were revealed, in Study II a person-oriented method was used to identify differently behaving subgroups of students and investigate the combined and simultaneous effects of different dimensions on academic achievement.

5.2 Study II

Ketonen, E., & Lonka, K. (2013). How are situational academic emotions related to teacher students' general learning profiles? In K. Tirri & E. Kuusisto (Eds.), *Interaction in Educational Domains* (pp. 103–114). Rotterdam: Sense Publishers. doi:10.1007/978-94-6209-395-9_9

Study II investigated the relationship between the more general approach first-year university students took to studying and the ways they experienced their course emotionally. Following a person-oriented approach, different student profiles were formed and differences between profiles in terms of academic emotions, perceived challenge and competence, invested self-study time, and course grades were examined.

The participants were 107 Finnish first-year student teachers from an introductory course in educational psychology. The self-report questionnaire consisted of questions about exhaustion, problems in regulation of learning, lack of interest, task avoidance and optimism related to studying in general, as well as situational factors, measured in the context of the course (i.e., interest, enthusiasm, determination, energy, exhaustion, anxiety, nervousness, irritation, stress, sense of competence and perceived challenge). Following the person-oriented emphasis of the study, cluster analysis was used to examine the kinds of student profiles that could be found based on general level measures. One-way ANOVAs and MANOVAs were conducted to examine group differences in clustering variables and in course-specific (situational) factors.

Three groups of students with unique profiles were identified: dysfunctional, committed and unstressed. *Dysfunctional* students (33%) reported the most problems in their studying overall and they were the least optimistic about their success. *Committed* students (29%) expressed the least lack of interest and task avoidance in their studies and were quite optimistic about their success. Nevertheless, committed students still displayed some exhaustion and lack of self-regulation. *Unstressed* students (38%) were characterized by second highest scores on lack of interest and task avoidance but still they reported the highest optimism and least exhaustion and lack of regulation related to their studies in general.

Finally, the relation of these general student profiles to course-specific (situational) factors and academic outcomes were investigated. The results revealed that dysfunctional students displayed lower levels of all the positive emotions than either the committed or the unstressed students. Similarly, dysfunctional students reported exhaustion and irritation significantly more than the other two groups. By contrast, unstressed students reported the lowest levels of anxiety, nervousness, and stress; however, dysfunctional and committed students did not differ from each other in terms of these negative emotions. Both committed and unstressed students displayed a higher sense of competence than dysfunctional students but in terms of perceived challenge of the course, no group differences were found. Finally, committed students had spent more time in self-study than the other two groups, but no differences in course grades were found five days later.

Study II particularly indicated that more general dispositions in studying are related to the type of situational emotions that are triggered in a lecture context. These dispositions also relate to short-term behavioural educational outcomes (i.e., time invested in self-study during the course). Although committed students were the most engaged, they still displayed some exhaustion and negative activating emotions. In Study III a person-oriented approach was also applied but the number of participants and disciplines was increased, a model-based method for identifying the subgroups of students was used and long-term indicators of educational outcomes (ECTS credits and GPA from the first two academic years) were obtained. Furthermore, two central measure in terms of university studying, namely uncertainty of career choice and study engagement, were added as profiling variables.

5.3 Study III

Ketonen, E., Haarala-Muhonen, A., Hirsto, L., Hänninen, J., Wähälä, K., & Lonka, K. (2016). Am I in the right place? Academic engagement and study success during the first years at university. *Learning and Individual Differences, 51*, 141–148. doi:10.1016/j.lindif.2016.08.017

Study III focused on university students' academic engagement and disengagement profiles adopting a person-oriented approach. In addition, by investigating whether the profiles differed in terms of academic achievement, the study aimed to examine the simultaneous effects of various dimensions of studying on educational outcomes.

The participants consisted of 668 first- and second-year Finnish university students from different disciplines: law, theology, science, teacher education and electrical engineering. The self-report questionnaire data were collected from introductory courses and 2-year achievement data were retrieved from the universities' records. Following a person-oriented approach, students with similar patterns of study engagement, study-related exhaustion, lack of interest, lack of self-regulation, and uncertainty of career choice were identified through latent profile analysis. Additionally, to describe further the characteristics of the engagement profiles, it was investigated how students with different profiles differ with respect to academic achievement by ANOVAs.

For this dissertation, I also investigated the structural validity of the scales by means of confirmatory factor analysis (CFA; not reported in the original study). In the model, all items for each scale could load on the corresponding factor only. Good model fit was defined as a value above .95 on the Comparative Fit Index (CFI), as a value below .05 on the Root Mean Square Error of Approximation (RMSEA) and as a value below .08 for the Standardized Root Mean Square Residual (SRMR; see, for example, Hu & Bentler, 1999). All solutions were generated using Maximum Likelihood (ML) estimation. The initial CFA on the variables fit the data rather well, $\chi^2 = 606.41$, $df = 179$, $p = .00$, CFI = .93, RMSEA = .06, SRMR = .05. However, an examination of modification indices suggested a few minor changes to the model. Error covariances between three pairs of items on the study engagement scale were freed. Consequently, the modified model provided an even better fit, $\chi^2 = 459.15$, $df = 176$, $p = .00$, CFI = .96, RMSEA = .05, SRMR = .05; $\Delta\chi^2(3) = 147.26$, $p = .00$. In conclusion, the CFA model with minor modifications fit the data well, indicating the structural validity of the profiling variables. The mean scores of each scale were used for subsequent analyses. The correlations, descriptive statistics and internal consistencies (i.e., Cronbach's alphas) of the scales are presented in the original article; standardized factor loadings and residual variances are shown in Appendix B.

In the main analysis, four groups of students were identified: engaged, disengaged, undecided and alienated. *Engaged* students (69%) represented a typical, well-functioning student in the sample. They were certain of their career choice, showed the highest study engagement and had no serious problems in studying. *Disengaged* students (14%) showed the opposite: they neither felt certain about their career choice nor saw the significance of their studies subject-wise. In addition, they showed no study engagement; instead, they exhibited exhaustion and lack of self-regulation. *Undecided* students (9%) were the most uncertain about their career choice but these students still appeared quite functional: they reported relatively high study engagement and interest and as little exhaustion and lack of regulation as the engaged students. Finally, *alienated* students (8%) showed some inconsistency, even though they were highly certain of their career choice, they still expressed high lack of interest in the content matter. They also showed as little study engagement and as much exhaustion and lack of self-regulation as their disengaged peers.

In terms of academic performance, the disengaged and undecided students received the lowest grades and least credits after the first academic year, while engaged students had the most positive educational outcomes. Interestingly, despite the low study engagement and the lowest interest, the alienated students still performed relatively well. After another academic year, the engaged students were still the only group managing to reach 55 credits per year (an official goal set by the university). However, at this point the difference was found only between the engaged and disengaged students, and differences in GPA were no longer found.

In sum, Study III emphasizes that individual differences in academic engagement already exist in the early stage of university studies. These dispositions varied considerably and were associated with long-term indicators of study success (GPA) and behavioural educational outcomes (ECTS credits). It appeared that the general meaning of studying, either professional or content based, was related to better performance. While in Studies I-III mainly cross-sectional questionnaire data were used, in Study IV an intensive longitudinal experience sampling data and intra-individual approach was applied in order to overcome some limitations of the previous studies. Most importantly, in Study IV the contextual and situational closeness was enhanced and retrospective bias minimized by asking students to rate their experiences in real time on repeated time occasions, rather than over a longer duration or only once. Furthermore, it was possible to examine whether the findings across students hold at the level of situations and within-person functioning, constructing a more profound understanding of students' experiences.

5.4 Study IV

Ketonen, E., Dietrich, J., Moeller, J., Salmela-Aro, K., & Lonka, K. (2017). The role of daily autonomous and controlled educational goals in students' academic emotion states: An experience sampling method approach. *Learning and Instruction*. Advance online publication. doi:10.1016/j.learninstruc.2017.07.003

The main purpose of Study IV was to investigate the antecedents of university students' academic emotions in the context of self-determination theory (Deci & Ryan, 2000), using an intra-individual approach and an experience sampling method (ESM). More specifically, the aim was to examine whether setting autonomous versus controlled-motivated educational goals in the morning would predict students' emotional states during the day (i.e., intra-individual association) and compare this to between student patterns (i.e., inter-individual association). In addition, the extent to which university students' academic emotions vary from one learning situation to another, from one day to another, and from one individual to another was examined.

The participants were 55 Finnish first-year university students, majoring either in psychology, educational sciences or media engineering. Following the ESM-approach, students completed smartphone diaries over 14 consecutive days using the contextual activity sampling system (CASS) instrument. Students' autonomous and controlled goal motivation was assessed in morning questionnaires and academic emotions in three daytime questionnaires (interested, enthusiastic, determined and active measured a positive activating state, while anxious, nervous, irritable and stressed measured a negative activating state). The two-week intensive longitudinal data were organized in a hierarchical three-level structure, with situations (Level 1) nested within days (Level 2) nested within students (Level 3) and thus, multilevel structural equation modeling (MSEM) was applied (see Fig. 5). To test the equivalence of latent structures of both positive and negative emotions across levels, multilevel confirmatory factor analysis (MCFA) was also used. Although the factors were expected, they were not supported on all levels. Positive emotions were kept as separate manifest items on the between-day level, but otherwise positive and negative emotions were modelled as one latent factor with equal loadings across the levels. Finally, in the additional MSEMs, the control variables of life satisfaction and depressive symptoms measured before the two-week experience sampling period were included.

First, it was shown that students' academic emotions were more situation driven than day or person dependent. Second, the results of the MSEMs showed that on the day level (intra-individual association), higher autonomous goal motivation positively predicted all positive emotions, while controlled goal motivation predicted negative emotions. Interestingly, higher controlled motivation was also associated with one of the positive emotions, namely determination. Findings on

the between-student level (inter-individual association) partly mirrored the between-day level results: students who on average perceived their daily educational goals as more autonomously motivated than their peers did, also tended to experience positive emotions more often, across all situations. On the other hand, the relation between controlled motivation and negative emotions was explained by the more general affective disposition of the individual, namely the depressive symptoms the individual displayed. However, although the control variables of life satisfaction and depressive symptoms were related to both positive and negative emotions (and depressive symptoms to controlled motivation), adding them did not change the predictive impact of autonomous motivation on positive emotions on the student level.

Overall, the findings of Study IV point out that the motivational disposition (in the morning) is related to the type of situational emotions that are experienced in educational settings (later during the day). Furthermore, the strong variation in emotional experiences across learning situations suggests that academic emotions seem to be highly impacted by the momentary influences and the characteristics of a particular learning situation in question. While in Study IV the associations between motivational disposition and situational experiences were examined during a two-week period in the first academic year, in Study V a longitudinal measurement-burst design allowed the investigation of students' experiences during both their first- and second academic year. Furthermore, the general motivational disposition explaining situational experiences was measured on a different timepoint (at the beginning of the first academic year), in order to improve the design of Study II, where both general dispositions in studying and the more situational experiences were measured at the same time.

5.5 Study V

Ketonen, E., Malmberg, L. E., Salmela-Aro, K., Muukkonen, H., Tuominen, H., & Lonka, K. (manuscript submitted for publication). *The role of study engagement in university students' daily experiences: A multilevel test of moderation.*

In Study V, the daily experiences of university students' task-specific value and emotions were examined using an experience sampling method (ESM) and intra-individual approach. The main purpose was to investigate whether there are individual differences in the relation between task-specific value and emotions and whether first-year study engagement affect these daily, within-person experiences during the first two years of studying.

The participants were 72 Finnish first-year university students having either psychology, educational sciences or media engineering as their major. Of the participants, 56 (77.8%) continued in the study during their second academic year. On both years, students attended a two-week intensive data collection, where the

participants' phones beeped five times a day as a signal to complete a short CASS-questionnaire (i.e., state assessment) measuring task-specific value and situational emotions (interested, enthusiastic, determined and active measured a positive activating state, while anxious, nervous, irritable and stressed measured a negative activating state). In addition, study engagement and control variables of depressive symptoms and life satisfaction were assessed once at the beginning of the first academic year (i.e., general-level assessment). Due to the hierarchical nature of the data (with situations nested within students), multilevel confirmatory factor analysis (MCFA) and structural equation modeling (MSEM) with both fixed and random effects were applied in the data analyses.

It was found that higher task-specific value predicted more positive emotions and less negative emotions within situations (intra-individual association). In addition, students who tended to experience on average more task-specific value across all situations than their peers did, also experienced positive emotions more often (inter-individual association). However, individual variation was found in value-emotion relations. To explain this individual variation, the role of first-year study engagement was added into the model. It was revealed that the higher the study engagement was at the beginning of first year, the more intense the positive emotions predicted by perceived value of the task were during both the first- and second-year daily activities. Regarding negative emotions, for those students who had high study engagement (+ 1 SD) at the beginning of the first academic year, a higher-level of perceived value clearly predicted fewer negative emotions during the daily activities in the second academic year. On the other hand, for those with low engagement (- 1 SD) at the beginning of studies, second-year task-specific value and negative emotions were unrelated. Finally, first-year study engagement also predicted higher situational value directly even during the daily activities of the second academic year.

To sum, Study V emphasizes that the effect of value appraisals on academic emotions varies across students; that is, individual differences do exist. The more general motivational disposition (such as study engagement) seem to explain even in the long-term why students react emotionally differently on value appraisals.

Table 5. Summary of the main results: Student profiles, dynamics between general dispositions in studying and situational experiences and correlates of academic achievement

Study	Student profiles (general level)	Dynamics between different levels	Correlates of academic achievement
Study I			• Interest and exhaustion were positively, and anxiety negatively related to *course grade*
Study II	• Dysfunctional (33%) • Committed (29%) • Unstressed (38%)	• Dysfunctional students displayed the least positive emotions and sense of competence and high negative emotions and exhaustion *in lecture context* • Committed students showed high positive emotions and competence, but also negative emotions • Unstressed students reported least negative emotions and high positive emotions and competence	• Committed students invested more hours in *self-study time* than the others • No differences in course grades were found between profiles
Study III	• Engaged (69%) • Disengaged (14%) • Undecided (9%) • Alienated (8%)		• Disengaged students earned the least and engaged the most *ECTS credits* during *first and second academic year*, alienated students progressing relatively well and undecided improving their performance • Disengaged and undecided students had the lowest *GPA first year*, but later differences were no longer found
Study IV		• Autonomous goal motivation *in the morning* predicted students' *situational* positive emotions later during the day • Controlled motivation predicted negative situational emotions, but also determination later during the day	
Study V		• First-year *general* study engagement moderated the relation between *situational* value and academic emotion both in short- (same year) and long-term (second year) • First-year study engagement also directly predicted higher situational value even in long-term	

6 Discussion

The present dissertation suggests that in addition to the '*skill*' (competence beliefs) and the '*will*' (motives for studying), the emotional '*thrill*' (activating academic emotions) is a central aspect of university studies, closely interacting with students' beliefs and interests; together having consequences on academic achievement. In the present dissertation, it is suggested that by investigating each of these aspects and their combination, more comprehensive understanding of the motivational-emotional part of higher education student learning could be attained. Furthermore, the present dissertation emphasizes the role of motivation and academic emotions in the process of being engaged and successful in one's studies. By doing this, a proposition is made, how both the more general theories on student motivation and academic emotions, as well as the research literature on student engagement could be linked and applied to the research tradition on higher education student learning.

6.1 Main findings

In this chapter, I will discuss the main findings of this dissertation in relation to the research questions I posed for my inquiry. I will first present the identification of specific university student profiles, representing the more general motivational-emotional dispositions in studying. Second, I will focus on how the motivational-emotional profiles and other more general motivational dispositions are related to students' contextual and situational experiences. Third, the consequences of both general dispositions and situational emotions for short- and long-term academic achievement are discussed.

6.1.1 Motivational-emotional profiles of university students

The first aim of this dissertation was to investigate what kinds of motivational-emotional profiles can be identified among students in the beginning of university studies (in Study II called general learning profiles, in Study III academic engagement profiles). Consistent with the prior higher education research using a person-oriented approach or student pattern perspective (e.g., Heikkilä et al., 2012; Mäkinen et al., 2004), different student groups with more or less functional emphasis in terms of studying and learning and level of engagement were found.

In the original studies, the profiles were not titled based on raw scores of the profiling variables alone but the level of scores relative to the rest of the sample and to scores on other dimensions in the same profile were also considered. Furthermore, since in Study III variables of study engagement and uncertainty of career choice were included instead of optimism and task avoidance, the names of

the profiles are not fully consistent between Studies II and III. In Study II the profile names were more based on students' cognitive and attributional strategies and beliefs, whereas in Study III students' motivational and emotional engagement was emphasized. Although Studies II and III applied only partly identical measures (and different statistical methods within the person-oriented approach), the results of the original studies that focused on student profiles were still content-wise and in terms of theoretical and empirical implications quite consistent. In both studies, subgroups of engaged and motivated students, students expressing disengagement and various problems in studying and students exhibiting quite functional profiles but displaying clearly less engagement were identified; thus, they were called *academic engagement profiles*. Furthermore, for the purposes of this dissertation, one of the names between the original studies was chosen to describe each of these similar profiles. Next, I will describe one by one each of the student groups especially reflecting the profile characteristics through the lens of students' beliefs, interests and emotions, aspects presented in the Introduction. Since these dimensions of student learning have not been simultaneously studied using this kind of approach, the results are compared with the prior research only in the possible places of convergence.

