

University Students' Approaches to Learning, Self-
Regulation, and Cognitive and Attributional Strategies
Connections with Well-Being and Academic Success

Annamari Heikkilä

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Abstract

This dissertation empirically explores the relations among three theoretical perspectives: university students' approaches to learning, self-regulated learning, as well as cognitive and attributional strategies. The relations were quantitatively studied from both variable- and person-centered perspectives. In addition, the meaning that students gave to their disciplinary choices was examined.

The general research questions of the study were: 1) What kinds of relationships exist among approaches to learning, regulation of learning, and cognitive and attributional strategies? What kinds of cognitive-motivational profiles can be identified among university students, and how are such profiles related to study success and well-being? 3) How do university students explain their disciplinary choices?

Four empirical studies addressed these questions. Studies I, II, and III were quantitative, applying self-report questionnaires, and Study IV was qualitative in nature. Study I explored relations among cognitive strategies, approaches to learning, regulation of learning, and study success by using correlations and a K-means cluster analysis. The participants were 366 students from various faculties at different phases of their studies. The results showed that all the measured constructs were logically related to each other in both variable- and person-centered approaches. Study II further examined what kinds of cognitive-motivational profiles could be identified among first-year university students (n=436) in arts, law, and agriculture and forestry. Differences in terms of study success, exhaustion, and stress among students with differing profiles were also looked at. By using a latent class cluster analysis (LCCA), three groups of students were identified: non-academic (34%), self-directed (35%), and helpless students (31%). Helpless students reported the highest levels of stress and exhaustion. Self-directed students received the highest grades. In Study III, cognitive-motivational profiles were identified among novice teacher students (n=213) using LCCA. Well-being, epistemological beliefs, and study success were looked at in relation to the profiles. Three groups of students were found: non-regulating (50%), self-directed (35%), and non-reflective (22%). Self-directed students again received the best grades. Non-regulating students reported the highest levels of stress and exhaustion, the lowest level of interest, and showed the strongest preference for certain and practical knowledge. Study IV, which was qualitative in nature, explored how first-year students (n = 536) in three fields of studies, arts, law, and veterinary medicine explained their disciplinary choices. Content analyses showed that interest appeared to be a common concept in students' description of their choices across the three faculties. However, the objects of interest of the freshmen appeared rather unspecified. Veterinary medicine and law students most often referred to future work or a profession, whereas only one-fifth of the arts students did so.

The dissertation showed that combining different theoretical perspectives and methodologies enabled us to build a rich picture of university students' cognitive and motivational predispositions towards studying and learning. Further, cognitive-emotional aspects played a significant role in studying, not only in relation to study success, but also in terms of well-being.

Keywords: approaches to learning, self-regulation, cognitive and attributional strategies, university students

Annamari Heikkilä

Laadukkaan yliopisto-opiskelun osatekijät

Lähestymistavat oppimiseen, itsesäätely, kiinnostus, sekä kognitiiviset ajattelu- ja toimintastrategiat

Tiivistelmä

Tässä väitöskirjatutkimuksessa tarkasteltiin yliopisto-opiskelijoiden lähestymistapoja oppimiseen, itsesäätelyä sekä kognitiivisia ajattelu- ja toimintastrategioita. Näiden kolmesta eri tutkimustraditiosta nousevien käsitteiden välisiä suhteita tutkittiin empiirisesti sekä muuttuja- että henkilöorientoituneilla tilastollisilla menetelmillä kolmessa osatutkimuksessa. Neljännessä osatutkimuksessa tarkasteltiin minkälaisia syitä opiskelijoilla oli alavalintansa taustalla.

Ensimmäisessä osatutkimuksessa (n=366) osallistujat olivat useista eri tiedekunnista ja eri vaiheissa opintojaan. Lähestymistavat oppimiseen, itsesäätely sekä ajattelu- ja toimintastrategiat muodostivat kaksi kognitiivis-motivatioaalista profiiliryhmää. Ryhmät erosivat toisistaan opintomenestyksen suhteen. Toisessa osatutkimuksessa tarkasteltiin vastaavanlaisia profiileja ensimmäisen vuoden opiskelijoilla (n=436) kolmesta eri tiedekunnasta (humanistinen, oikeustieteellinen ja maa- ja metsätaloustieteellinen). Tulokset osoittivat, että kolmeen profiiliryhmään kuuluvat opiskelijat erosivat toisistaan sekä opintomenestyksen että hyvinvoinnin suhteen. Kolmannessa osatutkimuksessa tarkasteltiin ensimmäisen vuoden opettajaopiskelijoiden (n=213) kognitiivis-motivatioaalaisia profiileja sekä niiden yhteyttä opintomenestykseen, tietokäsityksiin ja hyvinvointiin. Tulokset osoittivat, että kolmeen eri ryhmään kuuluvat opiskelijat erosivat toisistaan opintomenestyksen, hyvinvoinnin ja episteemisten uskomusten suhteen. Kiinnostuksen puute oli yhteydessä ongelmalliseen profiiliin. Epäadaptiivisessa profiilissa yhdistyivät oppimisen säätelyn ongelmat ja tehtävien välttely. Tämän ryhmän opiskelijat raportoivat eniten stressiä ja opiskelu-uupumusta. Kaikissa kolmessa osatutkimuksessa syväsuuntautuminen oppimiseen oli yhteydessä itsesäätelyyn ja suotuisiin motivaatioaalisiin strategioihin. Sellaiset opiskelijat, joita voisi luonnehtia optimistisiksi ja itseohjautuviksi, menestyivät ja voivat parhaiten.

Neljännessä osatutkimuksessa analysoitiin sisällöllisesti kolmen tiedekunnan (humanistinen, oikeustieteellinen ja eläinlääketieteellinen) opiskelijoiden (n=536) kertomia syitä opiskelualansa valinnalle. ”Kiinnostus” osoittautui yleisesti käytetyksi perusteluksi alavalinnoille. Erityisesti ammatillisesti orientoituneissa koulutusohjelmissä myös tulevaisuuden työ mainittiin usein. Sen sijaan humanisteista vain noin viidesosa ilmaisi tulevaisuuden työn valintansa perusteena. Vastausten perusteella opiskelijoiden kiinnostus oli opintojen alussa orastavaa, selkeitä kiinnostuksen kohteita ei mainittu kovin usein.

Väitöskirja osoitti, että yliopisto-opiskelijan lähestymistapoja oppimiseen, itsesäätelyä sekä ajattelu- ja toimintastrategioita on hyödyllistä tarkastella kokonaisuutena. Näillä profiileilla on yhteyksiä sekä opintomenestykseen että hyvinvointiin. Kiinnostus osoittautui keskeiseksi opiskelijoiden alavulnnoissa ja sen puute oli yhteydessä ongelmalliseen opiskeluprofiiliin.

Avainsanat: lähestymistavat oppimiseen, oppimisen säätely, ajattelu- ja toimintastrategiat, yliopisto-opiskelijat

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Helsinki, March 2011
Annamari

List of original publications

This thesis is based on the following four original publications, which are referred to in the text by their Roman numerals (Studies I-IV):

- I 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.
- II 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.
- III Heikkilä, A., Nieminen, J., Niemivirta, M. & Lonka, K. (submitted). Relations among teacher students' approaches to learning, cognitive strategies, well-being, and study success.
- IV 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.

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1 Introduction

Understanding student learning is a complex and very intriguing matter. The central idea of the present work is that by combining several theoretical perspectives, research traditions, and methodologies, one can build a more comprehensive picture of university students' learning processes, motivation, and well-being. Further, intertwining the traditions may ultimately help one create innovative pedagogies and learning environments, which may promote active, self-regulated learning.

In today's mass university, educators wrestle with the presence of substantial differences in individual students' backgrounds and modes of learning. The number of students has been growing quickly, and the student population in Finnish higher education is now vastly more heterogeneous in social and cultural terms than ever before. Simultaneously, the demands for effectiveness regarding the number of degrees produced by the academic units have increased. Statistics show problems in flow-through: In recent decades, completion of higher education, particularly graduation, has become postponed (Salmela-Aro & Helve, 2007).

From a student's perspective, the environment is rather demanding and competitive. For a new student, the learning environment poses many challenges: Only a part of the university teachers are pedagogically certified, unlike in upper secondary school, and less support and counselling is available than in previous phases of studies. Since 2005, study time has been limited, accumulation of credits is actively followed, and financial aid is tied to the accumulation of credits. Therefore, it is important to investigate cognitive and motivational predispositions and practices which may have consequences for the quality and the duration of studies.

This study is of current significance also with respect to the focus of educational research, which has been shifting from investigations of mainly cognitive processes to studying cognition in interaction with motivation (Rozendaal, Minneart & Boekaerts, 2001). The interplay between motivational, cognitive, and affective aspects of student learning has not previously been systemically examined (Boekaerts, 1997; Pintrich, 2000). In this present work, university students' approaches to learning (Marton & Säljö 1976a), regulation of learning (Vermunt, 1998; Zimmerman, 2000; Boekaerts, 1996; Pintrich, 2004), as well as cognitive and attributional strategies (Nurmi et al., 2003; Eronen et al., 1998; Norem 1989) are examined in relation to each other. To our knowledge, there are no empirical studies in which these phenomena, with these conceptualizations, have been investigated. The frameworks will be first presented separately, followed by a discussion of the similarities and differences they have, both theoretically and methodologically.

1.1 Approaches to Learning

The question of the most important aspects of study methods and motivation has intrigued educational psychologists since the 1960s, at least. Already in the 1970s Entwistle and Wilson (1970) developed scales measuring motivation and study methods. The greatest weakness of these scales was an over-simple description of study methods; the authors later admitted that they failed to take into account the existence of different approaches to studying used by students (Entwistle, Hanley & Hounsell, 1979). These differences in the ways students tackle academic tasks were investigated and catalogued by Marton and Säljö (1976a). This perspective had a very important impact on the research and its relevance in understanding academic learning, and it is still highly valued (e.g., Entwistle, & McCune, 2004; Watkins, 2001). This tradition, the Student Approaches to Learning (SAL) perspective and models, derive from in-depth qualitative interviews with students about their learning, studying, and motivation in the university context. This phenomenographic tradition originated in Europe: Research began in Gothenburg in the 1970s when Marton and Säljö (1976a) conducted an ecologically valid study of the strategies students used when reading texts. The main research method used was experiments with small numbers of subjects whose process and learning outcomes were intensively studied. Students were asked to read one or more passages of academic prose and subsequently asked questions about the passage and about how they approached the text. Based on students' answers Marton and Säljö (1976a) introduced a model of qualitative differences in learning: They showed that there were two distinguishable approaches to process the text material to be learned: deep and surface. Students who applied a deep approach to learning paid attention to the fundamental idea or message in the materials they were studying. Their intention was to understand, and in order to do this, they processed the material actively. By contrast, students applying a surface approach minimized the use of their intellectual capacity and sought to remember the text word by word. In other words, the latter students' intention was to reproduce the contents, and the learning process was characterized by syllabus-boundness and rote learning. Thus, the term 'approach to learning' originally referred to how intentions and processes were combined in student learning.

Around the same time as Marton and Säljö (1976a), Pask (1976) devised learning tasks which required understanding of written materials, and in which students were asked to explain their understanding to the researcher. He identified a dichotomy of strategies: One group of students saw a task in a broad context and in personal terms, and showed a tendency to be impulsive in reaching conclusions (holistic strategy), whereas another group applied a step-by-step, impersonal strategy, focusing on one particular task at a time, processing material step by step

(serialist strategy). Pasks' strategies can be seen as differing ways of constructing understanding (Entwistle, & McCune, 2004), but aspects of the serialist strategy have also been found to be linked with memorization, external regulation of learning, and seeing learning as the intake of knowledge (Vermunt, 1998).

Fransson (1977) showed that lack of interest in the text, efforts to adopt to the expected test demands, and high test anxiety increased the tendency towards surface-processing. In contrast, strong interest and low anxiety produced a higher proportion of deep-level approaches with good factual recall. Also Marton and Säljö (1976b) showed that a deep approach was associated with qualitatively better learning outcomes.

Students' approaches to learning are dependent on both the context and content of learning. The intention to understand may not always lead to a deep level understanding if, for example, the subject matter is too difficult or unfamiliar. However, most students may be classified as adopting either a surface or a deep approach to the majority of tasks meaning that they have predispositions to adopt particular processes (Biggs, 1993). The tradition to design inventories to look at university students' approaches in this light of students' general preferences was started by Entwistle and Ramsden (1983) and Biggs (1979), who developed The Approaches to Studying Inventory (ASI, Entwistle & Ramsden, 1983) and The Study Process Questionnaire (SPQ, Biggs, 1979; 1985) (see for reviews Lonka, Olkinuora & Mäkinen, 2004; Entwistle & McCune, 2004). Since then, a large number of different inventories have been developed.

When developing the inventories of learning, a third category of approaches to learning was included: the strategic or achieving approach to studying (Entwistle & Ramsden, 1983; Biggs, 1987). Students adopting this approach work hard to achieve good grades. They choose their learning strategy to maximize the chances for academic success: They appear to be cue conscious and very aware of assessment practices (see also Biggs, 1993). The achieving approach is different from deep and surface approaches since it refers to the ways students organize their studying, while deep and surface approaches describe the ways in which students engage in actual contents of the task (Biggs, 1985).

