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Stability and change in achievement goal orientations: A person-centered approach

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ABSTRACT

Two longitudinal studies used a person-centered approach to examine the stability and change in students' achievement goal orientations within a school year (i.e., during 9th grade; measurement period 4 months, $N = 530$) and between school years (i.e., across 11th and 12th grade; measurement period 12 months, $N = 519$). Distinct groups of students with different motivational profiles were extracted in both studies with considerable consistency in profiles across the two academic contexts (i.e., lower and upper secondary school). Four groups of students were identified in both studies: indifferent, success-oriented, mastery-oriented, and avoidance-oriented. Students' motivational profiles were substantially stable; about 60% of all students displayed a stable motivational profile over time. Furthermore, most changes in the group memberships were directed towards similar groups. Findings support the conception of achievement goal orientation as an enduring disposition that reflects students' generalized beliefs and tendencies to select certain goals and to favor certain outcomes.

1. Introduction

Achievement goal research is a prominent approach to motivation. Yet, achievement goal theorists have differed notably in their conceptualizations of goals and, consequently, the research has been heterogeneous. Basically, it has been divided into two conceptualizations: one perspective looks at achievement goals in terms of enduring dispositions (i.e., achievement goal orientations), while the other places more emphasis on the situation- and task-specific nature of goals. This study represents the former. In our view, it is crucially important to understand the nature of individual differences in the development of motivational tendencies, and since the issue of stability and change in achievement goals over time is somewhat overlooked in the field, a longitudinal person-centered approach was utilized in the present study. Thus, our major aim was to examine the stability and change in students' achievement goal orientation profiles.

1.1. Achievement goals versus achievement goal orientations

The research on achievement goals largely originates from the works of Dweck (1986) and Nicholls (1984). They both defined achievement goals as the purposes for which individuals engage in achievement behavior. This perspective suggests that differences in specific self-schemas, relatively enduring individual knowledge structures, provide foundation for different goal orientations. Dweck and her colleagues (Dweck, 1986; Dweck & Leggett, 1988) argued that goal orientations are reflected in individuals' theories of the nature of intelligence and that different theories about oneself would lead to the adoption of different goals. More specifically, the theory of intelligence as malleable produces an orientation toward developing competence (i.e., mastery goal orientation), whereas the theory of intelligence as a fixed, uncontrollable entity orients the individual toward a concern with demonstrating competence (i.e., performance goal orientation).

Conversely, Nicholls (1984) suggested that goals set in motion an approach to success and that conceptions of ability flow from these goals. That is, employing the undifferentiated conception of ability (i.e., that more effort leads to more ability) would be associated with task-involvement (mastery goal orientation) and using the differentiated conception of ability (i.e., that effort and ability are inversely related) would be linked to ego-involvement (performance goal orientation). Nicholls' perspective further emphasized the role of the experienced environment in the employment of different conceptions of ability and in goal adoption, and, although he defined actualized motivation in terms of situationally induced goal states, he also argued for relatively stable individual differences in task- and ego-related motivational tendencies. These were taken to reflected more generalized goal preferences, task and ego orientations, respectively (Nicholls, 1989).

Both Dweck and Nicholls thus acknowledged that which specific goals students pursue in a given situation depend on the

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interaction of dispositional tendencies and situational cues, although their emphases on these two factors were different. They also both predicted that performance goals should get more prominent as children go through school. According to Dweck (1999) this is because children develop a more entity view of intelligence as they get older, whereas according to Nicholls (1990) this is in part because of developmental changes in their conceptions of ability and, in part, because of systematic changes in school context.

A decade later, Elliot (1999) took an explicit step towards a more situation- and task-specific approach by defining achievement goal as a specific type of goal, one in which the focal end state or result is competence. This definition keeps the reason for achievement behavior separate from the aim of achievement behavior; it is the aim that is construed as representing the goal construct (Elliot & Thrash, 2001). Elliot further differentiated achievement goals on two basic dimensions: according to how competence is defined and according to how competence is valenced. When viewed from a hierarchical standpoint (Elliot, 2006), the achievement goals are posited to emerge from more general motives (e.g., the need for achievement and fear of failure), self-conceptions and theories (e.g., entity and incremental theories of ability), and environmental emphases (e.g., classroom goal structures).

To sum up, these different approaches have led to heterogeneous research in terms of conceptualizations of goals and underlying theoretical and meta-theoretical assumptions that guide empirical investigations. In our conceptualization, we have focused on achievement goal orientations as individual differences reflecting people's generalized goal and outcome preferences. Our view here is similar to that of Dweck's (1992), which differentiates the specific outcomes individuals pursue in particular settings from the "more superordinate classes of goals that are behind the particular outcomes individuals strive for" (Dweck, 1992, p. 165; see also Nicholls' (1989), discussion on individual differences in goal orientations). In our view, specific goals represent objects, events, states, or experiences one seeks to attain, whereas goal orientations refer to a disposition that manifests itself in the individual's propensity to select certain goals and to favor certain outcomes; it reflects individuals' preferences for particular types of desired end-states (Niemivirta, 2002b; Tuominen-Soini, Salmela-Aro, & Niemivirta, 2008). This implies that over time, people learn to value the consequences of certain outcomes, for example, through need satisfaction, and therefore begin to favor goals that help to attain those given outcomes. Naturally, situational and environmental cues influence the extent to which certain preferences become activated and how people respond to those cues.

Originally, a distinction between two types of goals were made (Dweck, 1986; Nicholls, 1984). The mastery goal referred to the purpose of developing competence or task mastery, whereas the performance goal referred to the purpose of demonstrating competence relative to others (Ames, 1992; Dweck, 1986). Later research expanded this dichotomous scheme by describing other goals related to achievement behavior. For example, based on the assumption that not all students are positively motivated in the classroom, Nicholls and his colleagues (Nicholls, Patashnick, & Nolen, 1985; Nolen, 1988) formulated yet another distinct class of goals, namely work avoidance goals. The purpose associated with this goal was effort reduction by avoiding challenging tasks, putting forth as little effort as possible and trying to get away with it. Grounding on the distinction between approach and avoidance valence, performance goal was further differentiated into performance-approach (directed at demonstrating competence) and performance-avoidance goals (directed at avoiding the demonstration of incompetence) (Midgley et al., 1998). Similar distinction has also been assigned to mastery goals, although the avoidance component of mastery goals remain yet somewhat undefined theoretically and operationally (e.g., Elliot & McGregor, 2001; Pintrich, 2000). Other mastery-related nuances include mastery-extrinsic goals (Niemivirta, 2002b) and outcome goals (Grant & Dweck, 2003). The mastery-extrinsic goals (see Niemivirta, 2002b) refer to the tendency of using external criteria such as grades or explicit feedback for evaluating whether one has attained the given goal of mastering a subject or learning a new thing. Students holding these tendencies want to master school subjects and they focus on absolute success instead of relative success, not necessarily due to its instrumental value, but rather due to the fact that good grades imply mastery and learning.

Despite the general consensus, some disparities exist as to which goals and orientations truly reflect *achievement*-related goals and orientations. In a sense, the roots of these distinctions can be seen to stem from two different perspectives into the subject; one that is linked with the achievement context (e.g., Nicholls, Ames) and another that grounds on some competence-related qualities assigned to goals (e.g., Elliot). Although the classification of relevant goals is mostly overlapping across these perspectives, some crucial differences exist. The latter for example does not incorporate work avoidance goals into the classification because such goals do not fit the classification scheme (i.e., do not reflect competence-related strivings and cannot be classified according to valence and definition of success). However, and in line with the former perspective, such avoidance tendencies are nevertheless strongly present in the authentic educational setting, and thus reflect individuals' attempts to cope with *achievement*-related demands inherent in the classroom (Thorkildsen & Nicholls, 1998).

As implied by the above brief overview, most studies have examined the role of achievement goals and orientations from a variable-centered perspective. That is, how specific achievement goals or goal orientations relate to specific motivational and achievement-related outcomes. However, if achievement goal orientation is conceptualized as consisting of several types or dimensions that we all share, but which vary in terms of individual importance, the relative emphasis on one or more of them may become more relevant than an individual dimension. Therefore, and in accordance with the multiple goals perspective (e.g., Niemivirta, 2002b; Pastor, Barron, Miller, & Davis, 2007; Pintrich, 2000; Seifert, 1996; Tuominen-Soini et al., 2008), we will here focus on goal orientation configurations rather than on individual orientations.

1.2. The stability and change in achievement goal orientations

The conceptual ambiguities in achievement goal research are also reflected in how goal stability has been addressed. When focusing on achievement goal orientations, the issue of stability and change is relatively self-evident. As the function of generalized tendencies is to provide continuity and effortless information processing (see Bargh & Barndollar (1996), for a discussion on automotives and chronic goals), one should also expect relative stability in students' goal orientations. However, when looking at situation- and task-specific goals, the role and meaning of stability is less clear. Here, stability is not an intrinsic property of the object (the *task-specific* goal itself), but rather an indirect function of either the situation (e.g., similar courses or classroom environments result in similar goals within individuals) or some other individual difference factors (e.g., motives that induce the adoption of certain goals).

Probably due to these conceptual ambiguities, relatively few empirical studies have investigated the longitudinal stability of either goals or goal orientations (for exceptions see Fryer & Elliot, 2007; Muis & Edwards, 2009) and when stability has been assessed it has often been more a by-product rather than an end in itself. Nevertheless, studies that explicitly examined differential

continuity (Anderman & Midgley, 1997; Anderman & Anderman, 1999; Bong, 2005; Fryer & Elliot, 2007; Meece & Miller, 1999, 2001; Muis & Edwards, 2009; Seifert, 1996; Senko & Harackiewicz, 2005) as well as studies that primarily addressed some other research questions (Bouffard, Boisvert, Vezeau, & Larouche, 1995; Dykman, 1998; Elliot & McGregor, 2001; Grant & Dweck, 2003; Middleton, Kaplan, & Midgley, 2004; Roeser, Midgley, & Urdan, 1996; Stipek & Gralinski, 1996; VandeWalle, 1997; Wolters, Yu, & Pintrich, 1996) both evidence moderate to high stability – as indexed by a correlation between two measurement points – in achievement goals or goal orientations over time. However, what exactly underlies the stability found in studies following different theoretical logic remains somewhat less clear.

Although there seems to be reasonable degree of stability in students' achievement goals over time, the presence of moderate to high rank-order stability does not exclude the possibility of mean level changes even within the same samples. Several studies suggest that students become less oriented towards mastery goals both within a school year (Fryer & Elliot, 2007; Meece & Miller, 1999, 2001; Shim, Ryan, & Anderson, 2008), between school years (Bråten & Olaussen, 2005; Meece & Miller, 1999), and across an educational transition (Anderman & Midgley, 1997; Anderman & Anderman, 1999). However, few studies show that students' mastery orientation remains largely stable within school years (Bong, 2005; Seifert, 1996; Smith, Sinclair, & Chapman, 2002).

Regarding performance goals, the results are more divergent suggesting that these goals may decrease within school years (Meece & Miller, 1999, 2001; Seifert, 1996) and between school years (Meece & Miller, 1999), or remain stable (Anderman & Midgley, 1997) or increase (Anderman & Anderman, 1999) across an educational transition. When performance orientation has been differentiated into separate approach and avoidance components, performance-approach orientation has decreased (Shim et al., 2008; Smith et al., 2002) or remained stable (Bong, 2005; Fryer & Elliot, 2007) and performance-avoidance orientation has decreased (Shim et al., 2008) or increased (Fryer & Elliot, 2007; Smith et al., 2002) within school years.