Engaged students

Consistent with the prior studies examining student profiles or patterns in a higher education context (e.g., Heikkilä et al., 2011; 2012), a well-functioning student profile in terms of studying was found in both the original studies with different samples. In Study II these students were labelled as *committed* and in Study III as *engaged* students. In both studies, these groups of students displayed the lowest levels of lack of interest and uncertainty of career choice (in Study III); thus, these students may be seen as having especially high value and interest in their studying. In terms of success beliefs and expectancies, these students perceived having no (Study III) or only moderately (Study II) problems in regulation of learning and they also displayed highly optimistic expectancies for their success (in Study II). Despite the similarities between the studies in terms of high interest and positive beliefs and expectancies, regarding emotional aspects small differences were found. In Study III this student group also expressed the highest study engagement in terms of energy, dedication and absorption, while they had the lowest exhaustion. However, in Study II students in this profile reported some levels of exhaustion. The possible negative side of engagement, namely exhaustion, has also been found in previous studies identifying student engagement profiles (e.g., Salmela-Aro et al., 2016; Tuominen-Soini & Salmela-Aro, 2014). Thus, the student profile found in both studies was labelled as *engaged*. The finding that engaged students also showed the lowest levels of task avoidance (in Study II) further demonstrates their high engagement: despite expressing some levels of exhaustion and problems in self-regulation, they still seem to be highly committed to their studies.

In Study III, most of the undergraduate students were engaged (69%), which is only natural since the participants were highly selected and studying based on their own choices. Since these students were certain of their career choice, interested in their domain and reported good self-regulatory skills, the study programme seemed to meet their expectations and regulatory skills well. In the previous studies identifying student profiles, the majority of students has been the engaged (75% either engaged or moderately engaged in Tuominen-Soini & Salmela-Aro, 2014) and committed ones (73% either interested in studying or work-life in Mäkinen et al., 2004). However, in Study II the analogous group was clearly smaller (29%). In addition to non-identical measures and smaller sample size, the difference supposedly stems from the different statistical method used (see Chapter 6.2 Methodological reflections).

Dysfunctional and alienated students

Groups of students with rather maladaptive profiles in terms of studying were revealed in both Study II and III. In Study II these students were labelled as *dysfunctional* and in Study III as *disengaged* and as *alienated* students. Especially the dysfunctional students of Study II and disengaged students of Study III were remarkably similar. The findings of both studies indicated that these students had the lowest ability beliefs and success expectations in terms of lack of self-regulation (Studies II and III); they also had low optimism and high levels of task avoidance (Study II). In addition, they were clearly lacking interest in their studies, experiencing high exhaustion (Studies II and III) and low study engagement (in Study III). These students were labelled as *dysfunctional*, because it appeared that they were not only disengaged, but faced many kinds of motivational and emotional problems in studying. A similar maladaptive orientation was identified by Lonka et al. (2008) using a variable-oriented approach (*dysfunctional orientation*) while Heikkilä et al. (in 2011 *helpless students*; in 2012, *non-regulative students*) and Tuominen-Soini and Salmela-Aro (2014, groups of *disengaged* and *burned-out*) used a person-oriented approach.

As said, in Study III, two rather maladaptive groups instead of one were identified, labelled as disengaged and alienated students to describe the slight difference in their motivational aspirations. Although both groups displayed low ability beliefs, high lack of interest and high exhaustion, *alienated* students were still quite certain of their career choice. Thus, they manifested a different motivational profile than the disengaged students who in contrast expressed high uncertainty of career choice. In fact, studying was still probably meaningful for these students. It might be that alienated students valued having a certain vocation and being good in the related professional skills or simply obtaining a job and entering into the work life, but nevertheless, the study programme somehow alienated them and made them lose interest. This partly resembles a *cynical profile* found among Finnish high school students (i.e., students who lose interest and meaning in

schoolwork, see Tuominen-Soini & Salmela-Aro, 2014). Alternatively, alienated students may have found the content of the courses either irrelevant or too theoretical regarding the applicability of knowledge. This kind of *professional* or *work life orientation* has also been previously found among higher education students (e.g., Lonka & Lindblom-Ylänne, 1996; Mäkinen et al., 2004; Vermunt, 1996; Vermunt & Donche, 2017) and to be related to good study progress (Mäkinen et al., 2004). Nevertheless, unlike in a previous study where reflective professionals experienced high study engagement (see Heiskanen & Lonka, 2012), in this study, alienated students displayed low study engagement, presumably because they still lacked interest in the content matter and the will to reflect on it.

Dysfunctional students constituted a rather large group in both studies; in Study II, they were 33% of the student sample and in Study III disengaged and alienated students combined included 22% of the students. However, it is quite typical for freshmen to experience exhaustion, increased workload and lack of self-regulation (Lindblom-Ylänne & Lonka, 2000; Litmanen et al., 2014). Many of these students came directly from high school and were still 'learning how to learn' in the academic community. In addition, they might already be exhausted due to demanding exams right before entering university (see Chapter 3). However, while exhaustion may be an indicator of current study stress even in the right program, finding little personal meaning in studies could be a sign of deeper, more enduring problems hindering academic engagement. Overall, lacking general meaning in studies can be detrimental to motivation and even a reason for dropping out (Mäkinen et al., 2004). While in Study II only one dysfunctional group was identified (possibly due to the more limited measures and the different statistical method used), Study III revealed two different subtypes of students with rather maladaptive profiles: one completely lacked value and interest and another lacked interest but not necessarily value; thus, the latter group showed a slightly more favourable profile in terms of studying. However, even the presence of career certainty seemed to entail psychological distress for alienated students.

Undecided students

Finally, in both original studies a group of students that displayed a quite functional profile but displayed clearly less engagement than the engaged students was identified. To characterize these students, the term *unstressed* was used in Study II and *undecided* in Study III. Both groups showed a favourable profile in terms of beliefs, expectancies and emotional experiences: they reported as little lack of regulation (Studies II and III) and as much optimism (Study II) as the engaged students and as little or even less exhaustion (Studies II and III). However, in terms of interest, they differed from the engaged students. In Study II unstressed students displayed a greater lack of interest than the engaged students. In Study III undecided students were instead the most uncertain about their career choice but still

found the content of their studies somewhat interesting. Despite these motivational hesitations, these students did not show any task avoidance (Study II) and expressed quite high study engagement (Study III). Thus, since these students did not display any major problems in studying but were clearly hesitant in terms of the significance of their studies (in different ways), this group was labelled as *undecided* students. This kind of *ambivalent orientation* (i.e., absence of clear study motives) has also been found in previous literature when it comes to describe student motivation (Vermunt, 1996; Vermunt & Donche, 2017).

It might be that lacking the clear meaning of studies (either interest or career driven) partly explains why undecided students did not become exhausted. They probably were not as committed as the engaged students and commitment is often related to stress (Kember & Leung, 2006). Alternatively, they may have been simply bored. Their positive beliefs and expectancies may indicate that these students already had more prior knowledge and better learning skills. Nevertheless, the results suggest that although their early stage career ambivalence or search for the meaning of studies in general, undecided students did not seem to undergo any serious psychological distress; in fact, these students still seemed to be quite functional in both studies. A similar kind of group showing no distress has also been identified in previous studies among Finnish university students, where they were referred to as *non-academic students* (Heikkilä et al., 2011).

In Study III undecided students only represented 9% of the student sample, presumably because these students only expressed uncertainty of their career choice but showed no other motivational problems (students displaying other problems in studying were included in the disengaged or alienated group). In my view, it is not surprising to find such a group of students at the beginning of university studies. Surely competing or even conflicting aspirations are rather common among young adults at an age and life situation where major life choices are made. It is important to note that undecided students in Study III were not lacking interest; thus, instead of being non-academic, they may just have had competing preferences for their future profession and the most uncertain students would probably change their discipline after the first academic years. For example, many of the students first majoring in math or chemistry may later apply to the faculty of medicine. Previous literature indicates that some of the short-term negative consequences of early career indecision may lead to long-term positive consequences, particularly if a better person-occupation fit is achieved as a result of extended search behaviour (Betz & Voyten, 1997; Lent, Brown, & Hackett, 2000). However, the fact that in Study II over one-third (38%) of the students belonged to the undecided group is somewhat alarming, since compared to engaged students, these students expressed more lack of meaning in their studies, a factor that can be very harmful and even a reason for dropping out (Mäkinen et al., 2004). Thus, it could be that gradually the more negative aspects of this profile will begin to show.

Summary of findings regarding student profiles

The motivational-emotional profiles identified in the original studies were substantially similar despite the differences in the measures, student samples, statistical methods used and the context in which the studies were conducted. Although four conceptually distinct academic engagement profiles of university students were found (summarized in Fig. 6, see Chapter 6.1.3), it must be noted that the profiles were not entirely equivalent. The profile of engaged students appears to be the most well-functioning and favourable in terms of studying, because these students expressed positive beliefs or expectancies, high interest or value in their studies and their emotional experiences were mostly positive. However, the profile of undecided students also appears to be quite adaptive in terms of students' beliefs and emotional aspects in studying; only the lack of clear study motives hinders their engagement. In contrast, the profile of dysfunctional students could be considered as maladaptive, considering the negative beliefs and expectancies, lack of interest or value in studying and the negative emotional experiences these students displayed. Finally, the subgroup of alienated students appeared to be slightly more adaptive compared to the dysfunctional groups, since alienated students acknowledge their career choice to be right although they have other motivational and emotional problems.

It is interesting to observe that even engaged and undecided students reported similar levels of positive beliefs and expectancies yet the meaning of these two profiles was somewhat different. Moreover, not only dysfunctional, but also engaged students expressed some levels of exhaustion (in Study II). These findings demonstrate that it is not necessarily the levels of individual motivational and emotional factors, but the combination and interdependence of these aspects that makes student profiles adaptive. Furthermore, as Study III indicated, it seems to be necessary to recognize the *type* of meaning for studying. For instance, whether one is studying due to the interest in learning new ideas or to facilitate either current or future goals for more external reasons might be decisive. Thus, besides only examining whether students are interested in studying (or not), it should be investigated more deeply *why*, since the compelling reasons may obviously vary between students (see e.g., Mikkonen et al., 2009). For instance, there seem to be students who do not experience studying as particularly inspiring (or challenging) but may still understand the relevance of their studies.

Overall, the findings of the original studies indicate that in the most favourable profile, students' beliefs and expectancies were highly positive, students had well-grounded reasons for studying and their emotional experiences related to studying were mostly positive. However, even among highly selected university students, there seem to be less adaptive approaches to studying. Identifying different student profiles is beneficial both for understanding the heterogeneity among higher education students and their level of engagement, as well as in explaining why

some students perform better than others (see Chapter 6.1.3). In addition, the academic engagement profiles identified in the present dissertation reflect the more general dispositions in studying (i.e., general/student level in Fig. 1) and may predispose students to certain contextual and situational experiences (see next chapter). However, as stressed earlier, although student profiles are perceived as *more* stable dispositions than the situational experiences, they are not conceived as unchangeable student traits; instead, they are a result of the dynamic interplay between personal and contextual influences with the potential for change and development (see e.g., Vermunt & Endedijk, 2011).

6.1.2 Dynamics between general dispositions and situational experiences

The second aim of the present dissertation was to examine how student profiles (Study II) and other motivational dispositions (Studies IV and V) were related to university students' contextual and situational experiences in the short- and long-term. In line with the very few previous studies investigating the relations between more general orientations and situational experiences of university students (see e.g., Tanaka & Murayama, 2014, in other contexts, see e.g., Ahmed, Minnaert, et al., 2010; Salmela-Aro et al., 2016; Tapola et al., 2013), it was found that students' situational experiences were related to the more general disposition in studying. This interaction was found in all three original studies using divergent analytical approaches and different statistical methods.

In Study II, following the person-oriented approach, it was shown that the student profiles differed in terms of course-specific experiences. In Study V, an intra-individual approach and intensive longitudinal data were used to indicate that study engagement at the beginning of university studies predicted students' daily situational experiences during the first and even second academic year. Finally, Study IV also utilized an intra-individual approach to point out that the motivational disposition students had each morning was related to situational academic emotions they experienced later that same day. Next, I will present the results of each study in more detail, first focusing on the general student level dispositions and second, on more short-term daily dispositions in relation to students' situational experiences. Since the research combining intensive longitudinal data with more general-level assessments has only recently emerged, the findings are mainly discussed considering previous cross-sectional research.

Relation between student-level disposition and course-specific experiences

In Study II, the interaction between general disposition in studying and course-specific situational experiences was examined; that is, students with different motivational-emotional profiles (see previous chapter) were compared in terms of situational academic emotions, perceived challenge and competence appraisals. The results revealed that dysfunctional students displayed lower levels of positive

activating emotions than either the committed or unstressed students. In contrast, unstressed students reported the lowest levels of negative activating emotions. The finding that not only dysfunctional, but also committed students experienced negative activating emotions might again be a sign of their commitment: committed students may feel concern about their performance, which is revealed in anxiety. It should be noted that it is particularly the *activating* type of negative emotions in question, which has been also shown to produce positive educational outcomes in some situations (Pekrun et al., 2002). It might be that precisely the antecedents of emotions (in this case student dispositions) may help to understand the nature as well as the consequences of the more obscure academic emotions (see also, next chapter).

Dysfunctional students reported more *situational exhaustion* than committed (and unstressed) students, although some amount of general study-related exhaustion was also typical for the committed students (see previous chapter). At least in this sense, the situational consequences still seem to be more unwanted for the dysfunctional than for the committed students. Unstressed students, on the other hand, seem to lack all negative emotions; thus, besides not worrying about their performance, these students may have a lower commitment. Finally, both committed and unstressed students expressed a higher sense of competence than dysfunctional students, while all three student groups reported equal amounts of challenge. Since the first-year students were in question, it was not surprising that the experienced level of challenge was generally high. Furthermore, the high competence beliefs may further support the hypothesis that unstressed students may already have more knowledge of the course content to begin with (see also, previous chapter) and therefore show more positive experiences.

To sum, the findings of Study II support the idea whereby students with differing dispositions react to same academic course in various ways. The profiles showed meaningful and consistent differences across the contextual experiences and shed more light on the characteristics of the student groups. For instance, it was further demonstrated that unstressed students did not seem to experience negative emotions or distress even in the course context perceived as quite challenging, while committed students did. However, committed and unstressed students were similar in terms of a common strong sense of competence and positive academic emotions; thus, these dispositions seem to trigger more positive situational experiences in a course context. The dysfunctional orientation, on the other hand, seemed to predict more negative experiences, that is, a lower sense of competence, more negative activating emotions and exhaustion. Since in Study II both the profiles and situational factors were measured at the same point in time, in Study V it was examined whether the relation between general motivational disposition and situational experiences would still be found if these were measured at different timepoints (i.e., at the beginning of studies and later during the first and second academic year; see next chapter).

Relation between student-level disposition and situational experiences

Another way to approach the dynamics between general dispositions and situational experiences was to examine this relation by means of combining questionnaire data with intensive longitudinal experience sampling data. In Study V, the purpose was to investigate whether there are individual differences in the relation between situation-specific value appraisals and emotions and whether a more general disposition in studying (i.e., first-year study engagement) predicts these daily experiences during the first two academic years. The results indicated that in general, higher task value predicted more positive activating emotions and fewer negative activating emotions within situations. In line with previous literature (e.g., Pekrun, 2006), students who on average tended to experience more task value than their peers across all situations also experienced positive emotions more often. However, as revealed also by Ahmed, Werf, et al. (2010) individual variation was found in value-emotion relations, suggesting that students react emotionally in different ways. Most importantly, it was shown that particularly the general student-level engagement explained this individual variation, even during the second academic year.

More close inspection revealed that the higher the study engagement was at the beginning of first year, the more intensively perceived value of the task also predicted positive emotions in everyday situations. Regarding negative emotions, for those students who had high study engagement at the beginning of the first academic year, higher task value clearly predicted fewer negative emotions during the daily activities. On the other hand, for those with low engagement, the constructs were unrelated, suggesting that even high situational task value would not reduce negative emotions within situations for these students. Finally, first-year study engagement also predicted higher situational task value directly during the measurements for both years but was unrelated to emotions. To sum, also in Study V the general disposition of engagement was related to everyday situational experiences (see also, Salmela-Aro et al., 2016), especially to task value and the association between task value and emotions. The more general study engagement seemed to explain why students react emotionally differently on value appraisals. This relation was demonstrated to hold in both the short- and long-term, since general disposition moderated situational experiences even beyond the first academic year.

