The dominant achievement goal in Dutch secondary education

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The Dominant Achievement Goal in Dutch Secondary Education

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Voorwoord

Greetje van der Werf, Hans Kuyper, Anneke Timmermans: ik had fantastische begeleiders. Dat bleek ook nodig. Dank, dank, veel dank. En nogmaals dank, want daar is reden voor.

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Nu overweeg ik: hij is dr klaar mee.

TABLE OF CONTENTS

Chapter 1

Introduction

1.1 INTRODUCTION

Life without goals is hard to imagine. Almost everyone has had, one time or another, the intention to become a pop star, lose weight, quit smoking, exercise more, treat the pupils more patiently, tend the garden, reduce stress levels, start with the ninth symphony, or finally complete the thesis. The goals that play a prominent role in this thesis, i.e. achievement goals, are a more specific kind of goals than those above; they play their part in situations in which a person has to perform and thus are ubiquitous in education, the workplace, and sports (Elliot, 2005). Consequently, achievement goals have been studied in several domains of life, but notably in the domains of work (Baranik, Barron, & Finney, 2007; de Lange, Van Yperen, Van der Heijden, & Bal, 2010; Van Yperen, & Orehek, 2013), sports (Nien, & Duda, 2008; Ntoumanis, Thøgersen-Ntoumani, & Smith, 2009; Puente-Díaz, 2012) and education (Harackiewicz, Barron, Tauer, & Elliot, 2002; Nie, & Liem, 2013; Wirthwein, Sparfeldt, Pinquart, Wegerer, & Steinmayr, 2013); the focus in this thesis is upon achievement goals in the domain of education.

Differences in performance are partly due to differences in achievement goals (Van Yperen, Blaga, & Postmes, 2014, 2015). Furthermore, achievement goals are related to other individual student variables known to influence performance such as effort (Ho & Hau, 2008), interest (Harackiewicz, Durik, Barron, Linnenbrink-Garcia, & Tauer, 2008), intrinsic motivation (Dysvik & Kuvaas, 2013), self-efficacy (Huang, 2016) , perceived competence (Law, Elliot, & Murayama, 2012), and cheating (Van Yperen, Hamstra, & van der Klauw, 2011). In addition, school and classroom variables, like (perceived) classroom goal structure, influence the goal adoption of students (Lau & Nie, 2008; Murayama & Elliot, 2009). Consequently, the study of achievement goals offers many opportunities to link (educational) theory and (educational) practice on individual, classroom and school levels, respectively.

Thus it is quite understandable that the study of achievement goals became prominent since the first tentative formulations in the early eighties of the last century (Elliot, 2005; Senko, 2016). The results of the increasing amount of achievement goal studies led to several adaptations of the original ideas. The number of proposed goals that explains significant and relevant variance in subject's behavior evolved; theories with two (Ames & Archer, 1988), three (Elliot & Church, 1997), four (Elliot & McGregor, 2001) and six (Elliot, Murayama, & Pekrun, 2011) different goals appeared. On the other hand Huang (2012) advised, on the basis of the explained variance in academic achievement, to move on to other constructs, which amounts to a zero-goal theory. Yet other adaptations are the proposition of a work-avoidance goal (King, 2014; King & McInerney, 2014), and of social goals, i.e. goals subjects engage in to reach social aims as status, the approval of relevant others, or belonging to a group (Dowson & McInerney, 2004). Furthermore, unresolved discussions arose as well: whether it is possible to endorse multiple goals simultaneously (Barron &

Harackiewicz, 2001; Senko, Hulleman, & Harackiewicz, 2011), whether certain kind of goals deserved attention from the scientific world (Brophy, 2005) and whether the same goal labels are used for qualitatively different goals (Blaga, 2012; Hulleman, Schrager, Bodmann, & Harackiewicz, 2010). In addition, recently a study has drawn attention to the remarkable fact that several widely studied achievement goals were hardly acknowledged by students when interviewed about their reasons for studying (Lee & Bong, 2016).

As the former paragraph shows, the field of achievement goal research is lively, diverse, exciting and somewhat chaotic. Although not specific for this field, these circumstances make it a necessity to clarify which goal theory is used in this thesis, which instrument is used to measure the principle variable of interest, to which problems the thesis wants to speak and how. In this chapter the key concepts of this dissertation will be elucidated. A very concise account of the history and evolution of the achievement goal concept from its origin to the 2x2 achievement goal framework, which is the theoretical environment of the studies presented in this thesis, is given in subsection 1.2.1. The concept used in the empirical studies in this thesis, the Dominant Achievement Goal (DAG) is described in subsection 1.2.2. Both the 2x2 achievement goal framework and the DAG face overarching key issues which shall be addressed in the empirical chapters; these key issues are introduced in subsection 1.2.3. Tracks play a part in every empirical chapter that follows and for that reason the tracked Dutch secondary educational system is explained in subsection 1.3. Finally, section 1.4 describes how the key issues facing the 2x2 framework and the DAG will be addressed by the empirical studies presented in chapters 2, 3 and 4.