When approaches are examined with inventories and multivariate statistical methods are used, the factors derived are often referred to as orientations (Ramsden, 1988). Entwistle (1988) named this cross-situational consistency of approaches as 'orientation to studying'. He identified four orientations: Meaning-, Reproducing-, Non-academic-, and Achieving orientation (Entwistle, 1988; Entwistle & Ramsden, 1983). Also Vermunt and his colleagues (Vermunt, 1998; Vermunt & Vermetten, 2004) concluded that four qualitatively different ways of learning can be repeatedly found: 1) Reproductive learning, 2) Meaning-oriented learning 3) Application-oriented learning, and 4) Undirected learning, meaning that students do not really know how to learn, and experience many problems in

learning. In Vermunt's model, different ways of learning include, in addition to learning orientations, cognitive processing activities, mental models of learning and teaching, and metacognitive regulation activities students use to direct their learning processes. The last, regulation dimension, is clearly a separate dimension on the conceptual level (Entwistle & McCune, 2004), but its empirical relations with approaches to learning have been demonstrated repeatedly: Self-regulation is most often related with the deep approach (e.g., Lonka & Lindblom-Ylänne, 1996; Rozendaal, Minnaert & Boekaerts, 2005). This linkage can be understood since in high-quality learning, self-regulatory processes are harnessed to serve a student's intentions and goals. In deep approach to learning, searching for meaning involves monitoring and reshaping thoughts, whereas the surface approach is merely reactive (Biggs, 1988).

A large amount of quantitative research has confirmed the important distinction between the two main approaches in a variety of contexts and populations (e.g., Entwistle & Ramsden, 1983; Vermunt & van Rijswijk, 1988; Lonka & Lindblom-Ylänne, 1996; Biggs, 1987; 1993; Watkins, 2001; Richardson, 1997). Self-report surveys and questionnaires have been used extensively to assess students' approaches to learning. Although the general conceptualization is widely accepted, criticisms have also been presented. For example, the exact nature of the deep and the surface approaches has been reassessed (Richardson, 1997). The early studies, applying interview designs, indicated that deep and surface approaches were either different categories or forms of understanding (Marton, 1975), or a single bipolar dimension along which individuals may vary (Marton, 1976). Questionnaire-based research takes a somewhat broader scope, focussing on students' dispositions to adopt meaning and reproducing orientations to studying (Pintrich, 2004). Richardson (1997) concluded that "it could be argued that the continuous measurements generated by questionnaires on approaches to studying reflect the result of aggregating a large series of bare dichotomies across a wide variety of learning situations" (p. 302).

1.2 Self-Regulated Learning

Since a major function of education is the development of life-long learning, self-regulatory skills are very important to develop. Self-regulated learners are generally characterized as active learners who regulate their own learning processes in many different ways (Schunk & Zimmerman, 1994). In higher education, where external support is limited, self-regulation seems to be an especially relevant issue (Vermunt & Verloop, 1999). During the last decades, theories of self-regulation have been actively refined and many conceptualizations have been introduced (e.g., Pintrich

& De Groot, 1990; Schunk & Zimmerman, 1994; Boekaerts, 1997; Vermunt & Verloop, 1999; Boekaerts & Niemivirta, 2000; Pintrich, 2000; Zimmerman, 2002).

Dinsmore, Alexander and Loughlin (2008) published a review of efforts to define and characterize metacognition, self-regulation, and self-regulated learning during the past decades. According to them, the contemporary broad definition of the concept of self-regulated learning includes both metacognitive knowledge and metacognitive regulation of learning. The origin of these two components is apparently in the works of Flavell (1976) and Brown (1978). Reviewing the extensive literature on self-regulation of behavior is beyond the scope of this dissertation, as is also the discussion about the historical roots of these partly overlapping concepts. In this dissertation, the focus is on self-regulated learning and its theoretical basis.

Unlike the SAL theories, the theories of regulation of learning originally were based on theoretical assumptions about student learning, relying on an information processing (IP) paradigm. In line with this original framework, self-regulation was operationalized earlier purely to cognitive processes, such as monitoring and controlling of cognitive strategies (Wolters, 1998). The empirical findings have raised questions about the adequacy of this purely cognitive conceptualization: For example, students' management and control of their effort is shown to be an important component of self-regulation. Pintrich and De Groot (1990) reported that self-regulating students are able to maintain their cognitive engagement in the task even if there are distractions. Nowadays the information processing perspective is not just limited to cognitive processing but also includes motivational, affective, and contextual factors. According to Pintrich (2000), however, a more accurate characterization of information processing (IP) would be, in present-day terminology, the *self-regulated learning* (SRL) perspective (see also Schunk & Zimmerman, 1998; Zimmerman & Schunk, 2001).

Zimmerman (2002) listed the component skills and modelled the phases and the processes of self-regulation. Before the task (Forethought Phase), a self-regulating learner is *setting specific proximal goals* for oneself and, *adopting powerful strategies* for attaining these goals. During the performance (Performance Phase) a self-regulating student is *monitoring her or his own performance* selectively for signs of progress: Research has shown, for example, that if task demands change, self-regulating students are able to modify their strategies (Butler & Winne, 1995; Zimmerman, 2000). Performance phase includes also *structuring physical and social context*, for example by minimising noise. *Time management* is also an important part of regulation. After the performance (Self-Reflection Phase), self-regulating student is *self-evaluating* her or his methods, *making causal attributions* to the results, and thinking about how to *adapt future methods*. In addition to SRL having a metacognitive and strategic nature, Zimmerman (2002) states that it is likely to be, at least partially, intrinsically motivated.

All the elements of self-regulated learning are adaptive and valuable in higher education. However, not all the students, even among highly selected university students, are capable of self-regulating their learning. Some students rely on external regulation, which refers to regulation that is taken over by the teacher, by study materials, or by other aspects of the learning environment (Vermunt, 1998; Vermunt & Verloop, 1999). Some students may have problems regulating their studies or, in the extreme situation, lack regulatory skills altogether (Vermunt & van Rijswijk, 1988). As presented in the approaches to learning chapter, self-regulation is most often related with the deep approach (e.g., Vermunt & van Rijswijk, 1988; Lonka & Lindblom-Ylänne, 1996; Rozendaal, Minnaert & Boekaerts, 2005). External regulation, in turn, is shown to be associated with surface approach (Vermunt & van Rijswijk, 1988; Lonka & Lindblom-Ylänne, 1996).

1.3 Cognitive and Attributional Strategies

In addition to approaches to learning and self-regulated learning, academic achievement can be examined in the light of the different ways in which individuals approach and respond to challenges in the academic environment (Norem & Cantor, 1986; Eronen et al., 1998; Nurmi et al., 2003; Martin et al., 2001; Martin, Marsh, Williamson, & Debus, 2003a; Martin, Marsh, & Debus, 2003b). In approximately the same period that the student approaches to learning tradition (SAL) started to develop, a dramatic change was taking place in the study of motivation. The emphasis shifted to a social-cognitive approach on cognitive mediators, that is, how people construe the situation, interpret events, and process information about the situation (Dweck, 1986). Considerable research has been directed toward understanding the variables that influence these motivational processes affecting both learning outcomes and well-being of the students. For example, research on such factors as achievement goals (e.g., Dweck, 1986; Dweck & Legget, 1988), achievement goal orientations (e.g., Dweck & Elliot, 1983; Tuominen-Soini, Salmela-Aro & Niemivirta, 2008), attributions for success and failure (e.g. Zuckerman, 1979) and self-efficacy (e.g., Bandura, 1986) has done much to identify the adaptive and maladaptive ways students think about studying and the learning environment. In this dissertation, the focus is on university students' cognitive and attributional strategies, referring to the cognitive, affective and behavioral processes people apply to achieve their goals and to evaluate the outcomes of their actions (Cantor, 1990). These strategies include two major processes, first, cognitive planning and second, the evaluation of behavioral outcomes by means of causal attributions (Norem, 1989; Nurmi, Salmela-Aro & Ruotsalainen, 1994).

In most of the motivation research traditions, it has been assumed that some individuals apply active, task-focused strategies when facing challenges, while other individuals seem to deliberately seek to avoid such situations. Active strategies have been conceptualized in various ways, such as 'illusory glow optimism' (Cantor, 1990) and 'mastery-orientation' (Pintrich & DeGroot, 1990; Dweck & Elliot, 1983) of which the former is examined in this dissertation.

Illusory glow optimism as a cognitive and attributional strategy is characterized as striving for success, having high outcome expectations, and desire to enhance a strong image of competence (Cantor, 1990; Norem, 1989). This conceptualization focuses on expectancies of success in the future while ability or self-efficacy beliefs, defined as the individual's perception of his or her current competence at a given activity, focus more on the present ability (Eccles & Wigfield, 2002). Bandura further (1997) distinguished between two kinds of expectancy beliefs: outcome - and efficacy expectations. Individuals can believe that their behavior will produce a certain outcome, for example study success, but may not believe that they are able to perform that behavior. In the cognitive and attributional strategy perspective there is not such fine-grained analysis concerning the nature of the beliefs before action.

When evaluating their behavioral outcomes, illusory optimists are willing to take credit for their successes and to blame external factors, such as other people and situation, for their failures. This phenomenon has been introduced as self-serving bias (Zuckerman, 1979). In self-efficacy theory, the attributions are different: Self-efficacious individuals rapidly recover their lowered sense of efficacy after enduring failure or difficulty and attribute failure to insufficient effort or deficient knowledge (Bandura, 1997).

Another interesting, and surprisingly productive strategy in academic environment is the *defensive-pessimistic* strategy (Eronen et al., 1998; Cantor, 1990; Norem & Cantor, 1986). Students using this strategy have low expectations and feel very anxious before performance. Martin, Marsh, and Debus (2001) suggested that defensive pessimism should be regarded as dysfunctional, since it is a strategy for protecting one's self-worth. However, the negative feelings need not become self-fulfilling prophecies, but rather may serve as a motivator before performance and attributional cover after the performance. Eronen et al., (1998) showed that defensive-pessimistic students expressed more rational planning of the task at hand than the users of any other strategy: Negative expectations serve as a motivator to prepare well for challenging task. There is evidence that, in an academic environment, at the beginning of studies, a defensive-pessimistic strategy is even more productive than an optimistic strategy: During the first two years, defensive-pessimistic students had passed more courses than optimistic students (Eronen et al., 1998). The picture looks different if the focus is changed onto the well-being of the students: Optimistic students were more satisfied with

their studies than defensive-pessimistic students who showed only a few positive affects when faced with an academic challenge. In the long run, an optimistic strategy turned out to be the most successful: During their third year, optimistic individuals passed as many courses as the users of the defensive-pessimistic strategy (Eronen et al., 1998).

Task-avoidance has been described in terms of self-handicapping strategy (Jones & Berglas, 1978), procrastination (Steel, 2007) and mastery-orientation (Dweck, 1986; Pintrich & DeGroot, 1990; Dweck & Elliot, 1983). The need to protect one's self-worth arises primarily from a fear of failure and concern about the implications failure may have for one's private and public sense of ability and subsequent self-worth, as described in the self-worth theory of motivation (see for review Covington, 2000). Self-handicappers are afraid of potential failure and they concentrate on task-irrelevant behavior in order to create excuses for their failure. This provides them with an attributional cover, but simultaneously it also decreases the likelihood of success. Similarly, students with low self-efficacy prefer to complete only uncomplicated academic tasks to which they apply minimal effort and limited persistence, or they might choose to entirely avoid the completion of an academic assignment. For these reasons, self-efficacy beliefs are often said to be better predictors of academic success than are actual abilities (Bandura, 1997). Again, Eronen et al., (1998) showed that university students using self-handicapping strategies were less satisfied and less successful in their studies, in comparison to optimistic and defensive-pessimistic students.

1.4 Commonalities and Differences between the Research Traditions

There are basic assumptions deriving from cognitive psychology shared by all the three research traditions. Students' expectations, prior experiences and beliefs are seen as unique filters that color their perceptions and actions. For example, Marton and Säljö (1976b) concluded: 'Students adopt an approach determined by their expectations of what is required of them' (p. 125). However, in the SAL models, more general expectancy and efficacy components are not included, whereas in SRL-, and in cognitive strategy models, they play a significant role. Pintrich (2004) argued that the absence of these affective components is a serious omission in SAL models, since research has shown that efficacy is closely tied to actual performance, achievement and self-regulation of behavior.

In all of these theoretical perspectives, the regulation of action is modeled as consisting of stages including both motivational and strategic elements. In other words, motives and strategies are bound together in all these traditions.

For example, Nurmi (1989) has suggested that regulation of action consists of two major stages: cognitive planning and the evaluation of behavioral outcomes. Zimmerman (2002) in turn, has defined a list of key processes and modelled the phases in self-regulated learning. The notion of approach to learning describes both *why* students do the things they are doing, and *how* they do it. The intention is an important aspect of the approaches to learning. Biggs (1987) has described an approach to learning as a ‘congruent motive-strategy package’. Pintrich and DeGroot (1990) similarly introduced the idea of ‘the will and the skill’ to describe metacognition. Because of these similarities in the concepts, Case and Gunstone (2002) argue that it is clear that constructs of approach to learning and metacognition are strongly related.

In high quality learning, self-regulatory processes are harnessed to serve students’ learning motives, goals, and intentions. These processes have been conceptualized both in the self-regulated learning tradition, and in the social-cognitive approach. The former proposes that students with well-developed self-regulatory skills are able to use a variety of strategies regardless of their own motivational ground or task demands (Butler & Winne, 1995; Zimmerman, 2000). The latter explains it as an adaptive motivational pattern: Mastery-oriented students seek challenges, persist in the face of obstacles, and enjoy exerting effort in the pursuit of task mastery (Dweck, 1986). Students who have regulatory problems, on the other hand, may not have sufficient skills to serve their learning motives, and their regulatory strategies may be serving other motives, such as protecting self-worth. Task-irrelevant behavior is a good example of a protective motive of this kind (Jones & Berglas, 1978). In turn, this can be conceptualized more cognitively by focusing on the problems that a student may have in processing subject matter (Zimmerman, 2002; Vermunt & van Rijswijk, 1988; Vermunt, 1989).

