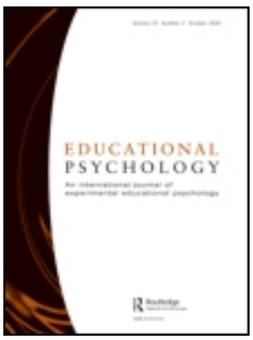

Routledge
Taylor & Francis Group

Educational Psychology
An International Journal of Experimental Educational Psychology

ISSN: 0144-3410 (Print) 1469-5820 (Online) Journal homepage: http://www.tandfonline.com/loi/cedp20

The prevalence, development and domain specificity of elementary school students' achievement goal profiles

Joost Jansen in de Wal, Lisette Hornstra, Frans J. Prins, Thea Peetsma & Ineke van der Veen

To cite this article: Joost Jansen in de Wal, Lisette Hornstra, Frans J. Prins, Thea Peetsma & Ineke van der Veen (2016) The prevalence, development and domain specificity of elementary school students' achievement goal profiles, Educational Psychology, 36:7, 1303-1322, DOI: 10.1080/01443410.2015.1035698

To link to this article: http://dx.doi.org/10.1080/01443410.2015.1035698

Educational Psychology, 2016
Vol. 36, No. 7, 1303–1322, http://dx.doi.org/10.1080/01443410.2015.1035698

Routledge
Taylor & Francis Group

The prevalence, development and domain specificity of elementary school students' achievement goal profiles

Joost Jansen in de Wal[a]*[,1], Lisette Hornstra[b], Frans J. Prins[a], Thea Peetsma[b] and Ineke van der Veen[c]

[a]*Department of Pedagogical and Educational Sciences, Utrecht University, Utrecht, The Netherlands;* [b]*Research Institute of Child Development and Education, University of Amsterdam, Amsterdam, The Netherlands;* [c]*Kohnstamm Institute, University of Amsterdam, Amsterdam, The Netherlands*

(*Received 24 September 2014; final version received 25 March 2015*)

This study's aim was to examine the prevalence, development and domain specificity of fifth- and sixth-grade elementary school students' achievement goal profiles. Achievement goals were measured for language and mathematics among 722 pupils at three points in time. These data were analysed through latent profile analysis and latent transition analysis. Results indicated that three similar goal profiles could be discerned at all measurement waves for both language and mathematics. Profiles were labelled 'multiple goals', 'approach oriented' and 'moderate/indifferent'. In both mathematics and language, around 80% of the participants remained stable in their goal profiles across measurements. Students who transitioned between goal profiles mostly moved from less to more favourable profiles. Profile membership and transitions between profiles were found to be relatively domain general with 60% overlap between domains. The high level of stability over time and across domains suggests that students' goal profiles represent relatively stable personal dispositions.

Keywords: motivation; elementary school students; achievement goals; profiles; development; domain specificity

Introduction

Motivation for learning is an important influence on students' academic outcomes (Covington, 2000). Students' motivation, however, has been found to be decreasing throughout their educational careers (Gottfried, Fleming, & Gottfried, 2001). In addition, this decrease has been reported to have its onset before students even leave elementary school (Gottfried et al., 2001; Hornstra, van der Veen, Peetsma, & Volman, 2013). Achievement goal theory approaches motivation by focusing on the motivational orientations students have for their competence relevant behaviour (for reviews, see Elliot, 2005; Hulleman, Schrager, Bodmann, & Harackiewicz, 2010; Kaplan & Maehr, 2007). In line with research from other theories of motivation, elementary school children's achievement goals too have been shown to become less favourable over time (Bong, 2009; Shim, Ryan, & Anderson, 2008).

*Corresponding author. Email: Joost.Jansenindewal@ou.nl
[1]Present address: Welten Institute, Research Centre for Learning, Teaching and Technology, Open University, Heerlen, The Netherlands.

Over the last decades, an important body of achievement goal research has revolved around the investigation of achievement goal *profiles* (Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002; Linnenbrink, 2005; Pastor, Barron, Miller, & Davis, 2007; Pintrich, 2000b). Goal profile research assumes that individuals have combinations of achievement goals for (classes of) tasks, and that some of these combinations are more favourable than others (Pastor et al., 2007). Few scientific studies have investigated achievement goal profiles and their development in elementary school children (for an exception, see Schwinger & Wild, 2012). However, since the decline of students' motivation already starts in elementary school, more research is needed that describes the nature and development of elementary school students' achievement goal profiles.

In addition, it is unclear whether achievement goal profiles are domain general or domain specific dispositions of students. A number of studies relate achievement goal profiles to general achievement scores (Daniels, Stupnisky, Pekrun, Haynes, & Perry, 2009; Pastor et al., 2007; Tuominen-Soini, Salmela-Aro, & Niemivirta, 2008). Other studies focus on mathematics achievement as an outcome of mathematics-specific goal profiles (Linnenbrink, 2005; Pintrich, 2000b; Schwinger & Wild, 2012). Without empirical evidence on the degree of domain specificity of student motivation, however, the possibility of making predictions about behavioural patterns of individuals in specific contexts remains limited (Bong, 2001).

The present study aims to provide insight in the nature of goal profiles and their stability over time and across domains. Specifically, it is investigated (a) what achievement goal profiles are present among fifth- and sixth-grade elementary school students, (b) how these students develop in terms of achievement goal profiles and (c) to what extent profiles and their development are domain general or domain specific.

Conceptualising 'achievement goal' as a construct

A theoretical issue that makes achievement goal research challenging concerns the conceptual definition of an achievement goal (Elliot & Thrash, 2001; Hulleman et al., 2010). Two conceptualisations have been debated. In one, achievement goals are conceptualised as 'cognitive representations that serve a directional function in motivation by guiding individuals toward or away from specific possible outcomes' (Elliot & Thrash, 2001). From this perspective, achievement goals are 'pure' aims that account for the direction but not for the energisation (e.g. reasons) of behaviour. Operationalisations that followed from this conceptualisation have focused only on individuals' purposes for achievement behaviour. For example: 'My *aim* is to completely master the material presented in this class' (Elliot & Murayama, 2008).

On the other hand, achievement goals have often been conceptualised as 'goal orientations' (Kaplan & Maehr, 2007; Pintrich, 2000a). These orientations comprise cognitive schemas that include the aforementioned aims but also other achievement-related factors such as beliefs, feelings, evaluative standards, levels of persistence, and interests. As such, goal orientations do not only consist of 'what' a student is trying to achieve but also of 'why' and 'how' (Kaplan & Maehr, 2007). In line with this conceptualisation, we consider achievement goals to consist of several purposes. An operationalisation that has followed from this conceptualisation is, for example: 'I *like* to show others that I can solve a math assignment' (Seegers, Putten, & Brabander, 2002).

The conceptualisation of achievement goals as pure aims may not accurately reflect the experience of goal pursuit in real life. Therefore, the present research takes the 'goal orientations' conceptualisation of achievement goals as a point of departure. This is in concurrence with Kaplan and Maehr (2007) (see also Hulleman et al., 2010, p. 423) who argue that 'limiting the achievement goal conceptualisation to end states or standards could remove the phenomenological realism from the construct'.

