University of Groningen

Dominant achievement goals across tracks in high school

Scheltinga, Peter A. M.; Kuyper, Hans; Timmermans, Anneke C.; van der Werf, Greetje P. C.

Published in:
Educational Psychology

DOI:
[10.1080/01443410.2015.1024613](https://doi.org/10.1080/01443410.2015.1024613)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2016

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Scheltinga, P. A. M., Kuyper, H., Timmermans, A. C., & van der Werf, G. P. C. (2016). Dominant achievement goals across tracks in high school. *Educational Psychology*, 36(7), 1173-1195.
<https://doi.org/10.1080/01443410.2015.1024613>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Dominant achievement goals across tracks in high school

Peter A.M. Scheltinga*, Hans Kuyper, Anneke C. Timmermans and Greetje P.C. van der Werf

Gion, University of Groningen, Groningen, The Netherlands

(Received 4 July 2014; final version received 17 February 2015)

The dominant achievement goals (DAGs) of 7008 students in the third grade of Dutch secondary education (US grade 9) were investigated, based on Elliot & McGregors' 2×2 framework (2001), in relation to track-level and motivational variables. We found the mastery-approach goal and the performance-approach goal, generally considered adaptive, to be more prominent among students in lower tracks. In contrast, avoidance goals were more common in higher tracks. Most notably, in the highest track, the mastery-avoidance goal was the most prominent. Additionally, we found that students with a dominant performance-approach goal scored highest on almost all motivational variables examined; students without a DAG scored mostly second highest. The implications of these findings are discussed.

Keywords: motivation; achievement goal; secondary education

Introduction

The achievement goal construct has emerged in recent decades as an influential approach for understanding how people assess, value, experience and respond to situations in which they have to perform (Elliot, 2005). Achievement goals are related to relevant educational outcomes such as performance, attainment, ability and interest (Baranik, Stanley, Bynum, & Lance, 2010; Hulleman, Schrager, Bodmann, & Harackiewicz, 2010), but are important in other domains of life as well. For instance, in the domain of sports, achievement goals influence enjoyment, effort, satisfaction and performance (Puente-Díaz, 2012), and in the domain of work achievement, goals influence intrinsic motivation and effort (Dysvik & Kuvaas, 2013). Achievement goals are even relevant at the societal level; for instance, the so-called performance-approach goals (see below) are more prominent in less developed countries than in more developed countries (Dekker & Fischer, 2008).

The achievement goal approach, however, has scarcely been investigated in relation to the phenomenon of educational tracking, which is a common feature of secondary and tertiary education systems in many countries. For instance, Austria, Germany, Lithuania, Luxemburg, the Netherlands and Switzerland all have tracked educational systems. Tracking has profound social implications because higher tracks generally lead to better educational opportunities and consequently to better career perspectives. Generally, students in higher tracks have to meet higher academic and performance standards. These higher standards may evoke avoidance

*Corresponding author. Email: p.a.m.scheltinga@rug.nl

tendencies – with the adoption of less adaptive achievement goals as a result. Another possibility may be that the track system works as a sieve that results in more adaptive achievement goals in higher tracks. Thus, in everyday educational practice, knowledge about the prevalence of specific achievement goals might eventually lead to emphasising different goals in different tracks. Currently, however, the adaptability of the various achievement goals is the subject of continued debate (Brophy, 2005; Elliot, 2005; Huang, 2012; Lau & Nie, 2008; Murayama & Elliot, 2012). Herein lies the first objective of our research; we aimed to replicate and extend findings concerning achievement goals and track level. Specifically, we wanted to investigate the prevalence of achievement goals across tracks in secondary education. To this end, we used the relatively new concept of the students' *Dominant Achievement Goal* (DAG, Van Yperen, 2006). The promise of the DAG concept lies in the possibility to bring results from experiments in line with results using survey instruments; an experimental manipulation is supposed to lead to the adoption of a specific achievement goal that is *dominant* in that setting. This is the first time the DAG approach has been used in secondary education.

The second objective was to replicate and extend findings concerning DAG and motivation. DAG groups were studied by Van Yperen (2006) in relation to several motivation-related constructs. We compared the various DAG groups with regard to variables drawn from the multi-dimensional Personal Investment Model (PIM), which is generally used to explore differences in motivational profiles between groups (Maehr, 1984). This choice makes it possible to extend findings by associating DAG groups with constructs as effort expenditure, social power, social motivation and homework effort and to replicate findings concerning self-efficacy, interest and extrinsic motivation. In addition, using the PIM may strengthen the basis of the DAG concept, which has only once been examined in conjunction with a different achievement goal instrument (Van Yperen, 2006).

The review of the relevant literature comprises three sections. We start with a condensed explanation of the achievement goal framework, culminating in the DAG concept. After that, we will present the results concerning achievement goal and track and the tracked Dutch secondary education system, in that order. Finally, the third part consists of an introduction to the global variables that constitute the PIM.

The achievement goal approach

Achievement goals may be defined as 'future-focused cognitive representations that guide behaviour to a competence-related end state that the individual is committed to either approach or avoid' (Hulleman et al., 2010, p. 423). The concept of goal orientation originated in the domain of education, but soon inspired studies in the domains of work and sports as well (Blaga, 2012; Payne, Youngcourt, & Beaubien, 2007). In 2001, Elliot and McGregor published the influential 2×2 achievement goal framework, which distinguishes four achievement goals through the combination of two dimensions. The valence dimension comprises the person's orientation regarding the goal, approach being a focus towards positive consequences and avoidance being a focus away from negative consequences (Elliot, 2005; Elliot & McGregor, 2001). The definition dimension comprises the way a person implicitly defines being competent: as having a high level of personal or task-related competence or as being (or looking) competent relative to others; the former is called a mastery orientation, the later is called a performance orientation (Elliot, 2005).

Combining the dimensions yields four achievement goals: mastery-approach goals, mastery-avoidance goals, performance-approach goals and performance-avoidance goals. Because the goals inherit the characteristics of the dimensions, they are associated with different sets of attainment-related beliefs, cognitions and affects.

In the current research, we looked at achievement goals from the perspective of the DAG. If a person consistently prefers one goal over the others, that goal is considered the person's DAG (Van Yperen, 2006).¹ Typically, a DAG is found for about 85% of respondents (Van Yperen & Orehek, 2013). To date, there are only four publications in which use of the DAG method is reported; viz. Van Yperen (2006), de Lange, Van Yperen, Van der Heijden, and Bal (2010), Van Yperen, Hamstra and van der Klauw (2011), and Van Yperen and Orehek (2013). In the first and third publications, the participants were university students; in the second and fourth, workers were the subjects. As our focus was on the educational domain, we will primarily discuss the first and third publications.

The 2006 publication comprises two studies. In the first study, using a sample of 333 freshmen with a mean age of 19.9 years, Van Yperen examined the DAG in relation to need for achievement, self-efficacy, affectivity, perfectionism, academic motivation and an instrument to assess achievement goals (the Achievement Goal Questionnaire, Elliot & McGregor, 2001; Elliot & Murayama, 2008). In this sample, 279 students (83.8%) had a DAG. Compared with the other groups, the mastery-approach goal group had relatively high levels of need for achievement, self-efficacy, positive affectivity, perfectionistic striving and intrinsic motivation. The performance-avoidance goal group had relatively high levels of avoidance orientation, negative affectivity, socially prescribed perfectionism, extrinsic motivation, and amotivation and low levels of interest. The performance-approach goal group had relatively high, but the mastery-avoidance goal group relatively low, levels of almost all variables under investigation.

In the second study, using a sample of 279 sophomores and juniors with a mean age of 21.4 years, Van Yperen examined the DAG with regard to perceived competence, interest and graded performance. This sample contained 241 students (86.4%) with a DAG. Compared with the other groups, the performance-avoidance group scored significantly lower on all three variables. The performance-approach group scored significantly higher than the other groups on perceived competence and graded performance. No significant differences existed between the two mastery groups on these three variables. These results were found to be consistent with the general trend in achievement goal research. In addition, the group without a DAG did not have a distinct profile (Van Yperen, 2006).