Assumptions about the nature of learning are shared between the theoretical perspectives: Active, constructivist, situational and collaborative aspects of learning are emphasized (Lonka et al., 2004, Pintrich, 2004). In general, situational and contextual thinking has become dominant in theories of motivation (Volet, 2001). An assumption that ‘self-regulatory activities are mediators between personal and contextual characteristics and actual achievement or performance’, (Pintrich, 2004, p. 388) is shared within the three traditions. Volet (2001) conceptualized it as ‘experiential interface’ which mediates between the predispositions of the students and the context of learning. The notion that the learning context is not an objective entity, but, rather, is perceived, observed or interpreted by the students is implied, if not stated, in all these three perspectives.

Differences between the traditions and constructs emerge both from theoretical backgrounds and methodologies. SAL models are usually bottom-up models derived from in-depth qualitative interviews. This phenomenographic approach emphasizes students’ qualitative reports of their own learning and motivation. In

contrast, researchers of self-regulated learning have used the information processing approach, described as being derived in a top-down manner from theoretical constructs and theories in cognitive and educational psychology (Pintrich, 2004). Research designs include, for example, think-aloud protocols, experimental designs and quantitative methods. Cognitive strategy literature, in turn, has its historical roots in the cognitive perspective on personality. This tradition emphasizes the ‘doing’ side of personality, by focusing on how the dispositional structures of personality are cognitively expressed and maintained in social interaction (Cantor, 1990). Research designs include both experimental and survey designs. Because of such profound differences in theory building, the grain-size difference of the constructs is evident (Pintrich, 2004). SAL models focus on much larger grain size: Its units of analysis are quite general, such as general approaches to learning. In turn, SRL models usually try to capture specific phases and strategies in the regulation of learning.

The three theoretical perspectives introduced (SAL, SRL, and cognitive and attributional strategies) provide differing explanations for the same phenomena: success and duration of studies in the university context. Thus, in explaining university studying, it seems fruitful to empirically integrate these research traditions, their constructs, and methodologies.

1.5 Interest

An important cognitive-emotional element plays a major role in students’ motivation and learning: the psychological state of being interested. Research has shown that the level of person’s interest is an important motivational factor which has powerful influence on learning (Hidi & Renninger, 2006; Eccles, & Wigfield, 2002). It has also been shown that learning activities based on interest lead to better learning results, especially, interest leads to deep-level learning (e.g. Hidi, 1990; Krapp, 2002; 2005; Renninger, 2000).

Interest can be conceptualised to be both as a psychological state and a pre-disposition. As a *psychological state* interest includes focused attention and increased cognitive functioning with positive feelings of pleasure and concentration (Hidi & Renninger, 2006). It highly resembles the state of intrinsic motivation, described in a following manner by Eccles & Wigfield (2002, p. 112): “*When individuals are intrinsically motivated, they engage in an activity because they are interested in and enjoy the activity*”. Della Fave and Massimini (2005) suggested that positive psychological features, such as interest as a psychological state, and optimal experience have long-term effects on the development; optimal experiences create a positive circle of enjoying the situation and looking for suitable

challenges, which recreate such feelings in the future. Tsai et al. (2008) introduced the construct of *interest experience* to highlight the multifaceted nature of such experiences: They are influenced both by a combination of stable individual characteristics and aspects of the current situation.

Interest can develop from an actual psychological state into a relatively enduring predisposition, as Hidi and Renninger (2006) described in their four-phase model of interest development (based on the previous work of Krapp, 2002). In the first phase, individual's attention is triggered by a particular condition or an object in the environment. This is a unique element of interest: It always has an object or it is connected to certain content (Schiefele, 1999; Krapp, Hidi & Renninger, 1992; Krapp & Lewalter, 2001). If this *situational interest* lasts, it may lead to increased knowledge, value and positive feelings (Hidi, 2000) and it can evolve into the *maintained situational interest*. Maintained situational interest can be considered as intrinsically motivated behavior even though interest was at first triggered by external stimuli (Hidi, 2000; Hidi & Harackiewicz, 2000). The third phase, *emerging individual interest*, describes a relatively enduring predisposition to seek repeated reengagement with particular contents over time, which, however, still requires some external support. The last, *well-developed individual interest* is a relatively enduring predisposition to re-engage particular contents over time. It is an ongoing and deepening relation of a person to particular content (Renninger, 2000). This leads to more structured knowledge and value base, which of course, are connected with increasing expertise in the area of interest. Individual interest can be regarded as a motivational resource that helps people to cope with even unfavourable learning conditions (Katz, Assor, Kanat-Maymon, & Bereby-Meyer, 2006; Silvia, 2006). For example, when working on boring tasks, people with higher individual interest are more likely to engage in interest-enhancing strategies thus making the task more enjoyable (Sansone, Weir, Harpster, & Morgan, 1992). The same phenomenon can be also conceptualized from the perspective of self-regulated learning: Students with good self-regulatory skills are able to use a variety of strategies regardless of their own motivational ground or task demands (Butler & Winne, 1995; Zimmerman, 2000).

In individual interest, two components are distinguishable (Schiefele, 1999): feeling-related and value-related valences. Feeling-related valences refer to the feelings that are associated with an object or an activity - feelings such as involvement, stimulation, or flow. Value-related valences refer to the attribution of personal significance of importance to an object or activity. Eccles and Wigfield (2002, p. 114) give an example of this: If students associate mathematics with high personal significance, because mathematics can help them get prestigious job, we would not speak of interest.

Nevertheless, nothing is fixed: Any phase or level of interest can become dormant, regress to a previous phase, or disappear altogether (Renninger, 2000;

Renninger, Sansone, & Smith, 2004). In their investigation in authentic learning situations with younger students, Tsai et al. (2008) found that the learning situations, in which students perceive the teacher taking their perspective and understanding their needs, were associated with higher interest experiences. In contrast, lessons where teachers do not allow enough time for reflection, and disrupt students' natural learning rhythms, students have less interest experiences.

It is important to study what is the starting point of new university students in the light of their interest development. Why did they choose their disciplines and do they, already at the beginning of their studies, reflect upon some individual interest towards their field of studies? Mäkinen et al. (2004) found that students' reported lack of interest by the first year predicted dropout during the third study year. It is possible that all the cognitive-affective aspects of studying described above-- interest, approaches to learning, self-regulation, and cognitive and attributional strategies--have possible consequences for general well-being of students.

1.6 Stress and Exhaustion in University Students

Different kinds of motivational dispositions and approaches to learning may be related – not only to learning outcomes— but also to the general well-being of university students. Research on stress and study-related burnout as experienced by higher education students has recently been growing (Salmela-Aro & Kunttu, 2010; Salmela-Aro, Aunola & Nurmi, 2008; Lonka et al., 2008; Robotham & Julian, 2006; Law, 2007; Schaufelli et al., 2002). This may be due to the growing interest in stress and well-being. There is a greater awareness of the potential impact stress and burnout may have in work-life: They may cause financial, emotional, and social consequences. As university is the students' working place, it is important to examine whether students experience stress and exhaustion when studying.

Stress is a mental and physical state worth investigating since it can have many kinds of consequences. Lazarus and Folkman (1984) defined stress as a result of an individual's perceptions that they do not have the resources to cope with a perceived situation from the past, present or future. It is caused by a fear, and the body's reaction to that fear is the instinctive preparation for 'fight or flight'. However, the same situation may be regarded as stressful by one individual, but not stressful for another. Further, not all stress is negative: At its best, stress can also have a positive effect enabling individuals to respond effectively in demanding situations.

Study-related-exhaustion, a component of study-related-burnout (Salmela-Aro & Kunttu, 2010; Schaufelli et al., 2002), can be defined as study-related experiences of strain, particularly chronic fatigue resulting from an overtaxing

study load. Another aspect of study-related-burnout, cynicism, refers to an indifferent or a distant attitude towards studies, to losing one's interest, and feeling that studying has lost its meaning. Even only one aspect of cynicism, lack of interest, can have important predictive value in university environment as showed in a Finnish study of Mäkinen et al. (2004): They found that a reported lack of interest during the first study year predicted dropout during their third year in university across many domains.

Study-related burnout is a promising concept for examining the well-being of university students since it, unlike many other concepts, is a context-specific construct, conceptualized strictly in the context of higher education (Salmela-Aro & Kunttu, 2010). Since even full-time university students often work outside university during the study year, it is important to apply context-specific measures, in order to examine what is the particular role of study-related stressors for their well-being.

The opposite of burnout, namely study engagement, has interested researchers in the present period (Schaufeli et al., 2002; Salmela-Aro & Kunttu, 2010). It is defined as vigor, dedication and absorption in relation to studying. It is a positive, fulfilling state of mind. Salmela-Aro and Kunttu (2010) assumed that it is possible that certain subjects generate more engagement in their completion than others: They, for example, hypothesized that as the entrance to medical school is very difficult, success in the selection procedure might show at a high level of study engagement and low level of burnout. This hypothesis was supported: Medical students experienced the lowest level of study burnout and highest level of study engagement.

1.7 Brief Description of the Finnish University Context

Studying always takes place in a cultural context. There are some features particular to the Finnish higher education system. Firstly, Finnish university students are a highly-selected population. Acceptance to universities relies both on subject-specific entrance examinations and on secondary-school achievement. Only a small percentage of applicants is accepted. Therefore, it is very intriguing to examine how these pre-selected, high-achieving university students approach their studying. Secondly, The University of Helsinki considers the Bachelor's degree to be an interim degree towards the Master's degree. In general, there is no selection process in the transition from the Bachelor's level studies to the Master's level studies. As a part of the Bologna Process in Europe, Finland launched a reform of the higher education system. At the beginning of the autumn term 2005, the two-cycle degree system (i.e. Bachelor's and Master's degree system), was

introduced, but students are still accepted straight to a long program consisting of both undergraduate and graduate studies. Thirdly, as education is subsidized by the State through the Ministry of Education, Finnish universities have no tuition fees for regular degree students. Students are also eligible for a government financed Study grant, which is about EUR 300 per month. Most students do not rely on loans to finance their studies. Living in the metropolitan area is, however, quite expensive and the financial aid offered by the government is not sufficient to cover all the expenses. Consequently, most students complement their income by working outside of the university during terms.

1.8 Summary

University students' cognitions, motivations and emotions related to studying and learning can be examined from various perspectives. In the present dissertation, interrelations among predispositions emerging from three different theoretical perspectives are examined by using quantitative methods: students' approaches to learning (SAL), self-regulated learning (SRL), and cognitive and attributional strategies (CAS). Students' explanations of their disciplinary choices are explored by applying a qualitative approach, since quantitative methods would not reveal the personal reasons that the students give for their studying a certain discipline.

The focus of the present work is on the general predispositions and motives, and the study design relies on self-report questionnaires (Studies I – III) and open-ended questions (Study IV). Behind lies a more systemic view. It is important to understand students' approaches to learning, regulation of learning, cognitive and attributional strategies, and interest, since such inclinations may lie behind adaptation to the learning environment. Part of the predispositions may be more stable (Vermunt & Vermetten, 2004 ; Lonka et al., Mäkinen & Olkinuora 2004), reflecting students' history and background. This does not imply that the students would exhibit similar predispositions across all learning situations (Tsai et al., 2008; Kember, Leung, & McNaught, 2008; Gordon, & Debus, 2002) or subject domains (Baeten, Kyndt, Struyven, & Dochy, 2010; Biggs, 1987; 1999; Entwistle, & Ramsden, 1983; Lonka & Lindblom-Ylänne, 1996). Nor does this mean that the predispositions would be unchangeable. As Volet (2001) and Boekaerts (2001) pointed out, the context of studying and the subject domain are closely related to affective and motivational factors.

Simone Volet (2001) proposed a multi-dimensional and multilevel cognitive-situative framework for understanding learning and motivation in context (p. 69, Figure 1.). The concepts and the measurements in the present dissertation only capture the somewhat stable inclinations and tendencies of students' cognitions

and motivations related to learning, presented in the top left corner of the model (Figure 1). The academic life, though, is mediated through individual experiential interfaces, where students' cognitions, motivations, and emotions meet the affordances of the learning context. Even though the contextual aspects are not directly measured in this dissertation, our multi faculty data enables us to take a look at different contexts: the participants in the four-part studies came from various faculties and fields of studies. It was of interest to see, whether some combinations of inclinations would be general across domains.

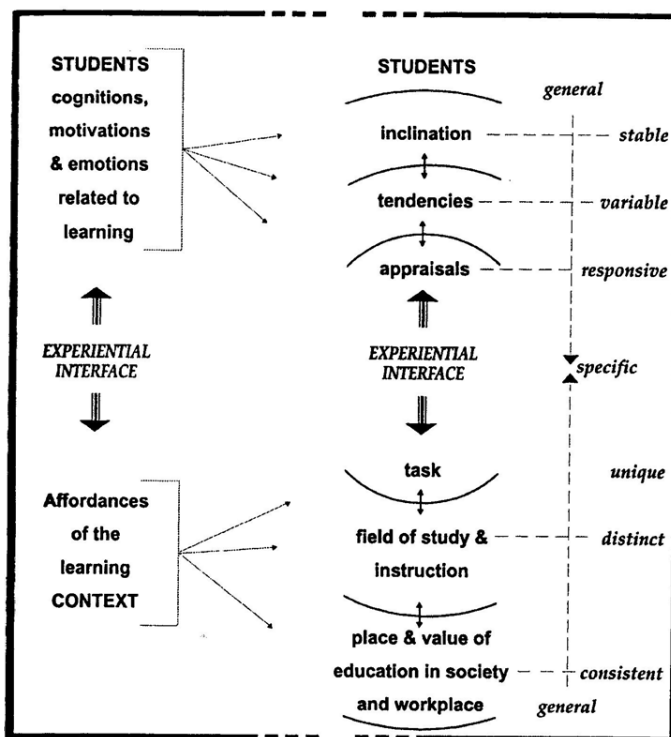


Figure 1 A multi-dimensional and multilevel cognitivesituative framework for understanding learning and motivation in context. (Adopted from Volet, 2001, p. 69).