1.2 THE ACHIEVEMENT GOAL APPROACH

1.2.1 The 2x2 achievement goal framework

The results of the various achievement goal studies in the first decade or so of research were essentially all in the same general (and expected) direction. The original theories posited two broad goal orientations, known by several names (Elliot, 2005), but often (and here) referred to as mastery goals and performance goals. Persons with a mastery goal orientation look at challenging situations as opportunities to learn a lot, and learning a lot is seen as a form of personal growth. In contrast, persons with a performance goal orientation experience challenges as opportunities to exhibit their knowledge and skills, which implies that challenge constitutes a threat of failure. Consequently, persons endorsing mastery goals were generally associated with more positive results, for instance higher grades, than those endorsing performance goals.

Regularly, however, endorsement of performance, respectively mastery goals was associated with positive and null results. The 2x2 achievement goal framework (Elliot & McGregor, 2001), one of the more influential approaches to the study of achievement goals

(Hulleman et al., 2010; Lee & Bong, 2016), attempted to explain the deviating results by pruning back the goal orientations to the standards persons use to assess their success on the task at hand. In the 2x2 achievement goal framework those standards are based on the answer to two questions: a) how does the subject *define* competence? and b) what is the subject's *valence* with regard to competence? The above two questions give rise to two dimensions. The *valence* dimension comprises the approach-avoidance distinction: a tendency to approach success versus a tendency to avoid failure. The *definition* dimension has a mastery and a performance pole, respectively. Mastery is, in this context, the tendency to define competence in terms of personal or task-based progress; likewise, performance is the tendency to define competence in terms of the ranking in a group. The two dimensions define four goals: performance-approach goals, performance-avoidance goals, mastery-approach goals, and mastery-avoidance goals.

A charming assumption of this framework is that the aims persons may have when adopting a goal, nor the reasons for adopting it, matter much; if a particular goal is adopted, the consequences of that goal will follow. Whether a high need for achievement or the wish to impress the parents brings a student to adopt a performance-approach goal makes no difference for to the consequences that the goal produces (Senko, 2016).

Meta-analyses of empirical studies show that, in the 2x2 framework, a performance-approach goal is related to high scores on various performance indicators[1] (Huang, 2012; Van Yperen, et al., 2014; Wirthwein, et al., 2013), while a mastery-approach goal is associated with high scores on performance indicators (Van Yperen et al., 2014; Van Yperen et al.,2015) *and* on interest (Baranik, Stanley, Bynum, & Lance, 2010; Hulleman et al., 2010). Thus both approach goals are related to high scores on performance indicators but only the mastery-approach goal is related to high scores on interest as well. Likewise, a performance-avoidance goal is related to modest scores on interest (Baranik et al., 2010; Hulleman et al., 2010) *and* to modest scores on performance indicators (Baranik et al., 2010; Hulleman et al., 2010; Van Yperen et al., 2014, 2015), while a mastery-avoidance goal is related to modest scores on performance indicators (Baranik et al., 2010; Huang, 2012; Hulleman et al., 2010; Wirthwein et al., 2013) but to somewhat higher scores on interest (Baranik et al., 2010). Thus both avoidance goals are related to modest scores on performance indicators, but the mastery-avoidance goal, which is relatively little studied, is related to somewhat elevated interest scores.

Introduction

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1   If the performance-approach goal is primarily measured as *outperforming others*, then it is associated with a variety of positive outcomes, for instance self-regulation, deep learning (Senko & Dawson, 2017), and academic achievement (Hulleman et al.,2010). In contrast, if the performance-approach goal is primarily measured as *appearing talented*, then it is negatively associated with academic achievement (Hulleman et al., 2010) and has null effects upon self-regulation and deep learning (Senko & Dawson, 2017).

According to the meta-analyses of Blaga (2012) and Van Yperen et al. (2014, 2015), the association of both approach goals with high performance indicator scores holds across the frequently studied domains work, sports, and education. In the context of education these general results vary with the nature of the performance indicator; the meta-analysis by Wirthwein et al. (2013) shows that the positive correlation of performance-approach and mastery-approach scores is significantly lower if standardized achievement test scores are used as opposed to GPA, exam grades, semester grades or the performance on a specific task. In contrast, the negative association of the performance avoidance score with performance indicators is significantly more negative in studies in which exam grades or achievement test scores are used as performance indicators than in studies that used GPA, semester grades or the performance on a specific task.

After its first publication in 2001, the 2x2 achievement goal framework has been examined in combination with dozens of variables; several of these will be discussed in the following chapters. Based on the extant research literature, however, the conclusion here is that the mastery-approach goal and the performance-avoidance goal are generally viewed as the most, respectively least, ideal form of competence-based regulation (Elliot, 2005). Another way to express this is to call the performance-avoidance and the mastery-approach goal the least, respectively, the most *adaptive* achievement goal.