Van Yperen et al. (2011) investigated the relation between DAG and intention to cheat. The DAGs of a group of undergraduate students ($N = 264$) were determined in three domains of life: work, sports and education. Again, for each domain, more than 85% of the students had a DAG, and 21% of the students had the same DAG in all domains. Compared with students endorsing a mastery goal, students endorsing a performance goal showed a higher intention to cheat in all domains. The wish to cheat fits snugly in a performance goal because if competence is defined as outperforming others, cheating may very well lead to that end; in contrast, it does not fit very well in a mastery goal as it would not lead to better skills.

Little is known about the characteristics of the group *without* a DAG. Theoretically, goal adoption leads to a set of cognitions, beliefs, affects and behaviour, so not having a DAG may indicate a lack of focus. This, in turn, might imply little

resilience in the case of setbacks and a tendency to procrastinate. On the other hand, persons without a DAG may set and pursue goals more flexibly, so perhaps this group chooses goals in relation to the task and/or how well they are performing.

Educational track and achievement goal

Studies on the relations between track and achievement goals are scarce. To our knowledge, the dissertation of Paulick (2011) and the article by Paulick, Watermann and Nückles (2013), reporting the use of a three-goal model (i.e. mastery-approach goals, performance-approach goals and performance-avoidance goals), are the only publications on this subject. In the German educational system, in which these studies were conducted, track allocation takes place at the end of grade 4, when the pupils generally are 10 years old. There are basically three tracks: Gymnasium, Realschule and Hauptschule. The first of these tracks gives access to university if pupils pass the final exam after grade 12 or 13, generally at the age of 18 or 19. The other two tracks typically lead, after graduation in grades 9 or 10, to a system that combines on-the-job-training with part-time education at a vocational school (Paulick et al., 2013). Paulick et al. (2013) controlled for gender in their analyses; however, gender differences play a minor role in achievement goal theory in general. Consequently, we looked exploratively into gender differences in our research. Students who subsequently went to the Gymnasium showed a significantly lower mean level of both types of performance goals in grades 4 (before the transition), 5 and 6 (after the transition) than students who went to the other tracks. Moreover, although in grade 4 the mean level of mastery-approach goals was significantly higher for students who subsequently enrolled in the Gymnasium, the magnitude of the decline after the transition was greater as well (Paulick, 2011). Both before and after the transition, the associations within each track between achievement goals and school achievement were weak at best. Nevertheless, in all tracks, achievement was positively predicted by mastery-approach goals. In contrast, only in the Gymnasium track did performance-approach goals negatively predict school achievement (Paulick et al., 2013). This last result is in line with research in which performance goal measures focus on evaluative aspects (Hulleman et al., 2010), and indeed a substantial number of the items Paulick and her colleagues used show that evaluative focus (e.g. ‘... that the teacher thinks I am the best student.’, ‘... that others think I am smart’). It has been shown that performance-approach goal measures that refer to concerns about one’s intellectual status in the eyes of relevant others are consistently negatively associated with achievement. In contrast, performance-approach goal measures focusing on normative aspects (e.g. ‘I try to do better in my courses than other students’) generally show a positive association with achievement (cf. Blaga, 2012).

In short, Paulick (2011) and Paulick et al. (2013) found less adaptive goals to have higher means in lower tracks. In contrast to those results, however, and in response to the higher performance standards imposed on students in the higher tracks, there may be a tendency to adopt avoidance goals. First, higher performance standards may trigger fear of failure, which influences the stability of a person’s goal configuration (Fryer & Elliot, 2007). Second, a greater emphasis on grading may lead to more test anxiety, which is associated with performance-avoidance goals (Elliot & McGregor, 1999). Third, social comparison is practised by both students with a mastery goal and students with a performance goal (Régner, Escribe, &

Dupeyrat, 2007), thus it is reasonable to expect that emphasis on grading and higher standards leads to a heightened sensitivity to one's rank in class. This may lead to an inclination to experience the classroom structure as performance oriented. Because several studies suggest that (perceived) classroom goal structure is associated with personal goal adoption (Bong, 2008; Murayama & Elliot, 2009; Urdan & Schoenfelder, 2006; Wolters, 2004), a higher prevalence of personal performance goals may be the result. Fourth, Niiya, Brook, and Crocker (2010) found that even students with an incremental view of intelligence, traditionally associated with mastery goal adoption, are prone to self-handicap if their self-worth is contingent upon academics. Self-handicapping, in turn, is associated with performance-avoidance goals (Elliot & Church, 2003; Midgley & Urdan, 2001). Lastly, Lau and Nie (2008) found *classroom* performance goal structures to reinforce the association between *personal* performance-avoidance goals, loss of engagement, effort withdrawal and avoidance coping.

The present study was conducted in the context of Dutch secondary education, which is compulsory until age 18. Primary education lasts eight years, from age 4–5 until age 12–13. At the end of primary school, a nationwide attainment test is administered to assess a student's aptitude. The result of the test in combination with a teacher recommendation leads to enrolment in a specific track, but the secondary school board has the final decision about track placement. During the total period of secondary education, track mobility may occur, but it is most common in the first two years.

The secondary school system consists of five tracks varying in level of difficulty. Track A (pre-university education) prepares students for university in six years; track B (higher general secondary education) provides a general education for five - years and gives access to higher professional education (but not university). Tracks C, D and E take four years and offer prevocational education at advanced, middle and basic levels, respectively, and give access to senior secondary vocational education (but not to higher professional education or university). Teachers in tracks A and B are more highly trained and qualified than those in other tracks, but the tracks are similar as regards the number of lessons on the timetable. Compared with the educational systems of Germany and Italy, in the Dutch system, the effect of social origin on track choice is relatively weak (Contini & Scagni, 2010). However, it has been shown that after ability has been controlled for, children from higher educated backgrounds receive higher diplomas (Tieben & Wolbers, 2010).

Our subjects have been exposed to three years of high school after a transition at age 12, as opposed to one year of high school after a transition at age 10 in the German sample. This fact, in combination with the results mentioned above concerning the adoption of avoidance goals, leads to the following hypothesis: both avoidance goals will be more prevalent in higher tracks, while both approach goals will be more prevalent in lower tracks.

The PIM and motivational profiles

We aimed to corroborate and extend the motivational profiles found in the (dominant) achievement goal approach. To that end, we used the comprehensive, multiple-goal 'Personal Investment Model' (PIM, Maehr, 1984). This model assumes that the meaning of the situation to the person involved is critical in determining how she chooses to invest effort in it. In the PIM, motivated behaviour in various settings

is the result of three global variables: the goals people have, their sense of self and their perception of possible actions. We discuss the global variables to the extent that they are relevant to the objectives of the present paper. Because people's goals, sense of self and perceptions of possible actions are influenced by their social and cultural contexts, the PIM is mostly investigated from the point of view of differences between groups (Ali & McInerney, 2005; Maehr & Archer, 1987; McInerney & Ali, 2006), which makes this model ideally suited for our purposes.

The goals in the PIM are divided into mastery motivation, performance motivation, social motivation and extrinsic motivation. Those goals can each be broken down in two subgoals: mastery motivation in task involvement and effort expenditure, performance motivation in competition with others and social power, social motivation in affiliation and social concern, and extrinsic motivation in praise and token rewards (see 'Measures' for an example of each of these achievement goals). We will look at mastery motivation and performance motivation first because of the possible similarities with the 2×2 framework. Because the subgoals that constitute mastery motivation and performance motivation were not conceived along the dimensions *definition* and *valence*, it would have been quite serendipitous if they coincided with the subdivision of the 2×2 framework, i.e. mastery-approach, mastery-avoidance, performance-approach and performance-avoidance goals. Indeed, they do not coincide. An inspection of the Inventory of School Motivation (ISM, Ali & McInerney, 2005; see the Section Measures) used to measure the PIM shows that task involvement, effort expenditure, competition and social power are measured in an approach fashion, which implies that the PIM does not have equivalents for the mastery-avoidance and performance-avoidance goals, respectively. On the other hand, the 2×2 framework does not have a goal comparable to the subgoal social power, which is the goal to become a leader of a group. However, an inspection of the Achievement Goal Questionnaire (Elliot & McGregor, 2001), used to validate the DAG (Van Yperen, 2006), reveals that the performance-approach goal of the 2×2 framework is the spitting image of the competition subgoal of PIMs performance motivation. Furthermore, the PIMs task-involvement subgoal very much reflects interest. Meta-analyses show that interest has a strong positive relation with mastery-approach goals and a moderate positive relation with performance-approach goals (Baranik et al., 2010; Huang, 2011; Hulleman et al., 2010). The relationship of the avoidance goals with interest is unclear; Baranik et al. (2010) reported a positive relationship of both avoidance goals with interest, while Hulleman et al. (2010) found a negative and a null relation of both performance-avoidance and mastery-avoidance goals with interest.