The trichotomous achievement goal framework

In line with other studies on the goal orientations of elementary school children (e.g. Schwinger & Wild, 2012; Shim et al., 2008), this study will adhere to a trichotomous achievement goal framework. The trichotomous achievement goal framework (Elliot, 1999; Elliot & Harackiewicz, 1996) distinguishes between a mastery approach goal (i.e. students' orientations toward increasing their own competence or master a task at hand), a performance avoidance goal (i.e. striving not to perform worse relative to others) and a performance approach goal orientation (i.e. aiming to demonstrate higher competence relative to others).

Mastery approach goals have been found to be related to positive learning processes and outcomes such as intrinsic motivation, high task interest, a preference for moderate challenge and persistence in the face of failure. Performance avoidance goals have been consistently associated with maladaptive cognitions, affect and behaviour such as test-anxiety, self-handicapping, task avoidance and low performance. Findings with respect to performance approach goals have not been consistent, sometimes relating these goals to positive and sometimes to negative outcomes (for reviews see Harackiewicz et al., 2002; Hulleman et al., 2010).

Adopting the trichotomous achievement goal framework implies that this study does not consider mastery avoidance goals (i.e. striving to avoid losing skills and abilities; Elliot, 1999). Mastery avoidance goals are the least researched and least understood of all types of achievement goals (Elliot & Murayama, 2008). At the time of conducting this study, the authors did not know of any validated scale that measured mastery avoidance goals from the goals as orientation conceptualisation (see Hulleman et al., 2010). As such the existing measures of mastery avoidance goals did not fit our theoretical framework. It may, in fact, be difficult to measure mastery avoidance goals in young children (Carr & Marzouq, 2012). Items measuring striving to avoid losing competence require complex wording which is difficult for adults to understand, let alone young children. Finally, since elementary children have not yet fully developed their competence in school subjects, and hence have little to lose, they may be less prone for mastery avoidance orientations. As such, whether or not children actually pursue mastery avoidance goals is still a point of discussion (Carr & Marzouq, 2012).

Achievement goal profiles

The notion of pursuing multiple achievement goals at the same time (i.e. having a goal profile) was brought forward mainly as an explanation for the aforementioned inconsistent findings with respect to performance approach goals (Harackiewicz et al., 2002; Pintrich, 2000b). Positive outcomes were expected to result from, for example, high mastery approach goals in combination with high performance

approach goals and low performance avoidance goals. Students with this profile would profit from the benefits of mastery approach goals (e.g. desire to improve) as well as performance approach goals (e.g. desire to be the best), maximising their learning outcomes (Harackiewicz et al., 2002). As such, this profile would be favourable over other achievement goal profiles. A less favourable profile would be the combination of low mastery approach, high performance approach and high performance avoidance goals, since performance avoidance goals would counteract the positive effects of mastery and performance approach goals.

Studies have indeed shown that students displaying high mastery approach and high performance approach orientations have equally or more adaptive educational and motivational outcomes compared to students having only high mastery goal orientations (Pintrich, 2000b; Tuominen-Soini et al., 2008). Whereas some studies are inconclusive in this respect (Schwinger & Wild, 2012), van der Veen and Peetsma (2009) concluded that the adaptive effects of combining high mastery and high performance approach goal orientations also held specifically for young students.

It is not clear exactly which goal profiles should be expected in any sample of elementary school students. The main reason for this is that achievement goals are partly situation specific (see 'Stability and change of achievement goals and goal profiles'). Another reason is that, as mentioned above, researchers adopt different conceptualisations and frameworks to investigate achievement goal profiles. Finally, the number of studies investigating elementary school students' achievement goal profiles is rather low (Schwinger & Wild, 2012).

Adopting a two-dimensional goal orientation framework, van der Veen and Peetsma (2009) distinguished four goal orientation profiles in 12-year-old students. These profiles included low mastery–low performance approach, low mastery–high performance approach, high mastery–low performance approach and high mastery–high performance approach combinations (see also Pintrich, 2000b). Schwinger and Wild (2012) distinguished three profiles in their sample of elementary school children adopting a trichotomous achievement goal framework. The first profile displayed high means on all three dimensions and was designated 'high multiple goals'. The second profile was labelled 'moderate multiple goals'. The third profile displayed a relatively high mastery goal orientation and was named 'primarily mastery oriented'. These profiles were consistently found from third to seventh grade.

In addition to previous goal profile studies among children, correlations between the different achievement orientations reported in earlier studies can provide indications of which profiles may be expected. These correlations generally differ from what is found among older populations (Hulleman et al., 2010). High correlations were found between all achievement goals among sixth graders by Bjørnebekk and Diseth (2010). This is in line with the 'multiple goal' profiles distinguished by Schwinger and Wild (2012). Bong (2009) also reported high positive correlations among elementary children, but showed that the correlation between mastery approach and performance avoidance orientations decreased over time.

Conceptually, we do not expect profiles in which performance approach goals are high and the other two goal orientations are low. Reversely, profiles in which performance approach goals are low and the other two goal dimensions are high are not expected either. This is because goal orientations that share values on the approach-avoidance dimension or mastery-performance dimension are expected to coincide (Elliot & Murayama, 2008; Schwinger & Wild, 2012).

Stability and change of achievement goals and goal profiles

Developments in students' achievement goals are associated with multiple factors. First of all, achievement goals may be stable due to students' self-schemas. Self-schemas are relatively enduring cognitive-affective belief systems individuals have about themselves (Kaplan & Maehr, 2007). Dweck and colleagues (Dweck, 1986; Dweck & Leggett, 1988) theorised that achievement goal orientations result from individual students' theories about the nature of intelligence. If intelligence is conceived to be fixed, this would result in a tendency to demonstrate competence (i.e. performance goal orientation). On the other hand, if intelligence is believed to be malleable, students would be prone to developing competence (i.e. mastery goal orientation). Likewise, Nicholls (1984) stated that the adoption of a goal orientation results from students' conceptions of ability. That is, an undifferentiated sense of ability (the belief that more effort leads to more ability) will lead to a mastery goal orientation. A differentiated sense of ability (the belief that effort and ability are inversely related) will lead students to compare the effort they have exerted to that of others and adopt performance goals.

Because of the enduring nature of self-schemas, this perspective on achievement goal orientations predicts a relative stability in achievement goals and goal profiles. If changes do occur, a decrease in mastery approach goals would be predicted that coincides with an increase in performance goals. Nicholls (1984) argued that young children do not develop a differentiated sense of ability until the higher grades of elementary school. Therefore, they will not evaluate their competence through social comparison. Since adopting a performance goal orientation involves making social comparisons, young children will be less performance oriented and more mastery approach oriented compared to older children. In terms of profiles, this would lead to more children adopting a profile in which performance goals are more salient than mastery goals.