In sum, the results concerning goal stability are diverse; achievement goal endorsement seems to be stable to some degree, but it also seems to change or vary over time. A straightforward interpretation of current findings is rather difficult because of the several sources of conceptual and empirical variation found in the research. In current literature, researchers typically conceptualize achievement goals within either a trichotomous framework (i.e., mastery, performance-approach, and performance-avoidance goal orientations) or a 2×2 framework (i.e., mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance goal orientations), but in prior literature, researchers often used constructs of mastery goal orientation and performance goal orientation without separating the approach and avoidance components. Some achievement goal measures focus on specific learning tasks (i.e., one learning assignment) and some on studying in general, and sometimes the correspondence between how the goals are conceptualized and how they are operationalized is deficient. Also, the educational contexts have varied and the intervals between the measurement points have differed considerably in different studies, ranging from a couple of weeks to several years. And, finally, the age of participants has varied across studies, ranging from elementary school students to university students. All these differences and ambiguities are likely to introduce variability in the results on goal stability. Nevertheless, despite the above concerns, some common lines of findings can be identified. Studies that consider achievement goal orientations as enduring dispositions that reflect individual's generalized beliefs or tendencies and use measures operationalized on the same level (i.e., focus on studying and learning in general), demonstrate stability in achievement goal orientations over time (e.g., Anderman & Midgley, 1997; Anderman & Anderman, 1999; Seifert, 1996). Furthermore, even studies that focus on specific goals and use corresponding measures (i.e., focus on task- or class-specific goals) demonstrate stability over time (e.g., Elliot & McGregor, 2001; Fryer & Elliot, 2007; Meece & Miller, 2001; Senko & Harackiewicz, 2005). However, virtually all these studies have deployed a variable-centered approach to the study of individual differences in the development of motivation and, hence, focused on the stability and change in individual goals or goal orientations. This, in our view, is a major limitation, which we will seek to address by examining stability and change in achievement goal orientations from a person-centered perspective.

1.3. The present research

Despite the extensive research on achievement goals, there are several limitations to the existing research on the development of achievement goal orientations. First, more studies are needed that use longitudinal designs to investigate the stability and change in achievement goal orientations. Second, it would be important to address the questions concerning individual development over time through a person-centered approach (Bergman, Magnusson, & El-Khouri, 2003) and focus on the relative emphasis of different motivational tendencies and classify students into homogenous groups with similar profiles across the various dimensions of achievement goal orientation (for cross-sectional studies profiling students on different dimensions of achievement goals, see Liu, Wang, Tan, Ee, & Koh, 2009; Niemivirta, 2002a; Pastor et al., 2007; Tuominen-Soini et al., 2008; Wang, Biddle, & Elliot, 2007). Moreover, the majority of studies have investigated longitudinal changes in achievement goal orientations among younger students (e.g., elementary and middle school students) and so it would be important to investigate it among older students (e.g., high school students), as well.

The major aim of the present study was to examine the long-term stability of lower and upper secondary school students' achievement goal orientation profiles. Consequently, we aimed at complementing the prior work, first, by utilizing a person-centered approach and, second, by deploying the clustering-by-states method for longitudinal data (I-States as Objects Analysis; Bergman & El-Khouri, 1999), which has not, to our knowledge, been used in other studies examining achievement goal orientations. In other words, we examined developmental change in motivation as a function of multiple goals, that is, with regard to shifts within a person's goal configurations. Further, we wanted to investigate the development of achievement goal orientations among older adolescents, and hence, the participants of this study were about 15- and 17-year-old students. Finally, we examined the development of achievement goal orientations preceding transitions and, also, both within a school year (Study 1) and between school years (Study 2).

2. Study 1

2.1. Aims

The current study used a longitudinal person-centered approach to examine the temporal stability and change in students' achievement goal orientations within a school year, that is, during the final year of lower secondary school. The specific research questions were:

(1) What kinds of achievement goal orientation profiles can be identified among lower secondary school students during the 9th grade?

(2) How stable are achievement goal orientation profiles during the 9th grade? How do the profiles change? What are the typical and conversely untypical developmental trajectories of change?

Based on prior work (Niemivirta, 1998, 2002b; Tuominen, Salmela-Aro, Niemivirta, & Vuori, 2004; Tuominen-Soini et al., 2008), we expected certain achievement goal orientation profiles to emerge. First, we expected to find groups with an emphasis on mastery, performance, and avoidance, that is, groups with a dominant tendency towards a single goal orientation. In addition, we anticipated a large group with an emphasis on a combination of these goal orientations. We further expected that goal orientation would remain largely stable during the measurement period. Previous studies have exhibited moderate to high stability in goal orientation within a school year (Bong, 2005; Elliot & McGregor, 2001; Fryer & Elliot, 2007; Nolen & Haladyna, 1990; Seifert, 1996; Senko & Harackiewicz, 2005; Stipek & Gralinski, 1996; Wolters et al., 1996).

2.2. Method

2.2.1. Context and participants

This study is part of the ongoing Finnish Educational Transitions (FinEdu) Studies. In Finland, the comprehensive school is a 9-year compulsory general schooling for all children aged 7–16. It is comprised of primary school (Grades 1–6) and lower secondary school (Grades 7–9).

The data were collected from all the lower secondary schools in one city in Eastern Finland. The participants were 15-year-old ($M = 15.00$, $SD = 0.19$) ninth grade students. At the first measurement point, 707 students returned their questionnaires. A total of 530 students (75% of the original sample, 269 girls and 261 boys) participated in the study at both measurement points and had complete achievement goal orientation information and were consequently included in the final sample. Independent samples t-tests were performed in order to examine whether the students in the final sample and the students with incomplete data differed in their achievement goal orientations in Time 1. The only minor difference was found on mastery-extrinsic orientation ($t(224.86) = 2.90$, $p < .01$) favoring the participants with full data ($M = 5.41$, $SD = 1.19$) over the ones with incomplete data ($M = 5.06$, $SD = 1.36$). No differences were found on mastery-intrinsic orientation ($t(686) = 1.61$, $p = .108$), performance-approach orientation ($t(688) = 0.99$, $p = .325$), performance-avoidance orientation ($t(688) = 1.06$, $p = .290$), and avoidance orientation ($t(242.62) = -1.72$, $p = .087$).

2.2.2. Measures

2.2.2.1. Achievement goal orientations. We used the instrument by Niemivirta (2002b), which distinguishes five achievement goal orientation scales. The scale for *mastery-intrinsic orientation* comprised three items assessing students' focus on learning, understanding and gaining competence (e.g., "To acquire new knowledge is an important goal for me in school"). The scale for *mastery-extrinsic orientation* comprised three items assessing students' aspiration on getting good grades and succeeding in school (e.g., "My goal is to succeed in school"). The scale for *performance-approach orientation* comprised three items assessing students' focus on relative ability and judgments of competence (e.g., "An important goal for me in school is to do better than other students"). The scale for *performance-avoidance orientation* comprised three items assessing the avoidance of demonstrating normative incompetence (e.g., "I try to avoid situations in which I might fail or make a mistake"). Finally, the scale for *avoidance orientation* (referring to work avoidance; see Nicholls et al., 1985; Nolen, 1988) comprised three items reflecting students' desire to avoid achievement situations and to minimize the effort and time spent on studying (e.g., "I try to get away with as little effort as possible in my school work"). Students rated all items using a 7-point Likert-type scale ranging from 1 (*Not true at all*) to 7 (*Very true*). A small percentage of data points were omitted on one occasion or the other. The missing values in achievement goal orientation measures were imputed by expectation–maximization (EM) algorithm as implemented in the SPSS statistical program. Only 0.8% of the item scores measuring achievement goal orientations were missing, the majority of which consisted of one missing item per questionnaire. Composite scores were computed for each scale by averaging the scale sum scores. The Cronbach alpha reliabilities at the two measurement points were .88 and .85 for mastery-intrinsic orientation; .85 and .87 for mastery-extrinsic orientation; .69 and .73 for performance-approach orientation; .82 and .83 for performance-avoidance orientation; and .72 and .73 for avoidance orientation.

2.2.2.2. Additional motivational indices. For validation purposes, we added other relevant motivational indices and academic achievement as criterion variables. It was assumed that these variables would obtain different patterns of correlations with the five achievement goal orientations. The scale for *school value* (Niemivirta, 2004) comprised three items assessing students' perceived importance, utility, and interestingness of school going and studying (e.g., "I think going to school is a waste of time", reversed item). The scale for *fear of failure* (Niemivirta, 2002b) comprised three items assessing students' preoccupation with possible failures in school (e.g., "I always worry about failing in tests and exams"). The scale for *academic withdrawal* (Niemivirta, 2002b) comprised three items reflecting students' generalized tendency to withdraw from demanding school tasks or to give up easily (e.g., "I have realized that I give up easily if school tasks are difficult"). All items were rated using a 7-point Likert-type scale ranging from 1 (*Not true at all*) to 7 (*Very true*). The Cronbach alpha reliabilities at the two measurement points were .73 and .76 for school value; .80 and .79 for fear of failure; and .72 and .76 for academic withdrawal. Students' self-reported grade point average (GPA) was used as a measure of their *academic achievement*, because no register data were available. Academic achievement for Time 1 was assessed at Time 1 by asking students to report their GPA from the preceding term (i.e., 8th grade). One year following the actual data collection of Time 2, the students were asked to report their GPA from the preceding term (i.e., 9th grade) and these estimates were then used as indices for the students' academic achievement at Time 2. The categorized scale for GPA ranged from 1 (=lowest) to 8 (=highest).

2.2.3. Procedure

The participants completed self-report questionnaires on achievement goal orientations and additional motivational indices twice during the 9th grade (January and May 2004). Questionnaires were administered to students in school during regular class sessions.

2.2.4. Data analyses

First, analyses concerning structural stability, stability in mean levels, and normative stability were conducted using longitudinal confirmatory factor analysis. Second, following a person-centered approach (Bergman et al., 2003), students with similar patterns of achievement goal orientation were identified through latent profile analysis (LPA; Vermunt & Magidson, 2002). Third, a configural frequency analysis (von Eye, Spiel, & Wood, 1996) was used to examine the stability of and changes in group memberships from Time 1 to Time 2.

2.2.4.1. Longitudinal confirmatory factor analysis. Before moving onto the identification of achievement goal orientation profiles, analyses concerning structural stability, stability in mean levels, and normative stability were conducted using longitudinal confirmatory factor analysis (LCFA). It must be ensured that the same thing at each measurement point is assessed, in other words, sufficient measurement invariance over time is established. After that, the change in mean levels can be assessed. Furthermore, the normative stability of the construct must be addressed. This refers to the degree to which the relative ordering of the subjects on the variable remains constant over time; high correlations across time reflect high stability in relative individual differences.

In the present study, LCFA was performed on items reflecting achievement goal orientations in Time 1 and Time 2. The procedure for testing invariance involved testing and comparing six models that imposed successive equality restrictions on model parameters. Model 1 tested the equality of the overall factorial structure over time. Model 2 was identical to Model 1 except that like items' factor loadings were constrained as invariant across measurement points. A comparison of the goodness-of-fit between these models constituted a test of metric invariance over time. Model 3 included the restrictions from Model 2 plus the additional constraint of equal internal consistency (same quality of measures) over time. Model 4 was identical to Model 3 except for the additional constraint of invariant intercepts imposed across measurement points for like items. A comparison between Models 4 and 3 evaluated the hypothesis of scalar invariance over time. Model 5 imposed the additional constraint of invariant construct variances over time. Finally, Model 6 was the most restrictive model tested and included the additional constraint of invariant latent means over time. LCFA was performed using the M*plus* statistical package (Muthén & Muthén, 1998–2006).