We expect the dominant mastery-approach goal group to have (a) a high mean on the PIMs mastery motivation, i.e. the task and the effort subgoals (b) a relatively low mean on the PIMs performance motivation, i.e. the competition and the social power subgoals. For the dominant mastery-avoidance group, we expect a similar pattern with the exception of effort, on which we expect a considerably lower level. Furthermore, for the dominant performance-approach goal group, we expect a low mean on the task goal, but high means on the effort and competition goal. For the performance-avoidance group, we expect low levels on the task, effort, competition and social power goals. Finally, for the group without a DAG, we do not have specific expectations.

The PIMs social motivation is subdivided in affiliation and social concern. Because students with performance goals are other-directed in the sense that

comparing with others defines one's competence, others students are essentially rivals. This may imply that it is necessary to affiliate with others to assess their strengths and weaknesses but, in contrast, that it is not necessary to be motivated by social concern. As students with mastery goals do not rely on others for their sense of competence they may feel less a need to affiliate. We expect, based upon these tentative considerations, the performance-approach group to have the highest and the lowest mean score on affiliation and social concern, respectively. Furthermore, we expect the same pattern, but less extreme, for the performance-avoidance group. In addition, we expect the two mastery groups to exhibit low scores on affiliation, and we do not have distinct expectations regarding the group without a DAG.

The PIMS extrinsic motivation is subdivided in praise and token rewards. It stands to reason that students who rely on others for their sense of competence are also sensitive to manifestations of appreciation from relevant others, for instance, teachers, although there is reason to believe that outperforming others is a different achievement goal than wanting to bask in glory for one's accomplishments (Hulleman et al., 2010). Van Yperen (2006) found both dominant performance groups to show significantly higher scores on extrinsic motivation than both dominant mastery groups did. This last result is our expectation for the scores on the praise and token rewards goals as well. Regarding the group without a DAG, we do not have distinct expectations.

The PIMs next global variable, i.e. sense of self, consists of four components: self-identity, self-reliance, goal-directedness and self-efficacy. Feeling part of a social group or groups generates a sense of identity, and this self-identity affects social expectations and individual goals (Maehr, 1974). Self-reliance is the consequence of the person's perception that he/she is the prime mover of events as opposed to being controlled by other agents or situations. The third component, goal-directedness, is the tendency to set goals and to adapt one's behaviour to reach these goals; goal-directedness is associated with a feeling of well-being (Hortop, Wrosch, & Gagné, 2013) and the ability to postpone gratification (Bembenutty, 2011). The last component of sense of self, self-efficacy, refers to judgements people make about their own capacities. Self-efficacy is generally seen as an antecedent of achievement goal adoption because high self-efficacy levels predispose people to adopt an approach goal (Elliot, 2005; Elliot & McGregor, 2001). A meta-analytic study by Cellar et al. (2010) showed a moderate positive, a small positive and a small negative correlation of self-efficacy with, respectively, mastery-approach, performance-approach and performance-avoidance goals. Mastery-avoidance goals were not part of the meta-analysis, because a three-goal framework was used. Although mastery-avoidance goals were part of Baranik et al.'s (2010) meta-analysis, self-efficacy was absent in their study; the related concept of perceived competence was used instead. Mastery-avoidance goals showed a small positive relation to perceived competence; the other goals showed correlations similar to those in the Cellar et al. (2010) study. Using the DAG instrument, Van Yperen (2006) found both approach groups to be significantly more self-efficacious than the both avoidance groups, which is our expectation as well. We do not have distinct expectations regarding the group without a DAG.

Finally, the third global variable in the PIM is the person's perception of possible actions in a given situation; this refers to the behavioural alternatives the person sees as available, feasible and appropriate. A key notion in this respect is the relevance of the various actions in the individual's world. In an educational setting, for

instance, instructions concerning homework are likely to influence a person's perception of possible actions. To elaborate on homework issues: in contrast to the *time* spent on homework, homework *effort* positively predicts performance (Trautwein, Lüdtke, Schnyder, & Niggli, 2006). An opposite of homework effort, procrastination, is associated with avoidance goals, the mastery-avoidance goal in particular (Howell & Watson, 2007; Seo, 2009). In view of the above, we included a measure of homework effort in our study. We expect both approach groups to show high mean scores and both avoidance groups to exhibit significantly lower mean scores on homework effort, respectively. We do not have distinct expectations regarding the group without a DAG.

Method

Procedure

In the context of the longitudinal project COOL^{5–18}, which studies children's school career from age 5 until 18, data were collected by the Groningen Institute for Educational Research (GION), a department of Groningen University. In various waves, progress in selected school subjects is measured and data pertaining to school performance are collected; among the latter are data concerning DAG and PIM. The total sample for participation in the student questionnaire was 7813 students, spread over 81 schools. The sample of secondary schools and students can be considered largely, although not completely, representative of secondary schools and students in the Netherlands. There was an overrepresentation of schools offering tracks A and B and a slight underrepresentation of schools offering tracks D and E.

All data collection took place in school. Schools were free to choose the day or days on which to administer the tests and questionnaires. The total time needed was six school hours, up to one school hour per questionnaire or test. Additional administrative data were provided by the schools. Authorisation for the gathering and subsequent analysis of the data was given by the students' parents. More information can be found on the COOL^{5–18} website.²

Participants

We used student questionnaire data ($N = 7813$) from the third year of secondary education, which is equivalent to US grade 9, that were collected during the spring of 2008. The response to the student questionnaire was 7813 (87.9%). We dropped 805 students from the analyses because (1) they could not be assigned to a specific track ($n = 466$), (2) they had not answered all six achievement goal items ($n = 337$) or (3) their sex was unknown ($n = 2$). This reduced the sample to 7008 cases. Most students in the selected sample were 15 or 16 years old. The mean age was 16.0 years ($SD = .6$), with a range from 14 to 20. The first five columns of Table 1 show the division of the students over the tracks and provide a comparison with nationwide population data.

Lower track students were underrepresented and higher track students overrepresented in our sample. However, this did not pose a problem for our analyses because our first aim was to detect differences in DAG prevalence *between* tracks; over or underrepresentation influences the volume of the tracks but not the DAG percentages within. Furthermore, in the analyses relating DAG to the PIM, our second aim, we controlled for the variable track.

Table 1. Sample (*S*) data and comparison with population (*P*).

Track	Sample (<i>S</i>)			Population (<i>P</i>) %	Difference <i>S</i> – <i>P</i>
	<i>N</i>	%	% Boys		
A	1841	26.3	43.2	22.0	+4.3
B	1895	27.0	50.3	21.0	+6.0
C	1895	27.0	49.0	27.1	–.01
D	736	10.5	56.0	15.7	–5.2
E	641	9.1	62.2	14.2	–5.1
Total	7008	99.9	49.8	100.0	–.1

Notes: A – pre-university education, B – higher general secondary education, C – prevocational education theoretical track, D – prevocational education middle track, E – prevocational education basic track.

Measures

Track

Data on students' educational track were provided by the school administrations. Five educational tracks were distinguished; ordered from highest to lowest, A–E.

Dominant achievement goal

Van Yperen's (2006) method was used to determine the DAG; see Table 2. Six pairs of propositions, in which the achievement goals were pitted against each other in a round robin fashion, were offered. Following the stem 'This year, I find it *most important* in school ...' the student had a choice between two statements representing different achievement goals, e.g. 'to do better than last year' or 'not to do worse than others'. The mastery-approach goal was represented by 'to do better than last year'; the mastery-avoidance goal by 'not to do worse than last year'. The performance-approach goal was indicated by 'to do better than others', whereas 'not to do worse than others' indicated the performance-avoidance goal. For each goal, there were three relevant contrasts.