Table 1 synthesizes the main theoretical constructs from SAL, SRL and CAS traditions, as well as the role interest. In the present dissertation, the focus is on students' predispositions towards studying, emerging from those traditions. In Table 1, they are divided into two main categories : 1) those that in previous studies appeared fruitful in promoting high-quality learning in the long term, and 2) those that may be less favourable or problematic in the light of academic studying and learning.

Various previous studies have demonstrated the positive relation between deep level processing and self-regulation with qualitatively better learning (e.g. Entwistle & Ramsden, 1983; Marton & Säljö, 1976b; Vermunt & van Rijswijk, 1988; Vauras, 1991; Lonka & Lindblom-Ylänne, 1996; Lonka, 1997; Nieminen, Lindblom-Ylänne, & Lonka, 2004; Vermunt & Vermetten, 2004). Previous research has also demonstrated the positive relation between illusory glow optimism and study success (Eronen et al., 1998; Nurmi et al., 2003), while self-handicapping students were shown to be less successful. Yet, to my knowledge, relations between all these three traditions (SAL, SRL and CAS) and the theoretical constructs derived from them have not been empirically examined before.

Table 1 shows relations among approaches to learning, regulation of learning, interest, and cognitive and attributional strategies. Some of these relations were empirically proven in previous research, some are theoretically assumed relations to be tested in this dissertation. Table shows both the main concepts and their empirical operationalizations.

Table 1. A summary of fruitful and less favourable dispositions towards studying, based on previous research. Scales being measured in the questionnaires used in this dissertation are highlighted by using *Italics*). ¹

DIFFERENT COGNITIVE-MOTIVATIONAL PREDISPOSTIONS FOR STUDYING	
Predispositions, processes, and conceptions that may be:	
Fruitful in the long term	Less favorable in the long term
SAL: Approaches to learning (Marton & Säljö, 1976; Entwistle & Ramsden, 1983)	
Deep approach or studying for meaning:	Surface approach or intention to minimize the cognitive load:
<i>Deep Understanding</i>	<i>Surface Approach</i>
<i>Critical Evaluation of Knowledge</i>	
CAS: Cognitive and attributional strategies (Cantor, Norem, Nurmi, Salmela-Aro & Haavisto, 1995). Strategies and strategy components.	
Optimism	Self-handicapping
<i>Success Expectations</i>	<i>Task-Irrelevant Behavior</i>
<i>Reflective Thinking</i>	<i>Worrying Beforehand</i>
<i>Mastery Orientation</i>	
SRL: Regulation of learning (Vermunt & van Rijswijk, 1988)	
Self-regulated learning	Problems with regulation
<i>Self-Regulation</i>	<i>Lack of Regulation</i>
	<i>External Regulation</i>
Interest (Hidi & Renninger, 2006; Mäkinen, Olkinuora & Lonka, 2004)	
Personal interest	<i>Lack of Interest</i>

¹ Similar categorization concerning approaches to learning, study strategies, study orientations, regulation of learning, epistemological standards, and conceptions of learning and epistemologies was earlier presented by Lonka (1997, p.30).

1.9 Overall goal

In the introduction, a general aim of the present work was laid out: that is, to build a more comprehensive picture of university students' studying and learning by combining different theoretical perspectives and their conceptualizations.

Following the conceptual and theoretical frameworks outlined above, this goal was approached through the following general research questions:

- Q 1. What kinds of relationships exist among approaches to learning, regulation of learning, and cognitive and attributional strategies?
- Q 2. What kinds of cognitive-motivational profiles can be identified among university students, and how are such profiles related to study success and well-being?
- Q 3. How do students explain their disciplinary choices?

Along the lines of these research questions, Study I explored the interrelations among approaches to learning, regulation of learning, and cognitive strategies, both in a variable- and person-centered way with a heterogeneous multi-faculty sample of students. It was also examined if these were related with study success. Study II further examined the correlations, and explored what kinds of cognitive-motivational profiles can be identified among first-year university students. It was of interest whether there were differences among students with differing profiles in terms of study success, stress and exhaustion. Study III investigated cognitive-motivational profiles of a professionally oriented student group, namely, teacher students. Study IV made use of qualitative research methods. It explored how new university students in three different fields of study—arts, law and veterinary medicine—explained their choices of discipline.

2 Overview of the original studies

2.1 Study I

2.1.1. Aims

Study I was exploratory in nature. We wanted to understand why, even in highly selective Finnish student populations, seemingly capable students sometimes fail (Mäkinen, Lonka & Olkinuora, 2004)? We looked at aspects of studying in terms of three theoretical perspectives: students approaches to learning (SAL; Marton & Säljö, 1976a; Entwistle & McCune, 2004; Lonka et al., 2004), self-regulated learning (SRL; Pintrich, 2004; Vermunt & Vermetten, 2004), and cognitive and attributional strategies (e.g., Norem & Cantor, 1986; Nurmi et al., 2003). All these traditions have been applied to look at students' varying dispositions towards learning in higher education.

The aims of this study were to examine following research questions:

1. Are students' cognitive strategies related to their learning approaches and self-regulatory skills?
2. What kinds of cognitive-motivational profiles can be identified among university students?
3. Are cognitive strategies, learning approaches, and self-regulatory skills related to study success?

We assumed that a deep approach to learning, self-regulation and success expectations would be related to each other. Therefore, we expected to find clusters of students who expressed all of these. We also expected that such adaptive cognitive emotional beliefs would be positively related to study success.

2.1.2. Context of the study

The data were collected from students attending a course, 'Think fearlessly' (Lonka & Saarinen, 2000). This was a pedagogical innovation: The intention was to activate students during mass lectures. Students were encouraged to externalize their previous knowledge and beliefs in small groups during the lectures, in e-mail chat, and in personal written learning logs. The themes of the course were unusual too: For example, tools for personal change, and study and thinking skills were

discussed. The course was of general interest and also attracted non-students. Over 500 students actively participated in the course.

2.1.3. Participants and procedure

Since the data were collected from the course open to all university students, there were students from many faculties and at the different phases of their studies. The participants comprised 366 students who filled in and returned the questionnaires used in this study. Students were from various faculties and subjects, they were studying in 13 different programs. The sample was not randomly selected. The ages ranged from 18 to 55 years (mean 28.5, SD 8.38).

Self-report questionnaires were given to the students during the first lectures of the course. Students completed the questionnaires in their own time and returned them the next week.

2.1.4. Materials

The Task Booklet of Learning (Lonka & Lindblom-Ylänne, 1996) consisted of open-ended and Likert-type questions to assess approaches to learning and regulation of learning. The scale varied from (1) totally disagree to (5) totally agree.

The first 14 statements were adapted from the Approaches to Studying Inventory (Entwistle & Ramsden, 1983). The factor structure was not constructed by using factor analyses, but the three scales were computed identically to Lonka & Lindblom-Ylänne (1996). The scales measured Deep approach, Surface approach and Achievement motivation. The corresponding reliabilities for the scales (Cronbach's alphas) were .58, .70 and .48.

Regulation of learning was assessed with 25 items adopted from the Inventory of Learning Styles (Vermunt & van Rijswijk, 1988). The answering scale varied from (1) I seldom or never do this to (5) I (almost) always do this. Three scales were computed, again, without factoring the items, measuring Self-regulation ($\alpha = .84$), External regulation ($\alpha = .67$), and Lack of regulation ($\alpha = .72$).

Students' cognitive and attributional strategies in achievement situations were assessed using the Finnish version of the Strategy and Attribution Questionnaire (Nurmi et al., 1995), consisting of 40 statements. The statements were asked to be rated on a four-point rating scale from (1) Strongly agree to (4) Strongly disagree. Four subscales were calculated identically to earlier Finnish studies (Nurmi et al., 1995) measuring Success expectations ($\alpha = .69$), Task-irrelevant behavior ($\alpha = .76$), Reflective thinking ($\alpha = .64$), and Mastery-orientation ($\alpha = .62$).

Academic achievement was measured by using average grades obtained from previous courses, collected from the university student register.

2.1.5. Statistical procedure

Correlations were computed to examine the connections between learning approaches, regulation of learning, cognitive and attributional strategies, and grade point average. A clustering-by-cases procedure was used to classify the participants on the basis of their responses to approaches to learning, regulation of learning as well as cognitive and attributional strategies.

A hierarchical cluster analysis, selecting the squared Euclidian distance as a similarity measure, was carried out in order to decide the number of clusters. Ward's method was used to form the initial clusters without restricting their number. On the basis of the dendrogram, a three-cluster model was provided by the analysis, and on the theoretical grounds, a two-cluster solution was selected. After deciding the number of clusters, a Quick Cluster Analysis was used to form the final groups. Initial cluster centers were selected using a K-means algorithm. A t-test was used to explore if there was a difference between the groups in study success.

2.1.6. Results

Correlations. Success expectation correlated positively with Deep approach and Self-regulation of learning, and negatively with Surface approach, External regulation, and Lack of regulation. In other words, students who rated high on success expectations also expressed a deep approach to learning and readiness to regulate their own learning processes. Task-irrelevant behavior was positively related to Surface approach, External regulation, and Lack of regulation, and negatively to Deep approach and Self-regulation. The Mastery orientation scale had negative correlations with Surface approach and Lack of regulation, and a low positive correlation with the Deep approach. Reflective thinking had a low positive correlation with the Deep approach.

Student group profiles. Two groups of students were identified. The first group was labeled '*reproducing students with insufficient regulatory skills*'. Students in this group scored higher than students in the other group on Surface approach to studying, Lack of regulation, External regulation, and Task-irrelevant behavior, and lower on Deep approach, Self-regulation, and on Success expectations. The group consisted of 190 students. The second group was labeled *meaning oriented and optimistic students*. Members of this group ($n = 176$) expressed more Deep approach to learning, Self-regulation of learning, and Success expectations than students in the first group.

Study success. Study success was operationalized as Grade Point Average (GPA). In a variable oriented approach, it showed low positive correlations with Deep approach to studying and Self-regulation of learning, and negative correlation with Lack of regulation. External regulation also correlated positively

with GPA, but the correlation was not statistically significant. It was of interest whether study success was related to the individual profiles too. It appeared that *meaning oriented and optimistic students* (mean = 2.28, SD = 0.27) had received better grades during their studying than *'reproducing students with insufficient regulatory skills'* (mean = 2.17, SD 0.29, $t = -2.27$, $p < .05$).

2.1.7. Discussion

The main findings of the Study I indicated that approaches to learning, regulation of learning, as well as cognitive and attributional strategies, measured with self-report questionnaires, were intertwined. Students' adaptive dispositions towards learning—deep approach, self-regulation of learning, and optimistic strategy—clustered together, while less favorable aspects, namely, surface approach, problems with regulation of learning, and task-irrelevant behavior, were related to each other both in a variable- and in a person-oriented approach.

Our search found no earlier published studies in which all these aspects have been all looked at together. Since there is a need for conceptual discussion in the field of educational psychology, this study can help us in building new integrative theories for explaining university students' learning and clarifying the concepts used in educational psychology.

There were some methodological limitations in this study. First, the population was not randomly selected, and it was rather heterogeneous; there were students at different phases of their studies. Second, the K-means cluster analysis was used for examining what kinds of groups of students can be identified. There are several limitations in this traditional clustering method when compared with more recent clustering procedures. In the following study, we wanted to examine whether the results could be replicated with more homogenous group of students, using a more sophisticated clustering method.

2.2 Study II

2.2.1. Aims

In Study I the relations between various approaches to learning, self-regulation, cognitive and attributional strategies, and study success, were quite logical and understandable. In Study II, we were interested to further examine whether such dispositions together had relations to stress and exhaustion. We examined first-year students in order to study what kinds of cognitive-motivational profiles students expressed at the beginning of their studies. First-year students were assumed

to be in the process of adapting to the university environment. Even though the cognitive capacity of the freshmen was supposed to be high since they have just passed extensive entrance examinations, it was not an inevitable consequence that they would be able to cope with all the demands that the new learning environment posed. Commitment and success during the first year was shown to be a strong predictor for future study success (Mäkinen, Olkinuora & Lonka, 2004; Lindblom-Ylänne, Lonka & Leskinen, 1999). Therefore, it was informative to study the starting point of new students in the light of their cognitive-motivational states and dispositions.

Study II examined the following research questions:

1. What kinds of relationships exist among approaches to learning, regulation of learning, and cognitive and attributional strategies?
2. What kinds of cognitive-motivational profiles can be identified among university students?
3. Are there differences in term of exhaustion and stress among students with differing profiles?
4. Are there differences in study success among students with differing profiles?

2.2.2. Participants and procedure

The participants were 436 first-year students from three faculties in the University of Helsinki: the Faculty of Law ($n = 97$), the Faculty of Arts ($n = 141$) and the Faculty of Agriculture ($n = 141$). In the Faculties of Agriculture and Law, whole cohorts of first-year students were included in the sample. Due to the large number of students in the Faculty of Arts, a random sample of students was taken. Response rate was 50 %. The age of the students varied from 19 to 49 (mean 23.00, SD 4.7); 333 were female and 103 were male, one participant did not report gender.