Invariance is tested by comparing the goodness of fit statistics of a particular model with a model having additional constraints. The combination of the following indices was used here to evaluate overall model fit: Comparative Fit Index (CFI; Bentler, 1990) with a cutoff value of around .95, the root mean square error of approximation (RMSEA; Steiger, 1990) with a cutoff value of <.06, and the standardized root mean square residual (SRMR; Hu & Bentler, 1998) with a cutoff value of <.09. In order to take into account the slight non-normality of the sample data, maximum likelihood parameter estimates with robust standard errors and mean-adjusted chi-square test statistics (S–B χ^2) were used for analyzing mean and covariance structures (Satorra & Bentler, 1994). To calculate Δ S–B χ^2, parallel analyses with both robust estimators and ordinary maximum likelihood estimates were run. For assessing comparative model fit, the chi-square difference tests with the Satorra–Bentler scaled chi-square were performed using the method described by Satorra (2000). With respect to Model 6b, the amount of change in latent factor means over time was assessed by calculating Cohen's *d*.

2.2.4.2. Correlational analyses. Correlational analyses were performed in order to examine the convergent and discriminant validity of the achievement goal orientations.

2.2.4.3. Latent profile analysis. The present study used a person-centered approach to investigate what patterns of achievement goal orientations students show, how stable such patterns are, and how big a proportion of students show a particular pattern. In person-centered approach, the goal is to group individuals into categories, each one of which contains individuals who are similar to each other and different from individuals in other categories (Muthén & Muthén, 2000). In order to identify the cluster membership in longitudinal data (for a similar perspective, see Janson & Mathiesen, 2008; Lerkkanen, Rasku-Puttonen, Aunola, & Nurmi, 2004; Nurmi & Aunola, 2005), we used the ISOA procedure (I-States as Objects Analysis) proposed by Bergman and his colleagues (Bergman & El-Khouri, 1999, 2003; Bergman et al., 2003). According to this procedure, the patterns of the variables, described as "states", can be identified disregarding the time dimension and this classification can be used to describe individual development (Bergman et al., 2003). ISOA is optimal for studying short-term development (Bergman et al., 2003).

As a first step, we reorganized our longitudinal data and created a new file in which the data for each student for both measurement points was coded as a separate case. Second, for this reorganized data, we carried out a series of latent profile analyses (LPA; Muthén & Muthén, 2000; Vermunt & Magidson, 2002) in order to identify students with similar patterns of achievement goal orientation. Composite scores were used in the latent profile analyses. LPA is a probabilistic or model-based variant of traditional cluster analysis (Vermunt & Magidson, 2002), which goal is to identify the smallest number of latent classes (groups) that adequately describe the associations among observed continuous variables (achievement goal orientations). In the analyses, classes are added stepwise until the model optimally fits the data. For choosing the best fitting model, Bayesian Information Criterion (BIC) and Vuong–Lo–Mendell–Rubin (VLMR) likelihood ratio test were used as the statistical criteria. The model with the minimum values of the information criteria is considered to be the model of choice. The Vuong–Lo–Mendell–Rubin likelihood ratio test also provides a standard of comparison for ascertaining the preferred number of classes in a model (Lo, Mendell, & Rubin, 2001). The *p* value provided by the test indicates the probability that the H_0 model, the model with one less class, is tenable. A resulting *p* value less than .05 indicates that the estimated model is preferable over the reduced model. Furthermore, the usefulness and interpretableness of the latent classes (e.g., the number of individuals in each class) in the solutions were also considered to be criteria for choosing the best fitting model. The analyses were carried out using the M*plus* program (Muthén & Muthén, 1998–2006). In the LPA models, covariances were allowed to vary across clusters. Finally, the data (cluster membership) were reorganized in such a way that the data for each student at both measurement points were again handled as two successive measurements of the same individual.

2.2.4.4. Analysis of variance. After having established the different achievement goal orientation profiles, we conducted one-way ANOVAs in order to examine group differences in other motivational indices. ANOVAs were performed separately for Time 1 and Time 2.

2.2.4.5. Configural frequency analysis. In order to examine the stability of and changes in the group memberships from Time 1 to Time 2, a configural frequency analysis (CFA; von Eye, 1990) was carried out. CFA compares the observed to expected frequencies in a cross-tabulation and asks whether cell frequencies are larger or smaller than could be expected based on some chance model. In the present study, the base model selected for frequency comparison was the first order CFA, which assumes that all variables under study may show main effects, and are totally independent of each other (von Eye, 1990; von Eye et al., 1996). By means of CFA, we searched for typical and atypical patterns. Type is a pattern that is observed more frequently than expected by chance and antitype is a pattern that is observed less frequently than expected by chance. The question was, on one hand, whether there are any specific classes that individuals tend to stay in more frequently than would be expected by chance alone (i.e., individual stability), and on the other hand, whether there is movement between classes that cannot be ascribed to chance fluctuations (i.e., individual change).

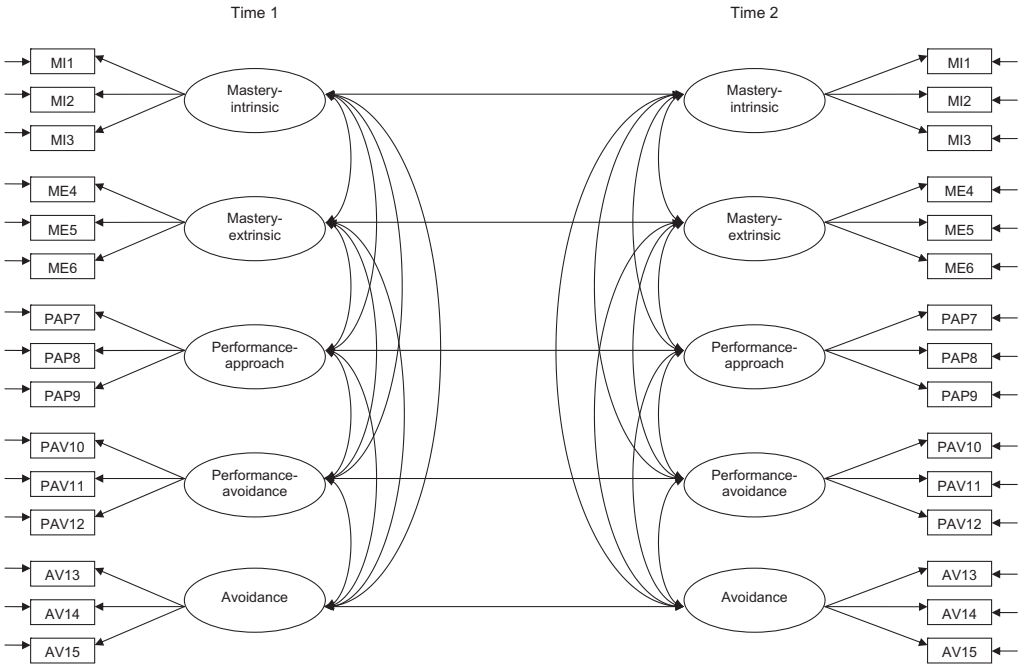

Fig. 1. The measurement model for scales assessing achievement goal orientations (Studies 1 and 2). *Note*. For the sake of clarity, freely estimated covariances between parallel error terms are omitted from the figure.

2.3. Results

2.3.1. Stability of achievement goal orientations

2.3.1.1. Structural stability. A model for the subsequent invariance analyses[1] is illustrated in Fig. 1 and the standardized factor loadings, and residual variances for the chosen measurement model are presented in Appendix A. The fit indices for the models tested are presented in Table 1. All of the subjective fit indices exceeded recommended criteria, and hence, suggested a good model-data fit for all six of the models within the invariance routine. Furthermore, we then compared the fit of the models. An acceptable fit of Model 1 indicated configurally invariant factor structure over time. Metric invariance was achieved; the model with equal factor pattern and loadings across measurement points (M2) fit the data better than the unconstrained model (M1) did. The model with equal internal consistency (M3) fit the data better than the previous model (M2). Furthermore, Model 4 fit the data better than Model 3, and consequently, scalar invariance was achieved. The test for equivalence of factor variance (M5) did appear to be viable, also. To sum up, there was evidence for the invariance of the overall factorial structure (M1), factor loadings (M2), internal consistency (M3), item intercepts (M4), and construct variances (M5) across the measurement points.

2.3.1.2. Stability in mean levels. The results of LCFA indicated that the test for equivalence of factor means (M6) was not supported. Although the chi-square difference test between Model 6 and Model 5 was significant, the subjective fit indices were acceptable for Model 6, also. Based on modification indices, three latent factor means were freed. These were the ones that had changed the most over time, that is, the latent means of mastery-intrinsic (Time 1 $M = 5.31$, $SD = 1.02$; Time 2 $M = 5.17$, $SD = 1.02$; $p < .05$, $d = 0.14$), mastery-extrinsic (Time 1 $M = 5.33$, $SD = 1.11$; Time 2 $M = 5.03$, $SD = 1.11$; $p < .001$, $d = 0.27$), and performance-avoidance (Time 1 $M = 4.11$, $SD = 1.43$; Time 2 $M = 3.90$, $SD = 1.43$; $p < .05$, $d = 0.15$) orientations, respectively, which all decreased slightly. This modification significantly improved the model fit (M6b).

2.3.1.3. Normative stability. Disattenuated correlations between the latent constructs across the measurement points were .61 for mastery-intrinsic orientation, .69 for mastery-extrinsic orientation, .68 for performance-approach orientation, .63 for performance-avoidance orientation, and .67 for avoidance orientation. The squared multiple correlations (R^2) for the five factors were .37, .48, .46, .40, and .45, respectively. As demonstrated by high disattenuated correlations between the latent constructs across the measurement points, the results indicated quite substantial normative stability in achievement goal orientations over time.

2.3.2. Correlational results

The correlational results (see Appendix B) demonstrate the slightly different patterns of associations for mastery-intrinsic and mastery-extrinsic orientations. For example, mastery-intrinsic and mastery-extrinsic orientations were positively related to school value and academic achievement and negatively related to academic withdrawal, but they were differently related to fear of failure; mastery-extrinsic orientation was positively related to fear of failure, while mastery-intrinsic orientation was not related to it. Also, there were clearly different patterns of associations for mastery-extrinsic and performance-approach orientations. For instance, mastery-extrinsic orientation was positively related to school value, while performance-approach orientation was not related to school value at Time 1 and negatively related to school value at Time 2. Also, performance-approach orientation had a stronger association with fear of failure than mastery-extrinsic orientation. Moreover, mastery-extrinsic orientation had a negative association with academic withdrawal, while performance-approach orientation had a positive association with academic

[1] First, cross-sectional confirmatory factor analyses on achievement goal orientations were performed separately for the two time points to verify the acceptability of the measurement of the constructs. The model fit the data well at Time 1, χ^2 (80, $N = 530$) = 232.12, $p < 0.001$, CFI = .96, RMSEA = .060, SRMR = .050, and at Time 2, χ^2 (80, $N = 530$) = 238.12, $p < 0.001$, CFI = .96, RMSEA = .061, SRMR = .052.

Table 1
Goodness of fit statistics for alternative models (Study 1).

Model	Hypothesis	χ^2 MLM	df	CFI	RMSEA	SRMR	Hypothesis test	Δ S–B χ^2	Δdf	*p*
M1	Configural invariance	568.474	345	.97	.035	.050	Overall fit			
M2	Metric invariance	576.075	355	.97	.034	.051	M2-M1	6.271	10	0.792
M3	Equivalence of residual variance	601.158	370	.97	.034	.051	M3-M2	25.205	15	0.047
M4	Scalar (item intercept) invariance	615.594	380	.97	.034	.051	M4-M3	13.780	10	0.183
M5	Equivalence of factor variance	623.702	385	.97	.034	.054	M5-M4	8.042	5	0.154
M6	Equivalence of factor means	677.697	390	.96	.037	.057	M6-M5	65.918	5	0.000
M6b	M6 + 3 factor means free	628.853	387	.96	.034	.054	M6b-M5	5.619	2	0.060

Note. CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; Δ S–B χ^2 = chi-square difference test with the Satorra–Bentler scaled chi-square.