If a person picks the same goal in all three relevant contrasts, then that goal is supposed to be that person's DAG; people without a consistent preference for a particular goal are classified as not having a DAG. For instance, students who chose 'not to do worse than others' on all three occasions in which that option was presented were assigned to a dominant performance-avoidance goal, while students who chose thrice 'to do better than last year' were assigned to a dominant mastery-approach goal.³

Table 2. The instrument used to determine the DAG.

For each item, choose either A or B This year, I find it <i>most important</i> in school ...			
	A		B
(a)	to do <i>better</i> than others	òr	not to do <i>worse</i> than others
(b)	to do <i>better</i> than last year	òr	not to do <i>worse</i> than last year
(c)	to do <i>better</i> than others	òr	to do <i>better</i> than last year
(d)	not to do <i>worse</i> than last year	òr	not to do <i>worse</i> than others
(e)	not to do <i>worse</i> than others	òr	to do <i>better</i> than last year
(f)	not to do <i>worse</i> than last year	òr	to do <i>better</i> than others

PIM

A cross-culturally validated operationalisation of the PIM (Maehr, 1984) recently became available: the Inventory of School Motivation (ISM, Ali & McInerney, 2005; McInerney & Ali, 2006). In the ISM, each goal category of the 'PIM' is measured using two subscales. For 'mastery motivation', these are task-involvement and effort to excel; for 'performance motivation', competition and group leadership; for 'social motivation', affiliation and social concern; and for 'extrinsic motivation', praise and token. We used the 33-item version of the ISM (Ali & McInerney, 2005). For each subscale, its title, Cronbach's alpha (in parentheses), and a sample item is given. Task ($\alpha = .59$):⁴ *I try harder with interesting work*. Effort ($\alpha = .76$): *When I am improving in my schoolwork I try even harder*. Competition ($\alpha = .80$): *I am only happy when I am one of the best in class*. Social Concern ($\alpha = .73$): *It is very important for students to help each other at school*. Social Power ($\alpha = .82$): *At school I like being in charge of a group*. Praise ($\alpha = .83$): *At school I work best when I am praised*. Affiliation ($\alpha = .68$): *I do my best work at school when I am working with others*. Token ($\alpha = .72$): *Getting merit certificates helps me work harder at school*.

Perceived self-efficacy

Perceived self-efficacy was measured using a six-item subscale of the Patterns of Adaptive Learning Scale (Midgley et al., 2000). Cronbach's α for this scale was .82; a sample item is: *If I keep trying, I can do almost everything at school*.

Homework effort/procrastination

From the Homework Scale (Trautwein et al., 2006), the five-item subscale Homework Effort was used to measure the conscientiousness exhibited by the student in doing homework assignments; Cronbach's $\alpha = .77$ for this scale. A sample item is: *I often do my homework just before the lesson or during breaks*.

Data analysis strategy

No missing values occurred on the variables Track, Sex and DAG, as a consequence of the way, participants were selected. On the eight ISM scales, the Self-efficacy scale, and the Homework-effort scale, however, missing data did occur. The percentages of missing values ranged between .8% for token and 4.2% for affiliation; the average percentage was 2.1%. SPSS was used for all analyses; its Expectation maximisation (EM) procedure was used to impute missing values. The EM procedure is an iterative process that generates maximum likelihood estimates for missing data based on the observed values on the other scales. Listwise deletion would have caused a loss of 7.4% of the cases.

The relations of Track and Sex with the DAG groups were analysed by applying chi-square tests of independence to the associated contingency tables. We then checked the multivariate and univariate significance of the differences between the five DAG groups on the 10 scale variables. Finally, we profiled the various DAG groups through Discriminant analysis; the details of which are made available in the Appendix 1. In this analysis, functions that maximise the differences between the DAG groups are formed through combinations of the scores on the 10 scale variables. The maximum number of functions is one less than the number of groups.

Due to the large sample size, very small differences could have been significant if we had used a .05 or .01 significance level. Therefore, we set the significance criterion at $p < .001$ throughout all analyses.

Results

The prevalence of the DAG

In our sample of 7008 students, 6204 students (88.5%) showed a consistent pattern of responses and were thus assigned a DAG; the other 804 students (11.5%) were not assigned a DAG. The most common DAG was the mastery-approach goal (3108 students, 45.4%), followed by the mastery-avoidance goal (2001 students, 28.6%). The performance-approach goal group (307 students, 4.4%) and the performance-avoidance goal group (716 students, 10.2%) were much smaller, even smaller than the group of students without a DAG.

The prevalence of the DAGs across tracks

The percentage of students without a DAG increased consistently from the highest track to the lowest track: 8.7% in track A, 9.0% in track B, 11.1% in track C, 16.8% in track D and 21.5% in track E. The associated value of χ^2 ($df = 4$, $N = 7008$) is 110.1, $p < .001$. Apparently, the proportion of students without a DAG gets larger as the track level gets lower, and this association is significant. Below, we concentrate on the prevalence of the DAG groups across tracks.

The observed frequencies deviate from an equal division (given the overall frequencies) of the four goal categories over the five tracks, χ^2 ($df = 12$, $N = 6204$) = 657.3, $p < .001$. With decreasing track level, i.e. from left to right in Table 3, (1) the performance-approach goal group increases from 3.9 to 10.3%, (2) the performance-avoidance goal group decreases from 17.1 to 9.1%, (3) the mastery-approach goal group increases from 29.9 to 67.8% and (4) the mastery-avoidance goal group decreases from 49.2 to 12.7%. As Table 3 shows, the regularity of this pattern is interrupted twice in track D, with the performance-avoidance and the mastery-approach goal groups.

Table 3. DAG and track percentages.

	Track				
	A	B	C	D	E
DAG					
Performance approach	3.9	4.1	4.6	7.0	10.3
Performance avoidance	17.1	11.0	9.2	6.4	9.1
Mastery approach	29.9	50.1	62.2	69.3	67.8
Mastery avoidance	49.2	34.8	24.0	17.3	12.7
Valence					
Approach	33.8	54.2	66.8	76.3	78.2
Avoidance	66.3	45.8	33.2	23.7	21.8
Definition					
Performance	21.0	15.0	13.8	13.4	19.4
Mastery	79.0	85.0	86.2	86.6	80.6

Note: A – highest track, ... , E – lowest track.

The lower part of Table 3 shows that the differences are far more pronounced on the dimension *valence* than on the dimension *definition*. From track A to E, the proportion of students with an approach goal increases by 44.4%. In contrast, there is a decline of 7.6% in the percentage of students with a performance goal from track A to D, followed by an increase of 6% from D to E, thus bringing the net decrease to a very modest 1.6%.

Sex, DAG and Track

Overall, a higher percentage of girls than boys had a DAG: 91.4 and 85.7%, respectively. This difference is significant, χ^2 ($df = 1$, $N = 7008$) = 55.9, $p < .001$. In the group of students *with* a DAG, we found differences between the sexes as well. Boys were more inclined to endorse a performance-approach goal or a mastery-approach goal than girls were; the corresponding percentages were 6.7% vs. 3.3% and 52.5% vs. 50.1%, respectively. Among girls, there was a stronger tendency to have a mastery-avoidance goal (35.0% vs. 29.3%). The findings of a Chi-Square test show the differences to be significant: χ^2 ($df = 3$, $n = 6204$) = 54.5, $p < .001$. The pattern across tracks was the same for both sexes. With decreasing track level, (a) the percentage of students without a DAG increased for boys [χ^2 ($df = 4$, $n = 3489$) = 65.2, $p < .001$] and for girls [χ^2 ($df = 4$, $n = 3519$) = 34.5, $p < .001$], (b) the two approach goals increased and (c) the two avoidance goals decreased.

Motivational characteristics of the DAG groups

A multivariate analysis of variance showed that the differences in motivational characteristics between the five groups on the ISM scales, the Homework and the Self-efficacy scale were significant ($\Lambda = .863$: $F = 26.28$; $df = 40$, 26,522; $p < .001$). The univariate results were significant ($p < .001$) on 8 of the 10 scales, the exceptions being the ISM scales social concern and affiliation. The significance of the group differences was tested with post hoc contrasts, following the Bonferroni procedure ($\alpha = .001$).