Relation between day-level disposition and situational experiences

In Study IV, the focus was again on more general disposition but this time on clearly shorter temporal level of specificity, namely the day level. It was investigated whether student's motivational disposition in the morning was related to the type of situational emotions that they experienced in educational settings later during the day utilizing an experience sampling procedure. Furthermore, the angle of self-determination theory (Deci & Ryan, 2000) in educational goal pursuit was

chosen to further understand the qualitative differences in the motivational disposition of students. It was shown that the higher the autonomous motivation was in the morning, the higher were the positive activating emotions during the day, while controlled motivation was associated with negative activating emotions during the day. In line with previous cross-sectional studies (e.g., Black & Deci, 2000; Miquelon & Vallerand, 2006; Reis et al., 2000), students who tended to set more autonomously motivated goals than their peers also experienced positive emotions more often across all situations and days.

Interestingly, higher controlled motivation was also associated with one of the positive emotions, namely determination. This suggests that controlled motivation might also have positive effects resulting in a somewhat higher persistence over the short term than a no-goal condition (see also, Vansteenkiste et al., 2006). Furthermore, previous research indicates that controlled motivation is likely to prompt some type of participation and engagement in learning, yet such participation is not necessarily intrinsic (Vansteenkiste et al., 2004). Finally, students' general life satisfaction was related to positive and depressive symptoms to negative emotional experiences in academic settings (also in Study V), indicating that besides study-related dispositions, the broader affective dispositions may influence situational academic experiences. To sum, also in Study IV the more general motivational disposition (every morning) was related to situational experiences. Especially the intrinsic reasons for pursuing educational goals seem to trigger positive activating emotions in students' daily lives. Furthermore, students expressed determination to pursue educational tasks, even for external reasons.

Summary of findings regarding dynamics between different levels of specificity

This dissertation indicated that general student profiles and dispositions were related to course-specific experiences (Study II) and daily situational experiences (Study V). In addition, similar pattern was found with shorter temporal scale, showing that students' motivational disposition every morning was related to their later emotional experiences the same day (Study IV). Thus, more general dispositions in studying seem to serve as a trigger to the more contextual and situational experiences in students' daily lives and these patterns seem to operate not only for short-term (Studies II and IV) but also for the long range even after a year of studying (Study V). In Figure 6 (see next chapter), these different temporal patterns of the original studies are demonstrated and the main results concisely presented. Overall, the findings of the original studies indicated that engaged and committed students as well as students experiencing autonomous motivation experienced more positive emotions in daily situations both directly and through increased task value. On the other hand, a student group with low expectancy beliefs, interest and value in studying (i.e., dysfunctional and disengaged students) and controlled motivation was related to negative emotional experiences (and

lower competence beliefs). Thus, it seems that first, one needs to have value (Study V) or general meaning (Study II) in studying in order to have more positive situational experiences. Second, it seems that the more these motives are grounded on intrinsic rather than extrinsic incentives (Study IV), the more likely positive emotions will be triggered instead of negative ones.

Finally, and probably most importantly, the patterns of behaviour detected cannot be generalized to apply to all students in similar ways because individual differences, especially in emotional responses, exist as Study V particularly indicated. For example, in Study II the engaged students experienced both positive and negative emotions and in Study V, the role of task value in predicting negative emotions was not as straightforward as it was between task value and positive emotions. Thus, it might be that at least for some students the high value and meaning of studies could increase negative emotions in addition to positive ones; this was particularly shown when comparing engaged and undecided students in Study II. Clearly, while higher task value, autonomous motivation and academic engagement in general increase positive emotions, the association with negative emotions seems to be ambiguous and may be explained at least partly by the fact that individuals react in different ways.

6.1.3 Consequences for short- and long-term academic achievement

The third and final aim of this dissertation was to investigate how both general dispositions in studying (Studies II and III) and more situational factors (Study I) are related to short- and long-term academic achievement. Both behavioural and performance-related educational outcomes were included to examine, for instance, what makes students invest their time in self-study and what factors predict study success. Studies II and III revealed that students with different academic engagement profiles differed with respect to the behavioural outcomes as well as study success both in short- and long-term. This is well in line with previous higher education literature indicating that student profiles or patterns prove to be an important predictor of academic outcomes (for a review, see Vermunt & Donche, 2017). In addition, Study I indicated that at the course level educational outcomes were also predicted by situational academic emotions. However, it is important to note that the participants of Studies I and II were the same (see Chapter 4.1 and Table 1); that is, the samples of the original studies were not independent so results need to be interpreted accordingly. Next, I will summarize the profile differences discovered in the original studies in terms of both short- and long-term behavioural and other educational outcomes and display from the variable-oriented perspective the situational emotions that were related to study success in Study I. The findings are discussed considering previous research on higher education students' achievement.

Behavioural educational outcomes

The academic engagement profiles in Studies II and III were associated with both short- and long-term behavioural educational outcomes (i.e., self-study time and earned ECTS credits). According to the findings of Study II, engaged students reported that they spent twice as many hours in self-study five days before the course exam than either dysfunctional or undecided students. A similar pattern was found in the results of Study III, where engaged students showed the most positive behavioural outcomes in terms of earned ECTS credits especially after the first academic year. In fact, engaged students were the only group that achieved the official annual goal of 55 credits set by the university. After the second academic year, engaged students were still the only group managing to keep the pace of 55 credits per year; however, this time a statistically significant difference was only found compared to the most dysfunctional students, while alienated students had maintained their relatively good study progress and undecided students had improved their performance. Thus, during the first two years of university, only the most dysfunctional students were left behind, while for instance the earlier career ambivalence of undecided students seemed to have only short-term negative consequences on their achievement. Furthermore, the lower first-year achievement by undecided students was likely due to a lack of commitment rather than other factors (see also Chapter 6.1.1).

Interestingly, the subgroup of alienated students received in both years almost as many credits as the engaged students; thus, they displayed strong indices of behavioural engagement. It may be precisely their high certainty of career choice that kept them going regardless of their low interest and insufficient self-regulatory skills. Nevertheless, also in this sense, this group appeared to be more favourable than the dysfunctional group (see also Chapter 6.1.1). The fact that alienated students performed relatively well may indicate either their strong aspiration to a certain profession and desire to enter work life or being good in the professional skills related to their future vocation. Work-life oriented students have been shown to progress even more quickly in their studies than those students primarily interested in studying and learning (Mäkinen et al., 2004). To sum, it again appears that the value and meaning of studies, either professional or content-based was related to more positive behavioural outcomes (see also, previous chapter concerning situational outcomes).

Study success

Interestingly, in Study II the student profiles did not differ in terms of the course grade, although differences in invested self-study time in the same context were found. However, when compared in Study III to the more general long-term academic performance (i.e., grade point average [GPA]), the undecided and dysfunctional students received the lowest grades during the first academic year, while engaged students had the most success. Again, alienated students also performed

rather well. However, during the second academic year, differences between profiles in terms of GPA were no longer found. Similarly, in study by Mäkinen et al. (2004), the gap between different student profiles increased in terms of earned study credits, but decreased in terms of GPAs during the first academic years.

Finally, using a different analytical approach (i.e., a variable-oriented approach), in Study I it was shown that although the student profiles of Study II were not related to the course grades, the course-specific situational emotions of these same students on a whole group level were (see also Lonka & Ketonen, 2012). Consistent with previous research, experienced interest was positively related to the grade awarded for the course (e.g., Hidi & Renninger, 2006; Krapp, 2002). Interestingly, exhaustion also predicted better performance; thus, it was not harmful in this context, perhaps referring to the cost of commitment rather than distress (see also, Schaufeli et al., 2002; Tuominen-Soini & Salmela-Aro, 2014). Finally, anxiety was negatively related to the course grade; thus, appeared to be harmful in this context. However, since a variable-oriented approach was used, individual differences and the more ambivalent effects of this negative activating emotion may had been concealed (see Chapter 4.3.2).

Overall, these three situational academic emotions (interest, exhaustion, anxiety) that were measured five days before the exam, explained approximately one third of the variance in course grades, even with the influences of self-study time controlled. However, although academic emotions are important contributors to learning outcomes, other factors not assessed in Study I, such as previous knowledge and different situational factors during the actual exam, may obviously contribute in a major way to performance. Nevertheless, reported academic emotions were more powerful predictors of study success than reported self-study time. This finding further emphasises that experienced academic emotions are important when predicting successful studying. However, it should be remembered that invested self-study time was measured five days before the exam and many students may not have even started to prepare for it. Already the names of the two groups reporting less self-study time (dysfunctional and undecided students) may indicate that they tend to procrastinate in educational tasks; therefore, the association with grades might be stronger if invested self-study time was measured the night before the exam to give a more realistic view. To sum, it seems that the more general dispositions in studying may not be that decisive in terms of grades (as they were concerning study credits), but instead, situational academic emotions measured five days before the course exam significantly predicted study success.

Summary of findings regarding educational outcomes

Figure 6 also summarizes the results regarding academic achievement found in Studies I, II and III. The findings suggest that university students' general motivational-emotional dispositions (i.e., academic engagement profiles) at the beginning of studies are not only related to students' contextual and situational experiences, but also to the behavioural educational outcomes (ECTS credits), even after two years of studying. Detecting these divergent consequences for academic achievement is beneficial both for understanding the heterogeneity among student profiles even more deeply and explaining why some students perform better than others. Moreover, by investigating whether the profiles differed in terms of academic achievement, it was possible to examine the *combined effects* of different motivational and emotional dimensions.

Consistent with the previous research, engaged students were academically more successful than their disengaged peers (e.g., Salanova et al., 2010; Schaufeli et al., 2002; Tuominen-Soini & Salmela-Aro, 2014) and lower achievement was also more typical of students having no clear meaning in their studies (see also Mäkinen et al., 2004). However, based on the partly unexpected results regarding the alienated students, one could pose a question, whether there is some amount of engagement that is sufficient to achieve certain outcomes. It appeared that since alienated students had at least some amount of engagement (i.e., high certainty of career choice), they were able to succeed sufficiently. Of course, they may have some negative effects in terms of psychological well-being, as was shown by their high exhaustion levels (see also, Chapter 6.1.1). Finally, it was shown that situational academic emotions measured on the course level were related to short-term study success (course grades), whereas the general dispositions in studying (student profiles) predicted overall long-term success, especially behavioural investment in studies in terms of earned credits. In conclusion, the combined findings of the original studies throughout the different research aims together suggest that the relationship between general dispositions in studying and academic achievement may also be mediated by situational academic emotions.

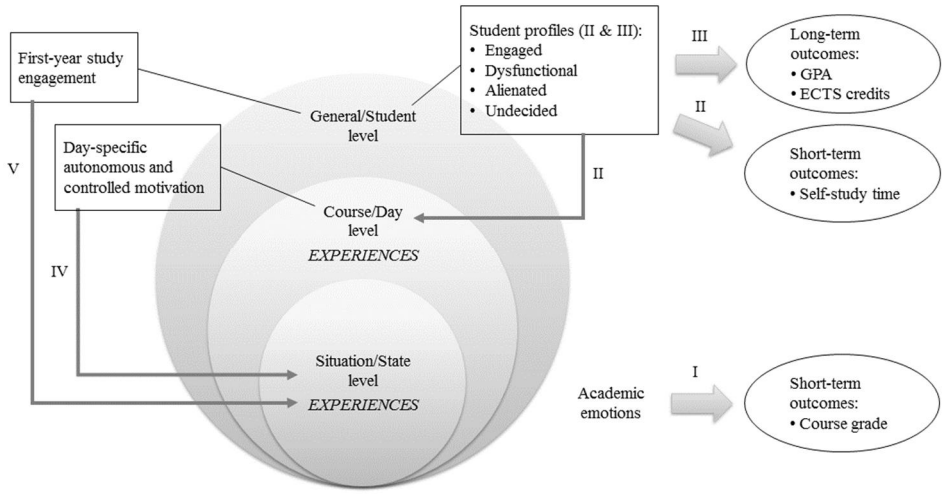

Figure 6. Summary of the main results: Student profiles (Studies II and III), dynamics between more general student dispositions and contextual/situational experiences (Studies II, IV and V) and correlates of academic achievement (Studies I, II and III). *Note*: Each of the main results is based on the findings from the original studies, which are referred in the figure by their Roman numerals (Studies I-V).

6.2 Methodological reflections

In Study I, a rather small sample of students (N=107) from one domain was included to examine whether situational academic emotions predicted study success in a lecture course. Eight academic emotions were measured once using a questionnaire, five days before the course exam. Thus, instead of repeatedly measuring situational experiences during the academic activities, the *contextual experiences* related to the course in more general were rather captured. For the analysis, a variable-oriented method was used, revealing general principles that apply to the *whole group* on a larger scale (Laursen & Hoff, 2006). Thus, in Study I, only the mean level associations between academic emotions and study success were revealed; possible individual or group differences remained concealed.

In Study II, the same sample of students as in Study I was used (N=107), but this time a person-oriented method was used to identify different *subgroups of students*. A person-oriented approach was also used in Study III, but the number of participants was significantly larger (N=668), comprised of students from four other disciplines in addition to those in teacher education. Besides revealing differently functioning subgroups of students, this approach allowed the assessment of the multifaceted nature of university students' learning and the investigation of the *combined effects* of different dimensions on academic achievement, instead of focusing solely on the emotional aspects. Furthermore, it considers whether the function of one factor on achievement varies depending on other factors that are simultaneously experienced (e.g., experiencing exhaustion with or without study

engagement). Although the person-oriented approach is often rather exploratory, in both studies the retained student groups were compared with respect to different outcome measures to examine the external validity of the obtained group solution (Aldenderfer & Blashfield, 1984). While in Study II academic outcomes were measured at the course level (invested self-study time and grades within the course), in Study III more long-term, objective indicators of behavioural outcomes and study success were used (ECTS credits and GPA from the first two academic years). This longitudinal achievement data strengthened the inferences that can be made about directional relations, identified first with concurrent data suggesting that student profiles may predict academic achievement.

In terms of the statistical analyses, in Study II cluster analysis was used to identify the student groups, whereas in Study III latent profile analysis (LPA) was employed. The major criticism of cluster analysis is that the researcher's subjectivity may bias the choice of a solution (Aldenderfer & Blashfield, 1984). Another concern is the lack of statistical indices to assist in the choice of a final solution and the sensitivity of the clustering algorithm on the results (Bergman & Magnusson, 1997; Steinley, 2003). However, a recommended two-step approach with a hierarchical (Ward's) method followed by a non-hierarchical (K-means clustering) procedure was used to identify the most distinct set of profiles (Hair, Anderson, Tatham, & Black, 1998). Due to the rather small number of participants in Study II, it was not possible to examine the stability of the cluster solution using, for instance, a split-sample cross-validation procedure (see Breckenridge, 2000).

LPA, on the other hand, avoids the problem of deciding between different algorithms to measure similarity (confronted in the context of cluster analysis) but it does not avoid the problem of having to decide on a number of groups to identify. However, it is possible to use statistical criteria to determine the number of clusters and since the analysis is model-based, different models can be tested and analysed for their goodness of fit. Another advantage over cluster analysis is that LPA also considers the uncertainty of the object's profile membership by generating probabilities of group membership (Vermunt & Magidson, 2002). To conclude, since both cluster analysis and LPA have their own limitations, the results regarding university student profiles should be perceived as rather exploratory in nature. Most importantly, it should be noted that each individual within a particular subgroup still scores somewhat differently on various factors (see Fig. 2). Nevertheless, a person-oriented approach is valuable for facilitating the translation of complex and multidimensional models into educational practice by identifying different student profiles.

Overall, although Studies II and III revealed different subgroups of students, within these groups the associations between variables were still aggregated, that is, describing the mean level of behaviour of each group although individuals usually differ somewhat even within a particular subgroup. Thus, although the concept of a person-oriented approach is established in the literature and well-suited

to describe the 'whole person' perspective instead of examining single variables, perhaps a *group-oriented approach* would be more illustrative of the procedure used in Studies II and III. In Studies IV and V the shift was made to use intensive longitudinal data by means of an experience sampling method and an intra-individual approach. Since the intra-individual approach allows the capture of students' experiences in natural settings as they occur and on repeated time occasions, in Studies IV and V, multiple state experiences within each student were captured *during* the academic activities in contrast to Studies I and II. In addition, the more general dispositions explaining these situational experiences were measured on a different timepoint (in Study IV every morning before the daytime experiences and in Study V before the experience sampling period began), in order to improve the design of Study II, where both general dispositions in studying and the situational experiences were measured simultaneously.