1.2.2 The dominant achievement goal

Several instruments have been used to assess achievement goals, and a couple of these have been used quite often. Examples of the last category are the achievement goal instrument of the Patterns of Adaptive Learning Scale (Midgley et al., 2000) and the Achievement Goal Questionnaire-Revised (Elliot & Murayama, 2008), of which the latter is specifically designed to measure the goals of the 2x2 achievement goal framework. In these instruments Likert-type survey items measure the various goals and thus the subject acquires a score on each achievement goal; data from such instruments lead to correlational methods. However, Van Yperen (2006) argued that in a given situation, subjects tend to prefer one particular achievement goal over the other goals and thus another route to studying the achievement goals of the 2x2 framework must be found in identifying that dominant achievement goal (DAG). This perspective leads to a division of the sample into different DAG groups and, thus, to analyses of between group differences. A benefit of studying the DAG is that its results may be compared more unequivocally with experimental research; in experimental achievement goal research the experimental manipulation is supposed to induce a dominant achievement goal in that situation (Van Yperen et al., 2015). In the next section it will become apparent that studies of achievement goals per *group* and studies of achievement goals as *variable* yield similar results; in this thesis these similar results are loosely denoted as profiles .

The DAG, which is a relatively new approach to assess the achievement goals of the 2x2 framework, is the main construct in this thesis. If, after pitching each goal against every other,

a person consistently chooses the same goal over the others, that preferred goal is her DAG. Consequently, five groups of subjects result; four of these groups consist of subjects that have a DAG, for instance a dominant performance-avoidance goal or a dominant mastery-approach goal. The group of subjects that does not have a consistently preferred goal forms the fifth group, the NDAG group. Generally, a large percentage of the subjects in any study in which the instrument is used has a DAG. In samples of workers, with mean ages of 69.0, 36.8 and 42.2 years, respectively, the percentages with a DAG were, in that order, 80%, 81% (de Lange et al., 2010), and 87% (Van Yperen & Orehek, 2013). Furthermore, in a sample of high-level swimmers with a mean age of 17.1 years, 90-95% had a DAG (Fernandez-Rio, Cecchini Estrada, Mendez-Giménez, Fernández-Garcia, & Saavedra, 2014).

In student samples, the DAG-percentages found were 84 and 86 (Van Yperen, 2006); these students had a mean age of 19.9, resp. 21.4 years. In another student sample, of 264 undergraduate students with a mean age of 19.9 years, Van Yperen et al. (2011) found 87%, 86% and 92% to have a DAG in the domains of work, sport and education, respectively. In addition, 21% of these students chose the same DAG (including NDAG) across the three domains; the DAG thus generally differs across domains.

This thesis attempts to contribute to achievement goal theory by addressing three key issues that face the 2x2 achievement goal framework and the DAG. First, the four DAG goals need substantiation with regard to conforming to the profiles of the 2x2 framework, and the NDAG students are still in need of a profile. Second, there are very few studies on the long-term results of the 2x2 achievement goal framework and, consequently, of the DAG. Third, there is a knowledge gap regarding the 2x2 achievement goal framework in and across groups of different cognitive ability and, consequently, regarding the DAG. In the next subsection these key issues will be elaborated further.

1.2.3 Three key issues for the 2x2 framework and the DAG

Table 1.1 gives an overview of the key issues and the chapters in which they are examined empirically; each chapter is dedicated to facets of at least two key issues.

Table 1.1 *Key issue and Chapter*

	Key issue 1	Key issue 2	Key issue 3
Chapter 2	+		+
Chapter 3	+		+
Chapter 4	+	+	+

Key issue 1. Corroborating that the DAG/NDAG profiles fit the 2x2 achievement goal framework
Key issue 2. Long term effects of the 2x2 achievement goal framework and the DAG
Key issue 3. Generalization of the 2x2 achievement goal framework and the DAG to a wider school population

Key issue 1. Corroborating that the DAG/NDAG profiles fit the 2x2 achievement goal framework.

To begin with, the number of studies in which the DAG was used is modest, thus the conclusion that the DAGs conform to the profiles of the four goals of the 2x2 achievement goal framework needs corroboration. Results that associate the DAG goals with academic performance measures and interest are reported only by Van Yperen (2006). Of 279 students (sophomores and juniors) in the science department the final course grades so far were obtained and a score on interest as well. On the variable interest the students with a dominant performance-avoidance goal scored significantly lower than the other four groups, while on graded performance the mean of the performance-approach group was higher than that of the performance-avoidance group, which was the only significant difference between the five DAG groups. If the profiles were conform those of the goals of the 2x2 framework one would rather expect the mastery-approach group to score at least as high on graded performance and especially on interest as the performance-approach group; and significantly higher than the other three groups as well, see for instance Hulleman et al. (2010) and Tables 1.2 and 1.3 below.