Inspection of the group means showed that the performance-approach group had the highest means on all 10 variables (on affiliation, this top position was shared with the mastery-approach group). This outcome was unexpected for the task, social power, social concern and affiliation scales. Surprisingly, the group without a DAG came second on six scales. The mastery-avoidance group turned out to have the lowest mean on the effort, competition, praise and self-efficacy scales, which essentially confirmed our expectations. The other two groups, i.e. performance-avoidance and mastery-approach, often came third or fourth. We had expected higher scores on the praise and token scales for the former and on the task and effort scales for the latter group, respectively.

In Table 4, we present the means and standard deviations of the five DAG groups together with the overall means and overall standard deviations on all 10 scales; the two scales on which the groups did not differ significantly, i.e. social concern and affiliation (together representing ISM's 'Social Motivation') are placed in the lowest two rows. In addition, we calculated the effect sizes (Cohen's d) of the group differences, see Table 5. The leftmost part of the table displays the effect sizes of the differences between the performance-approach group and the other DAG groups, while the three other parts show the (remaining) differences with the

Table 4. Group mean, standard deviations (within parentheses), overall mean, overall standard deviation (within parentheses) of the DAG groups on the ISM subscales, Self-Efficacy and Homework Effort.

	None	Performance approach	Performance avoidance	Mastery approach	Mastery avoidance	Overall mean
Task	3.68 (.73)	3.90 (.71)	3.71 (.65)	3.81 (.65)	3.74 (.62)	3.77 (.65)
Effort	2.99 (.75)	3.26 (.81)	2.84 (.69)	2.98 (.70)	2.81 (.68)	2.92 (.71)
Competition	2.43 (.90)	3.05 (.98)	2.20 (.84)	2.02 (.83)	1.87 (.73)	2.09 (.86)
Social power	2.06 (.94)	2.22 (1.05)	2.01 (.92)	1.83 (.86)	1.86 (.87)	1.90 (.89)
Praise	2.76 (.86)	2.93 (.89)	2.64 (.86)	2.58 (.85)	2.48 (.82)	2.60 (.85)
Token	2.91 (.88)	3.09 (.91)	2.76 (.81)	2.75 (.87)	2.58 (.81)	2.74 (.86)
Self-efficacy	3.54 (.66)	3.85 (.66)	3.48 (.60)	3.52 (.60)	3.43 (.59)	3.50 (.61)
Homework effort	3.51 (.67)	3.60 (.69)	3.42 (.60)	3.54 (.59)	3.48 (.59)	3.51 (.61)
Social concern	2.99 (.78)	3.09 (.77)	3.01 (.76)	3.02 (.78)	3.06 (.76)	3.03 (.77)
Affiliation	3.29 (.81)	3.36 (.85)	3.25 (.80)	3.36 (.79)	3.29 (.80)	3.32 (.80)

Notes: The two scales on which the groups did not differ significantly, i.e. social concern and affiliation (together representing ISM's 'Social Motivation'), are placed in the lowest two rows.

performance-avoidance, the mastery-approach and the mastery-avoidance group, respectively. In Table 5, bold numbers denote effect sizes based upon group differences that are significant after applying the Bonferroni procedure ($\alpha = .001$). As an example, the bold printed quantity $-.22$ to the right of 'token' and beneath 'Mastery Avoidance' indicates a small effect size on the basis of the significantly lower mean of the mastery-avoidance group as compared with the performance-avoidance group on the scale token. Overall, the effect sizes can, with a few exceptions in the scales effort, competition and Self-Efficacy, be qualified as small to medium.

Finally, we used Discriminant Analysis to profile the five groups of students. The 10 scale variables were used to discriminate maximally between the five groups. There turned out to be three significant ($p < .001$) discriminant functions; see Table 6 of the Appendix 1. The corresponding Eigenvalues (the ratio of the between-groups sum of squares to the within-groups sum of squares) were .120, .025 and .007, respectively. The first function accounted for 78.0%, the second for 16.5% and the third for 4.7% of the variance explained by the functions, which in turn was 13.7% of the total variance generated by the students on the 10 scales.

The first function discriminates between the performance-approach group and the other groups, especially the mastery-avoidance group with the group without a DAG in the middle. Although competition has the highest correlation with the first function, the token, praise, self-efficacy, effort and social power correlate modestly positive to the first function as well. The second function discriminates between the performance-avoidance group and the mastery-approach group with the other three groups in between. The effort, task, homework effort and affiliation scales correlate moderately to weakly positive, while the social power scale correlates weakly negative with this function. The third function distinguishes the performance-approach group from the group without a DAG. Positively correlated are the task, self-efficacy and social concern scales, and negatively correlated with this function is the token scale.

Table 5. Effect size of the contrasts (Cohen's *d*).

	Performance approach			Performance avoidance			Mastery approach			Mastery avoidance		
	Performance avoidance	Mastery approach		Performance avoidance	Mastery approach		Performance avoidance	Mastery approach		Performance avoidance	Mastery approach	
		Mastery approach	Mastery avoidance		Mastery approach	Mastery avoidance		Mastery approach	Mastery avoidance		Mastery approach	Mastery avoidance
Task	.19	.13	.16	.22	-.15	-.05	.04	.11	.13	.09	.09	.09
Effort	.42	.28	.45	.27	-.14	.04	-.15	.17	-.01	-.18	-.18	-.18
Competition	.86	1.03	1.18	.62	.17	.33	-.24	.16	-.40	-.56	-.56	-.56
Social Power	.21	.39	.36	.16	.20	.17	-.05	-.03	-.23	-.20	-.20	-.20
Praise	.29	.35	.45	.19	.07	.15	-.14	.10	-.17	-.27	-.27	-.27
Token	.32	.34	.50	.20	.01	.18	-.18	.17	-.16	-.33	-.33	-.33
Self-Efficacy	.38	.33	.42	.42	-.07	.08	-.10	.14	-.03	-.11	-.11	-.11
Homework	.18	.09	.19	.13	-.12	-.10	-.14	.10	.05	-.05	-.05	-.05
Effort												
Social concern	.10	.09	.04	.13	-.01	-.07	.03	-.05	.04	.09	.09	.09
Affiliation	.13	.00	.08	.08	-.14	-.05	-.05	.09	.09	.00	.00	.00

Notes: Bold numbers denote effect sizes based upon group differences that are significant after applying the Bonferroni procedure ($\alpha = .001$). The two scales on which the groups did not differ significantly, i.e. social concern and affiliation, are placed in the lowest two rows.

Table 6. Discriminant analysis: standardised CDF coefficients and structure matrix.

	Standardised coefficients			Structure matrix		
	F1	F2	F3	F1	F2	F3
Task	-.22	.29	.71	.04	.41	.55
Effort	.12	.78	-.37	.35	.57	.06
Competition	1.04	-.29	.39	.94	-.14	.10
Social concern	-.16	-.57	.42	-.02	-.05	.37
Social power	-.22	-.45	-.02	.30	-.37	.01
Praise	-.09	-.21	-.30	.37	.02	-.22
Affiliation	.06	.30	.06	.02	.30	.06
Token	.06	.28	-.64	.41	.18	-.37
Self-efficacy	.16	.18	.32	.37	.29	.41
Homework effort	.01	.05	-.02	.09	.38	.10

General discussion

Our research had two main objectives. First, we aimed to replicate and extend findings concerning achievement goals and track, using the DAG concept. Specifically, we wanted to investigate the prevalence of achievement goals across tracks in secondary education. Second, we aimed to replicate and extend findings concerning achievement goals and motivation, using the PIM; we wanted to extend findings concerning constructs as effort expenditure, social power, social motivation and homework effort and to replicate findings concerning self-efficacy, interest and extrinsic motivation.

The first important conclusion is that a high percentage (88%) of our group of students had a DAG. Other researchers in the domain of education found DAG percentages of 86, 84% (Van Yperen, 2006) and 92% (Van Yperen et al., 2011). In the domain of sports, 86% of the subjects had a DAG (Van Yperen et al., 2011), and in the domain of work, the percentages were 80% (de Lange et al., 2010) and 87% (Van Yperen et al., 2011). Thus, it seems that a dominant goal is active in a large part of the population in several domains of life. In addition, the prevalence of the mastery-approach goal (51%) was high in our sample compared with the studies mentioned above, where the percentages range from 14% (Van Yperen et al., 2011) to 40% (Van Yperen, 2006).