Table 2
Information criteria values for different class solutions (Study 1).

Number of classes	BIC	p_{VLMR}
1	17876.365	–
2	17251.317	0.0000
3	17117.813	0.0864
4	16971.394	0.0560
5	16955.046	0.7030

Note. BIC = Bayesian information criterion, p_{VLMR} = Vuong–Lo–Mendell–Rubin likelihood ratio test.

withdrawal. Finally, the patterns of associations were different for performance-avoidance and avoidance orientations; avoidance orientation had a stronger negative association with school value and academic achievement compared to performance-avoidance orientation, while performance-avoidance orientation had a stronger positive association with fear of failure than avoidance orientation.

2.3.3. Achievement goal orientation profiles

The first main goal of this study was to examine what kinds of achievement goal orientation profiles can be identified among lower secondary school students. The results from a series of LPAs showed that the four-class solution fit the data best (see Table 2 for fit indices). The average individual posterior probabilities for being assigned to a specific latent class (see Appendix C) were 0.84, 0.87, 0.83, and 0.88, respectively, and the entropy value was 0.73, which indicate that the four-class model provided a clear classification. The four groups were labeled, according to the score mean profiles, as *indifferent, success-oriented, mastery-oriented*, and *avoidance-oriented* (see Fig. 2). The students in the *indifferent* group (I-States $N = 415$, 39%; Time 1 $N = 204$, 38%; Time 2 $N = 211$, 40%) represented a prototypical student in the sample with a joint emphasis on both mastery and performance and avoidance (see Table 3 for pairwise comparisons on raw mean values and Appendix D for descriptive statistics for Time 1 and Time 2). *Success-oriented* students (I-States $N = 328$, 31%; Time 1 $N = 187$, 35%; Time 2 $N = 141$, 27%) expressed high levels of mastery-extrinsic, mastery-intrinsic, and performance-approach orientations. They seemingly strived for both absolute and relative success, although they considered the goal of learning and understanding important as well. *Mastery-oriented* students (I-States $N = 186$, 18%; Time 1 $N = 90$, 17%; Time 2 $N = 96$, 18%) emphasized mastery-intrinsic orientation and mastery-extrinsic orientations but had low scores on performance-approach, performance-avoidance, and avoidance orientations. Hence, an important goal for them in school was to learn and understand as much as possible, yet they also stressed the importance of getting good grades. *Avoidance-oriented* students (I-States $N = 131$, 12%; Time 1 $N = 49$, 9%; Time 2 $N = 82$, 15%) scored high on avoidance orientation and, in contrast, very low on mastery-intrinsic and mastery-extrinsic orientations. They mainly aimed at minimizing the effort and time spent on studying.

2.3.4. Differences in additional motivational indices

In order to further describe the characteristics of the motivational profiles, we examined how students with different achievement goal orientation profiles differed with respect to other

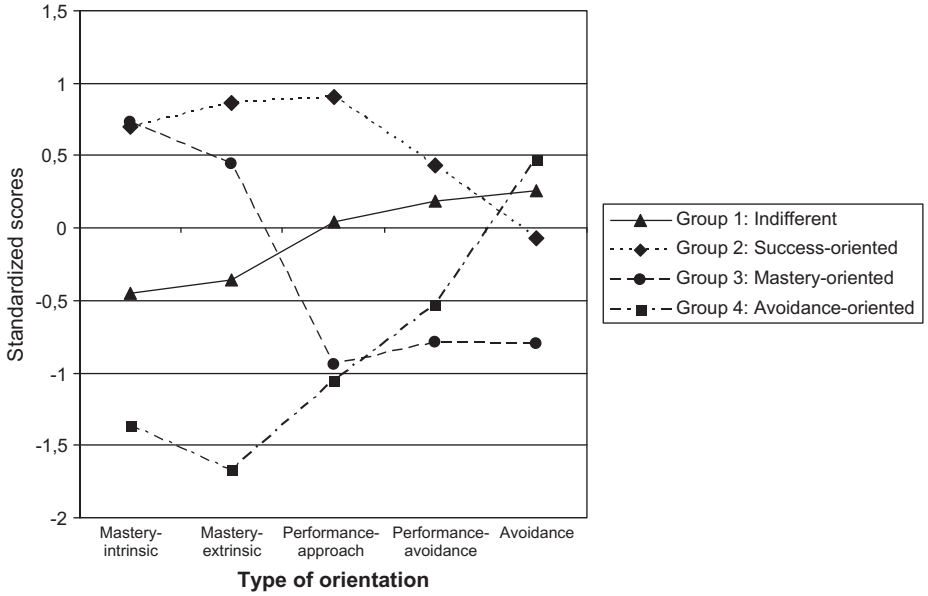

Fig. 2. Lower secondary school students' standardized mean scores on achievement goal orientation scales as a function of group membership (Study 1).

relevant motivational indices. All effects and the mean differences between goal orientation groups are summarized in Table 4. The results showed that goal orientation groups differed significantly in school value, fear of failure, academic withdrawal, and academic achievement. The pairwise comparisons of means revealed that mastery-oriented students displayed highest school value, followed by success-oriented students. Avoidance-oriented and indifferent students had equally low scores in school value. With respect to fear of failure, success-oriented and indifferent students had higher scores than mastery-oriented and avoidance-oriented students. With respect to academic withdrawal, mastery-oriented students scored the lowest on academic withdrawal, followed by success-oriented students, who, interestingly, did not differ significantly from avoidance-oriented students. Avoidance-oriented and indifferent students scored equally high on academic withdrawal. Finally, success-oriented and mastery-oriented students had higher academic achievement than indifferent and avoidance-oriented students.

2.3.5. Stability of achievement goal orientation profiles

The second main goal of this study was to examine the stability of and changes in the group memberships from Time 1 to Time 2. By means of CFA, we searched for "types" and "antitypes" of the categorical data. In the present study, achievement goal orientation groups at Time 1 and Time 2 provided sixteen possible configurations. For each configuration the observed frequency was compared to the corresponding expected frequency. The outcome of the CFA is presented in Table 5 and in Fig. 3. Application of CFA revealed four types and five antitypes. It turned out that four out of four cells, those corresponding to individuals belonging to the same class across the two measurement points, showed significant types. Approximately 57% of the students displayed a stable motivational profile over time. Most changes in the group memberships were directed towards similar groups, and there were less extreme changes than would be expected by chance. It was untypical for indifferent students to move to success-oriented or mastery-oriented groups and success-oriented students were unlikely to move to avoidance-oriented group. Also, it was untypical for mastery-oriented students to move to indifferent group and avoidance-oriented students to move to success-oriented group.

Table 5
Configural frequency analysis on Time 1 and Time 2 goal orientation groups (Study 1).

Configuration	T1/T2	*OBS.*	*EXP.*	χ^2	*p*
T	1 1	124	81.22	4.75	.0000
A	1 2	22	54.27	−4.38	.0000
A	1 3	20	36.95	−2.79	.0026
	1 4	38	31.56	1.15	.1259
	2 1	55	74.45	−2.25	.0121
T	2 2	99	49.75	6.98	.0000
	2 3	26	33.87	−1.35	.0881
A	2 4	7	28.93	−4.08	.0000
A	3 1	15	35.83	−3.48	.0003
	3 2	17	23.94	−1.42	.0780
T	3 3	49	16.30	8.10	.0000
	3 4	9	13.93	−1.32	.0935
	4 1	17	19.51	−.57	.2851
A	4 2	3	13.04	−2.78	.0027
	4 3	1	8.88	−2.64	.0041
T	4 4	28	7.58	7.42	.0000

Note. T1 = Time 1 goal orientation group (1 = indifferent, 2 = success-oriented, 3 = mastery-oriented, 4 = avoidance-oriented); T2 = Time 2 goal orientation group (1 = indifferent, 2 = success-oriented, 3 = mastery-oriented, 4 = avoidance-oriented). A = Antitype; T = Type.

2.4. Study 1 discussion

Study 1 examined the temporal stability and change in students' achievement goal orientations during the final year of lower secondary school. The results of LCFA indicated sufficient measurement invariance, meaning that equivalent achievement goal orientation constructs were assessed at both measurement points. The results also suggested considerable normative stability in achievement goal orientations over time. The latent factor means

Table 3
Mean differences in achievement goal orientations between goal orientation groups (Study 1).

Variable	Sample mean *N* = 1060		Indifferent *N* = 415		Success-oriented *N* = 328		Mastery-oriented *N* = 186		Avoidance-oriented *N* = 131		*F*(3, 1056)	*p*	η^2
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*			
Mastery-intrinsic	4.94	1.20	4.41	.75	5.78_a	.73	5.82_a	.71	3.31	1.18	438.56	**	.56
Mastery-extrinsic	5.24	1.25	4.79	.77	6.32	.53	5.79	.79	3.16	.87	691.76	**	.66
Performance-approach	3.73	1.31	3.79	.94	4.91	.89	2.49_a	.74	2.34_a	.84	428.36	**	.55
Performance-avoidance	3.75	1.47	4.02	1.21	4.38	1.44	2.59_a	1.07	2.97_a	1.49	95.80	**	.21
Avoidance	4.39	1.29	4.72_a	.97	4.30	1.27	3.36	1.17	5.00_a	1.52	70.93	**	.17

Note. Goal orientation group means within a row sharing the same subscripts are not significantly different at the $p < .05$ level (with Games–Howell correction).
N describes I-States rather than number of the students.
** $p < .001$.

Table 4
Mean differences in additional motivational indices between goal orientation groups (Study 1).

Variable	Indifferent		Success-oriented		Mastery-oriented		Avoidance-oriented		*F*	*p*	η^2
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*			
T1 School value	4.95_a	1.05	5.62	1.05	5.98	.83	4.35_a	1.53	$F(3, 517) = 37.33$	**	.18
T2 School value	4.66_a	1.14	5.45	1.35	6.08	.85	4.38_a	1.41	$F(3, 517) = 43.79$	**	.20
T1 Fear of failure	3.80_a	1.40	3.93_a	1.53	2.61_b	1.25	2.72_b	1.18	$F(3, 516) = 25.01$	**	.13
T2 Fear of failure	3.63_a	1.18	3.81_a	1.51	2.42_b	1.07	2.50_b	1.31	$F(3, 517) = 37.43$	**	.18
T1 Academic withdrawal	3.71_a	1.26	3.32_b	1.33	2.45	1.02	3.50_{ab}	1.36	$F(3, 515) = 20.51$	**	.11
T2 Academic withdrawal	3.65_a	1.14	3.24_b	1.42	2.18	.94	3.56_{ab}	1.32	$F(3, 512) = 32.89$	**	.16
T1 Academic achievement	4.49_b	1.52	5.39_a	1.38	5.27_a	1.39	3.92_b	1.22	$F(3, 437) = 18.70$	**	.11
T2 Academic achievement[1]	4.37	1.48	5.55_a	1.42	5.45_a	1.21	3.72	1.36	$F(3, 455) = 37.33$	**	.20

Note. Means within a row sharing the same subscripts are not significantly different at the $p < .05$ level (with Games–Howell correction, [1] with Bonferroni correction).
** $p < .001$.