Van Yperen (2006) expected and found main effects as well as interaction effects for both the definition (mastery vs. performance) and the valence (approach vs. avoidance) dimensions on several variables. Particularly of interest regarding the profiles are the scores on the Achievement Goal Questionnaire (AGQ), which is a widely used instrument for measuring the goals of the 2x2 framework in the traditional fashion, and, in addition, the scores on interest and performance indicators. Regarding the AGQ there was one significant definition x valence interaction; the dominant performance-approach goal group scored considerably higher than the other goal groups on AGQ's performance-approach scale. Aside from this interaction, there were two significant main effects. With regard to the definition dimension, the group of students with a dominant performance orientation showed (relative to those with a dominant mastery orientation) significantly higher scores on, respectively, the performance-avoidance and the mastery-avoidance scale of the AGQ. This last result is surprising and does not follow the 2x2 profile. In contrast, there were no significant main effects with regard to the valence dimension. Furthermore, all of the DAG groups scored highest upon the AGQ's mastery-approach scale, and all DAG groups with the exception of the performance-approach group, scored lowest on AGQ's performance-approach scale. On AGQ's performance-approach scale, performance-avoidance scale and mastery-approach scale the highest mean score was found with the dominant performance-approach group, while on AGQ's mastery-avoidance scale the highest mean score was generated by the dominant performance-approach goal group. Somewhat more differentiated results would have been more satisfying, one might say.

However, other variables from Van Yperen (2006) are relevant for the profiles of the 2x2 achievement goal framework as well. With regard to the definition dimension, the group of students with a dominant performance orientation showed (relative to those with

a dominant mastery orientation) higher negative affectivity scores, higher socially prescribed perfectionism scores, higher extrinsic motivation scores and higher amotivation scores. With regard to the valence dimension, the group of students with a dominant approach orientation showed (relative to those with a dominant avoidance orientation) higher self-efficacy scores and higher intrinsic motivation scores. Inspection of the significant interactions revealed that the performance-approach group had a significantly higher need for achievement, had a higher perfection aspiration level and found being perfect more important than the other three groups. In addition, the dominant mastery-approach group had a higher need for achievement than both avoidance groups and a higher perfection aspiration level than the mastery-avoidance group. Finally, the dominant performance-avoidance group had a significantly lower score on positive affectivity than the other three groups. These results fit the 2x2 achievement goal framework rather well.

The only other DAG study in the domain of education, i.e. Van Yperen et al. (2011), deals with the intention to cheat of 264 undergraduates with regard to hypothetical situations in the domains of work, sport and education. Students with dominant performance goals showed higher intentions to cheat on all three domains than students with dominant mastery goals. The NDAG group had a higher intention to cheat than the mastery group in the domain of sport; this was the only significant difference between the NDAG and the other groups. These results fit the supposed characteristics of the definition dimension because the intention to learn as much as possible in challenging situations should oppose the intention to cheat. However, they would fit the 2x2 framework better if a main effect was found for the valence dimension as well, or, better still, an interaction effect was found between both dimensions.

Three other publications exist in which the DAG is used (i.e., de Lange et al., 2010; Fernandez-Rio et al., 2014; Van Yperen & Orehek, 2013). However, in these studies the match of the DAG with the 2x2 frameworks profiles is taken for granted.

To evaluate the extent to which the DAG groups fit into the 2x2 achievement goal framework with regard to academic performance, Table 1.2 and Table 1.3 are given. Based on two recent meta-analyses (Van Yperen et al., 2014; Wirthwein et al., 2013), Table 1.2 shows the significant differences between the achievement goal *variables,* as opposed to achievement goal groups, with regard to academic performance; these results stem from studies using survey questionnaires. Various academic performance indicators, varying from GPA to scores on a specific subject were used to obtain an overall performance measure in both studies. The two approach goals have a significantly positive correlation with academic performance, but the mastery-approach goal has a significantly higher positive correlation with academic performance than the performance-approach goal. The mastery-avoidance goal has not been studied as often as the other three goals. Both meta-analyses found the performance-avoidance goal to more negatively related with academic performance than the mastery-avoidance variable. However, Wirthwein et al. (2013) found that result to be

significant after, but not before, using a trim and fill procedure; hence the somewhat cryptic indication '- (?)' in Table 1.2.

Table 1.2 *Significant differences between goal variables with respect to performance*

	pap	pav	map
pav	+		
map	-	-	
mav	+	-(?)[a]	+

Note. Based upon the meta-analyses by Wirthwein et al. (2013) and Van Yperen et al. (2014) The table should be read from column to row; example: the performance–approach goal has a higher correlation with performance than the mastery-avoidance group.

[a] -(?)= probably significant.