Self-report questionnaires were mailed to students together with a covering letter and a post-paid return envelope at the end of the first study year (about 8 eight weeks before the end). Four weeks later a reminder was sent to those had not returned the questionnaire. End of the first study year was selected to be the measurement time, since it was assumed that the students would already have some experience of university-level studying. Study success was gathered retrospectively from the university student register and was measured by means of grades obtained from previous studies.

2.2.3. Materials

Approaches to learning. Students' approaches to learning were assessed with 12 items, based on previous inventories such as ASI (Entwistle and Ramsden, 1983), and ILS (Vermunt, 1998), but formulated so as to describe what kinds of practices students valued in studying (Nieminen et al., submitted). The items were hypothesized to reflect two types of approaches to studying, a deep approach (e.g., "It is important to try to relate details to a bigger whole"), and a surface approach (e.g., "It is important to memorize new definitions and scientific concepts as literally as possible"). Unlike in Study I, where the scale varied from 1 to 5, all statements were rated using a Likert-scale ranging from 1 (totally disagree) to 6 (totally agree). In Study II, the original factor structure of the items was tested. A principal axis factor analysis with promax oblique rotation, as implemented in the SPSS v. 15 statistical package, suggested that after removing three items with low communality, three factors (explaining 58% of the total variance) would describe the data better than a two-factor solution (the eigenvalues for these factors were 2.58, 2.04, and 1.21, respectively). Accordingly, items reflecting the importance of understanding loaded on the first factor, items tapping surface approach on the second, and items referring to critical evaluation loaded on the third factor. Based on the obtained structure, three composite scores were computed and labelled as Deep understanding, Surface approach, and Critical evaluation, respectively. Corresponding reliabilities (Cronbach's alphas) were .74, .65, and .64. The reliabilities of this three factor solution were thus better than in Study I.

Regulation of learning. Items concerning regulation of learning were adopted from the Inventory of Learning Styles (Vermunt & van Rijswijk, 1988). These scales have been widely used and validated in earlier studies in Finland (Lonka & Lindblom-Ylänne, 1996; Nieminen et al., 2004; Heikkilä & Lonka, 2006). Two five-item scales intended to assess student's ability to regulate and diagnose their own learning process (self-regulation; e.g., "When I am studying, I also pursue learning goals that have not been set by the teacher but by myself") as well as the problems that a student may have with regulating learning (problems with self-regulation; e.g., "I notice that I have trouble processing a large amount of subject matter"). The scale External regulation used in Study I was not included. Likert-scales ranging from 1 (I seldom or never do this) to 6 (I almost always do this) were used for rating each item. Factor analysis (see above) replicated the hypothesized structure (with two factors explaining 50% of the total variance) and resulted in two clear factors (eigenvalues for these factors were 2.82 and 1.68): The first one included items reflecting active engagement and effective self-regulation, whereas the second one included items referring to study-related difficulties. Based on this, we constructed two composite scales labelled as Self-regulation and Lack of regulation. Reliabilities for these scales were .69 and .72, respectively.

Cognitive and attributional strategies. Students' cognitive and attributional strategies were assessed using the same Finnish version of the Strategy and Attribution Questionnaire that was used in Study I (SAQ; Nurmi, Salmela-Aro & Haavisto, 1995). The inventory included 40 items reflecting five different scales in the achievement context: Success expectations (e.g., "When I go into new situations, I usually expect I will manage."), Task-irrelevant behavior (e.g. "If something begins to go wrong with my school work, I quickly disappear to the cafeteria or to some other place."), Social support (e.g., "I know people who I can get support from."), Reflective thinking (e.g. "If difficulties arise, it usually helps to think them over."), and Mastery orientation (e.g., "Careful preparations for an exam leads to good results."). All items were rated with a four-point Likert-scale ranging from 1 (completely disagree) to 4 (completely agree). Principal axis factor analysis with promax oblique rotation was used for evaluating the structural validity of scales. Based on an iterative procedure, nine items were excluded due to having very low communality (below .20). For the rest of the items, a six-factor solution described the data best explaining 56% of the total variance (eigenvalues for the first six factors were 5.52, 3.94, 2.38, 1.85, 1.74, and 1.37, respectively). Although the hypothesized dimensions of the inventory were not entirely replicated, the current solution referred to constructs similar to the original work. Six composite scales were thus constructed using all items loading .40 or above. Based on the contents, these scales were labeled as Worrying beforehand (e.g. "I spend a lot of my time thinking about things, especially if there are difficulties."), Seeking social support (e.g. "If there are some difficulties, it helps to talk them over with another person."), Success expectations (e.g. "When I get ready to start a task, I am usually certain that I will succeed in it."), Reflective thinking (e.g. "If things do not go right, it is best to stop and think."), Task-irrelevant behavior (e.g. "What often occurs is that I find something else to do when I have a difficult task in front of me."), and Mastery orientation (e.g. "How I succeed in my studies depends on chance.", scored in reversed direction). The reliabilities for the resulting scales were .83, .84, .73, .81, .76, and .64, respectively.

Exhaustion. A modified version of the exhaustion scale (Maslach & Jackson, 1981) was used for assessing exhaustion. This version has also been applied in MED NORD instrument which is a tool for measuring medical students' study orientations and well-being (Lonka et al., 2008). This six items scale measures Exhaustion in Studying (e.g. "I feel I'm working too hard on my studies"). The frequency of these symptoms were rated on a five-point Likert-scale ranging from 1 (never) 5 (all the time). The reliability (alpha) for the scale was .80.

Stress. The experience of stress was measured with a single-item measure of stress symptoms (Elo, Leppänen & Jähkölä, 2003). This measure has first a definition of stress following a question and a rating scale: "Stress means a situation in which 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 frequency of stress experiences was rated on a 5-point Likert-scale ranging from 1 (not at all) to 5 (very much).

Due to the heterogeneity of the learning environments, all constructs were assessed on a general level, not specific to any subject.

2.2.4. Statistical procedure

In Study II, the structural validity of all the scales was tested by means of a series of factor analyses (unlike in the Study I, where the scales were computed on the basis of earlier studies). The relations between the scales were examined by computing correlations. Latent class clustering was used for clustering students into homogeneous groups. The configurations of these groups in relation to gender and study track/major/faculty was examined by means of configural frequency analysis. A series of ANOVAs was conducted to examine between-group differences across the criterion variables.

2.2.5. Results

Correlative relationships. Deep understanding correlated positively with Critical evaluation and Self-regulation. Critical evaluation had positive correlations with Self-regulation and Success expectations. Self-regulation correlated positively with Success expectations and negatively with both Task-irrelevant behavior and Lack of regulation. Lack of regulation correlated negatively with Success expectations and positively with Task-irrelevant behavior. There was a strong negative correlation between Task-irrelevant behavior and Success expectations.

Profiles. In Study I students with analogical patterns of approaches to learning, regulation of learning and cognitive and attributional strategies, were identified by using K-means cluster analysis. In Study II, a more advanced clustering procedure was applied, groups were formed through a latent class cluster analysis (LCCA; Vermunt and Magidson, 2002). It is a probabilistic or model-based variant of a traditional cluster analysis (Vermunt and Magidson, 2002). It aims to identify the smallest number of latent classes or groups that adequately describe the associations among observed continuous variables. Variables reflecting similar adaptive and maladaptive components of learning activity within each framework were used for the LCCA. Choice of the number of clusters is different compared to traditional cluster analysis: Classes are added stepwise until the model optimally fit the data, and statistical criteria such as Bayesian Information Criterion (BIC) are used to evaluate the best-fitting model. The results from a series of LCCAs suggested that a three-group solution described the data best. The BIC values

(smaller value implying better fit) for one- to four-group solutions were 9362.55, 9186.32, 9167.84, and 9183.43, respectively.

Students were distributed into the three groups which were labeled, according to the score mean profiles, as (1) *non-academic students*, (2) *self-directed students*, and (3) *helpless students*. *Non-academic students* (n = 148, 34 % of the sample) scored lowest on Deep understanding, Critical evaluation, Surface approach and Self-regulation and had average scores on Lack of regulation, Success expectations and Task-irrelevant behavior. This group was named *non-academic*, since students in this group did not show interest towards understanding and critical thinking. Interestingly, they did not seem to express surface approach to studying either. On the other hand, Surface approach was the only scale that did not discriminate the groups from each other. The mean of the scale was low in the whole population. *Self-directed students* (n = 151, 35 % of the sample) scored highest on Deep understanding, Critical evaluation, Self-regulation and Success expectations and lowest on Lack of regulation and Task-irrelevant behavior. *Helpless students* (n = 138, 32 % of the sample), representing the other type of maladaptive profiles, had highest loadings on Surface approach, Lack of regulation, and Task-irrelevant behavior and lowest on Success expectations.

Well-being and study success – differences between the groups. A series of ANOVAs were performed with cognitive-motivational profiles as an independent variable and other variables of interest as dependent variables. For validation purposes, the group differences were looked at with the cognitive-motivational scales that were not included in the clustering procedure. Significant overall effects were found for Worrying beforehand, Mastery orientation, and Reflective thinking, but not for Seeking social support (see table 1).

Table 1. Means, standard deviations, and ANOVA results for group differences on Approaches to Learning, Regulation of Learning, and Cognitive and Attributional Strategies.

Variable	Non-academic N=148		Self-directed N=151		Helpless students N=138		$F(2,434)$	p	η^2
	M	SD	M	SD	M	SD			
Deep Understanding	5.50	.57	5.91	.28	5.80	.31	40.49	<0.001	.16
Critical Evaluation	4.73	.66	5.67	.40	5.41	.60	109.67	<0.001	.34
Surface Approach	3.40a	.83	3.51a	.99	3.61a	.84	2.03	ns.	.01
Self-Regulation	2.92a	.61	3.97	.75	3.03a	.77	95.96	<0.001	.31
Lack of Regulation	2.76	.68	2.33	.64	3.47	.79	96.75	<0.001	.31
Success Expectations	3.12	.41	3.44	.37	2.66	.50	118.32	<0.001	.35
Task-Irrelevant Behavior	1.97	.53	1.71	.42	2.75	.47	186.52	<0.001	.46
Worrying Beforehand	1.95	.57	1.78	.61	2.33	.64	30.77	<0.001	.12
Mastery Orientation	3.70 a	.32	3.78 a	.35	3.56	.41	14.73	<0.001	.06
Reflective Thinking	3.32	.54	3.62 a	.48	3.45 a	.46	13.90	<0.001	.06
Seeking Social Support	3.30 a	.53	3.38 a	.63	3.35 a	.57	.734	ns.	.00

Note. Based on the Levene's test, the equality of error variance could only be assumed in Task-irrelevant behavior, due to which the Games-Howell correction was applied for pairwise comparisons for all other variables. For Task-Irrelevant Behavior, Bonferroni's correction was used. Means within a row sharing the same subscripts are not significantly different at the $p < 0.05$ level.

Group differences in relation to stress and exhaustion were examined, too. The main effects were significant both for stress [$F(2, 436) = 14.70, p < 0.001$] $\eta^2 = 0.06$ and exhaustion [$F(2, 436) = 33.6, p < 0.001$] $\eta^2 = 0.13$. Pairwise comparisons showed that the *helpless students* reported higher levels of stress and exhaustion than either *non-academic* or *self-directed students*, which, in turn, did not differ from each other.

The last aim was to examine whether there were differences between the groups in terms of study success. Study success was operationalized into two variables: grade point average (GPA) and accumulation of credits. The main effect was significant for GPA [$F(2, 325) = 9,5, p = 0.001$] $\eta^2 = .06$, and only marginally significant for the accumulation of credits [$F(2, 333) = 3,0 p = 0.051$] $\eta^2 = .02$. Compared to *non-academic* and *helpless students*, the *self-directed students* had significantly higher GPA, but regarding the accumulation of credits, the *self-directed students* differed only marginally ($p = .069$) from the *non-academic* students.

Table 2. Means, standard deviations and ANOVA results on Stress, Exhaustion and Academic Performance.

	Non-academic students		Self-directed students		Helpless students				
	M	SD	M	SD	M	SD	$F(2,434)$	p	η^2
Stress	2.64 a	.94	2.62 a	1.02	3.18	1.02	14.70	<0.001	.06
Exhaustion	2.45	.61	2.32	.65	2.94	.72	33.64	<0.001	.13
GPA	2.11 a	.35	2.29	.32	2.14 a	.33	9,52	<0.001	.06
Accumulation of credits	29.23 a	11.74	32.28 a	13.45	28.95 a	12.12	3,01	ns.	.02

Note. Based on the Levene’s test, the equality of error variance could be assumed in GPA, Accumulation of credits due to which the Games-Howell correction was applied for pairwise comparisons for Exhaustion, For GPA and Accumulation of credits Bonferroni’s correction was used. Means within a row sharing the same subscripts are not significantly different at the $p < 0.05$ level.

2.2.6. Discussion

The results of Study II supported the previous findings of the Study I. The similar patterns in correlative results could be identified: Deep approach, self-regulation of learning, and optimistic strategy clustered together while maladaptive dispositions, such as surface approach, problems with regulation of learning, and task-irrelevant behavior were related to each other, both in a variable- and in a person-oriented approach. The statistical methods were more sophisticated in Study II. The measurements were also more reliable in this part study. In addition, we included some measures of well-being.

In a person-oriented approach, three groups of students were identified: *non-academic students* (34%), *self-directed students* (35%) and *helpless students* (31 %). These groups differed from each other in study success, as the two groups also differed in Study I. In this study, study success was assessed both with grade point average (GPA) and accumulation of credits. *Self-directed students* had signifi-

cantly higher GPA than the other groups, but regarding the accumulation of credits *self-directed students* differed only marginally from the *non-academic students*.