Situational changes may also affect developments in students' achievement goals (e.g. Ames & Archer, 1988; Anderman & Midgley, 1997; Karabenick, 2004). Most studies investigating situational changes have focused on classroom policies and practices (referred to as classroom goal structures) that emphasise mastery approach goals (e.g. an improvement-oriented structure) or performance goals (e.g. a competition-oriented structure) (Ames & Archer, 1988). Classroom policies and practices are mostly determined by the teacher (Meece, Anderman, & Anderman, 2006) and have been found to be highly stable over a school year. It is therefore expected that, within school years, students' achievement goal profiles change little under the influence of situational changes. In contrast, between year changes are expected to occur more frequently because elementary school students often change teachers between school years. As a result, it may be expected that the chances of students changing achievement goal profiles within school years will be different from the chances of students changing achievement goal profiles between school years.

Only few studies have examined stability of goal profiles. Recent studies among primary and lower secondary school students present mixed findings with regard to relative stability of achievement goal profiles. Schwinger and Wild (2012) found stable achievement goal profiles between third and seventh grade in 35% of their participants. Tuominen-Soini, Salmela-Aro, and Niemivirta (2011) found that 57% of the students (15–17 years old) participating in their study had a stable achievement goal profile over the period of one year. Tuominen-Soini et al. (2011) also

found an increase in number of students that could be represented by a profile with relatively high-performance goals.

Domain specificity of achievement goal profiles and their development

As achievement goals are associated with students' self-schemas and the situations students act in, the domain specificity of achievement goals may also be approached this way. From a self-schema perspective, Dweck (1986) proposed that theories of intelligence are domain general rather than domain-specific. Support for this proposition was found by Stipek and Gralinski (1996) who concluded that students did not differ in their theories of intelligence across domains. When considering the effect of classroom situations, relative domain generality may be predicted as well. That is, elementary school children generally have all their lessons in the same class, taught by the same teacher. Therefore, classroom policies and practices (e.g. evaluation criteria) are not expected to differ much between language and mathematics lessons. The comparability of achievement goal profiles across domains is also supported by earlier achievement goal research. High correlations between equivalent achievement goals were found across academic work and sports by Duda and Nicholls (1992). Bong (2001) found high positive correlations across academic domains for performance approach and performance avoidance goals as well. For mastery goals, these correlations were moderate. However, domain intercorrelations between individual achievement goals may not be informative for the domain specificity of goal profiles. That is, high domain intercorrelations comprise that both high and low manifestations of an individual goal type should reflect domain generality. Therefore, profiles emphasising one type of goal may show just as much domain specificity as profiles with low scores for that goal type. As such, it is not clear from empirical results to what extent achievement goal profiles, or their development, are domain general or domain specific.

Hypotheses

Based on the literature discussed above, several hypotheses were formulated for this study. Because of the conceptual relation between performance approach goals and both mastery approach goals and performance avoidance goals, it was expected that no more than six profiles would be found. In addition, it was expected that a profile in which performance approach goals are high and the other two goals are low, or a profile in which performance approach goals are low and the other two goals are high would not be observed.

Concerning the development of goal profiles, considerable stability was expected because of the relative enduring nature of self-schemas. If changes would occur, students were expected to move to less favourable achievement goal profiles (e.g. profiles with high performance avoidance goals relative to mastery goals) as they advance through grades. This was expected because, according to Nicholls (1984), it is in fifth to sixth grade that children start evaluating their competence by comparing their performance to others. With respect to the occasion of changes, it was expected that change rates in goal profiles within a school year would be different from change rates between school years because of the situational change that takes place between school years as a result of getting a new teacher.

Finally, with respect to the domain specificity of goal profiles, it was expected that for a considerable proportion of students, goal profiles would be the same across domains. This hypothesis was based firstly on the premise that theories of intelligence are domain general rather than domain specific and second on the expectation that teachers' classroom policies and practices would not differ between domains. For the same reasons, it was hypothesised that changes in achievement goal profiles would be domain general.

Methodology

Sample and procedure

Three waves of data were collected for the present study from 722 students out of 37 classes in 25 schools in the Netherlands. Data were collected at the middle of fifth grade and at the start and middle of sixth grade by means of self-report questionnaires. Questionnaires were administered under supervision of a teacher in normal classroom conditions.

The students who participated were between 8 and 12 years old ($M = 10.64$, SD = 0.46) at the first wave of data collection, and 50% of the participants were girls. The sample was representative in terms of ethnicity with 87.5% of the students being identified as Dutch and 12.5% as non-western immigrants (Statistics Netherlands, 2012a). In addition, the sample was representative with respect to socio-economic status as indicated by the highest educational level obtained by one of the students' parents (Statistics Netherlands, 2012b); 13.3% of the student's parents were classified as having a low educational level, 41.7% as having an average educational level and 28.3% as having a high educational level. For the remainder of the sample (16.7%), there was no information on the educational level of the parents.

Measurement

Achievement goals for mathematics and language were measured by means of the goal orientation questionnaire developed by Seegers et al. (2002). This questionnaire consists of five items measuring mastery approach orientation (e.g. 'I feel satisfied when I have learned something in mathematics that makes sense to me'), six items measuring performance approach orientation (e.g. 'I enjoy getting a better grade in mathematics than my classmates') and six items measuring performance avoidance orientation (e.g. 'During mathematics tasks I am afraid that other students will notice my mistakes'). For all items that measured achievement goals for mathematics, equivalent items were answered for language. Students rated the extent to which they agreed with these items on a five-point Likert scale.

Internal consistencies indicated good reliability for all scales. Values of Cronbach's alpha for both domains can be found in Table 1. Construct validity was inspected for both domains by means of a confirmatory factor analysis. A model in which each sub-scale of the goal orientation questionnaire loaded only on its own factor fitted well to the data for language, χ^2 (116) = 379.34, $p < .001$; CFI = .93; TLI = .92; RMSEA = .06; SRMR = .06, and for mathematics, $\chi^2(116) = 450.94$, $p < .001$; CFI = .95; TLI = .94; RMSEA = .07; SRMR = .05.

Table 1. Reliability coefficients of achievement goal scales for language and mathematics.

	Language	Mathematics
Performance approach		
Wave 1	.89	.93
Wave 2	.92	.94
Wave 3	.93	.95
Performance avoidance		
Wave 1	.85	.92
Wave 2	.86	.93
Wave 3	.88	.93
Mastery approach		
Wave 1	.84	.87
Wave 2	.87	.90
Wave 3	.88	.91

Missing data handling

The current longitudinal data were subject to attrition. In the first measurement wave, 675 students participated, in the second 615 and in the third 518. It was found that a large majority of cases that had missing values on one item of a scale also had missing values on all other items of that scale. Often, this was the case for all scales and for whole classes of children. It was therefore concluded that these missing values could be ascribed to individual absence of students or the fact that schools or classes did not participate in certain measurements. It was concluded that the missing values were Missing At Random (see Schafer & Graham, 2002). Missing values were handled via the full information maximum likelihood procedure of Mplus 6.1 (B.O. Muthén & L.K. Muthén, 2010).