Table 1.3 presents the significant differences between the achievement goal *groups*, as opposed to achievement goal variables, regarding academic performance are given, based upon a recent meta-analysis of induced achievement goals (Van Yperen et al., 2015); these results stem from experimental studies. A remarkable difference between the tables is that the performance-avoidance *variable* probably has a more negative impact upon academic performance than the mastery-avoidance variable, while the relation of the *groups* with the same labels is the other way around. Thus the performance-avoidance group and the mastery-avoidance group are both negatively associated with academic performance, but the mastery-avoidance group more so than the performance-avoidance group. However, especially this last result should be interpreted with caution as it is based upon a modest number (namely, three) studies. Van Yperen (2006) found the profiles of the four dominant achievement goal groups to be in line with the assumption of the achievement goal approach that the mastery-approach and the performance-avoidance are the most, respectively least, ideal forms of competence-based regulation, while the performance-approach and the mastery-avoidance goal are somewhere in between. The profiles pictured in both tables coincide to a large extent, with the obvious exception of the no goal group.

Table 1.3 *Significant differences between goal groups with respect to performance*

	pap	pav	map	mav
pav	+			
map	-	-		
mav	+	+	+[a]	
no goal	*n.s.*	*n.s.*	+	*n.a.*

Note. Based upon the meta-analyses by Van Yperen et al.(2015). The table should be read from column to row; example: the performance–avoidance group has a higher mean than the mastery-avoidance group.

[a] *p*=.06. *n.s.*= not significant. *n.a.*= not available.

The preceding paragraphs depict our knowledge of the characteristics of the NDAG group as well. The group without a dominant achievement goal was found not to have a specific profile (Van Yperen, 2006). That being said, if a subject does not consistently prefer the same goal over the others, that might reflect something about its handling of other performance related situations as well. Therefore, the NDAG group might differ from the other groups with regard to the consequences of goal adoption, as for instance academic performance, as well. Accordingly, any information that might help to characterize this group, which generally encompasses about one seventh of the samples studied (De Lange et al., 2010; Fernandez-Rio et al., 2014; Van Yperen, 2006; Van Yperen et al., 2011; Van Yperen & Orehek, 2013), is interesting in itself. Thus for all five groups there is a considerable need for additional data.

Key issue 2. Long term results of the 2x2 achievement goal framework and the DAG.

Before the formulation of the 2x2 achievement goal framework, a lot of work had been done in a three goal system consisting of performance-approach, performance-avoidance and mastery goals (Elliot, 2005; Senko, 2016). Research based upon the 2x2 framework generally identifies the old mastery goals with the new mastery-approach goals. There was, consequently, only a knowledge deficit regarding the mastery-avoidance goal, being the new extension of the achievement goal theory. However, from 2010 on the mastery-avoidance goal appeared in meta-analyses (Baranik et al., 2010; Huang, 2012; Hulleman et al., 2010; Van Yperen et al., 2014) and the correlation of the mastery-avoidance goal with performance indicators could be estimated; see section 1.2.1 above.

Nevertheless, only a couple of studies are dedicated to long-term effects of the complete 2x2 achievement goal framework, while the results are surprising at the very least. To date the long-term effect of the complete framework has been investigated once in an educational setting (Bjørnebekk, Diseth, & Ulriksen, 2013) and once in the domain of work (Tanaka, Okuno, & Yamauchi, 2013). Bjørnebekk et al. (2013) found a correlation of -.23 between the performance-avoidance score and the final course grade two years later, of 231 bachelor students in an educational science program; the other three achievement goals were not related to the final course grade. Tanaka et al. (2013) studied a sample of 57 newly hired police-officers and found, a year after the measurement, that performance-approach and performance-avoidance goals were related to effort, with beta weights of .34 and -.32, respectively. In addition, these goals were, in the same order, related to interest as well, with beta-weights of .26 and -.25 respectively. There were no significant relations between the two mastery goals and the outcome variables. Consequently, there is a need for studies that relate the 2x2 achievement goal framework to (educationally) relevant outcomes over time.

Key issue 3. Generalization of the 2x2 achievement goal framework and the DAG to a wider school population.

The 2x2 achievement goal framework is for a large part based upon research in the domain of education, and, within that domain, based upon rather gifted and privileged samples, which detracts from its strength and usability. More than three decades ago Sears (1986), drew attention to the fact that in social psychology research about 80% of the published results depended on the use of samples of undergraduate samples, and, in addition, the author presented several hazards of this narrow database. Compared to the general population, "… students tend, among other things, to have [….] unusually strong cognitive skills, [……] quite unstable group relationships, [.….] and unusual egocentricity" (Sears, 1986, p. 527).

Perhaps the most serious disadvantage of a high percentage of student samples is the potential bias when obtained results lead to recommendations for the educational practice. In achievement goal research in general, the percentage of student samples is somewhat lower; in the meta-analyses by Hulleman et al. (2010) and Wirthwein et al. (2013), the percentages of student samples are 64% and 52%, respectively. However, the authors of this last publication comment: 'Even though most researchers are aware of the 2 x 2 achievement-goal frame-work developed by Elliot and colleagues (e.g., Elliot & McGregor, 2001), especially mastery-avoidance goals have rarely been investigated. [….] there is still a need for further research. For example, there is a lack of studies that have focused on younger school students as most research has been conducted with university students.'(Wirthwein et al., 2013, p. 83).