Differences could be also found in students' well-being. *Non-academic* and *self-directed students* appeared less distressed than *helpless students*. This finding supported our expectations that students' dispositions towards learning and studying would have consequences in terms of their well-being. To our knowledge, such findings are quite rare.

The results showed that two-thirds of the participants expressed some kind of a maladaptive cognitive-motivational profile. These unfortunate findings are, however, fairly generalizable to Finnish university students. There are problems with flow-through in Finnish higher education (Statistics Finland 2007) which is understandable in the light of our findings.

We wanted to replicate this finding by looking the program that is one of the most difficult to get in, namely, teacher students. In Finland, the career of elementary school teacher is surprisingly popular, and less than 15% of the applicants are accepted. In addition to an academic entrance examination, all applicants pass an interview and a communications skills test. We could not imagine a healthier population of smart students. Would they also express similar maladaptive profiles?

2.3 Study III

2.3.1. Aims

Our previous part studies with students from other fields, such as humanities, agriculture and law, demonstrated the fruitfulness of combining cognitive, motivational and emotional aspects for investigating students' learning. However, to our knowledge, not much is known about the relationships between these various cognitive-motivational aspects among teacher students.

Study III looked at how first year teacher students experienced learning in the beginning of their studies. We applied person-oriented approach (see Bergman, Magnusson & El-Khoury, 2003; Niemivirta, 2002) in order to explore what kinds of cognitive-motivational profiles, consisting of approaches to learning, and cognitive and attributional strategies, naturally occurred among first-year teacher students. Since many of the students came directly from high school, it was of interest to see how they would succeed on an activating course, calling for deep understanding and application of knowledge.

The aims of this study were to examine following research questions:

1. How are approaches to learning and cognitive and attributional strategies related to each other among first year teacher students?
2. What kinds of cognitive-motivational profiles can be identified among teacher students?
3. Are there differences among students with differing profiles
 - in terms of exhaustion, stress and lack of interest?
 - in terms of epistemological beliefs?
 - in terms of study success in an activating lecture course?

2.3.2. Context of the study

In Study III the sample was collected from first-year teacher students. Teacher students were chosen to examine what kinds of cognitive-motivational profiles these professionally-oriented students would express at the beginning of their studies. Since it is very difficult to get in to teacher education, a highly selected group of students was in question.

Students who participated in this study attended an introductory course in educational psychology, named *Human growth, development, and learning* (5 ECTS) in two consecutive autumn terms in University of Helsinki. There were six activating lectures, and each of them took 4 hours. The whole course included extensive readings, and took six weeks to complete. The examination called for understanding and application of knowledge, and rote learning was not rewarded.

2.3.3. Participants and procedure

The participants were 213 ($N = 213$) [2005 $n = 138$, 2006 $n = 75$] elementary teacher and kindergarten teacher students. Only those voluntary students participated who attended the lectures. Students were not rewarded for their participation in this study. They all signed an informed consent form.

All the students attending the lectures participated and filled in self-report questionnaires. The course examination was arranged one week after the last lecture.

2.3.4. Materials

All the instruments used in Study III were drawn from the MED NORD questionnaire (Lonka et al., 2008) which is a collection of scales measuring a variety of aspects of student learning. MED NORD scales are quite short, since the instru-

ment was originally designed in the context of medical education. The scales were shortened versions of those in Studies I and II.

Approaches to learning. In MED NORD, Students' approaches to learning were assessed with 12 items, based on previous inventories such as ASI (Entwistle and Ramsden, 1983) and ILS (Vermunt, 1998), but formulated so as to describe what kinds of practices students valued in studying. Based on Study II we hypothesized that the deep approach would divide into two aspects in this population. Therefore three factors, reflecting *deep understanding* (e.g., "It is important to try to relate details to a bigger whole"), *critical evaluation*, and *surface approach* (e.g., "It is important to memorize new definitions and scientific concepts as literally as possible") were hypothesized to describe the data best. All statements were rated using a Likert-scale ranging from 1 (totally disagree) to 6 (totally agree).

Cognitive and attributional strategies. A shortened version of Strategy and Attribution Questionnaire (SAQ, Nurmi et al., 1995) was used to assess students' cognitive and attributional strategies. The short version of the inventory includes 12 items describing only three scales: *Optimism*, *Task avoidance*, and *Social optimism*. The Likert scale ranged from (1) totally disagree to (6) totally agree.

Problems with regulation of learning. Items concerning problems with regulation of learning were originally adopted from the Inventory of Learning Styles (Vermunt & van Rijswijk, 1988). Two items from the original five-item scale were used for assessing students' self-evaluated problems with self-regulation from the original scale *Lack of regulation*: e.g., "I notice that I have trouble processing a large amount of subject matter"). A Likert-scale ranging from 1 (I seldom or never do this) to 6 (I almost always do this) was used for rating each item. Unlike in Studies I and II, only lack of regulation was measured.

Subjective well-being. Three separate scales were used for assessing students' well-being. Two of them were same as in Study II: Stress and Exhaustion. Stress was, again, measured with a single-item measure of *stress* symptoms (Elo, Lepänen & Jahkola, 2003), and exhaustion in relation to studying was measured with four-item MED NORD version of the Maslach & Jackson's (1981) *Exhaustion* scale, similar to the scale in Study II. A new aspect of well-being was also adopted as a short MED NORD version: students' experienced *lack of interest* (e.g., "The contents of my studies do not motivate me") was included in Study III. Lack of interest was assessed with two items from the *Inventory of General Study Orientations (IGSO)* (Mäkinen et al., 2004) which closely resembles questions that measure cynicism, an aspect of study-related-burnout (Salmela-Aro & Kunttu, 2010).

Epistemological beliefs. New criterion variables concerning epistemological beliefs were included in Study III. MED NORD instrument was partially based on Schommer's (1990) work on students' epistemological beliefs, three items referred to a view of preferring *certain knowledge* ("Teaching should provide certain facts about the issues that are being studied"). Two items assessed how

highly students valued *practical knowledge* ("It is important that the things I study have practical value"). All items were rated using a Likert-scale ranging from (1) totally disagree to (6) totally agree.

Study success was measured with using the grade achieved in the course from which the data were collected. The final grade was given on a Bologna scale 1-5.

2.3.5. Statistical procedure

In Study II, the structural validity of all the scales was tested by means of a series of factor analyses. In Study III, all items from the above set of scales (except for the one-item Stress –scale) were subjected to a confirmatory factor analysis to test the structural validity of the whole model. For the present purposes, an 11-factor measurement model was specified in which all given items were set to load on the respective factor only. The model was fitted to the data using maximum likelihood estimates as implemented in the Mplus statistical program. The fit of the model was evaluated using the fit indices CFI, SRMR and RMSEA along with the χ^2 -statistic, as suggested by Hu and Bentler (1999). Cutoff values of $\geq .90$, $\leq .09$ and $\leq .06$ were used for CFI, SRMR and RMSEA, respectively. The estimated model fitted the data well, $\chi^2(471) = 640.24$, $p = .000$; CFI = 0.92; SRMR = .057; RMSEA = .041, thus confirming the hypothesized structure. Based on the model, composite scores for each scale were constructed, and the resulting variables were labelled as 1) Optimism, 2) Deep Understanding, 3) Exhaustion, 4) Surface Approach, 5) Task Avoidance, 6) Lack of Interest, 7) Social Optimism, 8) Lack of Regulation, 9) Deep Critical, 10) Certain Knowledge, and 11) Practical Value. The Cronbach's alphas for each variable were .88, .75, .84, .67, .75, .71, .66, .69, .76, .72, .48, respectively.

Correlations were computed in order to study relations among the scales. Similar to Study II, Latent class clustering was used for clustering students into homogeneous groups. Finally, a series of ANOVAs was conducted to examine between-group differences across the criterion variables.

2.3.6. Results

Correlative results. Correlative results confirmed the previous findings of Studies I and II: Deep understanding correlated positively with Critical evaluation and Optimism, and negatively with Lack of regulation. Critical evaluation had a positive correlation with Optimism. Surface approach correlated negatively with Optimism. Lack of regulation correlated negatively with Optimism and positively with Task avoidance. There was a negative correlation between Task avoidance and Optimism.

Cognitive-motivational profiles. The results from a series of LCCAs using Latent Gold statistical software suggested that a three-group solution described

the data: The first group ($n = 106$) had a maladaptive profile with high scores on Task avoidance and Lack of regulation, low score on Optimism and average scores on Deep understanding, Critical evaluation, and Surface approach. The second group ($n = 60$) had a very adaptive profile altogether: Students in this group scored high on Optimism, Deep understanding, and Critical evaluation and low on Task avoidance, Surface approach, and Lack of regulation. The third group ($n = 46$) scored the lowest on Deep understanding and Critical evaluation, but interestingly, also on Task avoidance. The three groups were labelled, according to the score mean profiles, as (1) *non-regulating students* (50%), (2) *self-directed students* (28%), and (3) *non-reflective students* (22%).

Pairwise comparisons showed that the non-regulating group reported highest levels of stress, exhaustion, and lack of interest. Non-reflective and self-directed students did not differ from each other in terms of stress and exhaustion. Non-reflective students scored lowest on lack of interest, but most often expressed appreciating certain knowledge. Self-directed students received the highest grades in the course examination.

2.3.7. Discussion

The results of the Study III, again, supported the previous findings of the Studies I and II. The similar patterns in correlative results could be identified: Deep understanding, critical evaluation and optimistic strategy were positively related to each other. Maladaptive dispositions, such as surface approach, problems with regulation of learning, and task-irrelevant behavior were related to each other.

In a person-oriented approach, three groups of students could be identified: *non-regulating* (50%), *self-directed* (35%) and *non-reflective students* (22%). These groups differed from each other in well-being, in epistemological beliefs, and in study success.

The first profile, *non-regulating students*, was, quite surprisingly, the biggest group of the three. This group reported the most often stress, most exhaustion, and the least interest. They also showed the strongest preference for certain and directly applicable knowledge. This group highly resembled ‘helpless students’ group in Study II.

The group of *self-directed students* was the least stressed and exhausted, and they received the best grades. In their epistemological beliefs, they showed the lowest emphasis on certain knowledge and practical value. In Study II, 35% of first-year art, law, and agriculture students had a highly similar profile.

Non-reflective students did not seem to be distressed either, receiving average scores on Stress, Exhaustion, and Lack of Interest. In Study II, we named a quite similar profile as “non-academic students”, since these students demonstrated little critical evaluation and deep understanding, which are prominent aspects of the

traditional academic-meaning orientation. However, this study on professionally oriented teacher students leads us to think about this profile in a new way: This profile resembles “cookbook orientation”, found in another professionally-oriented group of students, namely medical students (Lonka et al., 2008). Cookbook orientation includes a strong preference for certain, concrete, and practical, easily applicable-knowledge. Similarly to the cookbook orientation, non-reflective students had a high loading on Certain Knowledge, and the highest scores on surface approach. Students in non-reflective group may be work-life oriented as Finnish teacher students earlier appeared to be (Mäkinen et al., 2004). Non-reflective students probably experienced a more instrumental value of studying.

For teacher educators, this study has an important message: Only one third of the first-year students showed a truly favorable and adaptive cognitive-motivational profile. Even in a highly selected teacher student population, two thirds of the students express some kind of maladaptive tendencies in relation to the goals of the course. Teacher students may be, more that we believe, dependent on external regulation. Many of the teacher students came directly from high school, and problems in self-regulatory or reflective skills made it difficult for them to understand complex concepts of educational psychology that were central in the course in question. Further, the activating course called for deep understanding and application of knowledge. Such demands for high-level cognitive functioning may have been too challenging for some of the participants, even though the course got very positive ratings in general.

The three quantitative studies shed light on understanding how students’ approaches to learning, self-regulation, and cognitive-motivational strategies were intertwined. We also showed that such dispositions were related to both study success and well-being. It was important, however, to also look at what lies behind such dispositions. Only by using a qualitative approach it was possible to understand, what would be the personal reasons of students for studying. Once these reasons are internalized into the personality system, they will form the basis of individual interests, preferences and motivational orientations (Volet, 2001).

2.4 Study IV

2.4.1. Aims

The general meaning that students give to their studies may play an important role in study persistence (Mäkinen & Olkinuora, 2004). Such states or dispositions are not easy to grasp by using merely quantitative methods. Therefore, the last part study made use of qualitative research methods. It explored how new university

students in three different fields of study—arts, law and veterinary medicine—explained their own disciplinary choices. Two of the disciplines were the same as in Study II (arts and humanities). It was assumed that the students' explanations of their disciplinary choices would reflect their motives and values for the incipient studies. Even if these motives change over time, they can be considered to have an influence on later studies. Some earlier studies have touched on similar questions in veterinary medicine (Health, Lynch-Blosse, & Lanyon, 1996; Ilgen et al., 2003), and humanities (e.g. Elvo & Pajala, 2002), but studies with a comparative point of view between the different fields of studies are unusual.

The present study concentrated on the following research questions:

1. How do students explain their disciplinary choices?
2. If students reflected upon some (emergent) individual interest towards their field of studies, how is this shown in their answers?
3. Are there some specific ways to explain the choices at the three faculties?

2.4.2. Participants

In Study IV the participants comprised 536 first-year students from Faculty of Arts ($n = 357$, of whom 291 were women and 66 men), Law ($n = 128$, 68 women and 39 men; 22 students answered anonymously) and Veterinary Medicine ($n = 51$, 45 women and 6 men). Students' ages varied: In all faculties, about 20 % of the students were 19 years old or younger; 60 % were 20 to 25 years old, and 20 % were older than 25.