On the other hand, the prevalence of the performance-approach goal (5%) was low. Reported percentages in the domain of education are 7% (Van Yperen et al., 2011), 10 and 14% (Van Yperen, 2006). In a sample of workers over 65 years of age, de Lange et al. (2010) found 25% to have a dominant performance-approach goal. A second important result is the pattern of distribution of the DAGs across tracks. Several aspects are of interest here. When we look across school tracks from high (A) to low (E), we observe a steady decrease in the percentages of students with a DAG, ranging from 91.3% in track A to 78.5% in track E. This finding may indicate that having a DAG is beneficial in itself, perhaps as a result of the ready availability of an established set of cognitions, beliefs and affect. Another interpretation is that higher track students may find it less difficult to be consistent, or to stay focused, when answering the six questions used to determine a dominant goal, which may indicate that the DAG instrument is confounded with cognitive ability. This is somewhat in line with the results from meta-analyses of studies using more

traditional instruments by Baranik et al. (2010) and Senko, Hulleman, and Harackiewicz (2011), who found prior ability to be associated to the various achievement goals. Of particular interest is the orderly way in which the distribution of DAGs varies with track. Our review of the literature led us to hypothesise that the prevalence of both avoidance goals would decrease while the prevalence of both approach goals would increase with decreasing track level, which they did. These results are in contrast to the findings of Paulick (2011), who found mastery-approach goals to be less strong but both performance goals to be stronger in the lower tracks. There may be various reasons why these findings diverge. First, Paulick (2011) worked within a three-goal system in which mastery goals are not bifurcated into approach and avoidance variants. Second, in the German studies, the instruments used come from a tradition in which both performance goals have a negative relation, and mastery goals have a firm positive relation, with school achievement. The DAG measures, in contrast, stem from a tradition in which performance-approach goals have moderate positive, mastery-approach goals weak positive, and both avoidance goals negative relations with school results (Blaga, 2012; Hulleman et al., 2010). Third, in the DAG approach, differences between groups are analysed, while in Paulick's work, interpersonal differences form the basis of the analysis and every subject has a score on each of the four achievement goals. Furthermore, the German school system differs from the Dutch in the number of tracks (three and five, respectively) and in the age at which students make the transition to secondary school (at age 10 and 12, respectively). Fourth, the higher number of tracks in the Dutch system may lead to higher competitiveness because of the possibility of changing track, and consequently to an inclination to perceive the classroom structure as performance oriented, which in turn may lead to stronger avoidance tendencies. Although in line with our hypothesis, a higher prevalence of avoidance goals in higher tracks is not what one hopes for because the performance-avoidance goal has almost universally been found to be maladaptive, and the mastery-avoidance goal is negatively related to performance too (Baranik et al., 2010; Murayama & Elliot, 2012). On the other hand, we found that the performance-avoidance group and the mastery-avoidance group did not have a significantly lower level than the performance-approach group on social power and homework effort, respectively. Perhaps conditions exist under which avoidance goals may be less maladaptive. For instance, Murayama and Elliot (2012) suggest that performance-avoidance goals may be adequate when protecting a lead might result in a victory or for tasks focused on not making errors. In the context of the Dutch-tracked educational system, avoidance goals may be beneficial for students by preventing teachers to form negative expectations that may result in self-fulfilling prophecies which, in turn, might lead to placement in a lower track.

Furthermore, because of its strong ties to interest (Baranik et al., 2010; Hulleman et al., 2010), the lower prevalence of the mastery-approach goal in higher tracks may have some less favourable side effects. In addition, Seo (2009) found that avoidance goals are more powerful in promoting procrastination than mastery goals are in shielding against procrastination. Although we expect that the potential cause of the higher prevalence of avoidance goals is the higher tracks' higher performance standards, another explanation of the results may lie in the operationalisation of the mastery goals (*to do better than last year* and *not to do worse than last year*). In lower tracks, *to do better than last year* is a good strategy as it might result in climbing to a higher track. In higher tracks, however, failure leads to placement in a

lower track. *Not to do worse than last year* may be a strategy to keep a good position.

The next important result we found is that, relative to boys, the percentage of girls with a DAG is larger overall *and* larger in every track. In addition, we found girls to be more inclined to adopt a mastery-avoidance goal but less inclined to adopt a performance-approach goal.

We now turn to the other main objective of our study, i.e. to use the PIM to extend findings concerning achievement goals and motivation; it generated several interesting results. The most notable outcome may be that, with the exception of the performance-approach group, the differences between the DAG groups are small. Although the different DAG groups exhibit distinct profiles, the effect sizes generally are small, which is, according to Huang (2012) a characteristic of achievement goal models. Our findings are, furthermore, in concordance with the results of Paulick (2011), who found only weak associations between achievement goals and attainment within tracks. On the other hand, the small effect sizes we found could be an indication of a lack in discriminatory power of the DAG instrument itself, although that would be in contrast to the results of Van Yperen (2006). Perhaps achievement goals in general and the DAG in particular are less important within tracked educational systems as a consequence of the influence of the tracked system itself. The performance-approach group, however, shows several medium and a couple of large effect sizes when compared with the other groups. Even when we discard the differences generated by the competition scale, which, as we argued above, is virtually identical to the instrument used to validate the DAG method, the performance-approach group is remarkably different from the other groups. To begin with, the performance-approach goal group had, next to competition, a higher mean level on task involvement, social power, praise, token, self-efficacy and homework effort than the other groups. To our surprise, however, this group scored highest on all other variables as well; this group seems to be very easy to motivate, or, alternatively, this group responds in a socially desirable way. We hold the first possibility to be more probable though, because we do not think that agreeing to a larger degree with statements like *I try harder with interesting work*, or *At school I work best when I am praised* does indicate a socially desirable response. Indeed, claiming the exertion of the same amount of effort regardless of amount of praise or interest would be a stronger indication of such an inclination. In contrast to the performance-approach group, our findings showed the mastery-avoidance group to exhibit the lowest means on effort, competition, praise, token and self-efficacy.

In the 2×2 achievement goal framework, the greatest distances should exist between goals that do not share a label, i.e. the mastery-avoidance–performance-approach combination and the mastery-approach–performance-avoidance combination. Our findings substantiate this through the first and second discriminant functions. The groups are separated primarily through a different appraisal of competition and, to a lesser extent, through differences in self-efficacy, token, effort, praise and social power. These results fit nicely into theoretical expectations because the performance-approach group should be geared towards an interpersonal sense of competence with a positive flavour, while the mastery-avoidance group has an intrapersonal (or task-related) outlook on competence with a strong desire to avoid doing worse than before, thereby being less susceptible to external motivational stimuli (Elliot & McGregor, 2001).

Furthermore, the performance-avoidance goal group lives up to its less adaptive reputation by showing low means on most variables. Likewise, the mastery-approach group confirms its adaptive reputation by showing relatively high levels on task, effort and self-efficacy. In addition, this group exhibits a low level of competition and social power. Confirming theoretical expectations, the mastery-approach–performance-avoidance combination was found to have little in common. These groups are separated most clearly through differences in effort, task, homework effort and social power, meaning that the mastery-approach group, relative to the performance-avoidance group, wants more interesting and demanding tasks and puts more effort into homework assignments, but is less interested in being in charge of co-workers.

A final set of important results concerns the group without a DAG. This group, which is marginally larger than the performance-avoidance goal group, but substantially larger than the performance-approach goal group (and in percentages decreasing consistently in size from lower to higher tracks), bears the closest resemblance to the performance-approach group on the majority of the scales, the most important difference, as shown by the third discriminant function, being the score on the ISM scale task. The performance-approach group has a higher self-efficacy is more interested in challenging tasks, scores higher on effort and, of course, on competition.

For educational purposes, it is useful to know that the DAG groups, with the exception of the small performance-approach goal group, do not seem to have very distinct motivational profiles within the tracks, which gives educators more freedom to act according to circumstances. On the other hand, educators may want to mitigate the stronger influence of avoidance goals in the higher tracks by providing a learning environment in which mistakes are welcomed and competition is tolerated but not encouraged.

Strengths and weaknesses

The present study is the first in which the DAG of secondary school students was examined. It is also the first in which DAG was examined at different track levels of education within the same age group, and with remarkable results. In addition, we examined the group without a DAG, thus extending our knowledge of a relatively large goal group. Lastly, the size of the sample lays a solid foundation for our findings.