Furthermore, while Studies I-III mainly using cross-sectional datasets determined the relationship between variables across individuals, Studies IV and V enabled the examination of relations between variables both at the student level and *within a given individual* on the level of situations. For instance, on the student level, task value and controlled motivation were unrelated with negative emotions. However, within situations, lower task value and higher controlled motivation clearly predicted more negative emotions, which obviously have educational implications. If only explored across students, these findings would have been concealed. Furthermore, taking one step forward from the person-oriented approach, patterns of behaviour within individuals were the basis for the analyses. However, no multilevel results are ever strictly intra-individual. Even on the situational level, the estimated parameters are averaged across individuals, reflecting intra-individual and inter-individual variation at the same time (Nett et al., 2017). In Study IV the associations between variables were aggregated to concern the mean level of the whole group (i.e., fixed effect). However, In Study V the *inter-individual differences* were revealed (i.e., random slopes) and only the inspection of cross-level interactions was conducted from a rather group-oriented perspective (comparison of groups expressing high or low study engagement at the beginning of their studies). Thus, the term *person-specific approach* (see also Brose, Voelkle, Lövdén, Lindenberger, & Schmiedek, 2015) could actually better describe the procedures used in Studies IV and V, in contrast to Studies II and III, in which the orientation was towards individuals, but the analyses remained at the group level. The next step could be to combine these two analytical approaches by examining different latent profiles in intra-individual datasets. Consequently, somewhat reasonable results in terms of generalization could be obtained by simultaneously including observations of each student's unique pattern of behaviour for the basis of the analyses.

To sum, by using various analytical approaches and describing statistical discrepancies, the attempt was to clarify how different approaches may complement each other. The group-oriented (i.e., person-oriented) approach used in the present dissertation combined the different motivational and emotional aspects of studying instead of investigating them separately, allowing a rich characterization of (groups of) individuals and adding nuance to variable-oriented methods. Furthermore, while variable-oriented studies often test the impact of a single aspect of student learning on outcome of interest, here it was possible to also examine the combined and simultaneous effect on academic outcomes. For instance, the variable-oriented approach used in Study I indicated that exhaustion was positively related and anxiety negatively related to study success. However, the student profiles revealed that some aspects of negative activating emotions may also lead to desired outcomes (since they were also experienced by engaged students in Study II) and that exhaustion may not be predictive of positive outcomes, if it is related to a more dysfunctional orientation (Studies II and III). As it seems, real-life is often complex in nature and a person- or group-oriented approach is a way to combine different theories and constructs related to student motivation and emotions and key to reveal the complex relations among them.

Finally, studies applying an intra-individual approach were included in the present dissertation to overcome some limitations of both the variable- and person-oriented studies. First, the approach contributes to understanding of emotional states that might be especially difficult to recall and that are subject to other forms of reporting bias (Goetz et al., 2013; Robinson & Clore, 2002; Walls & Schafer, 2006). An experience sampling method enhanced the contextual and situational closeness and minimized retrospective bias by asking students to rate their experiences in real time rather than later or over a longer duration. In addition, measuring situational emotions in the moments in which they occur enables researchers to address important research questions. For instance, it is possible to ask to what extent emotions represent rather stable dispositions or are alterable through changes in specific learning situations. It is also possible to further determine which malleable characteristics of a situation can change these emotional states. Finally, researchers may also wish to investigate which individuals experience which emotional states and how often and whether stable emotional patterns emerge from repeated experiences (Dietrich et al., 2017). From a practical perspective, answers to these questions can offer insights into how teachers and educators can foster and sustain adaptive emotions in specific learning tasks for different kinds of students.

6.3 General limitations and recommendations for future research

The present research has its own limitations which have implications for future research. Concerning the *participants and the context* of the study, first, the study was carried out in Finland and only included students from certain disciplines. Several features of Finnish universities, such as the difficult entrance requirements and lack of tuition fees, may mean that some of the findings could be different in other countries or higher education contexts. Furthermore, the characteristics of the academic context and environment, such as differences between disciplines, may have affected some of the results, but were beyond the scope of the present study. Second, since the response rate is often a problem with student surveys (Porter & Whitcomb, 2005), in Studies I-III the data were gathered from introductory lectures to attain the most comprehensive sample. Although the number of participants (and domains) was significantly raised in Study III, it should be acknowledged, however, that perhaps only the more active students were reached via the lectures; therefore, caution is advised in interpretation of the results. Furthermore, the characteristics of the lecture course in question (in Studies I-III) or the influence of the content of the activity (in Studies IV and V) were not examined. These aspects should also be addressed in future research. Finally, besides the context, the phase of university studies can also have an impact on results. Thus, it would be interesting to examine if the results are similar among more advanced students. Overall, the findings can only be generalised with caution.

In terms of the *measures* used in the original studies, there are some issues that should be discussed. First, the present study relied mostly on self-report measures, which could have caused the results to be partly contaminated by common method variance. However, objective measures of academic achievement were also included (in Studies I-III), meaning that the common method variance problem is less serious for this key outcome variable. Instead of using single grades, in Study III the long-term academic achievement based on multiple observations was obtained from the student register. However, future studies could also control for students' *prior* achievement. Furthermore, in Studies I and II invested self-study time was measured five days before the course exam; a more realistic estimation of the overall self-study time could have been obtained closer to exam. Second, some of the constructs in the original studies were measured with a single-item indicator, possibly lowering their reliability. For instance, in Studies I and II academic emotions were assessed with single item questions but in Studies IV and V latent constructs of positive and negative activating states were used instead.

Third, the operationalization of the constructs leaves some ambiguity in terms of interpretation of the results. For instance, Study II did not differentiate the reasons for lacking general meaning in studies, while in Study III the measure of uncertainty of career choice was added. On the other hand, in Study V the measure

of task-specific value did not specify the target of value, that is, *for what* the activity is important to student, while in Study IV both the autonomous and controlled reasons for students' daily educational goals, that is, the type of motivation, were assessed. Thus, especially in terms of students' values and interests, taking more carefully into account the qualitatively different aspects of the dimension may have led to more detailed results regarding the intrinsic and extrinsic reasons for engagement. In addition, to assess students' academic emotions, the short version of the PANAS was used to measure emotions likely related to motivation and performance (i.e., activating emotions) but it is recognized that different emotion frameworks and academic emotions exist (such as social or epistemic emotions; Pekrun & Linnenbrink-Garcia, 2012). Modifying the PANAS was necessary since the scale was not originally developed to fit an academic context (e.g., emotions such as guilty or scared were excluded) and to shorten the questionnaire especially for daily experience sampling. However, it would be interesting to also include deactivating emotions such as boredom (see Pekrun et al., 2010). Overall, future studies should better distinguish not only between different types of values or meaning of studying but also between different types of academic emotions.

Lastly, an even more general consideration related to the use of a self-report instrument as a tool for investigating emotional experiences is that they are only sensitive to what the respondent is able to consciously report. There may be emotional experiences of which one is not even conscious or that cannot be verbalized when responding to a survey. In addition, people are known to differ with respect to their abilities to describe their own inner states (Feldman Barrett, 2004). Thus, to reduce biases related to self-reported measures, additional data sources such as physiological indicators (e.g., cortisol levels, heart rate intervals measured with wearable devices) and behavioural observation (e.g., facial expressions) could also be used in the future studies to complement and extend self-report data.

Regarding the *research design and procedures*, essential improvements were already made during the research. First, while in Studies I and II academic emotions were measured once by using a questionnaire, in Studies IV and V an experience sampling method enabled gathering real time data of emotions in multiple situations, also in contexts other than a formal lecture. However, there are also challenges in this approach such as the trade-off between multiple assessments and the number of participants that can be included; this imposes limits on generalizability. Furthermore, the ESM data were collected each time across only 14 days, which also limited the possible conclusions and generalizations, because students' experiences may have changed over the course of an academic year; thus, not all this variety was captured. Moreover, using fixed beeping schedules in the ESM assessments instead of randomized timing may have increased anticipatory thoughts and consequently changed behaviours (Bolger et al., 2003). However, although reactivity to the investigation and routinized procedure may pose a risk in ESM studies due to the frequent sampling, no such experiences have been

reported in previous studies using the CASS procedure; the group that used CASS actually reported less stress than the group not using it (see Lachmann, 2013). Finally, although ESM collects real-time data, the data are still self-reported and subject to the same limitations of any self-reported data.

Second, only in a few cases did the datasets allow inferences about the causality between achievement, academic emotions and other constructs, whereas reverse or bidirectional explanations were also possible. In Studies I and II, academic emotions were measured five days before the exam the course achievement were based on but the more general motivational dispositions, invested self-study time and academic emotions, were measured in the same questionnaire, which may have strengthened their relations. Furthermore, because of the concurrent data, it is not possible to disentangle the direction of causality among the variables. In Studies IV and V the more general (or daily) motivational dispositions were measured at a different timepoint than the situational emotions, but again, bidirectional associations are also possible, especially in Study IV as stability in emotional outcomes may also explain why motivation in the morning predicts emotional experiences during the day. In intensive longitudinal datasets (Studies IV and V) reciprocal effects could be tested, such as whether more negative emotions in a given day lead students to adopt more controlled goals the next day or alternatively, by controlling emotional experiences from the previous days in the models. However, this would have required a different statistical approach than used in the present study. Finally, relations between variables may be affected by tertiary variables (also in the cases of causality), such as the content of the situation or an individual's prior knowledge, not included in the present study. Furthermore, these relations may also be curvilinear, while the present study focused only on linear associations between variables. To conclude, further studies should replicate the suggested pathways with larger sample sizes and cross-lagged designs, also taking better into account the possible intervening variables and non-linear associations.

Finally, besides considering the limitations of the present study, there are few additional *openings* for future research. First, although the measures used in the present study mainly concerned students' overall engagement, it is nevertheless reasonable to assume that these motivational dispositions may differ not only among disciplines but also between courses with different contents, physical environments and pedagogical methods. Incorporating domain- and course-specific measures and comparisons can help to determine to what extent university students' engagement represents a general tendency and to what extent it is content- or even situation-specific. Using longitudinal data and contextual methods, such as the experience sampling approach, not only the general and contextual nature of academic engagement, but also the potential fluctuations in momentary engagement shall be better understood. Furthermore, positive and negative emotions often occur concurrently in learning situations and with students (Moeller, Ivcevic,

Brackett, & White, 2017; Pekrun et al., 2002; Robinson et al., 2017). Detecting such intra-individual mixed emotion states opens interesting avenues for future ESM studies but requires different methods, such as co-occurrence network analysis or the application of person-oriented analysis in the context of intensive longitudinal datasets.

Second, although the present study focused on university students' engagement and situational experiences at the beginning of studies, three-year follow-up data from the students in Study III has already been gathered and this longitudinal data collection is still underway. It will be interesting to see which group succeeds best eventually in terms of graduation, how students' academic engagement profiles develop during their studies and how they predict later engagement, well-being and educational outcomes. Is the high engagement at the beginning of university studies due to a 'honeymoon effect' rather than a stable disposition? It has been indicated that higher education student learning patterns begin to form when first contact with the academic environment is established, but are dynamic in nature and may show different trajectories over time (Vermunt & Minnaert, 2003). Furthermore, as Study V introduced, more longitudinal studies that examine how students' general orientations are related to their situational experiences should be conducted. Future studies might also determine if situational academic emotions influence the development of general orientations. Overall, more research is needed to test potentially reciprocal longitudinal relationships between general student dispositions, situational academic emotions and educational outcomes to better understand the direction of effect and possible mediating effects between these factors (see e.g., Pekrun et al., 2017).

Third, it is assumed that academic engagement lies in the interaction of the student and the academic environment. However, the current study did not describe enough about how such interactions produce engagement. For instance, it is suggested that students will be more engaged when the learning environment meet their need for relatedness (e.g., Furrer & Skinner, 2003). Thus, instead of only concentrating on intra-individual factors that have an impact on one's experiences, the other nested structures, that is, the social and shared aspects of engagement and emotional experiences should also be taken into account (e.g., academic domain, peers, friends, families). Although the present dissertation was contemplated from a more individual perspective, it should be acknowledged that academic emotions may also be social in nature (Pekrun, 2006) and emotional experiences are always situated in the immediate and broader social context (Opt't Eynde & Turner, 2006; Schutz et al., 2006). Experience sampling and multilevel modeling are reasonably convenient also for the person-context interactionist approaches (see Fleeson, 2007).

Finally, although students' engagement and emotions develop in social contexts, we do not yet know well enough how this process can be fostered so that

enjoyment of learning is enhanced and emotions hindering engagement are prevented or put to productive use. Future research on higher education student learning should include more intervention studies and provide information on how instruction and social interaction among students can be modified to foster students' adaptive academic functioning. Why do students in the same course respond differently? How responsive is students' motivational and emotional engagement to changes in the context and does engagement change if conditions are altered? Intervention studies could provide valuable information about how to make university studies more engaging and productive learning experience for all students.

6.4 Educational implications

The findings of the present dissertation showed that individual differences in motivation, academic emotions and engagement already exist at the early stage of university studies and have significant consequences for students' academic achievement and everyday experiences both in the short and long run. It is alarming that even after two academic years only the group of engaged students achieved the goal of 55 ECTS credits per year (Study III). Failing to address this governmental goal has significant economic consequences for both the institutions and the students. Furthermore, engaged and autonomously motivated students experienced clearly more positive academic emotions than their disengaged peers, whereas negative emotions were pronounced in daily activities perceived to be done for external reasons or including less value for students. First-year study engagement was related to students' situational experiences even beyond the first academic year. Next, practical suggestions on how to enhance optimal everyday experiences, academic engagement and educational outcomes of university students are made.

First, a fundamental question related to whether one can influence individual's emotional appraisals, being deeply rooted in behaviour, personality and even biology, will guide the implications made for educational practice. However, in the present study it was indicated that students' academic emotions can be influenced, at least *through* their antecedents, such as the situational determinants or more general person-level factors. The strong variation in academic emotions across learning situations suggests that the characteristics of learning situations have a strong impact on emotional experiences and that this influence can be used by teachers to elicit optimal emotions, such as interest and enthusiasm in learning contents. Positive activating emotions especially vary by academic situation. This implies that educational interventions are assumed to have an effect especially on positive emotions. Thus, teachers can make a positive difference in their students' emotions even in the situations in which the learning is occurring and the instruction should be designed accordingly (e.g., Astleitner, 2000; Lonka & Ketonen, 2012). What can educators then do to foster students' interest and other positive

activating emotions? The primary recommendations based on the findings of the present dissertation are straightforward: enhancing the pursuit of autonomous educational goals and facilitating students' experience of subjective value of the activity fosters adaptive academic emotions.

Furthermore, although not directly tied to a specific academic activity, student dispositions and other individual factors may also influence situational experiences in study-related activities. Although students' depressive symptoms and life satisfaction may be beyond educational intervention, the study-related emotional and motivational difficulties, significantly related to university students' engagement, situational experiences and educational outcomes, should be addressed. Sufficient career and student counselling already in secondary school could help guide students to begin their studies in an optimal discipline and should be further provided in university settings. Since many of the students were uncertain about their career choice (Study III), the focus should also be on student selection to find the most devoted applicants. Besides lacking personal meaning in studying, students may have low engagement because of regulative problems (Studies II and III). With adequate instructional scaffolding, this friction between insufficient self-regulatory skills and the demands of the academic environment can be made more constructive (Vermunt & Verloop, 1999). The problem, however, may not always be a lack of commitment or self-regulatory skills. Discrepancies between students' expectations and the practices of the study programme may also result in a loss of interest. However, interest can be triggered and fostered during the first years of studies, since interest is not a fixed state, but rather a varying and developing experience that can be affected by instructional arrangements (Hidi & Renninger, 2006; Hulleman, Godes, Hendricks, & Harackiewicz, 2010). Finally, although exhaustion in a course context was positively related to study success and was also experienced by the more adaptive student groups, it may also be a sign of maladaptive academic functioning, relating to other problems in studying. To conclude, based on the student profiles, targeted interventions should be developed in order to prevent these early at-risk indicators.

Although optimal engagement is desirable, the present study also suggests that in some cases only a certain motive or source of engagement may be enough to achieve desired outcomes. For instance, alienated students were doing almost as well as the engaged students in terms of study success (in Study III), although they expressed a relatively high lack of interest; nevertheless, they were quite confident with their career choice. Furthermore, students were quite determined although expressing controlled motives for certain educational goals (in Study IV). Thus, it might be that only the 'no-goal condition' or lacking personal meaning overall is detrimental for engagement and achievement, since the more extrinsic reasons for studying also seem to prompt some type of effort and engagement in learning, yet such participation is not necessarily intrinsic. In other words, a student may be determined, active and successful yet not be fully interested in or enthusiastic

about the study task if it comes with a perceived obligation or if the student is more professionally oriented.

However, although this kind of disposition may be enough to achieve certain outcomes (such as the goal of 55 ECTS credits per year), it may yet come with an emotional price, as indexed by simultaneously increased negative emotions related to controlled motivation and the high distress displayed by the alienated students. Since also controlled goals and the more extrinsic reasons for studying are inevitably frequent and needed in academic settings, another intervention could target the coping strategies of dealing with these goals by addressing the control appraisals that may make the difference between negative and positive emotional outcomes (e.g., Ruthig, Perry, Hall, & Hladkyj, 2004). Emphasising the likeable and intrinsic aspects of tasks that are 'required by the situation' or 'mandatory to achieve things' may also lead to more positive and fewer negative emotions. Overall, university students should be provided with ways to regulate and cope with their emotions in varying learning situations (Asikainen et al., 2017; Nett et al., 2011).