2.4.3. Procedure and materials

The qualitative data were collected in autumn 2004 at the Faculties of Arts and Law, and in the autumn 2005 at the Faculty of Veterinary Medicine. The data were collected as a part of orientation courses in which the focus was on familiarizing students with study practices and planning of the studies. Students were asked to consider the reasons why they had chosen their field of study. The open question appeared in a questionnaire which was completed in writing.

2.4.4. Results

A qualitative content analysis (Chi, 1997; Silverman, 2006) was applied to analyze the reasons students expressed for why they had chosen their major subjects. The basic unit of analysis was a sentence forming an idea. Because an answer

might consist of many sentences and the categories used in the analysis were not mutually exclusive, the same answer could belong to several categories. In the beginning of the analysis, the entire corpus of the answers was analyzed without theoretical assumptions in order to let the coding schemes emerge from the data. Two main categories were found: (1) Interest in the field of study and (2) Future work. The main category of interest was further compared with the theories of interest and divided into subcategories by the object and history of interest.

Interest. Interest appeared to be a common concept term in students' description of their choices in all three faculties: Over 60 % of all students used the word "interest" (or some near by expression like interesting or being interested in) when explaining their choice of major subject. The Arts student most often used the expression of interest (68 %), but it was common also among Law students (55%) and Veterinary medicine students too (49 %). Similar expressions of interest were also used, such as "dear to my heart" and "my passion". If these expressions had been included into the interest category, over 80% of the answers at the Faculty of Arts and 69% of those at the Faculty of the Veterinary Medicine would have belonged to that category. However, in further analyses it was decided to concentrate only on those answers that included the word "interest" since the other expressions were open to various interpretations.

Future work. The second main category found was *future work*. Answers including ideas about future work or a profession were common at the Faculties Veterinary Medicine (80%) and Law (67%). In contrast, only one-fifth (22%) of the arts students mentioned future work in their answers. This main category included two types of answers: In the first category, work was mentioned as an only motive for the studies "A good and prestigious profession; social climbing" (law43). In the second category, multiple motives were mentioned "The reasons for my choice are love of animals, interest in medicine and good employment prospects" (vet22).

Interest in the Field of Study. The second aim of the study was to explore if students reflected upon some (emergent) individual interest towards their field of studies. Further, if they do, is this shown in their answers in particular way. The level of interest was analyzed by categorizing the expressions by the object and/or the history of interest. The first classification was made into two subcategories, general or special, depending on the specialty of the expressed object of interest. After classification into one of these subcategories of interest, the responses were analyzed by (1) the time frame of their interest, (2) experiences that students expressed in their field of study, and (3) how they compared their major with other possible objects of interest ("comparison"). These three subcategories characterized the ways in which the students expressed the history of their interest. One response might be categorized into several of these subcategories or none of them. In all three fields of studies, most of the students mentioned some general areas

of interest: “Interest in wide-ranging knowledge of society and various spheres of life (law1). Answers with special objects of interest were fairly uncommon, a few students of all three faculties mentioned special areas of interest: “I am interested in animal husbandry.” (vet33).

2.4.5. Discussion

Comparison of the three fields showed that “interest” was a typical word for students to explain their disciplinary choices. Interest in the field of study was most common among arts students, but also occurred often among the students of veterinary medicine and law.

Most of the responses expressed the object of interest in a general way, and it was impossible to draw any further conclusions about the level of interest. It may be assumed that the experienced interest was beyond situational interest, but more personal in nature, since the participants reported long-term passion in their field of study (Hidi & Renninger, 2006).

Comments related to future work were more common in the answers of the law and veterinary students than of the arts students, which may be an inevitable consequence of the differences between the fields: Professions connected with law and veterinary medicine are clear and limited, whereas in the Faculty of Arts most disciplines provide competence for various kinds of careers. Such a work-life orientation has been reported previously in quantitative studies of those students whose academic studies have a professional aim, such as medicine, teacher education, or law (Mäkinen, et al., 2004).

Most of the answers concerning future work suggested that students had motives connected both to studying and work: Students both perceived the utility of what they were learning for their futures and expressed interest in their field of study. Only a few answers concentrated purely on questions of work. These findings suggest that studying based purely to extrinsic motivation is rare. It is also questionable whether a professional or work-life orientation may really be considered as external or instrumental. Students give a general meaning for their studying, which is probably extremely motivating for them. Future studies will show whether such variation in interest as was found in the present study has linkages with success and well-being during later studies.

3 General discussion

In the general introduction, several arguments were presented to support the claim that, by combining different theoretical perspectives, research traditions, and methodologies, we can build a more comprehensive picture of university students' learning, motivation and well-being. Therefore, the aims of this dissertation were to contribute, first, with the three sets of empirical quantitative studies, to the understanding of the interrelations among university students' approaches to learning, self-regulated learning, as well as cognitive and attributional strategies. The fourth study, qualitative in nature, aimed to add to our understanding of the reasons students gave for their choice of disciplines in the light of an important motivational construct, interest. In the original articles, the findings of our studies are discussed thoroughly in the light of prior research. Here we discuss the overall understanding of university student learning, studying, and well-being emerging from the present findings.

The first study question, "How are university students' approaches to learning, self-regulation of learning, as well as cognitive and attributional strategies related to each other?" was examined with a variable-centered perspective. Correlative results showed that favorable cognitive-motivational predispositions of learning—deep understanding, critical evaluation of knowledge, self-regulation, and optimism, measured with self-report inventories—were positively related to each other. In a similar manner, maladaptive, or problematic dispositions, such as surface approach, problems of regulation, and task-irrelevant behavior, were interrelated. This similar correlative pattern was replicated three times in Studies I, II and III. To our knowledge, these three are the only published studies where all the three aspects—approaches to learning, regulation of learning, and cognitive strategies—are all looked at together. There are only a few recent studies which combine different lines of inquiry, for example, in a study of Phan (2009), future time perspective, epistemological beliefs, achievement goals, effort, and study processing strategies, and their relation to academic success were examined. The conclusion of the study was that it provided evidence for the direct and mediating relations between five theoretical frameworks and academic performance. Cano and Berben (2009) explored the relationship between achievement goals and approaches to learning and concluded that they may be intertwined aspects of students' experiences of learning mathematics at university. Because the field of educational psychology is rather complex with its numerous conceptualizations, this kind of integrative perspective, now raising its head, is fruitful and welcomed. Combining three research traditions leads to a new level of inquiry in understanding student learning. It offers a new perspective where studying is viewed not only as cognitive but also as motivational and emotional process.

The second study question, “What kinds of cognitive-motivational groups of students can be identified among university students?” was examined with a person-centered perspective.

Several types of cognitive-motivational profiles were identified. The results of the three empirical studies showed that each of the various cognitive-motivational profiles was uniquely associated with criterion variables, such as study success, in respect of both grade point average and accumulation of credits, stress, study-related-exhaustion, lack of interest, and epistemological beliefs.

In Study I, two groups of students were identified: the first group, labeled *reproducing students with insufficient regulatory skills*, expressing a surface approach, problems with regulation of learning, and task-irrelevant behavior. The second group was labeled *meaning oriented and optimistic students*, expressing a deep approach, self-regulation, and optimism. Students in the second group had received better grades.

In Study II, three groups of students with differing cognitive-motivational profiles were identified: *non-academic*, *self-directed*, and *helpless students*. We had problems with naming the first profile, but we decided to call it *non-academic*, since students in this group demonstrated hardly any critical evaluation or deep approach, and also showed low levels of self-regulation. These students did not seem to be distressed either. There was an intriguing finding with the study success of this group: It did not differ from the other groups, even though these students did not express dispositions that are usually associated with academic success, such as deep approach and self-regulation. This kind of profile was not found in Study I, which may due to the fact that K-means easily produces two extreme groups.

The profile of *self-directed students* was characterized by high-levels of self-regulation, optimism, deep understanding, and critical evaluation. *Self-directed students* were the most successful in terms of GPA, and, in addition as in Study I, they reported the lowest levels of stress and exhaustion. This is highly similar to the profile of *meaning oriented and optimistic students* in Study I, and further validates the finding that adaptive dispositions to learning cluster together. Zimmerman (2002) stated that because of their superior motivation and adaptive learning methods, self-regulated students are not only more likely to succeed academically, but also view their futures optimistically. This statement receives empirical support from our findings.

The third group, *helpless students*, expressed the highest levels of problems with regulating their studies, task-irrelevant behavior, moderate levels of surface approach, and low levels of optimism and self-regulation of learning. This profile resembles the group named *reproducing students with insufficient regulatory skills* in Study I. Study I already demonstrated the relation of a profile like this to the lower study success. The findings of Study II deepened our understanding of those negative consequences to which this kind of maladaptive cognitive-

motivational profile may lead: Helpless students expressed the highest levels of stress and exhaustion, had the lowest GPA, and had collected the smallest number of credits.

The person-centered results of the Study II showed that two-thirds of the participants expressed some kind of maladaptive cognitive-motivational profile. Despite that quite unfortunate finding, we believe that our results are fairly generalizable to Finnish university students. To test the generalizability of the findings, we examined one more group of students in Study III, namely first-year teacher students. Especially first-year students may experience friction when the learning environment calls for deep understanding (Lonka & Lindblom-Ylänne, 1996).

In Study III, three groups were identified: *non-regulating students*, *self-directed students*, and *non-reflective students*. These groups differed from each other in well-being, in study success, and in epistemological beliefs, which were a new aspect to look at, compared with the Studies I and II. The first profile, *non-regulating students*, quite surprisingly, comprised 50 % of the whole sample. Students in this group demonstrated both problems with regulating their studies and a general tendency to avoid challenging goals and situations. In Study II, a highly similar group was named *helpless students*. When naming this group in Study III, we were not satisfied with the previous name, since it may give a wrong impression of these students: In a highly selected population they showed most regulatory problems and task-irrelevant behavior, but that does not mean that they are helpless in general. The new name, *non-regulating students*, describes the nature of the group better. However, also this name can be slightly misleading: these students do regulate, but the regulation does not concern high-quality learning, but, presumably, their feelings of failure and beliefs about themselves, for example. The findings support this speculation: This group most often reported stress and exhaustion. In addition, they expressed lack of interest and showed a strong preference for directly applicable knowledge, which were the new criterion variables added to Study III. We do not know it, but it is also possible that these students only have problems in the context of academic environment: An interesting finding of Endedijk (2010) was that active regulation among teacher students dominated in practice schools whereas they relied on passive regulation at the university.

The profile of *Self-directed students* (28%) was similar to that found in Studies I and II. Again, this group expressed the least stress and exhaustion. In their epistemological beliefs, they showed the least emphasis on certain knowledge and practical value. Earlier studies with teacher students have demonstrated similar results with slightly different concepts: In a recent study of Endedijk, (2010) 29% of teacher students showed meaning-oriented learning conception.

The third group, *Non-reflective students*, (22%) expressed the lowest levels of deep understanding, critical evaluation, and task-avoidance. In surface ap-

proach, lack of regulation, and optimism these students had average loadings. These students did not seem to be distressed, either: They had average scores on stress, exhaustion, and lack of interest. This profile resembles the profile named *non-academic* in Study II. However, this Study III with profession oriented teacher students led us to think about this profile in a new way: the profile reminds cookbook orientation, found in another professionally oriented group of students, namely medical students (Lonka et al., 2008). Cookbook is an orientation reflecting high value to have certain, concrete and practical, applicable knowledge. Similarly to cookbook orientation, non-reflective students had high loading on certain knowledge. Students in *non-reflective group* may be work-life – or strongly professionally – oriented.

Our results showed that a considerable number of students seem to reflect a maladaptive cognitive-motivational profile. This finding calls for explanation. Even though the differences in the means of the scales used for creating the profiles were not dramatic, they were clear (effect sizes reaching medium level), and profiles were easy to interpret. In other words, the profiles reflected logical and understandable differences between the groups. Furthermore, the grouping was validated with systematic findings concerning the differences between the groups in study success and well-being. The fact that differences between the groups in study success were rather small is intriguing. Firstly, it needs to be kept in mind that our samples come from a highly selected population of university students, whose basic level of academic skills and self-regulation can be expected to be adequate, at least. The results should, therefore, be interpreted as relative to the general level of the student population. Furthermore, the small magnitude of the differences in study success may also reflect the nature of the assessment system and its ability to detect qualitative differences in students' learning outcomes.

Naming of subgroups of students is always somewhat tricky; any label will inevitably simplify reality in one way or another. Simplification is, however, needed in order to describe the gist of the findings – groups should be named in a way that clearly differentiates them from each other in a meaningful way. We admit that we may have been rather bold when naming the profiles. The reader needs, therefore, to be reminded that the differences among student groups were not extremely high or low.

One possible explanation for the surprisingly high proportion of students reflecting maladaptive profile is that there is a mismatch between students and the learning environment. Eccles and Midgley (1989) proposed that negative developmental changes may result if the educational context does not provide developmentally appropriate educational environments for students. This kind of negative developmental fit may lead to alienation and cynicism. In Finland, where making the transition to university is very demanding it is possible that, for some students, difference between the demands of the academic environment

and the level of their competence is too big and problems may arise. On the other hand, a more positive explanation for the problems of these novice students can be presented. The students may actually experience a constructive friction (Vermunt & Verloop, 1999). This means that the learning environment, where the control is shared between the teacher and the students, challenges the students to develop their self-regulatory skills. This may provoke stress reactions, but only longitudinal studies would tell whether this assumption is coherent. Also, we would need more information about the context of the learning environment.