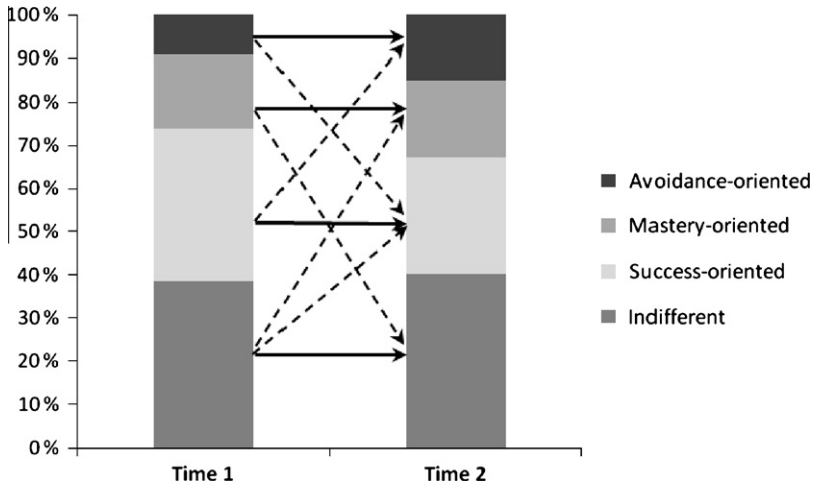

Fig. 3. Statistical types and antitypes (Study 1). Straight line indicates pathways between time points identified as statistical types; broken line indicates pathways between time points identified as statistical antitypes.

revealed statistically significant yet small decreases in mastery-intrinsic, mastery-extrinsic, and performance-avoidance orientations over time. The correlations within achievement goal orientations as well as between orientations and other indices of motivation were in agreement with our expectations. When identifying lower secondary school students' achievement goal orientation profiles, we found, as anticipated, groups having a dominant tendency towards mastery (i.e., mastery-oriented students), performance (i.e., success-oriented students), and avoidance (i.e., avoidance-oriented students) and, also as expected, a large group with a joint emphasis on both mastery and performance and avoidance (i.e., indifferent students). These groups differed in terms of their generalized motivational beliefs and academic achievement. For example, mastery-oriented and success-oriented students had equally high academic achievement, but the higher scores of success-oriented students' in fear of failure and academic withdrawal seem to be the unfavorable concomitants of holding such strong performance tendencies. Furthermore, the students that were more focused on validating or demonstrating their competence (i.e., success-oriented and indifferent students) experienced higher fear of failure than mastery-oriented students, who emphasized learning, or avoidance-oriented students, who just did not seem to care about schoolwork. On average, mastery-extrinsic and mastery-intrinsic orientations were emphasized most and performance-approach and performance-avoidance orientations least among the lower secondary school students. Finally, as we expected, the results showed that there was considerable stability in all the groups from Time 1 to Time 2; that is, 57% of the students displayed a stable motivational profile during the final year of lower secondary school. As most of the changes that did occur in the group memberships were directed towards groups with fairly similar motivational profiles, there were only few clear changes. More specifically, 40% of students moved to a fairly similar motivational group, only 3% of students reported a substantive negative change in their motivational profile (i.e., from mastery- or success-oriented group to avoidance-oriented group) and only 1% of students reported a considerable positive change in their motivational profile (i.e., from avoidance-oriented group to mastery- or success-oriented group).

3. Study 2

3.1. Aims

After examining lower secondary school students' achievement goal orientations within a school year, we examined the temporal stability and change in upper secondary school students' achievement goal orientations between school years, that is, across 11th and 12th grade. While the time between the two measurement points was 4 months in Study 1, it was extended to 1 year in Study 2. A longitudinal person-centered approach was used to answer the following research questions:

(1) What kinds of achievement goal orientation profiles can be identified among upper secondary school students across 11th and 12th grade?
(2) How stable are achievement goal orientation profiles across 11th and 12th grade? How do the profiles change? What are the typical and conversely untypical developmental trajectories of change?

Again, based on prior work (Niemivirta, 1998, 2002b; Tuominen et al., 2004; Tuominen-Soini et al., 2008), we expected to find several groups of students with different motivational profiles. More accurately, we anticipated that we would identify very similar motivational profiles among upper secondary school students than we identified in Study 1 among lower secondary school students. Along the lines of some prior studies (Anderman & Midgley, 1997; Meece & Miller, 1999, 2001; Middleton et al., 2004) we also expected rather stable goal orientation profiles over time, despite the longer time gap between measurement points in this study than in Study 1.

3.2. Method

3.2.1. Context and participants

Study 2 is also part of the ongoing Finnish Educational Transitions (FinEdu) Studies. After completing compulsory schooling, young Finns face an important choice: whether to continue in general education, that is, upper secondary school (academic track; Grades 10–12) or to apply for vocational education (vocational track). More than 90% of comprehensive school-leavers continue at the upper secondary level in the same year; about 51% opt for the general upper secondary school and 40% for the vocational school.

The data for Study 2 were collected from all the upper secondary schools in the same city as in Study 1 when the students were in the 11th grade and again the following year when they were in the 12th grade. In the beginning of the study, the participants were 17-year-old ($M = 17.05$, $SD = 0.27$) students. Of the 614 students participating in the study at the first measurement point,

Table 6
Goodness of fit statistics for alternative models (Study 2).

Model	Hypothesis	χ^2 MLM	df	CFI	RMSEA	SRMR	Hypothesis test	Δ S–B χ^2	Δdf	*p*
M1	Configural invariance	776.566	345	.94	.049	.058	Overall fit			
M2	Metric invariance	785.715	355	.94	.048	.059	M2–M1	8.468	10	0.583
M3	Equivalence of residual variance	821.367	370	.94	.048	.059	M3–M2	35.137	15	0.002
M3b	M3 + three pairs of residual variances free	794.009	367	.95	.047	.059	M3b–M2	10.497	12	0.572
M4	Scalar (item intercept) invariance	823.147	377	.94	.048	.059	M4–M3b	30.039	10	0.001
M4b	M4 + two pairs of intercepts free	807.720	375	.94	.047	.059	M4b–M3b	12.938	8	0.114
M5	Equivalence of factor variance	814.109	380	.94	.047	.060	M5–M4b	5.731	5	0.333
M6	Equivalence of factor means	831.916	385	.94	.047	.060	M6–M5	18.899	5	0.002
M6b	M6 + three factor means free	814.929	382	.94	.047	.060	M6b–M5	0.261	2	0.878

Note. CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; Δ S–B χ^2 = chi-square difference test with the Satorra–Bentler scaled chi-square.

519 students (response rate 85%) were present for both administrations of the questionnaire. All of these 519 students (336 girls and 183 boys) had complete achievement goal orientation information and were consequently included in the final sample. Independent samples *t*-tests revealed that students in the final sample did not differ from students with incomplete data in mastery-intrinsic orientation ($t(117.67) = 0.24$, $p = .814$), mastery-extrinsic orientation ($t(119.23) = 0.93$, $p = .356$), performance-approach orientation ($t(610) = -0.64$, $p = .526$), performance-avoidance orientation ($t(607) = -0.55$, $p = .583$), and avoidance orientation ($t(611) = -0.58$, $p = .562$) in Time 1.

3.2.2. Measures

3.2.2.1. Achievement goal orientations. Achievement goal orientations were assessed as in Study 1. The missing values in achievement goal orientation measures were imputed by expectation–maximization (EM) algorithm. In Study 2, only 0.3% of the questionnaire items measuring achievement goal orientations were missing. The Cronbach alpha reliabilities at the two measurement points were .87 and .86 for mastery-intrinsic orientation; .86 and .89 for mastery-extrinsic orientation; .73 and .77 for performance-approach orientation; .83 and .87 for performance-avoidance orientation; and .74 and .80 for avoidance orientation, respectively. The mean of mastery-intrinsic orientation was higher in the upper secondary school sample compared to that of the lower secondary school sample ($p < .001$, $d = 0.23$; see Appendices D and E for sample means) but otherwise there were not notable mean differences (*d*'s ranging between 0.05 and 0.11).

3.2.2.2. Additional motivational indices. Additional motivational indices were assessed as in Study 1. The Cronbach alpha reliabilities at the two measurement points were .69 and .69 for school value; .70 and .71 for fear of failure; and .72 and .73 for academic withdrawal. Students' self-reported grade point average (GPA) was used as a measure of their academic achievement. One year following the actual data collection of both Time 1 and Time 2, the students were asked to report their GPA from the preceding term. These estimates were then used as indices for the students' academic achievement of Time 1 and Time 2, respectively. The categorized scale for GPA ranged from 1 (=lowest) to 8 (=highest). The missing values in academic achievement at Time 2 were imputed by expectation–maximization (EM) algorithm as implemented in the SPSS statistical program.

3.2.3. Procedure

The participants completed self-report questionnaires on achievement goal orientations and additional motivational indices once during the 11th grade (January 2004) and once during the 12th grade (January 2005). Questionnaires were administered to students in school during regular class sessions.

3.2.4. Data analyses

Similar data analyses were conducted here as in Study 1. That is, longitudinal confirmatory factor analysis was first used to investigate structural stability, stability in mean levels, and normative stability. Next, the achievement goal orientation groups were identified through latent profile analysis and one-way ANOVAs were conducted in order to examine group differences in additional motivational indices. Finally, the stability of and changes in group memberships over time were examined using configural frequency analysis.

3.3. Results

3.3.1. Stability of achievement goal orientations

3.3.1.1. Structural stability. For the invariance analyses,[2] an identical set of models was used as in Study 1 (see Fig. 1 and Appendix A). The results of invariance testing are summarized in Table 6. All of the subjective fit indices met the recommended criteria and suggested a good model-data fit for all models. An acceptable fit of Model 1 indicated configurally invariant factor structure over time. Metric invariance was achieved; the model with equal factor pattern and loadings across measurement points (M2) fit the data better than the unconstrained model (M1) did. The model with equal internal consistency (M3) did not fit the data better than the previous model (M2), but the freeing of three pairs of residual variances significantly improved the model fit (M3b). Model 4 did not fit the data better than Model 3b, but by freeing two pairs of intercepts the model fit improved significantly (M4b) and, consequently, sufficient scalar invariance was achieved. The assumption for equivalence of factor variance (M5) was supported. To sum up, there was evidence for the invariance of the overall factorial structure (M1), factor loadings (M2), internal consistency (M3), item intercepts (M4), and construct variances (M5) across the measurement points. These results indicated sufficient measurement invariance over time despite the slight non-invariance of three pairs of residual variances and two pairs of intercepts.

3.3.1.2. Stability in mean levels. The results of LCFA indicated that the test for equivalence of factor means (M6) was not supported. Based on modification indices, three latent factor means were freed: mastery-extrinsic (Time 1 $M = 5.44$, $SD = 1.02$; Time 2 $M = 5.34$, $SD = 1.02$; $p = ns.$, $d = 0.10$) and performance-avoidance (Time 1 $M = 3.72$, $SD = 1.38$; Time 2 $M = 3.59$, $SD = 1.38$; $p = ns.$,

[2] Cross-sectional confirmatory factor analyses on achievement goal orientations were performed first. At Time 1, a model with a minor modification (i.e., error covariances between one pair of similarly worded items were freed) fit the data rather well, $\chi^2(79, N = 519) = 262.02$, $p < 0.001$, CFI = .95, RMSEA = .067, SRMR = .055. Also at Time 2, a model with minor modifications (i.e., error covariances between similarly worded items were freed) fit the data rather well, $\chi^2(77, N = 519) = 309.53$, $p < 0.001$, CFI = .95, RMSEA = .076, SRMR = .058).

$d = 0.09$), which decreased slightly, and performance-approach (Time 1 $M = 2.94$, $SD = 1.18$; Time 2 $M = 3.03$, $SD = 1.18$; $p = ns.$, $d = 0.08$), which increased slightly. This modification significantly improved the model fit (M6b). Consequently, the latent factor means were not identical over time but the changes were small.