Analytic strategy

The analyses employed in the present study are two applications of the general latent-class model: latent profile analysis (LPA), to investigate which profiles are present among the students in this study, and latent transition analysis (LTA), to examine the development of achievement goal profiles. The goal of LPA is, as with other clustering techniques, to identify the smallest number of profiles by which the data can best be described (Muthén & Muthén, 2000; Pastor et al., 2007). One of the advantages of using LPA over other clustering approaches is that more rigorous statistical criteria can be used to determine the number of profiles (Magidson & Vermunt, 2002; Muthén & Muthén, 2000; Pastor et al., 2007; Vermunt & Magidson, 2002). Another advantage is that LPA provides information about the accuracy of classifications of pupils into profiles. This information is captured in posterior latent-class probabilities, which are the probabilities that students belong to a certain profile (Magidson & Vermunt, 2002). These posterior latent-class probabilities can be summarised by means of the entropy statistic of a model, to capture overall classification accuracy.

Previous longitudinal studies of achievement goal profiles have consistently found the same profiles at different points in time (Schwinger & Wild, 2012; Tuominen-Soini et al., 2011). Since the configuration of achievement goals does not

change over time, the development of students' achievement goals can be said to reflect transitions between profiles. As noted above, this study will apply LTA (Kaplan, 2008; Nylund, 2007). LTA is a longitudinal extension of LPA in which individuals are allowed to make transitions between profiles. Where LPA provides probabilities of cases belonging to a certain profile, LTA also provides probabilities of cases transitioning between profiles. Following from the hypothesis that change rates in profiles within a school year will be different from change rates between school years, these latent transition probabilities are expected to differ between transition occasions.

Latent profile analyses

The data were analysed in several steps in Mplus 6.1 (B.O. Muthén & L.K. Muthén, 2010). Which achievement goal profiles were present among the students in the current sample for both domains at each measurement wave, was investigated with cross-sectional LPAs. In these LPAs, the scale scores for each of the achievement goals were modelled as indicators for a latent categorical variable. This latent variable represents the number of profiles to be distilled from the data. For each domain, in each data wave, solutions with one to six profiles were investigated.

Then, fit of the LPA models was assessed by means of various statistical tests and indicators of model fit. First of all the Aikaike Information Criterion (AIC; Akaike, 1974), Bayesian Information Criterion (BIC; Schwarz, 1978), and Sample size Adjusted BIC (SABIC; Sclove, 1987) were used to assess model fit. For these measures, lower values indicate better model fit. Secondly, two tests are reported that compare a profile solution to a profile solution with one less profile. These tests are the Lo–Mendel–Rubin Likelihood Ratio Test (LMRT) and the Bootstrapped Likelihood Ratio Test (BLRT). For both tests, significant *p*-values indicate that a model with a '*k*' number of profiles outperforms a model with one fewer profile (Nylund, Asparouhov, & Muthén, 2007). Finally, profile solutions were assessed on the quality of the classification as indicated by the entropy statistic, for which a higher value reflects a more accurate classification, and the theoretical viability of distinct profiles. Profiles with too little cases in them (e.g. <5% of the cases) were not considered theoretically meaningful.

Latent transition analyses

For the LTAs, as a first step, measurement invariance of the three achievement goals over time in both domains was confirmed. Assuming measurement invariance allows for a straightforward interpretation of transitions between profiles since profiles are the same across waves (Nylund, 2007). A more detailed report of the measurement invariance in this study can be requested from the first author.

Then the latent transition models were specified for language and mathematics achievement goals. Like the LPAs, an LTA model included scale scores of the goal orientations as indicators for a latent categorical variable. However, in this model, the data from all measurement waves were included. As such, the LTA model for both language and mathematics included three latent categorical variables instead of one. These latent categorical variables represented the achievement goal profiles at the three measurement occasions. In addition, the current LTA models included coefficients that regressed profile membership at the third measurement on profile

membership at the second measurement. Similarly, profile membership at the second measurement was regressed on profile membership at the first measurement. These coefficients are multinomial logistic regression coefficients predicting profile membership at time t given profile membership at time $t-1$. The value of these coefficients should be interpreted as the rate (or probability) of transitioning from one profile to another over time. For examples of Mplus syntax for LTA, the reader is referred to L.K. Muthén and B.O. Muthén (2010, p. 223).

To investigate whether transition rates within a school year differ from transition rates between school years, two LTA models, for each domain, were tested. In the first model, transition probabilities were estimated freely from the first to the second, and from the second to the third measurement. In the second model, transition probabilities were constrained to be equal. These models were compared by means of AIC, BIC and SABIC. This procedure is also known as the comparison of non-stationary to stationary transition probabilities (Nylund, 2007).

Domain specificity of goal profiles and transitions

The domain specificity of goal profiles was analysed by classifying cases into profiles based on their highest latent-class probabilities and then comparing these classifications between language and mathematics goal profiles by means of χ^2-tests. To investigate the domain specificity of the transitions made by students, they were classified based on their most likely latent transition pattern (e.g. profile A → profile A → profile B). Then these classifications were compared in terms of percentages of overlap between the two domains. Following the same procedure, the domain specificity was inspected for transitions from wave one to wave two, and from wave two to wave three separately. For exploratory reasons, we also examined gender differences regarding prevalence and stability of goal profiles. However, no meaningful differences were found.

Results

Prevalence of achievement goal profiles

Tables 2 and 3 show the results of the latent profile analyses for language and mathematics at the three measurement waves. From these tables, it is apparent that for both language and mathematics, across all measurement waves, fit statistics (AIC, BIC, and SABIC) decrease as more profiles are added to the models. However, all of the five- and six-profile solutions include profiles that represent very small proportions of cases (1–5.9%). Therefore, these profile solutions were not considered. Finally, for almost all waves, the three-profile solution has a higher entropy than the four-profile solution. Therefore, the three-profile solution is considered to best represent the sample for both mathematics and language.

Means for the various achievement goals in the three different profiles across measurement waves are displayed in Figure 1 and Table 4 for language and for mathematics. These displays demonstrate that the configuration of the separate achievement goals in the distinct profiles is largely consistent over time and across domains. Profile A is characterised by a similar score on all achievement goals. Therefore, this profile is labelled ‘multiple goals’. Profiles B and C have medium performance approach goals and medium to high mastery approach goals. The distinctive feature

Table 2. Latent profile solutions for language achievement goals.

k	AIC	BIC	SABIC	LMRT	BLRT	Entropy	Smallest profile (%)
Wave 1							
1	4459	4500	4471			1.000	100.0
2	4421	4480	4438	<.001	<.001	.712	17.8
3	**4396**	**4472**	**4418**	**.079**	**<.001**	**.713**	**12.4**
4	4368	4462	4396	.006	<.001	.695	11.2
5	4346	4459	4379	<.001	<.001	.777	3.1
6	4344	4475	4383	.025	.350	.727	3.1
Wave 2							
1	4046	4085	4057			1.000	100.0
2	4026	4084	4042	<.001	<.001	.654	18.0
3	**3987**	**4062**	**4008**	**.027**	**<.001**	**.783**	**12.8**
4	3981	4074	4007	.068	<.001	.806	1.8
5	3944	4055	3975	.036	<.001	.775	2.1
6	3937	4065	3973	.531	.060	.788	2.5
Wave 3							
1	3193	3232	3204			1.000	100.0
2	3173	3228	3187	.096	<.001	.627	23.9
3	**3067**	**3139**	**3085**	**.023**	**<.001**	**.885**	**10.2**
4	3043	3132	3065	.071	<.001	.859	6.4
5	3041	3147	3067	.048	.560	.867	5.9
6	3012	3135	3043	.321	<.001	.885	1.6

Notes: *k* = number of profiles; AIC = Aikaike Information Criterion; BIC = Bayesian Information Criterion; SABIC = Sample size Adjusted Bayesian Information Criterion; LMRT = Lo–Mendel–Rubin likelihood Ratio Test; BLRT = Bootstrapped Likelihood Ratio Test. For the LMRT and BLRT reported numbers are *p*-values.

between these profiles is that performance avoidance goals are structurally lower and mastery approach goals are structurally higher in profile B compared to profile C. Therefore, profile B is labelled 'approach oriented'. Compared to the other two profiles, profile C has average values for all goal orientations at all measurements across domains. Therefore, this profile is labelled 'moderate/indifferent'. One exception for this profile is the first measurement wave for mathematics in which performance approach goals are a point below their within domain wave-mean.