In achievement goal research using the DAG most studies used university samples as well, but two studies used samples of workers. The percentages of workers with a higher education or university background in these studies were 42% (de Lange et al., 2010) and 90% (Van Yperen & Orehek, 2013). One study used the DAG in the domain of sports, i.e. Fernandez-Rio et al., (2014); however, the authors did not provide the educational background of their sample of 19 high level swimmers.

The above implies that, in the context of education, the studies of the 2x2 achievement goal framework or the DAG used a high percentage of cognitively gifted samples, and, in addition, that there is a second generalizability problem caused by of the lack of studies with younger school children. Hence there is no good reason to expect the results of the 2x2 achievement goal or DAG research to hold for the entire school population because the 2x2 achievement goal framework nor the DAG have been tested at different cognitive ability levels.

1.3 THE DUTCH SYSTEM OF SECONDARY EDUCATION

The context of the empirical research of this thesis, that is, Dutch secondary education, is a tracked system in which the tracks follow an increasing order with regard to cognitive ability. As a consequence, the Dutch secondary educational system is a context in which the three key issues can be examined because the variable track may be used as a proxy for cognitive ability.

The Dutch educational system is compulsory until age 18. If at age 18 a qualification of at least ISCED level 353 (see for this and other ISCED codes UNESCO Institute for Statistics, 2012) has not been acquired the pupil is strongly stimulated to do so until age 23. The studies in this thesis are based upon data, gathered in 2008, 2011, 2013, and 2014 in Dutch secondary education, which is a system consisting of five tracks varying in level of difficulty. Until school year 2014/15, the result of a nationwide attainment test at the end of primary school combined with a teacher recommendation lead to enrolment in a specific secondary educational track; since school year 2014/15 the teacher recommendation is decisive (Ministerie van Algemene Zaken, 2014). For reasons of convenience the tracks will be referred to in order of difficulty level as track A to track E, in which track A denotes the most intellectually challenging track.

As an example, Table 1.4 presents the total number of pupils per track in the third grade in the year 2011 (Ministerie van Onderwijs, 2014). The distribution of pupils across the tracks shows minor trends over the years. As can be seen, the percentage girls and the track level increase together.

Table 1.4 *Grade 3 in 2011. Absolute Number of Pupils per Track and Percentage Girls*

	Tracks				
	A	B	C	D	E
N	43061	41072	52921	28553	20181
Girls%	52.9	50.6	49.6	47.4	44.2

Track A (voorbereidend wetenschappelijk onderwijs [pre-university education]) prepares students for university in six years; the first three years have ISCED code 244 and the last three years ISCED code 344. Graduation of track A permits access to university, which has ISCED code 6. Track B (hoger algemeen voortgezet onderwijs [higher general secondary education]) provides a general education for five years; the first three years have ISCED code 244 and the last two years ISCED code 344. Graduation of track B permits access to higher professional education, which has ISCED code 5. Track C (voorbereidend middelbaar beroepsonderwijs gemengde leerweg/ theoretische leerweg [junior vocational education mixed learning track/theoretical learning track]) takes four years and offers prevocational education at an advanced level; its ISCED code is 244. Graduation of track C permits

access to track B's final two years and to senior vocational education, which has ISCED code 354. Finally, tracks D (voorbereidend middelbaar beroepsonderwijs kaderberoepsgerichte leerweg [preparatory senior vocational education middle management learning track]) and E (voorbereidend middelbaar beroepsonderwijs beroepsgerichte leerweg [preparatory senior vocational education basic vocational learning track]) take four years and offer prevocational education at middle and basic levels, respectively; their ISCED code is 244. Graduation of track D or E gives access to upper senior vocational education, which has ISCED code 353.

1.4 OVERVIEW OF THE CONTENT OF THE THESIS

The data analyzed in this thesis were gathered in the context of the COOL[5-18] study. The COOL[5-18] study focused primarily on creating data files that provide information about educational careers, cognitive development, development of citizenship competences, and socio-emotional development of children from age 5 until 18, and on making those files available for researchers. The data collection in COOL[5-18] as well as the creation of the data files was split up in two separate projects, i.e. COOL-PO, which was a collaboration between ITS and SCO-Kohnstamm Instituut, and COOL-VO/MBO for which CITO en GION were responsible. In addition, the CBS participated as a partner of COOL5-18, being responsible for merging the collected data of both projects with the eduactional progress data that were available from the DUO files (the so-called Onderwijnnummerbestanden). In both projects three waves of data collection took place, in 2008, 2011 and 2014. In this thesis only COOL-VO/MBO data are used.

In each wave performance tests were taken for mathematics, comprehensive Dutch reading, English and citizenship and students filled in questionnaires about their background characteristics, SES, and a number of socio--emotional and motivational concepts.