3.3.1.3. Normative stability. Disattenuated correlations between the latent constructs across the measurement points were .59 for mastery-intrinsic orientation, .68 for mastery-extrinsic orientation, .75 for performance-approach orientation, .67 for performance-avoidance orientation, and .72 for avoidance orientation. The squared multiple correlations (R^2) for the five factors were .35, .46, .56, .45, and .52, respectively. The high disattenuated correlations between the latent constructs indicated substantial normative stability in achievement goal orientations over time.

3.3.2. Correlational results

The correlational results (see Appendix B) demonstrate the slightly different patterns of associations for mastery-intrinsic and mastery-extrinsic orientations. For example, mastery-intrinsic and mastery-extrinsic orientations were similarly related to school value, academic withdrawal, and academic achievement, but differently related to fear of failure; mastery-extrinsic orientation was positively related to fear of failure, while mastery-intrinsic orientation was not related to it. Also, there were different patterns of associations for mastery-extrinsic and performance-approach orientations. For instance, mastery-extrinsic orientation was positively related to school value, while performance-approach orientation was negatively related to school value at Time 1 and not related to school value at Time 2. Also, performance-approach orientation had a stronger association with fear of failure than mastery-extrinsic orientation. Moreover, mastery-extrinsic orientation had a negative association with academic withdrawal, while for performance-approach orientation, this correlation was positive. Finally, performance-avoidance and avoidance orientations were similarly related to academic withdrawal, but differently related to fear of failure and academic achievement; performance-avoidance orientation had a stronger positive association with fear of failure and avoidance orientation was negatively related to academic achievement, while performance-avoidance orientation was not related to it.

3.3.3. Achievement goal orientation profiles

The first main goal of Study 2 was to examine what kinds of achievement goal orientation profiles can be identified among upper secondary school students. The results of LPAs showed that the four-class solution fit the data best (see Table 7 for fit indices) and it provided a clear classification; the average individual posterior probabilities for being assigned to a specific latent class (see Appendix C) were 0.88, 0.83, 0.84, and 0.87, respectively, and the entropy value was 0.73. The four groups were labeled as *mastery-oriented, indifferent, avoidance-oriented, and success-oriented* (see Fig. 4). *Mastery-oriented* students (I-States $N = 377$, 36%; Time 1 $N = 195$, 38%; Time 2 $N = 182$, 35%) emphasized both mastery-intrinsic and mastery-extrinsic orientations but scored low on performance-approach, performance-avoidance, and avoidance orientations (see Table 8 for pairwise comparisons on raw mean values and Appendix E for descriptive statistics for Time 1 and Time 2). For them, the most important goal in school was to learn and understand as much as possible. *Indifferent* students (I-States $N = 348$, 34%; Time 1 $N = 176$, 34%; Time 2 $N = 172$, 33%) had joint emphasis on both mastery and performance and avoidance, and actually, they scored the highest on avoidance orientation. These students emphasized getting better grades than other students, trying to avoid situations in which they may appear incompetent, and trying to minimize the effort spent on studying. The motivational profile of *avoidance-oriented* students (I-States $N = 208$, 20%; Time 1 $N = 94$, 18%; Time 2 $N = 114$, 22%) was characterized by a rather high score on avoidance orientation and, at the same time, by the lowest scores on all the other orientations. Their main aim in school was to avoid achievement situations altogether. *Success-oriented* students (I-States $N = 105$, 10%; Time 1 $N = 54$, 10%; Time 2 $N = 51$, 10%) expressed very high levels of mastery-extrinsic and mastery-intrinsic orientations and they scored rather high on performance-approach and performance-avoidance orientations, also. Thus, they were strongly characterized by a strive for absolute and relative success but they also considered the goal of learning and understanding very important.

Table 7
Information criteria values for different class solutions (Study 2).

Number of classes	BIC	p_{VLMR}
1	17244.749	–
2	16727.523	0.0000
3	16487.317	0.0029
4	16360.066	0.0330
5	16300.565	0.2739

Note. BIC = Bayesian information criterion, p_{VLMR} = Vuong–Lo–Mendell–Rubin likelihood ratio test.

3.3.4. Differences in additional motivational indices

The results showed that goal orientation groups differed significantly in school value, fear of failure, academic withdrawal, and academic achievement. All effects and the mean differences between goal orientation groups are presented in Table 9. With respect to school value, success-oriented students displayed highest school value, followed by mastery-oriented students. Avoidance-oriented and indifferent students had equally low scores in school value. With respect to fear of failure, indifferent and success-oriented students had higher scores than mastery-oriented and avoidance-oriented students at Time 1. At Time 2, indifferent students scored highest on fear of failure, followed by success-oriented and mastery-oriented students, which did not differ significantly from each other. Avoidance-oriented students had the lowest score on fear of failure at Time 2. With respect to academic withdrawal, indifferent students had the highest score both at Time 1 and Time 2, followed by avoidance-oriented students. Mastery-oriented and success-oriented students had equally low scores on academic withdrawal but, at Time 1, the score of success-oriented students did not differ significantly from the score of avoidance-oriented students. Finally, success-oriented students had the highest academic achievement, followed by mastery-oriented students. Avoidance-oriented students had the lowest academic achievement.

3.3.5. Stability of achievement goal orientation profiles

The second main goal of this study was to examine the stability of and changes in the group memberships from Time 1 to Time 2. Application of CFA revealed four types and six antitypes (see Table 10 and Fig. 5). It turned out that four out of four cells, those corresponding to individuals belonging to the same class across both measurement points, showed significant types. Approximately 60% of the students displayed a stable motivational profile over time. Most changes in the group memberships were directed towards similar groups, and there were less extreme changes than would be expected by chance. It was untypical for indifferent students to move to success-oriented or mastery-oriented groups and success-oriented students were unlikely to move to avoidance-oriented group. Further, it was untypical for mastery-oriented

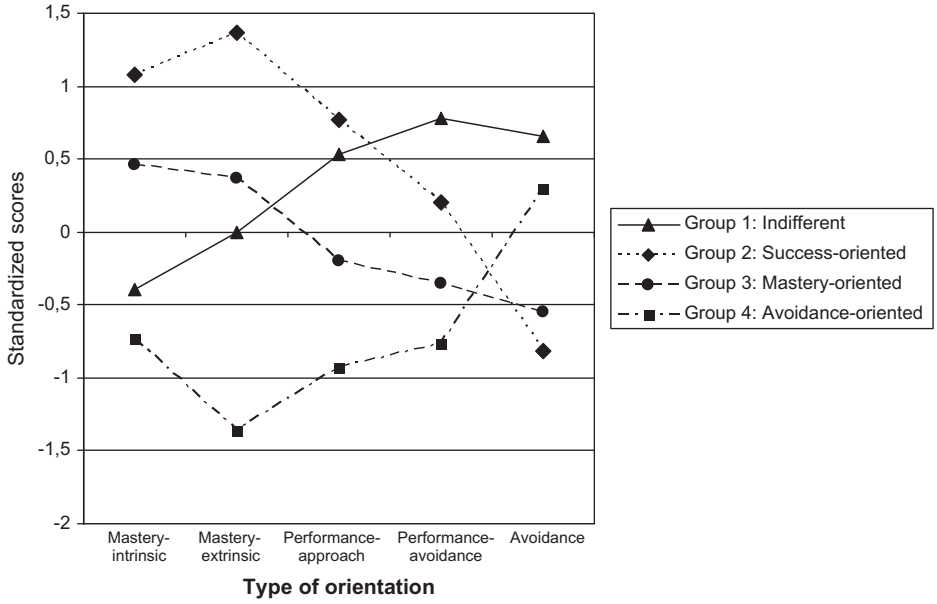

Fig. 4. Upper secondary school students' standardized mean scores on achievement goal orientation scales as a function of group membership (Study 2).

Table 8
Mean differences in achievement goal orientations between goal orientation groups (Study 2).

Variable	Sample mean $N = 1038$		Indifferent $N = 348$		Success-oriented $N = 105$		Mastery-oriented $N = 377$		Avoidance-oriented $N = 208$		$F(3, 1034)$	p	η^2
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*			
Mastery-intrinsic	5.21	1.12	4.77	.93	6.42	.54	5.73	.65	4.39	1.30	190.60	**	.36
Mastery-extrinsic	5.33	1.12	5.33	.84	6.86	.17	5.74	.49	3.80	.93	533.76	**	.61
Performance-approach	3.58	1.32	4.29_a	.95	4.59_a	1.48	3.32	1.12	2.35	.93	180.73	**	.34
Performance-avoidance	3.68	1.45	4.81	1.02	3.97	1.57	3.17	1.14	2.57	1.12	201.52	**	.37
Avoidance	4.30	1.35	5.19	.90	3.21	1.30	3.57	1.05	4.71	1.35	175.84	**	.34

Note. Goal orientation group means within a row sharing the same subscripts are not significantly different at the $p < .05$ level (with Games–Howell correction).
N describes I-States rather than number of the students.
** $p < .001$.

Table 9
Mean differences in additional motivational indices between goal orientation groups (Study 2).

Variable	Indifferent		Success-oriented		Mastery-oriented		Avoidance-oriented		F	p	η^2
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*			
T1 School value	5.20_a	1.02	6.47	.55	6.13	.61	5.46_a	1.07	$F(3, 511) = 53.97$	**	.24
T2 School value	5.27_a	.87	6.56	.39	6.04	.68	5.24_a	1.17	$F(3, 510) = 52.43$	**	.24
T1 Fear of failure	3.89_a	1.16	3.69_a	1.41	3.00_b	1.06	2.70_b	1.26	$F(3, 510) = 28.84$	**	.15
T2 Fear of failure[1]	3.80	1.20	3.15_a	1.36	2.95_a	1.09	2.50	1.01	$F(3, 511) = 32.25$	**	.16
T1 Academic withdrawal	4.13	1.18	3.12_{ab}	1.41	2.93_b	.98	3.52_a	1.41	$F(3, 509) = 33.20$	**	.16
T2 Academic withdrawal[1]	4.07	1.18	2.83_a	1.01	3.14_a	1.10	3.58	1.20	$F(3, 514) = 26.58$	**	.13
T1 Academic achievement[1]	4.51	1.32	5.87	1.29	4.99	1.38	3.84	1.45	$F(3, 508) = 29.51$	**	.15
T2 Academic achievement[1]	4.68	1.32	6.14	1.24	5.33	1.15	4.24	1.22	$F(3, 515) = 37.25$	**	.18

Note. Means within a row sharing the same subscripts are not significantly different at the $p < .05$ level (with Games–Howell correction, [1] with Bonferroni correction).
** $p < .001$.

students to move either to indifferent or avoidance-oriented groups and avoidance-oriented students were unlikely to move to mastery-oriented group.

3.4. Study 2 discussion

Study 2 examined the temporal stability and change in upper secondary school students' achievement goal orientations between school years, that is, across 11th and 12th grade. Like in Study 1, the results of LCFA indicated sufficient measurement invariance and substantial normative stability in achievement goal orientations over time. The latent factor means revealed small decreases in mastery-extrinsic and performance-avoidance orientations and a slight increase in performance-approach orientation over time. The correlations within achievement goal orientations as well as between orientations and other indices

Table 10
Configural frequency analysis on Time 1 and Time 2 goal orientation groups (Study 2).