Development of achievement goal profiles

As a first step, the models with non-stationary and stationary transition probabilities were compared in terms of model fit. This evaluates whether chances of transitioning between profiles within a school year are different from chances of changing between school years. The model with non-stationary transition probabilities fitted the data best for language, with AIC, BIC and SABIC differences of −205, −173 and −196, respectively. The same held for mathematics with AIC, BIC and SABIC differences of −192, −165 and −184. This indicated that transition rates were different within a school year compared to between school years. In line with our hypothesis, students were more likely to transition from one profile to another between school years compared to within the school year. Entropy values for the best fitting models indicated a good classification accuracy with values of .75 and .76, respectively, for language and mathematics.

Table 3. Latent profile solutions for mathematics achievement goals.

k	AIC	BIC	SABIC	LMRT	BLRT	Entropy	Smallest profile (%)
Wave 1							
1	4946	4986	4958			1.000	100.0
2	4868	4926	4885	<.001	<.001	.929	5.2
3	**4832**	**4908**	**4854**	**.004**	**<.001**	**.801**	**5.4**
4	4791	4886	4819	.092	<.001	.713	4.9
5	4679	4792	4713	.045	<.001	.855	3.9
6	4668	4799	4707	.457	<.001	.868	1.0
Wave 2							
1	4193	4232	4204			1.000	100.0
2	4158	4215	4174	<.001	<.001	.659	30.0
3	**4016**	**4091**	**4037**	**.004**	**<.001**	**.916**	**13.4**
4	3951	4044	3977	<.001	<.001	.874	13.8
5	3849	3958	3879	<.001	<.001	.897	2.8
6	3842	3969	3877	.019	.040	.857	2.8
Wave 3							
1	3429	3467	3439			1.000	100.0
2	3389	3444	3403	.009	<.001	.776	13.6
3	**3234**	**3306**	**3252**	**.087**	**<.001**	**.929**	**12.0**
4	3181	3270	3203	.002	<.001	.890	10.0
5	3069	3175	3095	<.001	<.001	.917	2.8
6	3049	3171	3079	.006	<.001	.882	2.8

Notes: *k* = number of profiles; AIC = Aikaike Information Criterion; BIC = Bayesian Information Criterion; SABIC = Sample size Adjusted Bayesian Information Criterion; LMRT = Lo–Mendel–Rubin likelihood Ratio Test; BLRT = Bootstrapped Likelihood Ratio Test. For the LMRT and BLRT reported numbers are *p*-values.

Results of the non-stationary LTAs for each domain are displayed in Tables 5 and 6.

Table 5 displays the estimated amount of students in each profile across measurement waves based on their most likely latent-class membership. For both language and mathematics, profile A emptied over time, profile B was relatively stable and profile C filled up. In accordance with Table 5, one of the most prevalent transition patterns for both language and mathematics was a pattern in which students move from profile A to profile C (A → C → C). Table 6 presents the six most prevalent transition patterns for both language and mathematics. This table shows that, for language, 78.12% of the students remained in the same profile throughout the three measurement waves. For mathematics, 85.22% of the students had a stable profile. Of the few students that transitioned, in both domains, the majority moved to more favourable profiles.

Domain specificity of achievement goal profiles

Tables 7–9 display cross-tables of the achievement goal profiles for language and mathematics from measurement wave one to three. Chi-square tests of independence showed that there was a significant relation between the two domains with a very high effect size (Cramer's *V*) at measurement one, $\chi^2(4) = 333.58$, $p < .001$, $V = .489$, measurement two, $\chi^2(4) = 338.77$, $p < .001$, $V = .493$, and measurement three, $\chi^2(4) = 268.56$, $p < .001$, $V = .439$. However, these tables also show that there

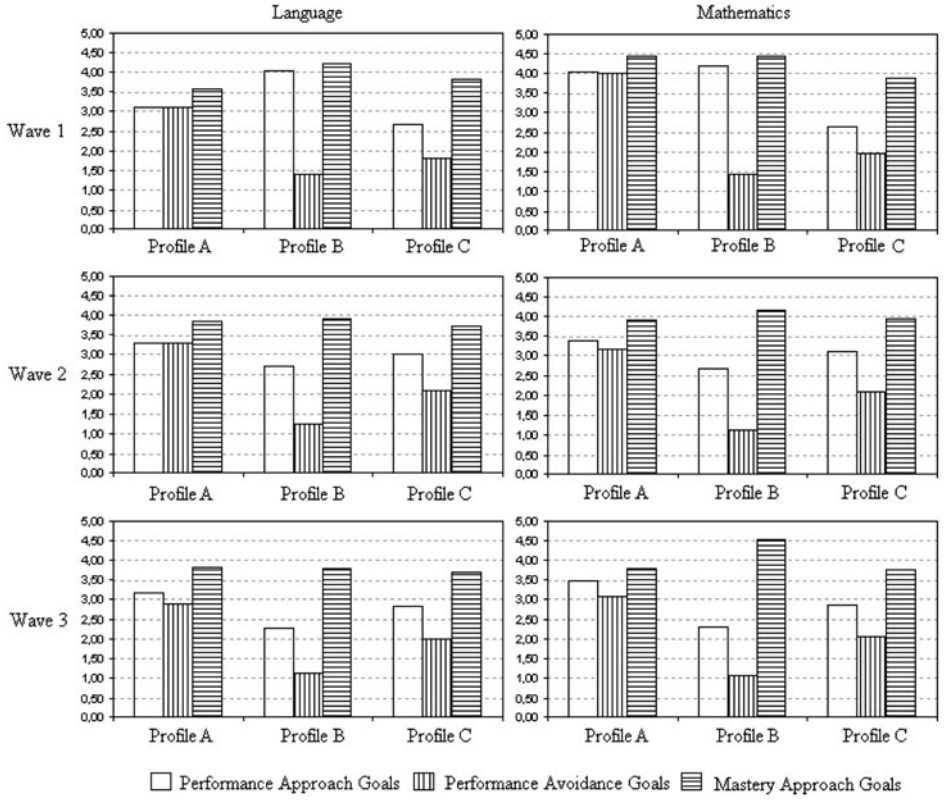

Figure 1. Means for achievement goal scores in different profiles across waves and domains.

Table 4. Means and standard errors for achievement goal scores in different profiles across waves and domains.