Although large, our sample contains only one age group, an obvious weakness as it limits the generalisability of our results. Furthermore, our data present a static image because they are not longitudinal. Moreover, some of our scales had a below-standard reliability, which probably had a dampening effect on the outcomes; see note 4. Another weakness is the lack of direct attainment measures. Direct attainment measures may provide a more accurate assessment of the adaptive value of the different goals in different tracks. In addition, the DAG instrument does not refer to why a particular goal is adopted, which means that the goals behind the goals (Urda & Mestas, 2006) remain unknown, although these may relate differently to various outcomes, such as attainment, interest and well-being.

Suggestions for further research

As the above suggests, there is good reason to look into the adaptive qualities of having a DAG in general and of having a mastery- or performance-avoidance goal

in particular. Research within tracks combining DAG, motivational variables and measures of attainment may help to achieve that aim. We expect that within each track, the link between mastery-approach goals and interest as well as the link between performance-approach goals and academic attainment may emerge. In addition, we expect the adaptive value of a specific DAG to be broadly similar in each track. However, the performance-approach group might be an exception; these goals may be adopted for different reasons in lower tracks (e.g. ‘I feel successful if I show people I’m smart’) than in higher tracks (e.g. ‘I try to do better in my courses than other students’), which may result in a difference in adaptiveness across tracks (Blaga, 2012; Hulleman et al., 2010).

The DAG pattern we found across tracks in the third year of secondary education probably results from a gradual systematic change that starts at the transition from primary to secondary education and becomes more pronounced over time. This pattern warrants examination for both theoretical and practical reasons. We need to know the prevalence of the DAG across tracks in each subsequent year, and which elements are the prime movers that generate the pattern. As we mentioned above, higher tracks have higher performance standards. In addition, students in higher tracks have, in general, greater intellectual capabilities than students in lower tracks. This may lead, in combination with the narrower intellectual bandwidth per track, to a diminished perceived competence in higher tracks – the Big-fish–little-pond-effect (Marsh et al., 2008) – with a higher prevalence of performance goals as a result. In contrast, because the big fish swims in other ponds, there may be an opposite effect in lower tracks with a gradual growth in perceived competence and a higher prevalence of mastery goals as a result.

Conclusions

A large percentage of students have a DAG. The prevalence of DAGs across tracks exhibits a remarkably regular pattern with some troubling facets; in higher tracks, avoidance goals have higher prevalences, but mastery-approach goals have lower prevalences. The differences between the DAG groups are in line with theoretical expectations. Finally, the group without a DAG resembles the performance-approach group, the most significant difference being a lower appraisal of interesting tasks.

Funding

This work was supported by the Nederlandse Organisatie voor Wetenschappelijk Onderzoek [grant number 023.001.190].

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes

1. The authors wish to express their gratitude to Nico van Yperen for helping us with the formulation of the achievement goals, providing the syntax for scoring them and commenting on an earlier version of this paper.

2. We used the Cool^{5–18} database, Secondary Education segment, which was composed from data gathered by GION and CITO. The data are available for researchers via Data Archiving and Network Systems (The Netherlands, <http://www.dans.knaw.nl/>).
3. In a ‘chance model’, exactly half of the respondents would be assigned to a DAG. Of the $2^6 = 64$ possible patterns for answering the items, 32 lead to the assignment of a DAG, 8 to each DAG.
4. Two of our scales have a below-standard reliability; the ISM scales ‘task’ and ‘affiliation’ show a Cronbach’s alpha of .59 and .68, respectively. This means that if these scales were used as outcome variables, the square roots of these alphas would be the upper bounds of validity; these are .77 and .82 for ‘task’ and ‘affiliation’, respectively. Generally, the associations between variables are significantly attenuated in the case of low alphas. Comments on the use of Cronbach’s alpha have been with us for decades. Schmitt (1996), for instance, argues: ‘When a measure has other desirable properties, such as meaningful content coverage of some domain and reasonable unidimensionality, this low reliability may not be a major impediment to its use’ (Schmitt, 1996, pp. 351–352). Because an exploratory factor analysis, in which eight factors are rotated using the varimax rotation, yields the eight subscales of the ISM (Zijlsing, Keuning, Kuyper, Van Batenburg, & Hemker, 2009), the scales ‘task’ and ‘affiliation’ have reasonable unidimensionality. Deletion of one item from ‘affiliation’ would have resulted in a Cronbach’s alpha of .74. However, this was not done because then only two, similarly formulated, items would remain.

References

- Ali, J., & McInerney, D. M. (2005). An analysis of the predictive validity of the inventory of school motivation (ISM). In *Australian Association for Educational Research (AARE) Conference. Sydney, Australia*. Retrieved from <http://www.aare.edu.au/05pap/ali05403.pdf>
- Baranik, L. E., Stanley, L. J., Bynum, B. H., & Lance, C. E. (2010). Examining the construct validity of mastery-avoidance achievement goals: A meta-analysis. *Human Performance*, 23, 265–282. doi:10.1080/08959285.2010.488463
- Bembenutty, H. (2011). Academic delay of gratification and academic achievement. *New Directions for Teaching and Learning*, 126, 55–65.
- Blaga, M. (2012). *Performance attainment and intrinsic motivation: An achievement goal approach.*, [s.n.], S.I. Retrieved from <http://irs.ub.rug.nl/ppn/34046402X>
- Bong, M. (2008). Effects of parent–child relationships and classroom goal structures on motivation, help-seeking avoidance, and cheating. *The Journal of Experimental Education*, 76, 191–217.
- Brophy, J. (2005). Goal theorists should move on from performance goals. *Educational Psychologist*, 40, 167–176.
- Cellar, D. F., Stuhlmacher, A. F., Young, S. K., Fisher, D. M., Adair, C. K., Haynes, S., ... Riester, D. (2010). Trait goal orientation, self-regulation, and performance: A meta-analysis. *Journal of Business and Psychology*, 26, 467–483. doi:10.1007/s10869-010-9201-6
- Contini, D., & Scagni, A. (2010). Inequality of opportunity in secondary school enrolment in Italy, Germany and the Netherlands. *Quality & Quantity*, 45, 441–464. doi:10.1007/s11135-009-9307-y
- de Lange, A. H., Van Yperen, N. W., Van der Heijden, B. I. J., & Bal, P. M. (2010). Dominant achievement goals of older workers and their relationship with motivation-related outcomes. *Journal of Vocational Behavior*, 77, 118–125.
- Dekker, S., & Fischer, R. (2008). Cultural differences in academic motivation goals: A meta-analysis across 13 societies. *The Journal of Educational Research*, 102, 99–110.
- Dysvik, A., & Kuvaas, B. (2013). Intrinsic and extrinsic motivation as predictors of work effort: The moderating role of achievement goals. *British Journal of Social Psychology*, 52, 412–430. doi:10.1111/j.2044-8309.2011.02090.x
- 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.
- Elliot, A. J., & Church, M. A. (2003). A motivational analysis of defensive pessimism and self-handicapping. *Journal of Personality*, 71, 369–396.