Finally, novel data collection methods (such as CASS), combined with modern technologies that are already being used by students daily, could also be used to monitor and give feedback to students during the study-related activities. The strengths and shortcomings of studies could be highlighted directly to students themselves, helping them to reflect on their learning and self-regulation. These forms of prospective monitoring of self-reported outcome measures have already served as an intervention in the context of clinical trials, suggesting that even the mere monitoring of one's mood decreased depressive symptoms; thus, it could be an effective intervention per se (e.g., Farhoult-Jepsen et al., 2015). Furthermore, estimating the kinds of activities that evoke either optimal learning moments and positive emotions or frustration and boredom combined with information about the content of the activity, could be used to develop pedagogical practices and interventions. In-the-moment measures and analytics may open a whole new field of comparisons of experiences in different contexts, helping to find out which courses are more engaging for students and which specific tasks are more motivating than others.

To sum, the findings of the present study suggest that intervention efforts should be targeted first to the characteristics of situations; that is, educators should help students to see the value in what they are doing in everyday learning situations. However, since the patterns of situational experiences differ as a function of individual differences, educators should also pay attention to the more general motivational dispositions, to understand students' daily academic functioning more fully. Since the general motivational disposition at the beginning of studies seem to play an important role in predicting students' later situational experiences and academic achievement, fostering students' general engagement and perceived

meaning of studies right at the beginning of university study may also have long-term positive effects.

However, the patterns of behaviour detected in the present study cannot be generalized to apply to all students in similar ways, since individual differences exist as the original studies indicated. For example, it might be that for some students the high value and personal meaning of studies could increase negative emotions in addition to positive ones. Furthermore, the differently engaged students (e.g., learning versus career oriented) should not be forgotten either: How can teachers deepen their interest and maintain their level of engagement? To conclude, recognizing the different student profiles and dispositions can make it easier to provide students with tailored support. It is important not to blame only the individual or the environment, but to take both into account as well as the balance between them. Accordingly, both universities and students themselves can affect the quality of this fit. The opportunity to engage students may lie in the ability to shape and influence the whole learning environment: how can more engaging learning environments and increasingly engaging pedagogical practices be designed for universities (see Lonka, 2012; Lonka & Ketonen, 2012).

6.5 Theoretical considerations

In this chapter, some theoretical remarks are made considering student motivation, academic emotions and the construct of engagement. First, a relevant question, also related to the present research, is whether additional (theoretical) constructs are needed and why. With this I refer to what is the added value of investigating engagement and using the concept, instead of explaining students' experiences by the original motivational and emotional theories at their roots. Next, I will specify why the advantages of using an inclusive construct of engagement when interpreting the results were seen to outweigh the drawbacks of the loss of specificity about the original concepts that were combined.

As noted already in the Introduction, engagement is theoretically somewhat messy; it overlaps with other constructs and sometimes simply substitutes different terminology for the same constructs (Fredricks et al., 2004). Eccles (2016) even asks if researchers are just reinventing existing wheels and going down already identified alleys. However, in the present dissertation the overlap with other literatures is well acknowledged and frankly admitted. The 'original' theories are perceived as foundational to understand and explain university students' engagement, providing suggestions for what may be its key constructs. The aim has been to not only give credit to the original theories on motivation and academic emotions but also to bring together separate lines of motivational and emotional research and examine their points of convergence. The holistic and integrated approach applied in the present dissertation has the benefit of unifying insights from

various bodies of research for practical purposes; in this case, they were used to investigate which university students are engaged and succeed in their studies.

As stated by Fredricks and colleagues (2004), part of the potential of engagement construct lies particularly in its capacity to examine how subsumed constructs interact and link areas of research of how students think, feel and behave in determining the outcomes associated with differing patterns of these interactions. In the special issue of student engagement and learning, published in *Learning and Instruction* in 2016, Boekaerts suggests that scholars seldom reflect on the various, possible alternative explanations based on theoretical frameworks used by other researchers and miss the chance to integrate different constructs, resulting in little cross-referencing between the different literatures and research traditions. This is seen as one of the main added values of the present dissertation: it provides an opportunity to examine how different constructs interact and how the *synergy* they serve may further explain engagement in university studies, beyond the already existing literature. In the present dissertation, engagement fits well as a framework in a process through which motivational and emotional constructs influence short- and long-term educational outcomes.

However, Fredricks and colleagues (2004, p. 84) have noted that although engagement has considerable practical benefit as an umbrella term that brings together a broad range of research, it may suffer from being everything to everybody. This is one of the central issues, which is also addressed in the commentaries by Eccles (2016) and Boekaerts (2016) in the special issue of student engagement. Can almost anything be included under this umbrella term? In the present dissertation, this concern was considered by attempting to carefully conceptualise the constructs that were suggested to contribute to university students' motivational and emotional engagement. The pre-existing motivation and emotion theories that were seen to describe students' engagement in their studies and the examples how insights gained from them may contribute to an understanding of what engagement is, were explained in the Introduction. Furthermore, the empirical findings of the present dissertation provided further support that the chosen aspects (and their combination) were indeed indicators of university students' engagement and involvement in their studies, since they were related to both self-reported time on task and objective measures of study progress, that is, behavioural indicators of enhanced engagement and persistence. However, as expressed by Appleton and colleagues (2008), whether this process should be explained by the original theories at their roots or by the engagement pathway, still partly remains the subject of future debate.

Since there are clear advantages of combining different perspectives on student learning, many overlapping and similar integrative frameworks defining *motivated behaviour* in academic settings can already be found. For instance, self-determination theory, self-regulated learning theory, expectancy value theories and theory of flow all emphasise the same core principles as engagement: cognition,

motivation, affect and behaviour (Eccles, 2016). What could be the possible added value of an engagement construct then? Descriptions that draw the difference between motivation and engagement describe engagement in terms of *energy in action* or a person's *active involvement* in a task or activity (e.g., Reeve, Jang, Carrell, Jeon, & Barch, 2004). In other words, engagement demands the connection between person and activity, a *person-environment fit* (Reschly & Christenson, 2006). This perspective suggests that engagement should be empirically investigated in a more contextualized way, by using in-the-moment measurements, for instance.

Another way could be to perceive motivation as guiding the decisions about engaging in or beginning a particular activity, while engagement is the factor keeping one doing the activity to actually attain the goal (e.g., passing a lecture course or attaining a degree). As suggested by Furrer and Skinner (2003), one could be motivated but not actively engaged in a task, in other words, that motivation is necessary but not sufficient for engagement. In my view, in this process academic emotions may play an important role in explaining how motivation gets translated into engagement; that is, they may spark and energize students and make them committed. On the other hand, if there is too much anxiety inhibiting the activity to be continued, the emotional cost may be loss of engagement. Here I return to the reasons why an engagement construct in this case was an appropriate choice: in my view, it emphasises the emotional aspects of studying more than the other theories and constructs might do. As defined in the American Heritage College Dictionary, engagement means 'being actively committed' and 'to participate' (a definition based on motivation and behaviour) but also 'to attract or involve' (a definition based on *emotion*; the New Oxford American Dictionary). Based on this, can something be called engagement without the activating emotional experiences such as enthusiasm?

As we cannot assume that motivation alone always leads directly to outcomes or the decision to act, in my view the relevant question is what also engages university students emotionally? Could we even find students highly inspired and passionate about their learning? Educators who see inspiration as an important part of studying at university, propose that students' emotions can serve as a trigger as 'will' and 'skill' catch up (Griffard, 2010). Maybe it is now time to combine more actively the research on academic emotions with the research tradition of university student learning as Vermunt and Donche (2017) proposed: "A sixth [conceptual] direction is to deepen the affective component of [university] student learning. Until now, this only has been marginally addressed, and deserves more attention".

6.6 Concluding remarks

In the Introduction, the hypothetical cases of Kevin and Susan enrolled in a statistics course were introduced. They were both engaged in their studies, but in different ways. In the light of the findings of the present dissertation, students, like Susan may be deeply interested in reflecting on the subject matter, whereas students like Kevin may be more interested in directly applicable knowledge and their future profession. Nevertheless, both student types were found to succeed better than those students who are still clarifying the personal meaning of their studying. Overall, it seems to be important to answer, '*I will study*', although the reasons for motivation may vary. Furthermore, the personal meaning may keep students committed despite the challenges that are often experienced at the beginning of university studies. Although both Susan and Kevin inevitably found the tasks of their statistics course rather challenging and may have questioned '*Can I?*', whether the related emotional experience is positive or negative may determine the level of their engagement. If the task, although challenging, is valued and involved with positive emotions, engagement is likely to exist. In case of Kevin, the question '*Am I feeling too anxious?*' may be relevant, possible preventing him from fully engaging in the activity or even leading to a loss of overall engagement. If only two of these three questions are asked, the picture of university students' engagement and achievement will be incomplete.

Founded on already well-defined theoretical bases, this dissertation produced new insights into university students' engagement. Overall, it described and provided evidence of how university students show various patterns of engagement already at the beginning of their studies. Furthermore, these dispositions were related to students' everyday experiences not only in the short- but also in the long-term. By combining students' beliefs and expectancies, their interest and values and the emotional experiences, much can be learned about the reasons why students are engaged and perform well in their studies. In their everyday lives, these factors are dynamically interrelated within students, as was shown by the present dissertation. Thus, there is a need for theoretical integration, research that incorporates different constructs and examines their simultaneous effects to more fully understand students' academic functioning.

Furthermore, it is difficult to understand students' academic engagement without understanding their everyday situational experiences, often context-specific. Within the higher education field, investigating students' experiences *as they occur* has only begun to receive systematic attention. By using various analytical approaches, in the present dissertation not only the individual patterns among subgroups of students were identified, but also the dynamic interaction between situational experiences and more general motivational disposition was indicated. It was shown that the dispositions formed at the beginning of studies may interact with students' daily experiences even after a year. The fusion of different motivational and emotional aspects of student learning, as well as the examination of

these on different contextual and temporal levels of specificity is valuable, since it may provide a richer portrayal of students' engagement and achievement than is possible in research focusing on single components or solely general-level measures. This proved to be a fruitful way to understand and represent university students' motivational-emotional engagement and commitment in its vast complexity.

To conclude, the present dissertation indicates that even highly selective admission to university does not automatically guarantee high engagement and success among all students. Some students are engaged and do well, some are disengaged but still get along satisfactorily, some display both problems in studying and low motivation and a small minority seem simply to be in the wrong place. These motivational-emotional dispositions were related to educational outcomes even after two years of studying. In the present dissertation, identifying both various configurations of different motivational and emotional dimensions and specific student profiles and the divergent consequences for situational experiences, combined with objective achievement data helped to answer what is the optimal synergy among the components leading to positive experiences and success. This is beneficial both for understanding the heterogeneity among higher education students and in explaining why some students succeed better than others. Most importantly, it enabled an observation of students' everyday lives, revealing the frequent and repetitive experiences students are predisposed within academic contexts. Educators should not only help students to attain a degree, but also enable them to enjoy learning and even flourish. The overall aim should be to promote meaningful learning and positive emotions during the decisive first years at university, since these are believed to be the keys to students' well-being and future success in life.

References

Ahmed, W., Minnaert, A., Werf, G., & Kuyper, H. (2010). The role of competence and value beliefs in students' daily emotional experiences: A multilevel test of a transactional model. *Learning and Individual Differences, 20*(5), 507–511.

Ahmed, W., Werf, G., Minnaert, A., & Kuyper, H. (2010). Students' daily emotions in the classroom: Intraindividual variability and appraisal correlates. *British Journal of Educational Psychology, 80*(4), 583–597.

Ainley, M., Corrigan, M., & Richardson, N. (2005). Students, tasks and emotions: Identifying the contribution of emotions to students' reading of popular culture and popular science texts. *Learning and Instruction*, *15*(5), 433–447.

Ainley, M., Hillman, K., & Hidi, S. (2002). Gender and interest processes in response to literary texts: Situational and individual interest. *Learning and Instruction*, *12*(4), 411–428.

Aldenderfer, M. S., & Blashfield, R. K. (1984). *Cluster analysis*. Beverly Hills, CA: Sage.

Alexander, P. A., Kulikowich, J. M., & Jetton, T. L. (1994). The role of subject-matter knowledge and interest in the processing of linear and nonlinear texts. *Review of Educational Research, 64*(2), 201–252.

Allen, J., & Robbins, S. B. (2008). Prediction of college major persistence based on vocational interests, academic preparation, and first-year academic performance. *Research in Higher Education, 49*(1), 62–79.

Appleton, J. J., Christenson, S. L., & Furlong, M. J. (2008). Student engagement with school: Critical conceptual and methodological issues of the construct. *Psychology in the Schools*, *45*(5), 369–386.

Asikainen, H., Hailikari, T., & Mattson, M. (2017). The interplay between academic emotions, psychological flexibility and self-regulation as predictors of academic achievement. *Journal of Further and Higher Education*, 1–15.

Astin, A. W. (1993). *What matters in college? Four critical years revisited*. San Francisco: Jossey-Bass.

Astleitner, H. (2000). Designing emotionally sound instruction: The FEASP-approach. *Instructional Science*, *28*(3), 169–198.

Baeten, M., Dochy, F., & Struyven, K. (2012). Using students' motivational and learning profiles in investigating their perceptions and achievement in case-based and lecture-based learning environments. *Educational Studies*, *38*(5), 491–506.

Baeten, M., Kyndt, E., Struyven, K., & Dochy, F. (2010). Using student-centred learning environments to stimulate deep approaches to learning: Factors encouraging or discouraging their effectiveness. *Educational Research Review*, *5*(3), 243–260.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.

Barker, E. T., Howard, A. L., Galambos, N. L., & Wrosch, C. (2016). Tracking affect and academic success across university: Happy students benefit from bouts of negative mood. *Developmental Psychology*, *52*(12), 2022–2030.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173–1182.

Barrett, L., Mesquita, B., Ochsner, K., & Gross, J. (2007). The experience of emotion. *Annual Review of Psychology, 58*, 373–403.

Beck. A. T., & Beck, R. W. (1972). Screening depressed patients in family practise: A rapid technic. *Postgraduate Medicine, 52*(6), 81–85.

Bergman, L. R., & El-Khouri, B. M. (2003). A person-oriented approach: Methods for today and methods for tomorrow. *New Directions for Child and Adolescent Development*, *2003*(101), 25–38.

Bergman, L. R., & Magnusson, D. (1997). A person-oriented approach in research on developmental psychopathology. *Development and Psychopathology*, *9*(2), 291–319.

Bergman, L. R., Magnusson, D., & El Khouri, B. M. (2003). *Studying individual development in an interindividual context: A person-oriented approach*. New York: Psychology Press.

Bergman, L. R., & Trost, K. (2006). The person-oriented versus the variable-oriented approach: Are they complementary, opposites, or exploring different worlds? *Merrill-Palmer Quarterly*, *52*(3), 601–632.

Betz, N. E., & Voyten, K. K. (1997). Efficacy and outcome expectations influence career exploration and decidedness. *The Career Development Quarterly, 46*(2), 179–189.

Bieg, M., Goetz, T., & Hubbard, K. (2013). Can I master it and does it matter? An intraindividual analysis on control–value antecedents of trait and state academic emotions. *Learning and Individual Differences*, *28*, 102–108.

Biggs, J. (1987). *Student approaches to learning and studying*. Melbourne: Australian Council for Educational Research.

Biggs, J. (2001). Enhancing learning: A matter of style or approach. In R. J. Sternberg & L. Zhang (Eds.), *Perspectives on thinking, learning, and cognitive styles* (pp. 73–102). London: Lawrence Erlbaum Associates.

Black, A. E., & Deci, E. L. (2000). The effects of instructors' autonomy support and students' autonomous motivation on learning organic chemistry: A self-determination theory perspective. *Science Education*, *84*(6), 740–756.

Boekaerts, M. (1996). Personality and the psychology of learning. *European Journal of Personality, 10*(5), 377–404.

Boekaerts, M. (2007). Understanding Students' affective processes in the classroom. In P. Schutz & R. Pekrun (Eds.), *Emotion in Education* (pp. 37–56). San Diego: Academic Press.

Boekaerts, M. (2016). Engagement as an inherent aspect of the learning process. *Learning and Instruction*, *43*, 76–83.

Boekaerts, M., & Cascallar, E. (2006). How far have we moved toward the integration of theory and practice in self-regulation? *Educational Psychology Review, 18*(3), 199–210.

Boekaerts, M., & Martens, R. (2006). Motivated learning: What is it and how can it be enhanced. In L. Verschaffel, F. Dochy, M. Boekaerts, & S. Vosniadou (Eds.), *Instructional psychology: Past, present and future trends. A look back and a look forward* (pp. 113–130). London: Elsevier.

Boekaerts, M., Pintrich, P. R., & Zeidner, M. (2005). *Handbook of self-regulation*. Elsevier Academic Press.

Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. *Annual Review of Psychology*, *54*(1), 579–616.

Bollen, K. A. (1989). A new incremental fit index for general structural equation models. *Sociological Methods & Research*, *17*(3), 303–316.

Breckenridge, J. N. (2000). Validating cluster analysis: Consistent replication and symmetry. *Multivariate Behavioral Research*, *35*(2), 261–285.