		Language			Mathematics		
		Profile A	Profile B	Profile C	Profile A	Profile B	Profile C
Wave 1	PAP	3.09 (.14)	4.03 (.16)	2.66 (.06)	4.03 (.23)	4.19 (.09)	2.64 (.05)
	PAV	3.09 (.16)	1.41 (.06)	1.82 (.07)	4.00 (.23)	1.44 (.07)	1.95 (.04)
	MAP	3.58 (.11)	4.20 (.14)	3.81 (.03)	4.43 (.15)	4.41 (.12)	3.89 (.03)
Wave 2	PAP	3.30 (.12)	2.70 (.09)	3.02 (.06)	3.38 (.10)	2.68 (.09)	3.12 (.06)
	PAV	3.31 (.08)	1.26 (.03)	2.09 (.05)	3.16 (.06)	1.11 (.01)	2.06 (.02)
	MAP	3.85 (.10)	3.91 (.05)	3.73 (.04)	3.91 (.08)	4.16 (.05)	3.93 (.04)
Wave 3	PAP	3.16 (.11)	2.25 (.08)	2.82 (.05)	3.50 (.11)	2.30 (.09)	2.87 (.06)
	PAV	2.88 (.07)	1.13 (.02)	1.99 (.02)	3.07 (.10)	1.08 (.01)	2.04 (.03)
	MAP	3.81 (.10)	3.79 (.05)	3.70 (.04)	3.79 (.09)	4.05 (.05)	3.75 (.04)

Notes: Standard errors are in parentheses; PAP = performance approach goals; PAV = performance avoidance goals; MAP = mastery approach goals.

are differences in classifications when domains are compared. Notably, at each measurement a large proportion of students in profile A for language had profile C for mathematics, and the reverse.

Table 5. Classification of individuals based on their most likely latent profile membership.

		Language		Mathematics	
Wave	Profile	*n*	%	*n*	%
1	(A) Multiple goals	109	15.59	87	12.36
	(B) Approach oriented	216	30.90	227	32.24
	(C) Moderate/indifferent	374	53.51	390	55.40
2	(A) Multiple goals	74	10.59	50	7.10
	(B) Approach oriented	234	33.48	238	33.81
	(C) Moderate/indifferent	391	55.94	416	59.09
3	(A) Multiple goals	30	4.29	42	5.97
	(B) Approach oriented	234	33.48	226	32.10
	(C) Moderate/indifferent	435	62.23	436	61.93

Table 6. Most prevalent latent class patterns for language and mathematics.

Language			Mathematics		
Latent class pattern	*n*	%	Latent class pattern	*n*	%
C → C → C	327	46.78	C → C → C	373	52.98
B → B → B	201	28.76	B → B → B	196	27.84
A → C → C	46	6.58	A → C → C	31	4.40
A → A → C	39	5.58	A → A → A	31	4.40
C → B → B	19	2.72	B → B → C	23	3.27
A → A → A	18	2.58	C → C → B	11	1.56
Other	49	7.00	Other	39	5.55

Note: (A) Multiple goals; (B) approach oriented; (C) moderate/indifferent.

Table 7. Achievement goal profiles across domains at the first measurement.

		Mathematics		
		A	B	C
Language	(A) Multiple goals	46 (6.60%)	6 (0.86%)	57 (8.17%)
	(B) Approach oriented	8 (1.15%)	158 (22.64%)	50 (7.16%)
	(C) Moderate/indifferent	28 (4.01%)	63 (9.03%)	282 (40.40%)

With regard to the transitions made by students it was found that 58.02% of the students that had a particular transition pattern over three waves for language, had a similar pattern for mathematics. For the transitions from wave one to wave two, this was 64.47%, and for the transitions from wave two to wave three, it was 66.19%. These figures include students that remain in the same goal profile at each measurement occasion. For reasons of clarity, we chose not to display these transition patterns in a cross-table.

Table 8. Achievement goal profiles across domains at the second measurement.

		Mathematics		
		A	B	C
Language	(A) Multiple goals	25 (3.58%)	8 (1.15%)	41 (5.87%)
	(B) Approach oriented	3 (0.43%)	175 (25.07%)	56 (8.02%)
	(C) Moderate/indifferent	21 (3.01%)	55 (7.88%)	314 (44.99%)

Table 9. Achievement goal profiles across domains at the third measurement.

		Mathematics		
		A	B	C
Language	(A) Multiple goals	11 (1.58%)	4 (0.57%)	15 (2.15%)
	(B) Approach oriented	1 (0.14%)	162 (23.21%)	71 (10.17%)
	(C) Moderate/indifferent	29 (4.15%)	60 (8.60%)	345 (49.43%)

Discussion

The aim of the present study was to examine the prevalence, stability and domain specificity of achievement goal profiles in elementary school students. The outcomes revealed three distinct goal profiles and showed substantial stability of these profiles over time and generality across subjects. These outcomes suggest that students' goal profiles represent relatively enduring personal dispositions. Below the outcomes with regard to the prevalence, stability, and domain specificity of students' goal profiles will be discussed in more detail.

The prevalence of achievement goal profiles

A first goal of the present study was to examine what types of achievement goal profiles are present among fifth- and sixth-grade elementary school students. Result showed that three profiles could be distinguished in the current sample. These three profiles were labelled 'multiple goals', 'approach oriented' and 'moderate/indifferent', and were found at all three measurement occasions for both language and mathematics, indicating that motivational dispositions are comparable across subject domains.

Around 5–15% of students were most likely to have a multiple goals profile, which has average performance approach and mastery goals, and somewhat higher performance avoidance goals compared to the other two profiles. Children in this profile can thus be characterised as having higher fears of not demonstrating the same ability as their classmates. They feel more embarrassed when they do not perform as well as others, especially when others point this out to them. Based on previous research, it may be expected that children in this profile have less than optimal learning strategies because their classroom behaviour is found to be characterised by more self-handicapping and task avoidance.

Around 30–35% of students were most likely to have an approach oriented profile. These students can be expected to show more positive learning behaviours. Because of their high mastery goal orientations they will have a focus on understanding and prefer challenging tasks. This is complemented with a healthy sense of competition and a drive to show competence that follow from their performance approach orientations. The majority of students, most likely to have a moderate/indifferent configuration of goal orientations, may be comparable to the approach oriented students. However, the positive effects of high mastery and performance approach goal orientations will be less outspoken in this group of students because they are counteracted by a relatively high manifestation of performance avoidance goals.

All profiles that were distinguished in the current sample had high mastery goals compared to the other goals within profiles. This is in concordance with the study performed by Schwinger and Wild (2012). These authors attribute this finding to a methodological bias; mastery goal questionnaire items are oftentimes stated in ways that make negating them unlikely (see also Hulleman et al., 2010). Besides methodological explanations, other factors may account for the high mastery goals in the current sample of students. Kaplan, Middleton, Urdan, and Midgley (2002) argued that students' goal orientations seem very bound to changes in goal structure. Earlier goal structure research concluded that in elementary school classrooms there is a general focus on mastery, not performance (Anderman & Midgley, 1997). As a result an achievement goal profile in which mastery as well as performance goals are high may be explained by the effects of a mastery-oriented classroom goal structure in combination with a personal focus on performance goals (either approach or avoidance). Moreover, these outcomes may be specific to the Dutch educational context. Perhaps elementary schools in the Netherlands are less focused on demonstrating performance and more focused on improvement compared to other countries. Future studies making international comparisons in this respect could help understand whether differences in educational context may account for these findings.