- Elliot, A. J., & McGregor, H. A. (1999). Test anxiety and the hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology*, 76, 628–644.
- Elliot, A. J., & McGregor, H. A. (2001). A 2×2 achievement goal framework. *Journal of Personality and Social Psychology*, 80, 501–519.
- Elliot, A. J., & Murayama, K. (2008). On the measurement of achievement goals: Critique, illustration, and application. *Journal of Educational Psychology*, 100, 613–628.
- Fryer, J. W., & Elliot, A. J. (2007). Stability and change in achievement goals. *Journal of Educational Psychology*, 99, 700–714.
- Hortop, E., Wrosch, C., & Gagné, M. (2013). The why and how of goal pursuits: Effects of global autonomous motivation and perceived control on emotional well-being. *Motivation & Emotion*, 37, 675–687.
- Howell, A. J., & Watson, D. C. (2007). Procrastination: Associations with achievement goal orientation and learning strategies. *Personality and Individual Differences*, 43, 167–178.
- Huang, C. (2011). Achievement goals and achievement emotions: A meta-analysis. *Educational Psychology Review*, 23, 359–388. doi:10.1007/s10648-011-9155-x
- Huang, C. (2012). Discriminant and criterion-related validity of achievement goals in predicting academic achievement: A meta-analysis. *Journal of Educational Psychology*, 104, 48–73. doi:10.1037/a0026223
- 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
- Lau, S., & Nie, Y. (2008). Interplay between personal goals and classroom goal structures in predicting student outcomes: A multilevel analysis of person-context interactions. *Journal of Educational Psychology*, 100, 15–29.
- Maehr, M. L. (1974). Culture and achievement motivation. *American Psychologist*, 29, 887–896.
- Maehr, M. L. (1984). Meaning and motivation. Toward a theory of personal investment. In R. Ames & C. Ames (Eds.), *Research on motivation in education* (pp. 115–144). Orlando, FL: Academic Press.
- Maehr, M. L., & Archer, J. (1987). Motivation and school achievement. In L. Katz & K. Steiner (Eds.), *Current topics in early childhood education* (Vol. 7, pp. 85–107). Westport, CT: Ablex.
- Marsh, H. W., Seaton, M., Trautwein, U., Lüdtke, O., Hau, K. T., O'Mara, A. J., & Craven, R. G. (2008). The Big-fish–little-pond-effect stands up to critical scrutiny: Implications for theory, methodology, and future research. *Educational Psychology Review*, 20, 319–350. doi:10.1007/s10648-008-9075-6
- McInerney, D. M., & Ali, J. (2006). Multidimensional and hierarchical assessment of school motivation: Cross-cultural validation. *Educational Psychology*, 26, 717–734. doi:10.1080/01443410500342559
- Midgley, C., Maehr, M. L., Hruda, L. Z., Anderman, E., Anderman, L., Freeman, K. E., ... Middleton, M. J. (2000). Manual for the patterns of adaptive learning scales. *Ann Arbor*, 1001, 1–68.
- Midgley, C., & Urdan, T. (2001). Academic self-handicapping and achievement goals: A further examination. *Contemporary Educational Psychology*, 26, 61–75. doi:10.1006/ceps.2000.1041
- Murayama, K., & Elliot, A. J. (2009). The joint influence of personal achievement goals and classroom goal structures on achievement-relevant outcomes. *Journal of Educational Psychology*, 101, 432–447. doi:10.1037/a0014221
- Murayama, K., & Elliot, A. J. (2012). Further clarifying the competition–performance relation: Reply to D. W. Johnson, et al. (2012). *Psychological Bulletin*, 138, 1079–1084.
- Niiya, Y., Brook, A. T., & Crocker, J. (2010). Contingent self-worth and self-handicapping: Do incremental theorists protect self-esteem? *Self and Identity*, 9, 276–297. doi:10.1080/15298860903054233
- Paulick, I. (2011). *Zielorientierungen und schulisches Lernen am Grundschulübergang* [Achievement goals and academic performance at the transition from primary school]. Göttingen: Georg-August-Universität.

- Paulick, I., Watermann, R., & Nückles, M. (2013). Achievement goals and school achievement: The transition to different school tracks in secondary school. *Contemporary Educational Psychology*, 38, 75–86. doi:10.1016/j.cedpsych.2012.10.003
- Payne, S. C., Youngcourt, S. S., & Beaubien, J. M. (2007). A meta-analytic examination of the goal orientation nomological net. *Journal of Applied Psychology*, 92, 128–150. doi:10.1037/0021-9010.92.1.128
- Puente-Díaz, R. (2012). The effect of achievement goals on enjoyment, effort, satisfaction and performance. *International Journal of Psychology*, 47, 102–110.
- Régner, I., Escribe, C., & Dupeyrat, C. (2007). Evidence of social comparison in mastery goals in natural academic settings. *Journal of Educational Psychology*, 99, 575–583.
- Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological Assessment*, 8, 350–353.
- Senko, C., Hulleman, C. S., & Harackiewicz, J. M. (2011). Achievement goal theory at the crossroads: Old controversies, current challenges, and new directions. *Educational Psychologist*, 46, 26–47. doi:10.1080/00461520.2011.538646
- Seo, E. H. (2009). The relationship of procrastination with a mastery goal versus an avoidance goal. *Social Behavior and Personality: An international journal*, 37, 911–919. doi:10.2224/sbp.2009.37.7.911
- Tieben, N., & Wolbers, M. (2010). Success and failure in secondary education: Socio-economic background effects on secondary school outcome in the Netherlands, 1927–1998. *British Journal of Sociology of Education*, 31, 277–290. doi:10.1080/01425691003700516
- Trautwein, U., Lüdtke, O., Schnyder, I., & Niggli, A. (2006). Predicting homework effort: Support for a domain-specific, multilevel homework model. *Journal of Educational Psychology*, 98, 438–456.
- Urdu, T., & Mestas, M. (2006). The goals behind performance goals. *Journal of Educational Psychology*, 98, 354–365.
- Urdu, T., & Schoenfelder, E. (2006). Classroom effects on student motivation: Goal structures, social relationships, and competence beliefs. *Journal of School Psychology*, 44, 331–349.
- Van Yperen, N. W. (2006). A Novel approach to assessing achievement goals in the context of the 2 × 2 framework: Identifying distinct profiles of individuals with different dominant achievement goals. *Personality and Social Psychology Bulletin*, 32, 1432–1445. doi:10.1177/0146167206292093
- Van Yperen, N. W., Hamstra, M. R. W., & van der Klauw, M. (2011). To win, or not to lose, at any cost: The impact of achievement goals on cheating. *British Journal of Management*, 22, S5–S15. doi:10.1111/j.1467-8551.2010.00702.x
- Van Yperen, N. W., & Orehek, E. (2013). Achievement goals in the workplace: Conceptualization, prevalence, profiles, and outcomes. *Self-Regulation and Strategic Motivational Orientations in Economic Contexts*, 38, 71–79. doi:10.1016/j.joep.2012.08.013
- Wolters, C. A. (2004). Advancing achievement goal theory: Using goal structures and goal orientations to predict students' motivation, cognition, and achievement. *Journal of Educational Psychology*, 96, 236–250.
- Zijlsing, D., Keuning, J., Kuyper, H., Van Batenburg, T., & Hemker, B. (2009). *Technisch Rapport. Eerste meting van Cool⁵⁻¹⁸ in het derde leerjaar van het voortgezet onderwijs* [Technical Report. First measurements of Cool⁵⁻¹⁸ in the third grade of secondary education]. Groningen: GION.

Appendix 1

We profiled the various DAG groups through Discriminant analysis, using the 10 scale variables as predictors and the five groups as criterion variable, which means that the (scores on the) ISM scales, Homework Effort and the Self-Efficacy scale are combined in a way that most optimally predicts membership of the various DAG groups. The combination of the variables that maximises the differences between the groups forms a 'function'. Then, after the effects of the first function are partialled out, a second function, orthogonally to the first,

is formed – and so on, until a next function proves to be insignificant. The maximum number of functions is one less than the number of groups.

The first function (F1) discriminates between the performance-approach group (mean 1.23) and the other groups, especially the mastery-avoidance group (mean $-.31$) with the group without a DAG in the middle (mean $.45$). The second function (F2, mean $-.25$) discriminates between the performance-avoidance group and the mastery-approach group (mean $.17$) with the other three groups in between. The third function (F3) distinguishes the performance-approach group from the group without a DAG, the former group having a mean of $.26$, the latter having a mean of $-.16$.

The left part of Table 6 contains the ‘standardised canonical discriminant function coefficients’. The most important variable constituting F1, with a coefficient of 1.04, was competition. Important variables constituting F2 were effort, social concern and social power, with corresponding coefficients of $.78$, $-.57$ and $-.45$, respectively. For F3, token and task were most important, with corresponding coefficients of $.71$ and $-.64$. The right part of Table 6 shows the correlations between the variables and the discriminant functions. ISM scale competition showed a very high correlation ($.94$) with F1, whereas token, effort, praise, power and self-efficacy correlated moderately (between $.30$ and $.50$) with this function.

Effort showed a large correlation ($.57$), while homework effort and task showed moderate correlations with F2. In addition, social power had a moderate negative correlation with F2. Task showed a large correlation ($.55$) with F3, but moderate correlations were found for social concern ($.37$) and self-efficacy ($.41$). Finally, token had a moderate negative correlation ($-.37$) with this third function.