Configuration	T1/T2	*OBS.*	*EXP.*	χ^2	*p*
T	1 1	110	58.33	6.77	.0000
A	1 2	3	17.30	−3.44	.0003
A	1 3	37	61.72	−3.15	.0008
	1 4	26	38.66	−2.04	.0209
	2 1	10	17.90	−1.87	.0310
T	2 2	26	5.31	8.98	.0000
	2 3	16	18.94	−.68	.2499
A	2 4	2	11.86	−2.86	.0021
A	3 1	34	64.62	−3.81	.0001
	3 2	20	19.16	.19	.4241
T	3 3	114	68.38	5.52	.0000
A	3 4	27	42.83	−2.42	.0078
	4 1	18	31.15	−2.36	.0092
	4 2	2	9.24	−2.38	.0086
A	4 3	15	32.96	−3.13	.0009
T	4 4	59	20.65	8.44	.0000

Note. T1 = Time 1 goal orientation group (1 = indifferent, 2 = success-oriented, 3 = mastery-oriented, 4 = avoidance-oriented); T2 = Time 2 goal orientation group (1 = indifferent, 2 = success-oriented, 3 = mastery-oriented, 4 = avoidance-oriented). A = Antitype; T = Type.

of motivation were in agreement with our expectations. As expected, we identified similar motivational groups (i.e., mastery-oriented, indifferent, avoidance-oriented, and success-oriented) among upper secondary school students than we identified in Study 1 among lower secondary school students. Again, these groups differed in terms of their generalized motivational beliefs and academic achievement. For example, both success-oriented and mastery-oriented students showed very adaptive motivational profiles and, interestingly, success-oriented students had even higher levels of school value and academic achievement than mastery-oriented students. Indifferent and avoidance-oriented students had less adaptive motivational profiles. Since indifferent students were more performance-focused compared to avoidance-oriented students, they had higher academic achievement and, at the same time, they experienced higher fear of failure and academic withdrawal. On average, mastery-extrinsic and mastery-intrinsic orientations were emphasized most and performance-approach and performance-avoidance orientations least. Finally, as we anticipated, the results showed that there was considerable stability in all the groups from Time 1 to Time 2; around 60% of the students displayed a stable motivational profile from 11th to 12th grade. As in Study 1, most of the changes that did occur in the group memberships were directed towards groups with fairly similar motivational profiles and there were only few clear changes. Precisely, 32% of students moved to a fairly similar motivational group, 6% of students reported a clear negative change in their motivational profile (i.e., from mastery- or success-oriented group to avoidance-oriented group) and 3% of students reported a substantive positive change in their motivational profile (i.e., from avoidance-oriented group to mastery- or success-oriented group).

4. General discussion

The aim of this study was, first, to investigate what kinds of achievement goal orientation profiles can be identified among lower and upper secondary school students and, second, to examine the temporal stability of these profiles. Distinct groups of students with different motivational profiles were found in both Study 1 and Study 2 with considerable consistency in student profiles across the two academic contexts. In other words, similar motivational profiles – indifferent, success-oriented, mastery-oriented, and avoidance-oriented – were found in both studies, which, in large part, concur with our prior studies (Niemivirta 1998, 2002b; Tuominen et al., 2004; Tuominen-Soini et al., 2008). Despite their marked similarities, the characteristics of the identified motivational profiles also differed slightly between lower and upper secondary school students. In the present context, this might be due to selectivity. After completing compulsory schooling about half of the Finnish students opt for the academic track, and these were the students that participated in Study 2. The motivational profiles and their differences in the two educational contexts are described in more detail below.

Indifferent group represented a prototypical student who 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. Indifferent students – like avoidance-oriented students – displayed lower school value than mastery- and success-oriented students but they had higher academic achievement compared to avoidance-oriented students. Among the lower secondary school students, the indifferent group was the biggest group (I-States: 39%; Time 1: 38%; Time

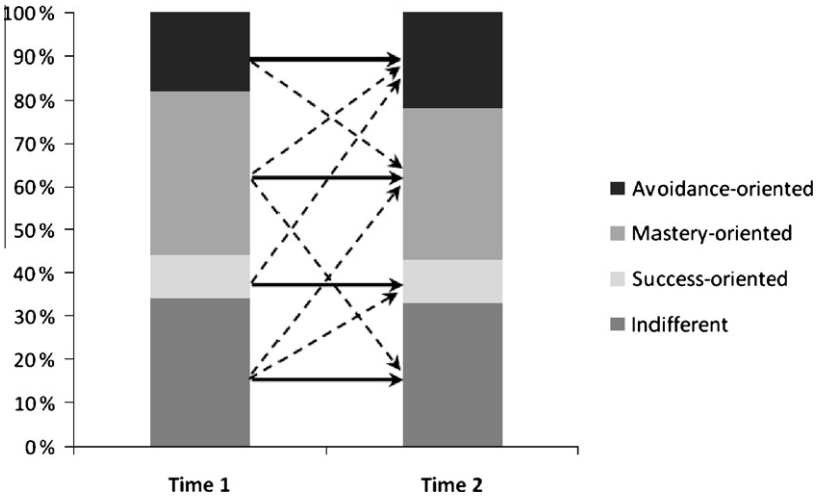

Fig. 5. Statistical types and antitypes (Study 2). Straight line indicates pathways between time points identified as statistical types; broken line indicates pathways between time points identified as statistical antitypes.

2: 40%). Although the number of students in this group may appear relatively high, the result concurs with our prior findings on nationally representative samples of adolescent students in Finland (Niemivirta, 2000; see also Tuominen et al., 2004; Tuominen-Soini et al., 2008). In the upper secondary school sample, this was the second largest group (I-States: 34%; Time 1: 34%; Time 2: 33%), and the students in this group, compared to the same group among lower secondary students, emphasized relatively more performance-approach and performance-avoidance orientations. It simply appears that the prototypical Finnish student seeks to do what is expected (i.e., to learn and perform well), but also tries to minimize the required effort. We believe that competing preferences are quite common among adolescents, especially in a school context where individuals seek to both follow personal interests and respond to external demands. Note, also, that in a recent WHO study on school-aged children, less than 15% of 11-year-olds, less than 10% of 13-year-olds and less than 5% of 15-year-olds in Finland reported liking school a lot (Currie et al., 2004), yet the Finnish students have succeeded extremely well in the PISA studies (PISA, 2006). These results agree with our finding suggesting that it is rather typical for Finnish students to acknowledge the importance of studying and succeeding in school, but still not necessarily to thrive in school.

Mastery-oriented students emphasized learning and strived towards goals implying self-improvement and growth (see also Niemivirta, 2002b; Tuominen et al., 2004; Tuominen-Soini et al., 2008). Relatively high school value and academic achievement, and relatively low levels of fear of failure and academic withdrawal characterized this group as well, suggesting that striving towards self-improvement is indeed adaptive in the school context. In upper secondary school, the mastery-oriented group (I-States: 36%; Time 1: 38%; Time 2: 35%) was slightly bigger than the indifferent group, suggesting that in the academic track, unlike in the general lower secondary sample, it is more typical for a student to emphasize learning and understanding and to also stress the importance of getting good grades. In lower secondary school, the relative proportion of mastery-oriented students was clearly smaller (I-States: 18%; Time 1: 17%; Time 2: 18%).

Success-oriented students were characterized by their strive for absolute and relative success and, also, for learning and understanding (see Tuominen-Soini et al., 2008). They displayed high school value and succeeded very well in school but, compared to the other favorable motivational group of mastery-oriented students, they were more preoccupied with possible failures in school. The success-oriented group in the upper secondary school sample (I-States: 10%; Time 1: 10%; Time 2: 10%) was smaller than in lower secondary school sample (I-States: 31%; Time 1: 35%; Time 2: 27%) but more strongly oriented towards both succeeding in school and mastering school subjects. Mastery- and success-oriented groups in the selective (i.e., upper secondary school) sample represented positive motivational profiles as revealed by their high scores on mastery-intrinsic orientation and low scores on avoidance orientation. The joint proportion of these favorable motivational profiles was very high (46%). The proportion of these profiles was high (48%) in the heterogeneous (i.e., lower secondary school) sample as well, but in this sample, the success-oriented group put more emphasis on avoidance tendencies. It should be noted, however, that despite the apparently positive motivational profile of success-oriented students, it has been found that these students are at risk of exhaustion in their studies (see Tuominen-Soini et al., 2008).

Finally, avoidance-oriented students' main goal was to minimize the effort and time spent on studying and, consequently, they showed the most maladaptive pattern of motivation (see also Niemivirta, 2002b; Tuominen-Soini et al., 2008). They had the poorest academic achievement and they displayed relatively low school value. Avoidance-oriented students were not particularly worried about failing in school, which can be seen as a sign of certain kind of passivity. The avoidance-oriented group was larger in upper secondary school sample (I-States: 20%; Time 1: 18%; Time 2: 22%) compared to lower secondary school sample (I-States: 12%; Time 1: 9%; Time 2: 15%). However, the number of avoidance-oriented students in the lower secondary school sample increased notably from Time 1 to Time 2. Most importantly, the upper secondary school students belonging to this group emphasized more mastery-intrinsic orientation and, thus, had a more adaptive motivational profile compared to the avoidance-oriented students in lower secondary school.

All in all, compared to lower secondary school students, upper secondary school students in general were more characterized by a will for learning (i.e., upper secondary school students had higher latent mean in mastery-intrinsic orientation and it stayed stable over 1 year, while lower secondary school students experienced a decrease in mastery-intrinsic orientation over 4 months) and, at the same time, by a strive for success (i.e., upper secondary school students had higher latent mean in mastery-extrinsic orientation and it decreased less over time compared to that of lower secondary school students). The results suggest that students who are positively oriented towards learning seem to opt for the academic track but, also, that the more competitive environment in the upper secondary school may drive students to emphasize outperforming others increasingly (i.e., upper secondary school students' latent mean in performance-approach orientation increased slightly over 1 year).

In this study, we found evidence for both stability and change in achievement goal orientations over time. The results indicated considerable structural and normative stability in achievement goal orientations; in other words, the constructs (the way different orientations were perceived) were invariable over time and the individual ranks across different variables remained quite constant. Moreover, even though there were some statistically significant overall changes in the latent mean levels of achievement goal orientations over time, the changes were small. Finally, students' motivational profiles were substantially stable both within a school year and between school years. In Study 1, nearly 60% of lower secondary school students displayed a stable motivational profile over the four last months of 9th grade. In Study 2, about 60% of upper secondary school students displayed a stable motivational profile over 11th and 12th grade, that is, during 1 year. Although the remaining proportion of students in both samples showing change in their motivational profile may seem high, it must be emphasized, that majority of the changes that did occur in group memberships were directed towards groups with fairly similar motivational profiles, and that only less than 5% of the students showed considerable changes. It is not surprising, though, that some students display a change in their motivational profile considering that a lot is happening in the lives of these young people. Adolescence is a phase of life, which is full of challenges, demands, possibilities, and changes related to, for example, puberty, gaining autonomy, interpersonal relationships, identity exploration, choice of career, and future-planning in general (e.g., Nurmi, 1993). In addition to this developmental turmoil related to adolescence, the forthcoming educational transition induces growing demands and even strain, which are likely to further influence adolescents' motivation.

However, due to a potential methodological bias that might influence the results, one should exercise caution when making inferences about the above findings. In latent profile analysis, in order to classify a given person, the probabilities of belonging in each

cluster are first calculated. Assignment is made to the cluster associated with the largest of the posterior probabilities. Although LPA allows membership of a person to each cluster to a certain degree, allowing for fractional cluster membership as captured in the posterior probabilities, the modal assignment of persons to clusters still results in a person being classified in only one cluster (Pastor et al., 2007). As a consequence, persons who are in the border of two groups are being classified into only one of them. This might increase the proportion of students who end up being classified as reporting a change in their motivational profile even though there really has not been a notable change in the configuration of their ratings.