Brose, A., Voelkle, M. C., Lövdén, M., Lindenberger, U., & Schmiedek, F. (2015). Differences in the between-person and within-person structures of affect are a matter of degree. *European Journal of Personality*, *29*(1), 55–71.

Brown, A. L. (1987). Metacognition, executive control, self-regulation and other more mysterious mechanisms. In F. E. Weinert & R. H. Kluwe (Eds.), *Metacognition, motivation and understanding* (pp. 65–116). Hillsdale, NJ: Erlbaum.

Cantor, N. (1990). From thought to behaviour: Having and doing in the study of personality and cognition. *American Psychologist*, *45*(6), 735–750.

Carstensen, L. L., Turan, B., Scheibe, S., Ram, N., Ersner-Hershfield, H., Samanez-Larkin, et al. (2011). Emotional experience improves with age: Evidence based on over 10 years of experience sampling. *Psychology and Aging*, *26*(1), 21–33.

Catrysse, L., Coertjens, L., Donche, V., Van Daal, T., & Van Petegem, P. (2015). The impact of personality and motivation on the development of learning strategies. *Pedagogische Studiën, 92*, 308–323.

Christenson, S. L., & Anderson, A. R. (2002). Commentary: The centrality of the learning context for student's academic enabler skills. *School Psychology Review*, *31*(3), 378–393.

Coates, H. (2010). Development of the Australasian survey of student engagement (AUSSE). *Higher Education*, *60*(1), 1–17.

Conner, T. S., Tennen, H., Fleeson, W., & Feldman Barrett, L. F. (2009). Experience sampling methods: A modern idiographic approach to personality research. *Social and Personality Psychology Compass*, *3*(3), 292–313.

Dahlin, M., Fjell, J., & Runeson, B. (2010). Factors at medical school and work related to exhaustion among physicians in their first postgraduate year. *Nordic Journal of Psychiatry*, *64*(6), 402–408.

Daniels, L. M., Haynes, T. L., Stupnisky, R. H., Perry, R. P., Newall, N. E., & Pekrun, R. (2008). Individual differences in achievement goals: A longitudinal study of cognitive, emotional, and achievement outcomes. *Contemporary Educational Psychology, 33*(4), 584–608.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

Deci, E. L., & Ryan, R. M. (2000). The 'what' and 'why' of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227–268.

DeCuir-Gunby, J. T., Aultman, L. P., & Schutz, P. A. (2009). Investigating transactions among motives, emotional regulation related to testing, and test emotions. *The Journal of Experimental Education, 77*(4), 409–438.

Delle Fave, A., & Massimini, F. (2005). The investigation of optimal experience and apathy: Developmental and psychosocial implications. *European Psychologist, 10*(4), 264–274.

Diener, E. (1999). Introduction to the special section on the structure of emotion. *Journal of Personality and Social Psychology*, *76*(5), 803-804.

Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, *49*(1), 71–75.

Diener, E., Sandvik, E., & Pavot, W. (1991). Happiness is the frequency, not the intensity, of positive versus negative affect. In F. Strack (Ed.), *Subjective well-being: an interdisciplinary perspective* (pp. 119–139). Oxford: Pergamon Press.

Dietrich, J., Viljaranta, J., Moeller, J., & Kracke, B. (2017). Situational expectancies and task values: Associations with students' effort. *Learning and Instruction, 47*, 53–64.

Dina, F., & Efklides, A. (2009). Student profiles of achievement goals, goal instructions and external feedback: Their effect on mathematical task performance and affect. *European Journal of Education and Psychology, 2*(3), 235–262.

DiStefano, C., & Kamphaus, R. W. (2006). Investigating subtypes of child development: A comparison of cluster analysis and latent class cluster analysis in typology creation. *Educational and Psychological Measurement*, *66*(5), 778–794.

D'Mello, S., & Graesser, A. (2012). Dynamics of affective states during complex learning. *Learning and Instruction*, *22*(2), 145–157.

Donche, V., Coertjens, L., Van Daal, T., De Maeyer, S., & Van Petegem, P. (2014). Understanding differences in student learning and academic achievement in first year higher education: An integrative research perspective. In D. Gijbels, V. Donche, J. T. E. Richardson, & J. D. Vermunt (Eds.), *Learning patterns in higher education: Dimensions and research perspectives* (pp. 214–231). New York: Routledge.

Donche, V., Coertjens, L., & Van Petegem, P. (2010). Learning pattern development throughout higher education: A longitudinal study. *Learning and Individual Differences, 20*, 256–259.

Donche, V., De Maeyer, S., Coertjens, L., Van Daal, T., & Van Petegem, P. (2013). Differential use of learning strategies in first-year higher education: The impact of personality, academic motivation, and teaching strategies. *British Journal of Educational Psychology, 83*, 238–251.

Donche, V., & Van Petegem, P. (2009). The development of learning patterns of student teachers: A cross-sectional and longitudinal study. *Higher Education, 57*, 463–475.

Eccles, J. S. (2009). Who am I and what am I going to do with my life? Personal and collective identities as motivators of action. *Educational Psychologist, 44*(2), 78–89.

Eccles, J. S. (2016). Engagement: Where to next? *Learning and Instruction, 43*, 71–75.

Eccles, J. S., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J. L., & Midgley, C. (1983). Expectancies, values, and academic behaviors. In J. T. Spence (Ed.). *Achievement and achievement motives* (pp. 75–146). San Francisco: Freeman.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology, 53*(1), 109–132.

Efklides, A. (2006). Metacognition and affect: What can metacognitive experiences tell us about the learning process? *Educational Research Review, 1*(1), 3–14.

Efklides, A., & Petkaki, C. (2005). Effects of mood on students' metacognitive experiences. *Learning and Instruction, 15*(5), 415–431.

Efklides, A., & Volet, S. (Eds.). (2005). Feelings and emotions in the learning process [Special issue]. *Learning and Instruction, 15*(5).

Elo, A. L., Leppänen, A., & Jahkola, A. (2003). Validity of a single-item measure of stress symptoms. *Scandinavian Journal of Work, Environment & Health, 29*(6), 444–451.

Entwistle, N. (1988). Motivational factors in students' approaches to learning. In R. R. Schmeck (Ed.), *Learning strategies and learning styles* (pp. 21–51). New York: Plenum Press.

Entwistle, N., McCune, V., & Scheja, M. (2006). Student learning in context: Understanding the phenomenon and the person. In L. Verschaffel, F. Dochy, M. Boekaerts, & S. Vosniadou (Eds.), *Instructional psychology: past, present and future trends* (pp. 131–148). Amsterdam: Elsevier.

Entwistle, N. J., & Ramsden, P. (1983). *Understanding student learning*. London: Croom Helm.

Fahrenberg, J., Myrtek, M., Pawlik, K., & Perrez, M. (2007). Ambulatory assessment-monitoring behavior in daily life settings. *European Journal of Psychological Assessment*, *23*(4), 206–213.

Faurholt-Jepsen, M., Brage, S., Vinberg, M., Jensen, H. M., Christensen, E. M., Knorr, U., & Kessing, L. V. (2015). Electronic monitoring of psychomotor activity as a supplementary objective measure of depression severity. *Nordic Journal of Psychiatry*, *69*(2), 118–125.

Feldman Barrett, L. F. (2004). Feelings or words? Understanding the content in self-report ratings of experienced emotion. *Journal of Personality and Social Psychology*, *87*(2), 266–281.

Ferla, J., Valcke, M., & Schuyten, G. (2008). Relationships between student cognitions and their effects on study strategies. *Learning and Individual Differences, 18*(2), 271–278.

Flavell, J. H. (1987). Speculations about the nature and development of metacognition. In F. E. Weinert & R. H. Kluwe (Eds.), *Metacognition, motivation and understanding* (pp. 21–29). Hillsdale, NJ: Erlbaum.

Fleeson, W. (2007). Using experience sampling and multilevel modeling to study person-situation interactionist approaches to positive psychology. In A. D. Ong & M. H. Van Dulmen (Eds.), *Oxford handbook of methods in positive psychology* (pp. 501–514). Oxford University Press.

Fortunato, V. J., & Goldblatt, A. M. (2006). An examination of goal orientation profiles using cluster analysis and their relationships with dispositional characteristics and motivational response patterns. *Journal of Applied Social Psychology, 36*(9), 2150–2183.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, *74*(1), 59–109.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist, 56*, 218–226.

Friedrich, H. F., & Mandl, H. (1986). Self-regulation in knowledge acquisition: a selection of German research. In G. Beukhof & R. J. Simons (Eds.), *German and Dutch research on learning and instruction: General topics and self-regulation in knowledge acquisition* (pp. 43–99). The Hague: S.V.O.

Frijda, N. H. (1993). Moods, emotion episodes, and emotions. In J.M. Haviland & M. Lewis (Eds.), *Handbook of emotions* (pp. 381–404). New York: Guilford Press.

Fryer, L. K., Ginns, P., & Walker, R. (2016). Reciprocal modeling of Japanese university students' regulation strategies and motivational deficits for studying. *Learning and Individual Differences, 51*, 220–228.

Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology*, *95*(1), 148–162.

Gale, T., & Parker, S. (2014). Navigating change: a typology of student transition in higher education. *Studies in Higher Education*, *39*(5), 734–753.

Ganotice, F. A., Datu, J. A. D., & King, R. B. (2016). Which emotional profiles exhibit the best learning outcomes? A person-centered analysis of students' academic emotions. *School Psychology International, 37*(5), 498–518.

Germeijs, V., & Verschueren, K. (2007). High school students' career decision-making process: Consequences for choice implementation in higher education. *Journal of Vocational Behavior, 70*(2), 223–241.

Goetz, T., Bieg, M., Lüdtke, O., Pekrun, R., & Hall, N. C. (2013). Do girls really experience more anxiety in mathematics? *Psychological Science*, *24*(10), 2079–2087.

Goetz, T., Frenzel, A. C., Stoeger, H., & Hall, N. C. (2010). Antecedents of everyday positive emotions: An experience sampling analysis. *Motivation and Emotion*, *34*(1), 49–62.

Goetz, T., Pekrun, R., Hall, N., & Haag, L. (2006). Academic emotions from a social-cognitive perspective: Antecedents and domain specificity of students' affect in the context of Latin instruction. *British Journal of Educational Psychology*, *76*(2), 289–308.

Goetz, T., Sticca, F., Pekrun, R., Murayama, K., & Elliot, A. J. (2016). Intra-individual relations between achievement goals and discrete achievement emotions: An experience sampling approach. *Learning and Instruction*, *41*, 115–125.

Goetz, T., Zirngibl, A., Pekrun, R., & Hall, N. (2003). Emotions, learning and achievement from an educational-psychological perspective. In P. Mayring & C. Von Rhoeneck (Eds.), *Learning emotions: The influence of affective factors on classroom learning* (pp. 9–28). Frankfurt: Peter Lang Publishing.

Gore, 2000. Cluster analysis. In H. E. Tinsley & S. D. Brown, S. D. (Eds.), *Handbook of applied multivariate statistics and mathematical modeling* (pp. 297–321). Academic Press.

Grant, H., & Dweck, C. S. (2003). Clarifying achievement goals and their impact. *Journal of Personality and Social Psychology*, *85*(3), 541–553.

Griffard, P. B. (2010). Dissecting Motivation: The Will-Skill-Thrill profile. *Journal of College Science Teaching, 40*(1), 10–11.

Guay, F., Ratelle, C. F., & Chanal, J. (2008). Optimal learning in optimal contexts: The role of self-determination in education. *Canadian Psychology*, *49*(3), 233–240.

Harackiewicz, J. M., Barron, K. E., Tauer, J. M., & Elliot, A. J. (2002). Predicting success in college: A longitudinal study of achievement goals and ability measures as predictors of interest and performance from freshman year through graduation. *Journal of Educational Psychology*, *94*(3), 562–575.

Heckhausen, H. (2012). *Motivation and action*. Springer Science & Business Media.

Heikkilä, A., & Lonka, K. (2006). Studying in higher education: students' approaches to learning, self-regulation, and cognitive strategies. *Studies in Higher Education*, *31*(1), 99–117.

Heikkilä, A., Lonka, K., Nieminen, J., & Niemivirta, M. (2012). Relations between teacher students' approaches to learning, cognitive and attributional strategies, well-being, and study success. *Higher Education*, *64*(4), 455–471.

Heikkilä, A., Niemivirta, M., Nieminen, J., & Lonka, K. (2011). Interrelations among university students' approaches to learning, regulation of learning, and cognitive and attributional strategies: a person oriented approach. *Higher Education, 61*(5), 513–529.

Heiskanen, H., & Lonka, K. (2012). Are epistemological beliefs and motivational strategies related to study engagement in higher education? *Procedia - Social and Behavioral Sciences*, *69*, 306–313.

Hektner, J. M., Schmidt, J. A., & Csikszentmihalyi, M. (2007). *Experience sampling method: Measuring the quality of everyday life*. Thousand Oaks, CA: Sage.

Hidi, S., & Renninger, K. A. (2006). The four-phase model of interest development. *Educational Psychologist, 41*(2), 111–127.

Hirsto, L. (2012). Certainty of career choice at the beginning of university studies-general strategies and attributions in achievement situations, and career motives. *Studies for the Learning Society*, *2*(2-3), 35–45.

Hirt, E. R., Melton, R. J., McDonald, H. E., & Harackiewicz, J. M. (1996). Processing goals, task interest, and the mood–performance relationship: A mediational analysis. *Journal of Personality and Social Psychology*, *71*(2), 245–261.

Hofer, B. K., & Pintrich, P. R. (1997). The development of epistemological theories: Beliefs about knowledge and knowing and their relation to learning. *Review of Educational Research, 67*(1), 88–140.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55.

Hughes, R., & Pace, C. R. (2003). Using NSSE to study student retention and withdrawal. *Assessment Update, 15*(4), 1–2.

Hulleman, C. S., Godes, O., Hendricks, B. L., & Harackiewicz, J. M. (2010). Enhancing interest and performance with a utility value intervention. *Journal of Educational Psychology, 102*(4), 880–895.

Humphrey, N., Curran, A., Morris, E., Farrell, P., & Woods, K. (2007). Emotional intelligence and education: A critical review. *Educational Psychology, 27*(2), 235–254.

Inkinen, M., Lonka, K., Hakkarainen, K., Muukkonen, H., Litmanen, T., & Salmela-Aro, K. (2014). The interface between core affects and the challenge–skill relationship. *Journal of Happiness Studies, 15*(4), 891–913.

Jimerson, S. R., Campos, E., & Greif, J. L. (2003). Toward an understanding of definitions and measures of school engagement and related terms. *The California School Psychologist*, *8*(1), 7–27.

Jones, E. E., & Berglas, S. (1978). Control of attributions about self through self-handicapping: The appeal of alcohol and the rate of underachievement. *Personality and Social Psychology Bulletin*, *4*(2), 200–206.

Joreskog, K.G., & Sorbom, D. (1979). *Advances in factor analysis and structural equation models*. Cambridge, MA: Abt Books.

Kamphaus, R. W., Huberty, C. J., DiStefano, C., & Petoskey, M. D. (1997). A typology of teacher-rated child behavior for a national US sample. *Journal of Abnormal Child Psychology*, *25*(6), 453–463.

Kember, D., & Leung, D. Y. (2006). Characterizing a teaching and learning environment conducive to making demands on students while not making their workload excessive. *Studies in Higher Education, 31*(2), 185–198.

Ketonen, E. (2011). *Kiinnostusta vai ahdistusta? Opettajaksi opiskelevien akateemiset tunteet, motivaatio ja opiskelun ongelmat suhteessa hyvinvointiin ja menestykseen aktivoivalla luentokurssilla* [Interest or anxiety? The impact of teacher students' academic emotions, motivation, and problems in studying on well-being and study success in an activating lecture course]. Master's thesis, University of Helsinki, Finland.

Klassen, R. M., Krawchuk, L. L., & Rajani, S. (2008). Academic procrastination of undergraduates: Low self-efficacy to self-regulate predicts higher levels of procrastination. *Contemporary Educational Psychology*, *33*(4), 915–931.

Krapp, A. (2002). Structural and dynamic aspects of interest development: Theoretical considerations from an ontogenetic perspective. *Learning and Instruction 12*(4), 383–409.

Krapp, A., Hidi, S., & Renninger, A. K. (1992). Interest, learning and development. In A. K. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development* (pp. 3–25). New York: Lawrence Erlbaum Associates, Inc.

Krause, K. L., & Coates, H. (2008). Students' engagement in first-year university. *Assessment & Evaluation in Higher Education, 33*(5), 493–505.

Kuh, G. D. (2001). Assessing what really matters to student learning inside the national survey of student engagement. *Change: The Magazine of Higher Learning*, *33*(3), 10–17.

Kuh, G. D., Cruce, T. M., Shoup, R., Kinzie, J., & Gonyea, R. M. (2008). Unmasking the effects of student engagement on first-year college grades and persistence. *The Journal of Higher Education, 79*(5), 540–563.