On the basis of the data collected within COOL[5-18], a multitude of research questions can be answered, inter alia questions regarding (the dominant) achievement goal. Achievement goals are an important area of interest for the author of this thesis, who has worked in senior secondary vocational education (MBO) for years. One of the nice qualities of the COOL[5-18] data is that they cover the entire track range of secondary education. The presence of the DAG instrument in the datasets provided the opportunity to analyze important theoretical and practical issues regarding the achievement goals for the first time.

In 2017 the COOL[5-18] project was completed; the COOL[5-18] website (http://www. cool5-18.nl/) is available for further information. The COOL[5-18] database is available for researchers via DANS (Data Archiving and Network Systems, The Netherlands, http:// www.dans.knaw.nl/).

The results presented in chapter two are based upon analyses of student questionnaire data which were collected in the first wave of data collection in grade three of secondary education, which took place in the spring of 2008. These data can be accessed at

https://doi.org/10.17026/dans-zgw-entf.

The results presented in chapter three are based upon analyses of student questionnaire data which were collected in the second wave of data collection in grade three of secondary education, which took place in the spring of 2011. These data can be accessed at

https://doi.org/10.17026/dans-xak-mq3g.

For the analyses that led to the results presented in chapter four the dataset from the second wave of data collection in grade three of secondary education (spring 2011) was merged with final examination data from wave three of track B (HAVO, 2013) and of track A (VWO, 2014), respectively. The examination data with regard to track B can be accessed at

https://doi.org/10.17026/dans-xn8-v6dy and with regard to track A at

https://doi.org/10.17026/dans-xye-zu7d , respectively.

The study in chapter two had two aims. The first objective was to investigate the prevalence of the DAG across tracks in secondary education, which is an important issue if there happen to be systematic differences across the tracks. The second aim was to replicate and extend findings concerning the DAG and motivation. All five DAG groups were compared with regard to variables drawn from the multi-dimensional Personal Investment Model (PIM, Maehr, 1984), which is generally used to explore differences in motivational profiles between groups; this made it possible to associate DAG groups with variables as effort expenditure, social power, social motivation and homework effort and to replicate findings concerning self-efficacy, interest and extrinsic motivation. This objective speaks directly to the characteristics of the four goals of the 2x2 framework and, in addition, to the characteristics of the NDAG group.

The study in chapter three was dedicated to the 2x2 framework, the DAG and their relation to students' grades Dutch, English and Math, and had two aim as well. The first aim was to explore whether the association of the achievement goal groups with academic outcomes varied across tracks, an aim that is directed to the paucity of results concerning the DAG and achievement performance indicators and thus, indirectly, is directed at the issue of the profiles of the various DAG groups as well. In addition, as the research regarding the impact of achievement goals on different school subjects is scarce, the second aim was to explore whether the association between the DAG and academic outcomes varies across school subjects.

In chapter four, the final empirical chapter, a study into the relations of the students' DAG in grade three with their final examination results several semesters later, is presented. The aim of the study was to explore whether these long-term consequences existed above and beyond the influence of gender, self-efficacy and perceived prior performance. In this study the data of the highest and second highest track were used; the time span between the

measurement of the DAG and the final examination was seven, respectively five, semesters. This aim speaks directly to the need for longitudinal results of both the 2x2 achievement goal framework and the DAG, while, in addition, the need to generalize to a wider population is addressed.

Lastly, in chapter five the three key issues (see Table 1.1) are used to evaluate the main findings of the three empirical studies with regard to theory and practice of achievement goals in general, the 2x2 achievement goal framework and the DAG. In addition, attention is given to the limitations of these studies and suggestions for future research are made.

A note to the reader
Chapters 2, 3 and 4 have been written in collaboration with others. Accordingly, in these chapters the personal pronoun 'we', instead of 'I' is being used.

Chapter 2

The Dominant Achievement Goal

across Tracks in High School

ABSTRACT

The dominant achievement goals of 7,008 students in the third grade of Dutch secondary education (US grade 9) were investigated, based on Elliot and McGregor's 2x2 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 dominant achievement goal scored mostly second-highest. The implications of these findings are discussed.

2.1 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 et al., 2010; Hulleman et al., 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 tendencies - with the adoption of less adaptive achievement goals as a result. In everyday educational practice knowledge about the prevalence of specific achievement goals might lead to emphasizing different goals in different tracks – eventually; currently, the adaptability of the various achievement goals is the subject of continued debate (Brophy, 2005; Elliot, 2005; Huang, 2012; Lau & Nie, 2008; Murayama & Elliot, 2012a,2012b). Herein lies the first objective of our research; we aimed to replicate and extend findings concerning achievement goals and track level. To this end we used the relatively new concept of the students' *dominant achievement goal* (DAG, Van Yperen, 2006) and investigated its prevalence across tracks in secondary education. This is the first time the DAG approach has been investigated in secondary education.