The development of achievement goal profiles

With respect to how students developed in terms of their achievement goal profiles, our expectation of a high degree of stability in goal profiles was confirmed. Around 80% of the students in our sample did not change achievement goal profiles across measurement waves. The high stability also suggests that goal profiles represent relatively enduring personal dispositions or tendencies of individuals. Although relatively high stability in achievement goal profiles was expected beforehand, the percentage of students with a stable profile in this study is remarkably high compared to other studies that examined the stability of students' goal profiles (e.g. Schwinger & Wild, 2012; Tuominen-Soini et al., 2011). Especially remarkable is the difference between our study and that of Schwinger and Wild, who found 35% stability in achievement goal profiles. This large difference may be explained by the fact that their study encompassed five years where the current research comprised one year. It is reasonable to expect more change as the period of investigation increases.

Among the few students that did transition between profiles, a large proportion moved from the 'multiple goals' profile to the 'moderate/indifferent' profile. Also the transition from the indifferent profile to the approach oriented profile was common among the few students that transitioned. Fortunately, but contrary to our

expectations, these transitions implied moving from a less favourable profile to a more favourable one. Contrarily, multiple previous studies have found that performance goals increase and mastery goals decrease as students get older (Anderman & Midgley, 1997; Bong, 2009; Shim et al., 2008; see also the review by Wigfield & Cambria, 2010). However, most research on developments of goal orientations has focused on secondary school students (e.g. Peetsma & van der Veen, 2013; Wigfield & Cambria, 2010). It could be that the onset of unfavourable developments in goal orientations takes place after students transition to secondary school, due to the more performance-oriented nature of secondary school (Kaplan et al., 2002).

Although goal profiles were relatively stable, the findings of this study also indicate that transitions, and especially transitions in favourable directions, do occur. These outcomes suggest that situational factors such as the classroom context and the teacher can affect students' goal profiles. This proposition is further supported by the finding that transitions were most likely to occur across school years, when differences in classroom context are greater and students usually get a different teacher, as compared to within school years. Teachers who are able to create a mastery-oriented classroom goal structure may thus be able to prevent their students from negative developments in their goal orientations.

The domain specificity of achievement goal profiles

Whereas previous research mainly focused on the configuration and development of goal orientation profiles, the present study also examined domain specificity of goal orientations. Our results indicate that goal profiles have a rather high degree of subject generality. Around 60% of the students had similar profiles across subject domains and made similar transitions. This further supports the assumption that goal orientation profiles can be considered relatively stable dispositions or tendencies. Yet, also a considerable amount of students showed different profiles for math and language. In line with previous research by Duda and Nicholls (1992) and Bong (2001) showing high correlations across subject domains, but also considerable domain specificity, it may be concluded that students goal orientations are formed by a combination of a personal tendency toward certain goals and a subject-specific element, which may comprise personal interest in the domain at hand or students' perceived competence with regard to the domain. It is also possible that the classroom goal structures could differ by subject even though subjects are taught by the same teacher in elementary school. Teachers may communicate different goal-related messages for math and language. Further research is needed to investigate the domain-specific personal and situative antecedents of goal profiles.

Limitations and suggestions for future research

Some of the outcomes presented above may be specific to the Dutch educational context, which could limit the generalisability of the findings. Furthermore, developments in students' goal profiles were studied during a rather limited period of only one year. Still, both within-school year and across school year changes were taken into account. Future research could further examine the development of goal profiles during longer periods of time and during the important transition from primary to secondary school. Additionally, the present study did not take into account characteristics of the classroom context that may explain why students adopt certain goal

profiles or why the transition from one to another. Future research could examine the extent to which context factors such as the classroom goal structure, affect the goal orientation profiles students adopt.

Conclusion

In all, the findings of the present study provide more insight in the nature and stability of students' goal profiles in elementary school. Three distinct profiles could be distinguished that were similar for language and mathematics. The LTAs, that this study was among the first to use as an analytical strategy in achievement goal research, indicated remarkably high stability of these goal profiles over time. High stability of goal profiles was also found across domains, a key contribution of this study to the literature. Yet, transitions over time did occur and transitions with students moving from a less favourable profile to a more favourable one were most frequent, especially from one school year to another. These outcomes imply that although goal profiles are relatively stable, situative factors, such as the classroom goal structure or teaching, can prevent students from being prone to disadvantageous developments in their achievement goals orientations.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by the National Scientific Organization of The Netherlands (NWO) [grant number NWO-PROO 411-07-122].

References

Akaike, H. (1974). A new look at the statistical model identification. *IEEE Transactions on Automatic Control, 19*, 716–723.

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80*, 260–267.

Anderman, E. M., & Midgley, C. (1997). Changes in achievement goal orientations, perceived academic competence, and grades across the transition to middle-level schools. *Contemporary Educational Psychology, 22*, 269–298.

Bjørnebekk, G., & Diseth, Å. (2010). Approach and avoidance temperaments and achievement goals among children. *Personality and Individual Differences, 49*, 938–943. doi:10.1016/j.paid.2010.07.034

Bong, M. (2001). Between- and within-domain relations of academic motivation among middle and high school students: Self-efficacy, task-value, and achievement goals. *Journal of Educational Psychology, 93*, 23–34. doi:10.1037//0022-0663.93.1.23

Bong, M. (2009). Age-related differences in achievement goal differentiation. *Journal of Educational Psychology, 101*, 879–896. doi:10.1037/a0015945

Carr, A., & Marzouq, S. (2012). The 2 × 2 achievement goal framework in primary school: Do young children pursue mastery-avoidance goals? *Psychology of Education Review, 36*, 3–8.

Covington, M. V. (2000). Goal theory, motivation, and school achievement: An integrative review. *Annual Review of Psychology, 51*, 171–200.

Daniels, L. M., Stupnisky, R., Pekrun, R. H., Haynes, T. L., & Perry, R. P. (2009). A longitudinal analysis of achievement goals: From affective antecedents to emotional effects and achievement outcomes. *Journal of Educational Psychology, 101*, 948–963. doi:10.1037/a0016096