Kunttu K., Pesonen T., & Saari J. (2017). *Student Health Survey 2016: a national survey among Finnish university students*. Ylioppilaiden terveydenhoitosäätiön tutkimuksia, 48. Helsinki, Finland: Finnish Student Health Service.

Kyndt, E., Dochy, F., Struyven, K., & Cascallar, E. (2011). The direct and indirect effect of motivation for learning on students' approaches to learning through the perceptions of workload and task complexity. *Higher Education Research & Development, 30*(2), 135–150.

Lachmann, H. (2013). *Contextual activity sampling – a method to develop clinical interprofessional education*. Doctoral dissertation, Karolinska Institutet, Stockholm, Sweden.

Lane, A. M., Whyte, G. P., Terry, P. C., & Nevill, A. M. (2005). Mood, self-set goals and examination performance: the moderating effect of depressed mood. *Personality and Individual Differences*, *39*(1), 143–153.

Larsen, R., & Diener, E. (1992). Promises and problems with the circumplex model of emotion. In M. S. Clark (Ed.), *Review of personality and social psychology, No. 13. Emotion* (pp. 25–59). Thousand Oaks, CA: Sage Publications.

Laursen, B. P., & Hoff, E. (2006). Person-centered and variable-centered approaches to longitudinal data. *Merrill-Palmer Quarterly, 52*(3), 377–389.

Law, D. W. (2007). Exhaustion in university students and the effect of coursework involvement. *Journal of American College Health*, *55*(4), 239–245.

Lent, R. W., Brown, S. D., & Hackett, G. (2000). Contextual supports and barriers to career choice: A social cognitive analysis. *Journal of Counseling Psychology, 47*(1), 36–49.

Leppel, K. (2001). The impact of major on college persistence among freshmen. *Higher Education, 41*(3), 327–342.

Lindblom-Ylänne, S., Haarala-Muhonen, A., Postareff, L., & Hailikari, T. (2017). Exploration of individual study paths of successful first-year students: an interview study. *European Journal of Psychology of Education*, *32*(4), 687–701.

Lindblom-Ylänne, S., & Lonka, K. (1998). Individual ways of interacting with the learning environment—are they related to study success? *Learning and Instruction*, *9*(1), 1–18.

Lindblom-Ylänne, S., & Lonka, K. (2000). Dissonant study orchestrations of high-achieving university students. *European Journal of Psychology of Education*, *15*(1), 19–32.

Linnenbrink, E. A. (2006). Emotion research in education: Theoretical and methodological perspectives on the integration of affect, motivation, and cognition. *Educational Psychology Review, 18*(4), 307–314.

Linnenbrink, E. A. (2007). The role of affect in student learning: A multi-dimensional approach to considering the interaction of affect, motivation, and engagement. In P. A. Schutz & R. Pekrun (Eds.), *Emotion in education* (pp. 107–124). San Diego, CA: Elsevier Academic Press.

Linnenbrink-Garcia, L., & Pekrun, R. (2011). Students' emotions and academic engagement: Introduction to the special issue. *Contemporary Educational Psychology*, *36*(1), 1–3.

Litmanen, T., Hirsto, L., & Lonka, K. (2010). Personal goals and academic achievement among theology students. *Studies in Higher Education*, *35*(2), 195–208.

Litmanen, T., Lonka, K., Inkinen, M., Lipponen, L., & Hakkarainen, K. (2012). Capturing teacher students' emotional experiences in context: does inquiry-based learning make a difference? *Instructional Science*, *40*(6), 1083–1101.

Litmanen, T., Loyens, S. M., Sjöblom, K., & Lonka, K. (2014). Medical students' perceptions of their learning environment, well-being and academic self-concept. *Creative Education*, *5*(21), 1856–1868.

Liu, W. C., Wang, C. K. J., Kee, Y. H., Koh, C., Lim, B. S. C., & Chua, L. (2014). College students' motivation and learning strategies profiles and academic achievement: A self-determination theory approach. *Educational Psychology, 34*(3), 338–353.

Lo, Y., Mendell, N. R., & Rubin, D. B. (2001). Testing the number of components in a normal mixture. *Biometrika, 88*(3), 767–778.

Lonka, K. (2012). Engaging Learning Environments for the Future: The 2012 Elizabeth W. Stone Lecture. In Gwyer, R., Stubbings, R., & Walton, G. (Eds.), *The road to information literacy: Librarians as facilitators of learning: IFLA Publications Series 157* (pp. 15–30). De Gruyter Saur.

Lonka, K., & Ketonen, E. (2012). How to make a lecture course an engaging learning experience? *Studies for the Learning Society, 2*(2-3), 63–74.

Lonka, K., & Lindblom-Ylänne, S. (1996). Epistemologies, conceptions of learning, and study practices in medicine and psychology. *Higher Education, 31*(1), 5–24.

Lonka, K., Olkinuora, E., & Mäkinen, J. (2004). Aspects and prospects of measuring studying and learning in higher education. *Educational Psychology Review, 16*(4), 301–323.

Lonka, K., Sharafi, P., Karlgren, K., Masiello, I., Nieminen, J., Birgegård, G., & Josephson, A. (2008). MED NORD–A tool for measuring medical students' well-being and study orientations. *Medical Teacher*, *30*(1), 72–79.

Lubke, G. H., & Muthén, B. (2005). Investigating population heterogeneity with factor mixture models. *Psychological Methods*, *10*(1), 21–39.

Lucas, R. E., Diener, E., & Suh, E. (1996). Discriminant validity of well-being measures. *Journal of Personality and Social Psychology*, *71*(3), 616–628.

Magnusson, D. (1998). The logic and implications of a person-oriented approach. In R. B. Cairns, L. R. Bergman, & J. Kagan (Eds.), *Methods and models for studying the individual* (pp. 33–64). Thousand Oaks, CA: Sage Publications.

Magnusson, D. (1999). On the individual: A person-oriented approach to developmental research. *European Psychologist*, *4*(4), 205–218.

Magnusson, D. (2003). The person approach: Concepts, measurement models, and research strategy. In S. C. Peck & R. W. Roeser (Eds.), *New directions for Child and Adolescent development*. *Person-centered approaches to studying development in context* (pp. 3–23). San Francisco: Jossey-Bass.

Mann, S. J. (2001). Alternative perspectives on the student experience: alienation and engagement. *Studies in Higher Education, 26*(1), 7–19.

Marsh, H. W. (1990). A multidimensional, hierarchical model of self-concept: Theoretical and empirical justification. *Educational Psychology Review*, *2*(2), 77–172.

Marsh, H. W., Lüdtke, O., Robitzsch, A., Trautwein, U., Asparouhov, T., Muthén, B., & Nagengast, B. (2009). Doubly-latent models of school contextual effects: Integrating multilevel and structural equation approaches to control measurement and sampling error. *Multivariate Behavioral Research*, *44*(6), 764–802.

Martin, A., Marsh, H., & Debus, R. (2001). Self-handicapping and defensive pessimism: Exploring a model of predictors and outcomes. *Journal of Educational Psychology*, *93*(1), 87–103.

Marton, F., & Säljö, R. (1976). On qualitative differences in learning: I—Outcome and process. *British Journal of Educational Psychology*, *46*(1), 4–11.

Marton, F., & Säljö, R. (1984). Approaches to learning. In F. Marton, D. Hounsell, & N. Entwistle (Eds.), *The experience of learning* (pp. 36–55). Edinburgh: Scottish Academic Press.

Meyer, D. K., & Turner, J. C. (2006). Re-conceptualizing emotion and motivation to learn in classroom contexts. *Educational Psychology Review, 18*(4), 377–390.

Mikkonen, J., Heikkilä, A., Ruohoniemi, M., & Lindblom-Ylänne, S. (2009). "I Study Because I'm Interested": University Students' Explanations for Their Disciplinary Choices. *Scandinavian Journal of Educational Research*, *53*(3), 229–244.

Minnaert, A. (1999). Motivational and emotional components affecting male's and female's self-regulated learning. *European Journal of Psychology of Education, 14*(4), 525–540.

Minnaert, A. E. (2000). Uncertainty about study choice and regulation. *Psychological Reports, 86*(3), 899–900.

Miquelon, P., & Vallerand, R. J. (2006). Goal motives, well-being, and physical health: Happiness and self-realization as psychological resources under challenge. *Motivation and Emotion*, *30*(4), 259–272.

Misra, R., McKean, M., West, S., & Russo, T. (2000). Academic stress of college students: Comparison of student and faculty perceptions. *College Student Journal, 34*(2), 236–245.

Moeller, J., Ivcevic, Z., Brackett, M. A. & White, A. (2017). Mixed emotions: Network analyses of intra-individual co-occurrences within and across situations. Manuscript submitted for publication. Preprint retrieved November 4, 2017, from https://osf.io/b4cxt/

Moeller, J., Salmela-Aro, K., Lavonen, J., & Schneider, B. (2015). Does anxiety in math and science classrooms impair math and science motivation? Gender differences beyond the mean level**.** *International Journal of Gender, Science, and Technology, 7*(2), 229–254.

Moeller, J., Spicer, J., Salmela-Aro, K., & Schneider, B. (2017). Advances in the research on situation-specific and contextual aspects of student engagement. In I. Schoon & R. K. Silbereisen (Eds.), *Pathways to Adulthood. Educational opportunities, motivation and attainment in times of social change* (pp.119–136). London: UCL IOE Press.

Molenaar, P. C. M. (2004). A manifesto on psychology as idiographic science: bringing the person back into scientific psychology, this time forever. *Measurement: Interdisciplinary Research and Perspectives, 2*, 201–218.

Molenaar, P. C., & Campbell, C. G. (2009). The new person-specific paradigm in psychology. *Current Directions in Psychological Science*, *18*(2), 112–117.

Muis, K. R., Pekrun, R., Sinatra, G. M., Azevedo, R., Trevors, G., Meier, E., & Heddy, B. C. (2015). The curious case of climate change: Testing a theoretical model of epistemic beliefs, epistemic emotions, and complex learning. *Learning and Instruction, 39*, 168–183.

Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus User's Guide*. Eighth Edition. Los Angeles, CA: Muthén & Muthén.

Muthén, B. O., & Muthén, L. K. (2000). Integrating person-centered and variable-centered analyses: Growth mixture modeling with latent trajectory classes. *Alcoholism: Clinical and Experimental Research*, *24*(6), 882–891.

Mäkinen, J., Olkinuora, E., & Lonka, K. (2004). Students at risk: Students' general study orientations and abandoning/prolonging the course of studies. *Higher Education, 48*(2), 173–188.

Nagengast, B., Marsh, H. W., Scalas, L. F., Xu, M. K., Hau, K. T., & Trautwein, U. (2011). Who took the "×" out of expectancy-value theory? A psychological mystery, a substantive-methodological synergy, and a cross-national generalization. *Psychological Science*, *22*(8), 1058–1066.

Nett, U. E., Bieg, M., & Keller, M. M. (2017). How much trait variance is captured by measures of academic state emotions? A latent state-trait analysis. *European Journal of Psychological Assessment*, *33*(4), 239–255.

Nett, U. E., Goetz, T., & Hall, N. C. (2011). Coping with boredom in school: An experience sampling perspective. *Contemporary Educational Psychology*, *36*(1), 49–59.

Nieminen, J., Lindblom-Ylänne, S., & Lonka, K. (2004). The development of study orientations and study success in students of pharmacy. *Instructional Science*, *32*(5), 387–417.

Norem, J. (1989). Cognitive strategies as personality: Effectiveness, specificity, flexibility, and change. In D. M. Buss & N. Cantor (Eds.), *Personality psychology. Recent trends and emerging directions* (pp. 45–60). Springer-Verlag.

Nurmi, J.-E., Aunola, K., Salmela-Aro, K., & Lindroos, M. (2003). The role of success expectation and task avoidance in academic performance and satisfaction: Three studies on antecedents, consequences and correlates. *Contemporary Educational Psychology*, *28*(1), 59–91.

Nurmi, J. E., Salmela-Aro, K., & Haavisto, T. (1995). The Strategy and Attribution Questionnaire: Psychometric Properties. *European Journal of Psychological Assessment*, *11*(2), 108–121.

Oatley, K., Keltner, D., & Jenkins, J. M. (2006). *Understanding emotions*. Blackwell publishing.

Op't Eynde, P., & Turner, J. E. (2006). Focusing on the complexity of emotion issues in academic learning: A dynamical component systems approach. *Educational Psychology Review*, *18*(4), 361–376.

Palinscar, A. S., & Brown, A. L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction, 1*(2), 117–175.

Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students*. San Francisco, CA: Jossey-Bass.

Pask, G. (1988). Learning strategies, teaching strategies, and conceptual or learning style. In R. R. Schmeck (Ed.), *Learning strategies and learning styles* (pp. 83–100). New York: Plenum Press.

Pekrun, R. (2000). A social-cognitive, control-value theory of achievement emotions. In J. Heckhausen (Ed.), *Motivational psychology of human development: Developing motivation and motivating development* (pp. 143–163). Oxford, UK: Elsevier Science.

Pekrun, R. (2005). Progress and open problems in educational emotion research. *Learning and Instruction*, *15*(5), 497–506.

Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review, 18*(4), 315–341.

Pekrun, R. (2012). Emotions: Functions and effects on learning. In N. M. Seel (Ed.), *Encyclopedia of the Sciences of Learning* (pp. 1141–1146). New York: Springer.

Pekrun, R., Frenzel, A. C., Goetz, T., & Perry, R. P. (2007). The control-value theory of achievement emotions: An integrative approach to emotions in education. In P. A. Schutz & R. Pekrun (Eds.), *Emotion in education* (pp. 13–36). San Diego, CA: Academic Press.

Pekrun, R., Goetz, T., Daniels, L. M., Stupnisky, R. H., & Perry, R. P. (2010). Boredom in achievement settings: Exploring control-value antecedents and performance outcomes of a neglected emotion. *Journal of Educational Psychology*, *102*(3), 531–549.

Pekrun, R., Goetz, T., Frenzel, A. C., Barchfeld, P., & Perry, R. P. (2011). Measuring emotions in students' learning and performance: The Achievement Emotions Questionnaire (AEQ). *Contemporary Educational Psychology*, *36*(1), 36–48.

Pekrun, R., Goetz, T., Titz, W., & Perry, R. P. (2002). Academic emotions in students' self-regulated learning and achievement: A program of qualitative and quantitative research. *Educational Psychologist, 37*(2), 91–105.

Pekrun, R., Lichtenfeld, S., Marsh, H. W., Murayama, K., & Goetz, T. (2017). Achievement emotions and academic performance: Longitudinal models of reciprocal effects. *Child Development, 88*(5), 1653–1670.

Pekrun, R., & Linnenbrink-Garcia, L. (2012). Academic emotions and student engagement. In S.L. Christenson, A.L. Reschly, A. L., & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 259–282). New York: Springer.

Pekrun, R., & Linnenbrink-Garcia, L. (2014). *International handbook of emotions in education*. New York: Routledge.

Pekrun, R., & Stephens, E. J. (2009). Goals, emotions, and emotion regulation: Perspectives of the control-value theory of achievement emotions. *Human Development*, *52*(6), 357–365.

Perry, R. P. (1991). Perceived control in college students: Implications for instruction in higher education. In J. Smart (Ed.), *Higher education: Handbook of theory and research* (pp. 1–56). New York: Agathon.

Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review, 16*(4), 385–407.

Porter, S. R., & Umbach, P. D. (2006). College major choice: An analysis of person–environment fit. *Research in Higher Education, 47*(4), 429–449.

Porter, S. R., & Whitcomb, M. E. (2005). Non-response in student surveys: The role of demographics, engagement and personality. *Research in Higher Education*, *46*(2), 127–152.

Postareff, L., Mattson, M., Lindblom-Ylänne, & Hailikari, T. (2017). The complex relationship between emotions, approaches to learning, study success and study progress during the transition to university. *Higher Education, 73*(3), 441–457.

Rabe-Hesketh, S., Skrondal, A., & Zheng, X. (2012). Multilevel structural equation modeling. In R. H. Hoyle (Ed.), *Handbook of structural equation modeling* (pp. 512–531). New York: Guilford Press.

Reason, R. D., Terenzini, P. T., & Domingo, R. J. (2006). First things first: Developing academic competence in the first year of college. *Research in Higher Education*, *47*(2), 149–175.

Reeve, J., Jang, H., Carrell, D., Jeon, S., & Barch, J. (2004). Enhancing students' engagement by increasing teachers' autonomy support. *Motivation and Emotion*, *28*(2), 147–169.

Reis, H. T., Sheldon, K. M., Gable, S. L., Roscoe, J., & Ryan, R. M. (2000). Daily well-being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin*, *26*(4), 419–435.

Reizle, M. (2013). Introduction: Doubts and insights concerning variable- and person-oriented approaches to human development. *European Journal of Developmental Psychology, 10*(1), 1–8.

Renninger, K. A., & Hidi, S. (2011). Revisiting the conceptualization, measurement, and generation of interest. *Educational Psychologist, 46*(3), 168–184.