Consequently and in agreement with related studies, our results demonstrate considerable intraindividual stability in achievement goal orientations both within a school year (Bong, 2005; Elliot & McGregor, 2001; Fryer & Elliot, 2007; Seifert, 1996; Senko & Harackiewicz, 2005; Stipek & Gralinski, 1996; Wolters et al., 1996) and between school years (Meece & Miller, 1999, 2001; Middleton et al., 2004). This lends support for the conception of achievement goal orientation as an enduring disposition that reflects students' generalized beliefs and tendencies to select certain goals and to favor certain outcomes in achievement and learning contexts.

5. Conclusions

The present study contributes to current research on achievement goals and goal orientations by filling some gaps in our understanding of the change and stability in motivation over time. Through longitudinal person-centered analyses – by focusing on groups of individuals with similar motivational tendencies (i.e., similar goal orientation configurations) – we were able to detect different motivational profiles of students as well as changes in these profiles over time. Adding to other studies focusing on students' achievement goal profiles (e.g., Daniels et al., 2008; Liu et al., 2009; Niemivirta, 2002a; Pastor et al., 2007; Tuominen-Soini et al., 2008; Wang et al., 2007), we explicitly acknowledged the fact that the patterning of goal orientations may change over time, and integrated this into the way students' profiles were identified (i.e., using LCFA and the ISOA procedure) and further analyzed (i.e., by means of configural frequency analysis). Other sources of variation were also taken into account by broadening the scope of study into two distinct educational contexts, and by including two age groups of adolescents and focusing on two different measurement intervals. Instead of the trichotomous (Elliot & Harackiewicz, 1996) or the 2×2 (Elliot & McGregor, 2001) frameworks commonly used in more task-specific achievement goal research, we focused on more general motivational tendencies and conceptualized them in terms of five types of achievement goal orientations and their configurations (see Tuominen-Soini et al., 2008).

In the present study, we focused on the structural and temporal stability of students' motivational profiles preceding educational transitions (i.e., the transition to upper secondary education and the transition to tertiary education). There was considerable stability in the profiles over time, even when the measurement period was prolonged from 4 to 12 months and there was a change in grade level. Nevertheless, the subtle changes detected in both group memberships and latent mean levels suggest that the role of contextual change and academic choices in the individual development of motivation may be important, and should thus be investigated more closely. This is in line with research on person-environment fit, which have documented declines in students' achievement motivation especially during educational transition periods (e.g., the transition from elementary to middle level schools) and attributes these changes primarily to the changing contexts and to certain instructional practices inappropriate for adolescents (Eccles & Midgley, 1989). Now that we have learned about the stability and grade-related changes in motivation *preceding* educational transitions, the study of stability and change *across* educational transitions would be a natural extension of the present work. A person-centered approach focusing on the qualitative changes in motivation (i.e., changes in individual and group profiles instead of mere overall mean levels) should prove to be powerful in exploring the possibility that only some of the students follow the suggested decline in motivation during educational transitions while some do not. Also, future research should try to better understand the etiology of different motivational profiles and the processes that are responsible for profile stability and change over time.

In our previous work we found that students with different achievement goal orientation profiles vary in terms of subjective well-being (Tuominen-Soini et al., 2008). Therefore, it would be of specific interest to also examine the developmental dynamics between motivation and well-being across educational transitions. For instance, since success-oriented students are more likely than mastery-oriented students to experience emotional exhaustion and stress, how will they deal with educational transitions, if this pattern of motivation is prolonged. Also, in future work, the possible moderating role of gender should be addressed, and the replicability of the typology obtained in this study with Finnish students should be tested in other cultures.

Knowledge about the students' different motivational profiles and the way these profiles remain stable or change over time can be valuable for educational practice in many ways. Recognizing that students view their schoolwork with quite different motivational mindsets leads to one important practical implication. By being aware of students' different motivational profiles, schools may be able to more appropriately respond to different students' needs and goals and, also, to pay special attention to the at-risk groups. Also, it would be crucial that the schools recognized those few students who seem to experience an extreme negative change in their motivational tendencies. Furthermore, the facts that achievement goal orientations are after all quite enduring individual dispositions and that goal orientation profiles remain rather stable over time suggest that the more general motivational tendencies may not be easily manipulated in the complex world of classrooms. They appear to be malleable, yet surprisingly stable over time. This stresses even more the importance of the capability of teachers to meet different students with different needs and to support their studying and learning individually.

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Appendix A

Standardized factor loadings, and residual variances for the chosen measurement model (Studies 1 and 2)

Item	Study 1						Study 2					
	Factor loading					Residual variances	Factor loading					Residual variances
	MI T1/T2	ME T1/T2	PAP T1/T2	PAV T1/T2	AV T1/T2	T1/T2	MI T1/T2	ME T1/T2	PAP T1/T2	PAV T1/T2	AV T1/T2	T1/T2
MI1	.769/.769					.409/.409	.773/.773					.402/.402
MI2	.847/.847					.283/.283	.806/.806					.351/.351
MI3	.849/.849					.279/.279	.893/.893					.202/.202
ME4		.793/.793				.372/.372		.802/.844				.357/.287
ME5		.797/.797				.364/.364		.805/.805				.353/.353
ME6		.872/.872				.240/.240		.891/.891				.206/.206
PAP7			.618/.618			.618/.618			.749/.749			.439/.439
PAP8			.563/.563			.683/.683			.679/.679			.538/.538
PAP9			.818/.818			.330/.330			.696/.696			.515/.515
PAV10				.815/.815		.336/.336				.810/.856		.343/.267
PAV11				.790/.790		.376/.376				.828/.828		.314/.314
PAV12				.734/.734		.461/.461				.770/.770		.407/.407
AV13					.595/.595	.645/.645					.638/.638	.593/.593
AV14					.788/.788	.379/.379					.838/.838	.297/.297
AV15					.675/.675	.544/.544					.692/.763	.522/.418

Note: T1 = Time 1, T2 = Time 2, MI = Mastery-intrinsic, ME = Mastery-extrinsic, PAP = Performance-approach, PAV = Performance-avoidance, AV = Avoidance.

Appendix B

Correlations (Studies 1 and 2)

		1	2	3	4	5	6	7	8	9
1	Mastery-intrinsic orientation	–	.48**/.54**	.05/.10*	.00/−.04	−.34**/−.42**	.44**/.55**	−.01/−.03	−.27**/−.27**	.33**/.41**
2	Mastery-extrinsic orientation	.58**/.63**	–	.39**/.43**	.23**/.21**	−.25**/−.32**	.34**/.45**	.19**/.18**	−.16**/−.17**	.45**/.51**
3	Performance-approach orientation	.25**/.22**	.38**/.43**	–	.41**/.46**	.07/.04	−.10*/.07	.42**/.47**	.15**/.11*	.19**/.19**
4	Performance-avoidance orientation	.05/.04	.11*/.12**	.35**/.47**	–	.29**/.21**	−.20**/−.17**	.57**/.61**	.39**/.36**	.06/.00
5	Avoidance orientation	−.32**/−.28**	−.22**/−.17**	.10*/.11**	.19**/.23**	–	−.52**/−.55**	.12**/.07	.41**/.40**	−.23**/−.21**
6	School value	.40**/.40**	.43**/.36**	−.02/−.11*	−.11*/−.21**	−.47**/−.48**	–	−.19**/−.14**	−.41**/−.43**	.28**/.36**
7	Fear of failure	−.01/.08	.10*/.13**	.30**/.46**	.52**/.61**	.16**/.11*	−.19**/−.20**	–	.47**/.45**	−.07/−.11*
8	Academic withdrawal	−.21**/−.21**	−.18**/−.21**	.10*/.18**	.40**/.43**	.38**/.37**	−.36**/−.45**	.63**/.57**	–	−.30**/−.27**
9	Academic achievement	.31**/.32**	.41**/.47**	.19**/.17**	−.03/−.10*	−.16**/−.23**	.43**/.44**	−.18**/−.15**	−.35**/−.37**	–

Note. Coefficients in lower secondary school (Study 1) are below diagonal; coefficients in upper secondary school (Study 2) are above diagonal. Coefficients for Time 1 and Time 2 are separated by slash, respectively.
*$p < .05$.
**$p < .01$.

Appendix C

Average latent class probabilities for most likely latent class membership (row) by latent class (column) (Studies 1 and 2)

	1	2	3	4
1	*0.835/0.881*	0.058/0.069	0.045/0.050	0.061/0.000
2	0.091/0.050	*0.871/0.830*	0.038/0.109	0.000/0.011
3	0.082/0.051	0.071/0.100	*0.832/0.836*	0.016/0.013
4	0.111/0.001	0.000/0.037	0.012/0.096	*0.877/0.865*

Note. Probabilities for Study 1 and Study 2 are separated by slash, respectively. Values in italics represent the average posterior probability associated with the clusters to which persons were assigned.

Appendix D

Descriptive statistics for achievement goal orientations (Study 1)

Variable	Sample mean				Indifferent				Success-oriented				Mastery-oriented				Avoidance-oriented			
	T1 *N* = 530		T2 *N* = 530		T1 *N* = 204		T2 *N* = 211		T1 *N* = 187		T2 *N* = 141		T1 *N* = 90		T2 *N* = 96		T1 *N* = 49		T2 *N* = 82	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Mastery-intrinsic	5.03	1.18	4.86	1.21	4.42	.81	4.39	.69	5.79	.68	5.77	.78	5.81	.68	5.82	.74	3.22	1.27	3.35	1.12
Mastery-extrinsic	5.41	1.19	5.06	1.28	4.90	.77	4.68	.76	6.34	.51	6.28	.57	5.86	.80	5.73	.78	3.13	.82	3.17	.91
Performance-approach	3.79	1.28	3.67	1.33	3.70	.98	3.88	.89	4.86	.90	4.99	.88	2.49	.67	2.50	.80	2.47	.81	2.27	.84
Performance-avoidance	3.85	1.49	3.65	1.44	4.07	1.24	3.97	1.19	4.45	1.45	4.28	1.44	2.58	1.06	2.61	1.09	2.97	1.45	2.97	1.52
Avoidance	4.37	1.29	4.40	1.28	4.75	1.00	4.69	.93	4.26	1.24	4.35	1.30	3.30	1.08	3.41	1.25	5.14	1.63	4.91	1.45

Appendix E

Descriptive statistics for achievement goal orientations (Study 2)

Variable	Sample mean				Indifferent				Success-oriented				Mastery-oriented				Avoidance-oriented			
	T1 *N* = 519		T2 *N* = 519		T1 *N* = 176		T2 *N* = 172		T1 *N* = 54		T2 *N* = 51		T1 *N* = 195		T2 *N* = 182		T1 *N* = 94		T2 *N* = 114	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Mastery-intrinsic	5.22	1.13	5.21	1.12	4.75	.97	4.80	.90	6.43	.57	6.42	.52	5.73	.65	5.74	.65	4.34	1.28	4.42	1.32
Mastery-extrinsic	5.38	1.10	5.28	1.15	5.38	.80	5.28	.88	6.85	.17	6.87	.16	5.74	.51	5.74	.47	3.79	.95	3.81	.92
Performance-approach	3.54	1.30	3.62	1.35	4.22	.95	4.36	.95	4.43	1.52	4.76	1.43	3.28	1.10	3.36	1.14	2.28	.88	2.40	.96
Performance-avoidance	3.76	1.41	3.61	1.48	4.81	1.00	4.80	1.05	4.09	1.47	3.84	1.67	3.24	1.11	3.10	1.17	2.65	1.18	2.51	1.07
Avoidance	4.32	1.34	4.29	1.36	5.25	.85	5.12	.93	3.43	1.33	2.98	1.23	3.55	1.01	3.59	1.10	4.68	1.41	4.73	1.31

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