Duda, J. L., & Nicholls, J. G. (1992). Dimensions of achievement motivation in schoolwork and sport. *Journal of Educational Psychology, 84*, 290–299.
Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, 41*, 1040–1048.
Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*, 256–273.
Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34*, 169–189.
Elliot, A. J. (2005). A conceptual history of the achievement goal construct. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 52–72). New York, NY: Guilford Press.
Elliot, A. J., & Harackiewicz, J. M. (1996). Approach and avoidance achievement goals and intrinsic motivation: A mediational analysis. *Journal of Personality and Social Psychology, 70*, 461–475.
Elliot, A. J., & Murayama, K. (2008). On the measurement of achievement goals: Critique, illustration and application. *Journal of Educational Psychology, 100*, 613–628. doi:10.1037/0022-0663.100.3.613
Elliot, A. J., & Thrash, T. M. (2001). Achievement goals and the hierarchical model of achievement motivation. *Educational Psychology Review, 13*, 139–156.
Gottfried, A. E., Fleming, J. S., & Gottfried, A. W. (2001). Continuity of academic intrinsic motivation from childhood through late adolescence: A longitudinal study. *Journal of Educational Psychology, 93*, 3–13. doi:10.1037//0022-0663.93.1.3
Harackiewicz, J. M., Barron, K. E., Pintrich, P. R., Elliot, A. J., & Thrash, T. M. (2002). Revision of achievement goal theory: Necessary and illuminating. *Journal of Educational Psychology, 94*, 638–645. doi:10.1037//0022-0663.94.3.638
Hornstra, L., van der Veen, I., Peetsma, T., & Volman, M. (2013). Developments in motivation and achievement during primary school: A longitudinal study on group-specific differences. *Learning and Individual Differences, 23*, 195–204. doi:10.1016/j.lindif.2012.09.004
Hulleman, C. S., Schrager, S. M., Bodmann, S. M., & Harackiewicz, J. M. (2010). A meta-analytic review of achievement goal measures: Different labels for the same constructs or different constructs with similar labels? *Psychological Bulletin, 136*, 422–449. doi:10.1037/a0018947
Kaplan, D. (2008). An overview of Markov chain methods for the study of stage-sequential developmental processes. *Developmental Psychology, 44*, 457–467. doi:10.1037/0012-1649.44.2.457
Kaplan, A., & Maehr, M. L. (2007). The contributions and prospects of goal orientation theory. *Educational Psychology Review, 19*, 141–184. doi:10.1007/s10648-006-9012-5
Kaplan, A., Middleton, M. J., Urdan, T., & Midgley, C. (2002). Achievement goals and goal structures. In C. Midgley (Ed.), *Goals, goal structures, and patterns of adaptive learning* (pp. 21–53). New York, NY: Routledge.
Karabenick, S. A. (2004). Perceived achievement goal structure and college student help seeking. *Journal of Educational Psychology, 96*, 569–581. doi:10.1037/0022-0663.96.3.569
Linnenbrink, E. A. (2005). The dilemma of performance-approach goals: The use of multiple goal contexts to promote students' motivation and learning. *Journal of Educational Psychology, 97*, 197–213. doi:10.1037/0022-0663.97.2.197
Magidson, J., & Vermunt, J. K. (2002). Latent class models for clustering: A comparison with k-means. *Canadian Journal of Marketing Research, 20*, 37–44.
Meece, J. L., Anderman, E. M., & Anderman, L. H. (2006). Classroom goal structure, student motivation, and academic achievement. *Annual Review of Psychology, 57*, 487–503. doi:10.1146/annurev.psych.56.091103.070258
Muthén, B. O., & Muthén, L. K. (2000). Integrating person-centered and variable-centered analyses: Growth mixture modeling with latent trajectory classes. *Alcoholism: Clinical and Experimental Research, 24*, 882–891.
Muthén, B. O., & Muthén, L. K. (2010). *Mplus (6.1)*. Los Angeles, CA: Author.
Muthén, L. K., & Muthén, B. O. (2010). *Mplus User's Guide* (6th ed.). Los Angeles, CA: Author.
Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review, 91*, 328–346.

Nylund, K. L. (2007). *Latent transition analysis: Modeling extensions and application to peer victimization* (Unpublished doctoral dissertation). University of California, Los Angeles.

Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling: A Multidisciplinary Journal, 14*, 535–569. doi:10.1080/10705510701575396

Pastor, D. A., Barron, K. E., Miller, B. J., & Davis, S. L. (2007). A latent profile analysis of college students' achievement goal orientation. *Contemporary Educational Psychology, 32*, 8–47. doi:10.1016/j.cedpsych.2006.10.003

Peetsma, T., & van der Veen, I. (2013). Avoidance-oriented students' development in motivation for maths, self-regulated learning behaviour and achievement: A person-centred study in the lowest level of secondary education. *Educational Psychology, 33*, 828–848. doi:10.1080/01443410.2013.802885

Pintrich, P. R. (2000a). An achievement goal theory perspective on issues in motivation terminology, theory, and research. *Contemporary Educational Psychology, 25*, 92–104. doi:10.1006/ceps.1999.1017

Pintrich, P. R. (2000b). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology, 92*, 544–555. doi:10.1037//0022-0663.92.3.544

Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods, 7*, 147–177. doi:10.1037//1082-989X.7.2.147

Schwarz, G. (1978). Estimating the dimension of a model. *The Annals of Statistics, 6*, 461–464. doi:10.1214/aos/1176344136

Schwinger, M., & Wild, E. (2012). Prevalence, stability, and functionality of achievement goal profiles in mathematics from third to seventh grade. *Contemporary Educational Psychology, 37*, 1–13. doi:10.1016/j.cedpsych.2011.08.001

Sclove, S. L. (1987). Application of model selection criteria to some problems in multivariate analysis. *Psychometrika, 52*, 333–343.

Seegers, G., Van Putten, C. M., & De Brabander, C. J. (2002). Goal orientation, perceived task outcome and task demands in mathematics tasks: Effects on students' attitude in actual task settings. *British Journal of Educational Psychology, 72*, 365–384.

Shim, S. S., Ryan, A. M., & Anderson, C. J. (2008). Achievement goals and achievement during early adolescence: Examining time-varying predictor and outcome variables in growth curve analysis. *Journal of Educational Psychology, 100*, 655–671. doi:10.1037/0022-0663.100.3.655

Statistics Netherlands. (2012a). *Statline: Population; age, sex, origin, and generation*. Voorburg: Author.

Statistics Netherlands. (2012b). *Statline: In, through, and outflow in education*. Voorburg: Author.

Stipek, D., & Gralinski, J. H. (1996). Children's beliefs about intelligence and school performance. *Journal of Educational Psychology, 88*, 397–407.

Tuominen-Soini, H., Salmela-Aro, K., & Niemivirta, M. (2008). Achievement goal orientations and subjective well-being: A person-centred analysis. *Learning and Instruction, 18*, 251–266. doi:10.1016/j.learninstruc.2007.05.003

Tuominen-Soini, H., Salmela-Aro, K., & Niemivirta, M. (2011). Stability and change in achievement goal orientations: A person-centered approach. *Contemporary Educational Psychology, 36*, 82–100. doi:10.1016/j.cedpsych.2010.08.002

van der Veen, I., & Peetsma, T. (2009). The development in self-regulated learning behaviour of first-year students in the lowest level of secondary school in the Netherlands. *Learning and Individual Differences, 19*, 34–46. doi:10.1016/j.lindif.2008.03.001

Vermunt, J. K., & Magidson, J. (2002). Latent class cluster analysis. In J. A. Hagenaars & A. L. McCutcheon (Eds.), *Applied latent class analysis* (pp. 89–106). Cambridge: Cambridge University Press.

Wigfield, A., & Cambria, J. (2010). Students' achievement values, goal orientations, and interest: Definitions, development, and relations to achievement outcomes. *Developmental Review, 30*(1), 1–35. doi:10.1016/j.dr.2009.12.001