Reschly, A., & Christenson, S. L. (2006). Promoting successful school completion. In G. Bear & K. Minke (Eds.), *Children's needs - III: Development, prevention, and intervention* (pp. 103–113). Bethesda, MD: National Association of School Psychologists.

Richardson, J. T. (1997). Meaning orientation and reproducing orientation: a typology of approaches to studying in higher education. *Educational Psychology*, *17*(3), 301–311.

Richardson, J. T. (2004). Methodological issues in questionnaire-based research on student learning in higher education. *Educational Psychology Review*, *16*(4), 347–358.

Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: a systematic review and meta-analysis. *Psychological Bulletin*, *138*(2), 353–387.

Robbins, S. B., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstrom, A. (2004). Do psychosocial and study skill factors predict college outcomes? A meta-analysis. *Psychological Bulletin 13*(2), 261–288.

Robinson, K. A., Ranellucci, J., Lee, Y. K., Wormington, S. V., Roseth, C. J., & Linnenbrink-Garcia, L. (2017). Affective profiles and academic success in a college science course. *Contemporary Educational Psychology*, *51*, 209–221.

Robinson, M. D., & Clore, G. L. (2002). Belief and feeling: evidence for an accessibility model of emotional self-report. *Psychological Bulletin*, *128*(6), 934–960.

Russell, J. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology, 39*, 1161–1178.

Russell, J., & Barrett, L. (1999). Core affect, prototypical emotional episodes, and other things called emotion: Dissecting the elephant. *Journal of Personality and Social Psychology, 76*, 805–819.

Ruthig, J. C., Perry, R. P., Hall, N. C., & Hladkyj, S. (2004). Optimism and attributional retraining: Longitudinal effects on academic achievement, test anxiety, and voluntary course withdrawal in college students. *Journal of Applied Social Psychology*, *34*(4), 709–730.

Salanova, M., Schaufeli, W., Martínez, I., & Bresó, E. (2010). How obstacles and facilitators predict academic performance: The mediating role of study burnout and engagement. *Anxiety, Stress and Coping, 23*(1), 53–70.

Salmela-Aro, K. (2009). *Opiskelu-uupumismittari SBI-9 yliopisto- ja ammattikorkeakouluopiskelijoille* [The study burnout inventory SBI–9 for students in higher education]. Ylioppilaiden terveydenhoitosäätiön tutkimuksia, 46. Helsinki, Finland: Finnish Student Health Service.

Salmela-Aro, K., Kiuru, N., Leskinen, E., & Nurmi, J.E. (2009). School Burnout Inventory (SBI): Reliability and validity. *European Journal of Psychological Assessment, 25*(1), 48–57.

Salmela-Aro, K., & Kunttu, K. (2010). Study burnout and engagement in higher education. *Unterrichtswissenschaft, 38*(4), 318–333.

Salmela-Aro, K., Moeller, J., Schneider, B., Spicer, J., & Lavonen, J. (2016). Integrating the light and dark sides of student engagement using person-oriented and situation-specific approaches. *Learning and Instruction*, *43*, 61–70.

Salmela-Aro, K., & Nurmi, J. E. (1996). Depressive symptoms and personal project appraisals: A cross-lagged longitudinal study. *Personality and Individual Differences, 21*(3), 373–381.

Salmela-Aro, K., & Nurmi, J.E. (1997). Goal contents, well-being, and life context during transition to university: A longitudinal study. *International Journal of Behavioral Development*, *20*(3), 471–491.

Salmela-Aro, K., & Näätänen, P. (2005). *Method of assessing adolescents' school burnout*. Helsinki, Finland: Edita.

Salmela-Aro, K., & Upadyaya, K. (2012). The schoolwork Engagement Inventory: energy, dedication, and absorption (EDA). *European Journal of Psychological Assessment*, *28*(1), 60–67.

Sansone, C., & Harackiewicz, J. M. (2000). *Intrinsic and extrinsic motivation: The search for optimal motivation and performance*. Sandiego, CA: Academic Press.

Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire a cross-national study. *Educational and Psychological Measurement, 66*(4), 701–716.

Schaufeli, W. B., Martínez, I. M., Pinto, A. M., Salanova, M., & Bakker, A. B. (2002). Burnout and engagement in university students a cross-national study. *Journal of Cross-Cultural Psychology, 33*(5), 464–481.

Schiefele, U. (1999). Interest and learning from text. *Scientific Studies of Reading*, *3*(3), 257–279.

Schmeck, R. R. (1988) (Ed.). *Learning strategies and learning styles*. New York: Plenum Press.

Schommer, M. (1990). Effects of beliefs about the nature of knowledge on comprehension. *Journal of Educational Psychology, 82*(3), 498–504.

Schunk, D. H., & Zimmerman, B. J. (1994). *Self-regulation of learning and performance: Issues and educational applications*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Schutz, P. A., Hong, J. Y., Cross, D. I., & Osbon, J. N. (2006). Reflections on investigating emotion in educational activity settings. *Educational Psychology Review, 18*(4), 343–360.

Schutz, P. A., & Lanehart, S. L. (2002). Introduction: Emotions in education. *Educational Psychologist*, *37*(2), 67–68.

Schutz, P. A., & Pekrun, R. E. (2007). *Emotion in education*. San Diego, CA: Academic Press.

Sheldon, K. M., & Elliot, A. J. (1998). Not all personal goals are personal: Comparing autonomous and controlled reasons for goals as predictors of effort and attainment. *Personality and Social Psychology Bulletin, 24*(5), 546–557.

Sheldon, K. M. & Elliot, A. J. (1999). Goal striving, need-satisfaction, and longitudinal wellbeing: The Self-Concordance Model. *Journal of Personality and Social Psychology, 76*(3), 482–497.

Shell, D. F., & Husman, J. (2008). Control, motivation, affect, and strategic self-regulation in the college classroom: A multidimensional phenomenon. *Journal of Educational Psychology*, *100*(2), 443–459.

Skinner, E. A. (1995). *Perceived control, motivation, & coping*. Thousand Oaks, CA: Sage Publications.

Skinner, E., Furrer, C., Marchand, G., & Kindermann, T. (2008). Engagement and disaffection in the classroom: Part of a larger motivational dynamic? *Journal of Educational Psychology*, *100*(4), 765–781.

Statistics for admission (2016). Retrieved November 4, 2017, from https://www.helsinki.fi/en/studying/how-to-apply/statistics-about-admissions

Steinley, D. (2003). Local optima in K-means clustering: what you don't know may hurt you. *Psychological Methods*, *8*(3), 294–304.

Stone, A. A., & Shiffman, S. (1994). Ecological momentary assessment (EMA) in behavorial medicine. *Annals of Behavioral Medicine*, *16*(3), 199–202.

Tanaka, A., & Murayama, K. (2014). Within-person analyses of situational interest and boredom: Interactions between task-specific perceptions and achievement goals. *Journal of Educational Psychology, 106*(4), 1122–1134.

Tapola, A., Veermans, M., & Niemivirta, M. (2013). Predictors and outcomes of situational interest during a science learning task. *Instructional Science, 41*(6), 1047–1064.

Tinto, V. (1996). Reconstructing the first year of college. *Planning for Higher Education, 25*(1), 1–6.

Tolvanen, A., Kiuru, N., Leskinen, E., Hakkarainen, K., Inkinen, M., Lonka, K., & Salmela-Aro, K. (2011). A new approach for estimating a nonlinear growth component in multilevel modeling. *International Journal of Behavioral Development, 35*(4), 370–379.

Tracey, T. J., & Robbins, S. B. (2006). The interest–major congruence and college success relation: A longitudinal study. *Journal of Vocational Behavior, 69*(1), 64–89.

Trautwein, U., Lüdtke, O., Kastens, C., & Köller, O. (2006). Effort on homework in grades 5–9: Development, motivational antecedents, and the association with effort on classwork. *Child Development*, *77*(4), 1094–1111.

Trautwein, U., Marsh, H. W., Nagengast, B., Lüdtke, O., Nagy, G., & Jonkmann, K. (2012). Probing for the multiplicative term in modern expectancy–value theory: A latent interaction modeling study. *Journal of Educational Psychology*, *104*(3), 763–777.

Trigwell, K., Ellis, R. A., & Han, F. (2012). Relations between students' approaches to learning, experienced emotions and outcomes of learning. *Studies in Higher Education, 37*(7), 811–824.

Tsai, Y. M., Kunter, M., Lüdtke, O., Trautwein, U., & Ryan, R. M. (2008). What makes lessons interesting? The role of situational and individual factors in three school subjects. *Journal of Educational Psychology*, *100*(2), 460–472.

Tuominen-Soini, H., & Salmela-Aro, K. (2014). Schoolwork engagement and burnout among Finnish high school students and young adults: Profiles, progressions, and educational outcomes. *Developmental Psychology*, *50*(3), 649–662.

Turner, J. E., & Schallert, D. L. (2001). Expectancy–value relationships of shame reactions and shame resiliency. *Journal of Educational Psychology*, *93*(2), 320–329.

Universities (2005). *Annual report*. Helsinki, Finland: Ministry of Education Publications, 2006.

Vaez, M., & Laflamme, L. (2003). Health behaviors, self-rated health, and quality of life: A study among first-year Swedish university students. *Journal of American College Health, 51*(4), 156–162.

Van der Veen, I. V. D., De Jong, U. D., Van Leeuwen, M. V., & Korteweg, J. A. (2005). The development of higher education students' interest in their subject: The case of higher professional education in the Netherlands. *Studies in Higher Education, 30*(3), 275–289.

Vansteenkiste, M., Lens, W., & Deci, E. L. (2006). Intrinsic versus extrinsic goal contents in self-determination theory: Another look at the quality of academic motivation. *Educational Psychologist*, *41*(1), 19–31.

Vansteenkiste, V., Lens, W., Witte, H., & Feather, N. T. (2005). Understanding unemployed people's job search behaviour, unemployment experience and well-being: A comparison of expectancy-value theory and self-determination theory. *British Journal of Social Psychology, 44*(2), 269–287.

Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., Matos, L., & Lacante, M. (2004). Less is sometimes more: Goal content matters. *Journal of Educational Psychology*, *96*(4), 755–764.

Vanthournout, G., Gijbels, D., Coertjens, L., Donche, V., & Van Petegem, P. (2012). Students' persistence and academic success in a first-year professional bachelor program: the influence of students' learning strategies and academic motivation. *Education Research International,* doi:http://dx.doi.org/10.1155/2012/152747

Vasalampi, K., Salmela-Aro, K., & Nurmi, J. E. (2010). Education-related goal appraisals and self-esteem during the transition to secondary education: A longitudinal study. *International Journal of Behavioral Development*, *34*(6), 481–490.

Vermetten, Y. J., Vermunt, J. D., & Lodewijks, H. G. (2002). Powerful learning environments? How university students differ in their response to instructional measures. *Learning and Instruction*, *12*(3), 263–284.

Vermunt, J. D. (1996). Metacognitive, cognitive and affective aspects of learning styles and strategies: A phenomenographic analysis. *Higher Education*, *31*(1), 25–50.

Vermunt, J. D. (1998). The regulation of constructive learning processes. *British Journal of Educational Psychology, 68*(2), 149–171.

Vermunt, J. D., & Donche, V. (2017). A learning patterns perspective on student learning in higher education: state of the art and moving forward. *Educational Psychology Review, 29*(2), 269–299.

Vermunt, J. D., & Endedijk, M. D. (2011). Patterns in teacher learning in different phases of the professional career. *Learning and Individual Differences*, *21*(3), 294–302.

Vermunt, J. D., & Minnaert, A. (2003). Dissonance in student learning patterns: when to revise theory? *Studies in Higher Education, 28*(1), 49–61.

Vermunt, J. D., & Verloop, N. (1999). Congruence and friction between learning and teaching. *Learning and Instruction*, *9*(3), 257–280.

Vermunt, J. D., & Vermetten, Y. J. (2004). Patterns in student learning: Relationships between learning strategies, conceptions of learning, and learning orientations. *Educational Psychology Review, 16*(4), 359–384.

Vermunt, J. K., & Magidson, J. (2002). Latent class cluster analysis. *Applied Latent Class Analysis, 11*, 89–106.

Voelkle, M. C., Brose, A., Schmiedek, F., & Lindenberger, U. (2014). Toward a unified framework for the study of between-person and within-person structures: Building a bridge between two research paradigms. *Multivariate Behavioral Research*, *49*(3), 193–213.

Volet, S. (2001). Understanding learning and motivation in context: A multi-dimensional and multi-level cognitive-situative perspective. In S. Volet, & S. Järvelä (Eds.), *Motivation in learning contexts. Theoretical advances and methodological implications* (pp. 57–84). Amsterdam: Pergamon.

Von Eye, A., & Bogat, G. A. (2006). Person-oriented and variable-oriented research: Concepts, results, and development. *Merrill-Palmer Quarterly*, *52*(3), 390–420.

Vuorinen, P., & Valkonen, S. (2005). *Ammattikorkeakoulu ja yliopisto yksilöllisten koulutustoiveiden toteuttajana* [Polytechnics and universities as a path to individual educational goals]. University of Jyväskylä Institute for Educational Research Occasional papers 25.

Walls, T. A., & Schafer, J. L. (2006). *Models for intensive longitudinal data*. New York: Oxford University Press.

Wang, M. T., & Peck, S. C. (2013). Adolescent educational success and mental health vary across school engagement profiles. *Developmental Psychology*, *49*(7), 1266–1276.

Ward J. H. (1963). Hierarchical grouping to optimize an objective function. *Journal of the American Statistical Association*, *58*(301), 236–244.

Watson, D., Clark, L., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063–1070.

Watson, D., & Tellegen, A. (1985). Toward a consensual structure of mood. *Psychological Bulletin, 98*, 219–235.

Watt, H. M., Richardson, P. W., Klusmann, U., Kunter, M., Beyer, B., Trautwein, U., & Baumert, J. (2012). Motivations for choosing teaching as a career: An international comparison using the FIT-Choice scale. *Teaching and Teacher Education*, *28*(6), 791–805.

Weiner, B. (1992). *Human motivation: Metaphors, theories, and research*. Thousand Oaks, CA: Sage.

Wentzel, K., & Wigfield, A. (2009). *Handbook of motivation at school*. New York: Routledge.

Wigfield, A., & Eccles, J. S. (2000). Expectancy–value theory of achievement motivation. *Contemporary Educational Psychology*, *25*(1), 68–81.

Wigfield, A., Tonks, S., & Klauda, S. L. (2009). Expectancy-value theory. In K. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 55–75). New York: Routledge.

Yik, M., Russell, J., & Barrett, L. (1999). Structure of self-reported current affect: Integration and beyond. *Journal of Personality and Social Psychology, 77*(3), 600–619.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory Into Practice, 41*(2), 64–70.

Appendices

Appendix A. Cronbach's alpha reliabilities for all variables

Scale	Study II	Study III	Study IV	Study V
Student-level measures				
Optimism	.77			
Task avoidance	.72			
Lack of regulation	.70	.71		
Exhaustion	.78	.81		
Lack of interest	.76	.75		
Uncertainty of career choice		.90		
Study engagement		.90		.85
Life satisfaction			.79	.82
Depressive symptoms			.83	.85
Day-level measures				
Autonomous motivation			.85	
Controlled motivation			.82	
Situation-level measures				
Positive activating emotion				
within-day level			.81	.80
between-day level			--	
between-student level			.94	.91
Negative activating emotion				
within-day level			.71	.77
between-day level			.94	
between-student level			.93	.93

Note: In Studies IV and V there is some overlap in the participants, that is, the samples of the original studies are not independent. Furthermore, since multilevel modeling was applied, the level-specific Cronbach's alphas were calculated for positive and negative activating emotion (however, no latent variable of positive activating emotion was specified on the between-day level in Study IV).

Appendix B. Standardized factor loadings and residual variances for the chosen measurement model in Study III (not reported in the original article)

Item	Factor loading					Residual variances
	SE	EXH	LINT	LREG	UCC	
SE1[1]	.735					.460
SE2	.709					.498
SE3[2]	.577					.667
SE4[1]	.697					.514
SE5	.861					.258
SE6[23]	.500					.750
SE7	.775					.400
SE8	.699					.511
SE9[3]	.689					.526
EXH1		.656				.570
EXH2		.647				.581
EXH3		.753				.433
EXH4		.856				.267
LINT1			.765			.414
LINT2			.779			.394
LREG1				.630		.604
LREG2				.767		.412
LREG3				.614		.622
UCC1					.918	.158
UCC2					.789	.378
UCC3					.892	.204

Note: SE = study engagement, EXH = exhaustion, LINT = lack of interest, LREG = lack of regulation, UCC = uncertainty of career choice. Error covariances between three pairs of items were freed: [1] = Items 1 ('When I study, I feel that I'm bursting with energy') and 4 ('I feel strong and vigorous when I'm studying'); [2] = Items 3 ('Time flies when I'm studying') and 6 ('When I'm studying, I forget everything else around me'); [3] = Items 6 and 9 ('I feel happy when I'm studying intensively').