The questionnaire data provided valuable findings. It was considered important, however, to deepen the understanding by using a more qualitative approach. Interest may be defined as a psychological state, consisting of cognitive concentration and a positive emotion (Hidi, 2000; Hidi & Renninger, 2006; Tsai et al., 2008). Since interest always has a target, it is difficult to capture this phenomenon by using a general questionnaire. As a study psychologist, I was interested in giving students a possibility to tell about their motivational ground for their studies. In quantitative studies concerning the general meaning that students gave to their studying (Mäkinen et al., 2004), lack of interest during the first year appeared to be crucial predictor for drop out after the third year of studying. The study pace of those students who were work-life oriented, such as teacher students and medical students, appeared to be good. Stated interest has therefore shown to play a role in study progress and engagement. The qualitative data gave more insight about the nature of interest in some of those domains that were involved in the quantitative part Studies I-III of this dissertation.

Qualitative **Study IV** explored how students in three fields: arts, law, and veterinary medicine, explained their disciplinary choices and how they reflected upon possible emergent individual interest towards their field of studies. The results showed that “interest” was a typical word for the students in their explanations of their disciplinary choices. Because interest is shown to be linked to high-quality learning (see Hidi & Renninger, 2006; Krapp, 2002; 2005), the students seemed to have a good starting point for their studies. Most of the students in all three fields mentioned some general areas of interest, but only a few students of all three faculties mentioned special areas of interest. It seemed that the object of interest was rather unspecified at the beginning of studies. Since Finnish masters degree studies offer a limited number of optional courses, it may only be good that students’ interest is not too specified at the beginning of studies.

In profession oriented fields, law and veterinary medicine, future work also played a significant role in students’ explanations of their choices. Most of the disciplines in the Faculty of Arts do not provide competence for a specific career, and thus, the prospects of finding future work may be beyond the student’s focus at the beginning of the studies. Most of the answers suggested that motives connected both to studying and work: purely instrumental explanations were

rare. These results are well in line with Mäkinen et al., 2004 who showed that in academic programs aiming at professions, students often expressed a clear work-life orientation. This kind of orientation was favourable in terms of their study progress. Thus, interest aiming at future work may be interpreted positively.

This study gives us important information about the reasons students give in connection with their choices. However, in future studies we should not simply record the presence of interest but pay attention to whether, how, why, and where interest can be encouraged to develop.

3.1 Some general methodological reflections

Criticism could be expressed as to our focusing on the participants' beliefs and dispositions rather than their real-life practices. We, however, think that examining beliefs is as important as examining practices. Both perspectives are needed to form a rounded picture of human beings. Because of the explorative, cross-disciplinary, and basic research nature of the studies, we decided to use non-context-specific self-report questionnaires. Self-report questionnaires are valid instruments for measuring students' beliefs or perceptions about learning, regulation, and motivation, which were the focus of the present dissertation. In line with the research questions, students' approaches to learning were assessed with items formulated to describe what kind of studying was generally valued in studying – instead of measuring how much they reported applying such principles in practice. Trying to measure practices or strategies by self-report questionnaires would possibly cause problems with construct validity, as Boekaerts (1996) pointed out. Nieminen et al. (submitted) suggested that, intentions and activities should, at least, be measured separately, even when using questionnaires. In their recent study, they empirically demonstrated that separate measurements targeting at importance and application tapped on to different, yet related, aspects of approaches to learning.

Pintrich et al. (2000) recommended an instrument adapted at the course level, which would be a good compromise between an overly global level focusing on learning in general (the level that was adopted in our studies) and a more micro-analytic or contextual level, focused on different tasks within a course. Based on the findings of this dissertation it is possible to design future studies with more narrowly focused questionnaires, and to develop task-specific study designs in which it would be possible to examine the causal relationships among these beliefs in detail. Other types of measures, such as observations, think-aloud protocols, interviews, accuracy ratings, and diaries would also be useful when studying the actual practices of students. However, these kinds of studies are

still rare: In their review about metacognition, self-regulation, and self-regulated learning Dinsmore & et al., (2008) showed that self-report was the dominant type of measure for all the constructs, especially in self-regulation and self-regulated learning research.

Most of the inventories, just like the ones used in this study, describe studying as essentially a solitary activity of the individual. Situational and collaborative aspects of learning are not yet well integrated with the current models of university studying that underlie inventory design (Lonka et al. 2004). In other words, our studies have been, in that sense, individually oriented. In future research it is important to broaden the point of view and study the external factors that regulate student learning, such as peers and other contextual factors (Salonen, Vauras, & Efklides, 2005; Volet, Summers, & Thurman, 2009).

Unlike in the earlier Finnish studies concerning students' cognitive strategies (Eronen et al., 1998; Nurmi et al., 2003), we did not examine whole strategies. Two main components of strategies in achievement situations, success-expectations and task-irrelevant behavior, were used when building the cognitive-motivational profiles. In the light of the present findings, which indicate that the basic components of strategies are intertwined with self-regulation and approaches to learning, it would be interesting to widen the perspective by using methodologies such as the Cartoon-Attribution-Strategy-Test, CAST (Nurmi, Haavisto, & Salmela-Aro, 1997), which would enable the examining of whole strategies in relation to approaches to learning and self-regulation.

Another limitation was the correlative nature of the study. Longitudinal designs are needed to better understand the true dynamics and developmental nature of the given phenomena. Without a developmental angle is not possible to say anything about the causal relationships among the phenomena investigated in the present study. In a sense, then, the present findings provide a good starting point; a snapshot of the onset of the development of these students' motivational-cognitive profiles in the context of university studies.

3.2 Some specific methodological reflections

There were some specific methodological limitations in Study I. First, the population was not randomly selected and the response rate was rather low (50%). These limitations may constrain generalizability. On the other hand, the population was rather heterogeneous; there were students from nearly all of the faculties at the University of Helsinki and at different phases of their studies. A second limitation concerns the low reliabilities of some individual scales. It has been argued that the multidimensional nature of approaches to learning gives rise to the typically low

levels of reliabilities (Kember et al., 2004). Third, the K-means cluster analysis was used for examining what kinds of groups of students can be identified. There are several limitations in this traditional clustering method when compared with more recent clustering procedures. First, K-Means uses an ad-hoc distance measure for classification. Second, with K-Means it is not possible to use statistical criteria for determining the number of clusters and third, K-Means does not allow the use variables of mixed types of scales.

Due to these limitations in Study I, the data for Study II were collected only from first year students, and more sophisticated clustering procedure, namely latent class clustering (LCCA; Vermunt & Magidson, 2002), was applied. This was possible with the help of Markku Niemivirta. Without his expertise in these statistical methodologies and the substance, we would not be as progressive as we now are with identifying student groups.

Latent class clustering, in general, provides several advantages over the K-Means. These include probability-based classification, use of statistical criteria for determining the number of clusters, inclusion of variables of mixed types scales, and no need to standardize variables. Lately, some criticism has been presented concerning robustness of latent class clustering (Bartholomew, Steele, Moustaki, & Galbraith, 2008; DiStefano, & Kamphaus, 2006; Marsh, Lüdtke, Trautwein, & Morin, 2009). Although we agree that our current understanding of the robustness of latent class clustering is still limited, some recent simulation and method comparison studies provide rather promising results supporting the advantages of latent class clustering (Bacher, Wenzig, & Vogler, 2004; Magidson & Vermunt, 2002). In future studies, it would be interesting to compare different clustering procedures. We could, for example, apply latent class clustering to the data of Study I to examine if the classification would be supported with another clustering method.

Kember, Biggs & Leung (2004) proposed that the use of confirmatory factor analysis is recommended as a routine procedure in the development and testing of instruments. It had not been carried out in Studies I and II. To test the structure of our data and to further validate our instrument, all items in Study III were subjected to a confirmatory factor analysis. The estimated model fitted the data well, thus confirming our hypothesized structure.

3.3 Conclusions

Various factors affect students' high-quality learning outcomes and well-being. The present doctoral dissertation explored students' approaches to learning, self-regulated learning, cognitive and attributional strategies, and interest. It contrib-

utes both to current research on student learning in higher education, to a conceptual discussion in the field of educational psychology, and to the development of inventories of student learning. The empirical studies showed that combining different theoretical perspectives and methodologies enabled us to build a rich picture of university students' cognitive and motivational predispositions to studying and learning. Our results further showed that cognitive-emotional aspects contributed to study success and well-being. Three first studies formed a coherent entity, and the fourth study added value in terms of better understanding the nature of interest. In future studies, it would be fruitful to combine the concept of interest more closely to cognitive-motivational profiles. Study III showed that lack of interest was related to a problematic cognitive-motivational profile. Therefore, it would be interesting to look at the consequences of reported interest to study success in the long run. There is a need for conceptual discussion in this area of educational psychology; the findings of the present study can help us in building new integrative theories for explaining university students' learning and clarifying the concepts used in research on interest and motivation.

A person-centered approach was shown to be very useful; it allows one to describe the representativeness of the given phenomena in terms of frequencies. Our results showed that a considerable number of students seem to express a seemingly maladaptive cognitive-motivational profile. Although the corroboration of our findings is needed, from the practical point of view, educators would do well to consider this issue. Perhaps the most important educational implication of the present study is that it reminds educators about the variation that exists among students in higher education. On the basis of Studies II and III, it may be conjectured that even in highly selected populations of university students, there are those whose cognitive-motivational mindset is less than optimal. This finding is particularly significant considering that the objective of the Finnish Ministry of Education is to raise the proportion of recent upper secondary school graduates among those accepted to universities (Universities, 2005). This means that freshmen are going to be even younger and less mature. At the same time, far too many students in Finland do not graduate in time (Statistics Finland 2007).

One third of university students showed an optimal cognitive-motivational profile characterized by deep level learning, self-regulation, and optimism. These self-directed students did not suffer from stress or exhaustion and they succeeded academically. Schaufeli et al., (2002) introduced the concept of study engagement, defined as vigour, dedication, and absorption. It is possible that self-directed students experience such a positive, fulfilling state of mind. Unfortunately, most of our students do not have such rosy outlook on studying.

Previous studies on Finnish secondary school students' motivational orientations have shown that a typical student "does acknowledge the goal of mastering school subjects and the importance of grades, but is somewhat reluctant to invest

in the attainment of those goals". Such students do not seem to suffer from serious psychological stress, either (Tuominen-Soini et al., 2008, p. 260), an attitude highly similar to the profiles of *non-academic* students in Study II, and *non-reflective* students in Study III. Our results interestingly showed that even though these students did not express the characteristics that are usually associated with academic success - a such as deep understanding, critical evaluation of knowledge, and self-regulation - their study success was similar to students showing a much more adaptive cognitive-motivational profile. These results may reflect our educational systems: in universities where mass-lectures still are the main form of teaching, students are not required to personally engage themselves in learning, and in student assessments active construction of knowledge is not required. Simone Volet (2001) talks about the experiential interfaces where students' cognitions, motivations, and emotions meet the learning tasks, conventions of the field of study, instructional practices, and even societal values concerning education. It seems that there is, in fact, congruence at the interface between students and the context. How deeply these students learn, and whether they develop skills for life-long learning, is a completely different question.

A significant proportion of students expressed a fairly maladaptive cognitive-motivational profile, showing problems with regulating their studies, surface approach to learning and task-irrelevant behavior, which is a crucial element in self-handicapping. These students reported the highest levels of stress, exhaustion, and in the group of teacher students, showed the strongest preference for certain and directly applicable knowledge. Deppe and Harackiewicz (1996) demonstrated how self-handicapping prevented the participants from engaging in activity, leading instead, to a focus on performance concerns. The dynamic relations between motivational and cognitive predispositions were not directly examined in our studies, but it could be hypothesized that the non-regulating students' need to protect their self-worth caused problems of regulation and led to surface approach. For these students there seems to be incongruence at the experiential interface, meaning that the learning context is not able to support engagement and learning for these students, and reciprocally, students are not able to meet the demands of the learning environment. Even though learning environments were not investigated in the dissertation at hand, it can be hypothesized that the non-regulating first-year teacher students in Study III experienced ambivalence between their own inclinations and the demands of the highly activating educational psychology course. These would be the students most in need of support for their studies.

As the objects of interest of our freshmen are still rather unspecified, as shown in Study IV, not even deep personal interest can work as a buffer that would help them cope with the academic environment. It seems especially important in the early phases of interest development that teachers, other students, and learning tasks offer positive support (Hidi & Renninger, 2006).

In the light of all of the findings, instruction should be geared towards a variety of aims: the development of scientific thinking and argumentation, students' development as self-regulated learners, and the development of students' interest and motivational orientation. We admit that it is extremely demanding to design learning environments where all of these aspects are taken into account. Tsai et al. (2008) suggested that instruction promoting interest should include a variety of features: students' prior and conceptual knowledge should be activated, teachers should seek to take students' perspective and support their autonomy, for example by explicitly explaining the aims of learning tasks. If we are to promote deep level learning, every effort must be made to avoid threatening conditions (Fransson, 1977) and to generate a learning environment where students are encouraged to ask the questions they have in their minds.

Inducing a deep approach to learning is not an easy task. There is evidence that sometimes efforts to promote deep approach produce contradictory results (for a recent review, see Baeten, et al., 2010). The successful promotion of deep approach and self-regulated learning appears to require holistic interventions in the spirit of constructive alignment: streamlining the objectives of the curriculum, the teaching and learning methods, and the evaluation system in order to promote active knowledge construction (Biggs, 1996). Even our brightest students are not free from motivational and emotional frustration. High-quality educational programs should, therefore, also offer individual guidance and counseling to support students on their way to become academic experts.

The findings indicate that meaningful, engaged, and productive learning is supported by a variety of interrelated phenomena. Consequently, simple solutions to instructional challenges are unlikely to emerge. For a curriculum to be successful, it needs to employ a variety of strategies for promoting the regulation of high-quality learning.

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