The second objective was to replicate and extend findings concerning achievement goals and motivation. We compared groups that had different dominant achievement goals with regard to various motivational variables, drawn largely from the multi-dimensional Personal Investment Model (PIM), which is generally used to explore differences in motivational profiles between social and cultural groups (Maehr, 1984). Comparison of the different DAG groups extends achievement goal theory through the use of the extra dimensions the PIM provides. 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).

2.1.2 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 2x2 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 & McGregor, 2001; Elliot, 2005). 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 latter 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 *dominant* achievement goal. If a person consistently prefers one goal over the others, that goal is considered the person's DAG (Van Yperen, 2006). 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 et al. (2010), Van Yperen et al. (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 (84%) 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 a-motivation, 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%) 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, mean age 19.9 years) 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-oriented profile, because if competence is defined as outperforming others, cheating may very well lead to that goal; in contrast, it does not fit very well in a mastery-oriented profile 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.

2.1.3 Educational track and achievement goal

The present study was conducted in the context of Dutch secondary education, which is compulsory until age 18. Primary education lasts 8 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 6 years; track B (higher general secondary education) provides a general education for 5 years and gives access to higher professional education (but not university). Tracks C, D, and E take 4 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).

Studies on the relations between track and achievement goals are scarce. To our knowledge, the dissertation of Isabell 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 goals 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 (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 mastery-oriented and performance-oriented students alike (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. Because 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, the results mentioned above lead us 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.

2.1.4 The Personal Investment Model (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. The PIM was conceived as multidimensional and includes several goals thought to regulate motivation in various settings such as the workplace and school; two of those goals are mastery goals and performance goals. In the PIM, motivated behaviour is the result of three global variables: the goals people have, their sense of self, and their perception of possible actions.

The goals in the PIM can be divided into mastery motivation, performance motivation, social motivation, and extrinsic motivation. Those goals can each be broken down in two sub goals: 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). Because the sub goals 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 2x2 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 2x2 framework does not have a goal comparable to the sub goal 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 2x2 framework is the spitting image of the competition sub goal of PIMs performance motivation.

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. Self-reliance is influenced by the awareness of being the origin of events as opposed to being controlled by other agents or situations. Goal-directedness is the tendency to set goals and to adapt one's behaviour to reach these goals. This component 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 judgments people make about their own capacities. Self-efficacy is the most thoroughly examined component of sense of self. 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 & McGregor, 2001; Elliot, 2005). 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., 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. In view of the above, we included a measure of self-efficacy in our study.

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. Instructional programs, for instance, 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.

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). In the PIM, interest is expressed through the task-involvement goal. 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) report 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, based on the above, the dominant mastery-approach goal group to have a) a high mean on the PIMs mastery motivation, i.e. the task and effort sub goals, b) relatively low means on competition and social power, c) moderate levels of affiliation and social concern d) low levels on praise and token rewards, and e) rather high levels of self-efficacy and homework effort. For the dominant mastery-avoidance group we expect a similar pattern with the exception of effort, self-efficacy and homework effort, on which we expect considerably lower levels for this group. Furthermore, for the dominant performance-approach goal group we expect low means on the task, affiliation and social concern sub goals, but high means on the effort, competition, praise and token rewards sub goals as well as high levels of self-efficacy and homework effort. For the performance-avoidance subgroup we expect low levels on the task, effort, competition, social power and affiliation sub goals, combined with low levels of self-efficacy and homework effort. For this group we expect high levels on the praise and token reward sub goals and perhaps a relatively high level on the social concern sub goal. Finally, for the group without a DAG we do not have specific expectations.

2.2 METHOD

2.2.1 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 collected; among the

latter are data concerning DAG and PIM. The total sample for participation in the student questionnaire was 7,813 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 over-representation of schools offering tracks A and B and a slight under-representation 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. Authorization 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].

2.2.2 Participants

We used student questionnaire data (N = 7,813) 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 7,813 (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 7,008 cases. Most students in the selected sample were 15 or 16 years old. The mean age was 16.0 years (SD = 0.6), with a range from 14 to 20. The first five columns of Table 2.1 show the division of the students over the tracks and provide a comparison with nationwide population data.

Table 2.1 *Sample (S) data) and comparison with population (P)*

| Track | Sample (S) | | | Population (P) | Difference |
	N	%	% Boys	%	S-P
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	-0.1

Note. A = pre-university education, B = higher general secondary education, C = prevocational education theoretical track, D = prevocational education middle track , E= prevocational education basic track

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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 DANS (Data Archiving and Network Systems, The Netherlands, http://www.dans.knaw.nl/).

Lower-track students were under-represented and higher-track students over-represented 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 under-representation 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.

2.2.3 Measures

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

Dominant achievement goal.
Van Yperen's (2006) method was used to determine the DAG; see Table 2.2. 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 are three relevant contrasts.

Table 2.2 *The instrument used to determine the Dominant Achievement Goal (DAG)*

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

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]

PIM.

A cross-culturally validated operationalization 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 (α = .59)[4]: *I try harder with interesting work.* Effort (α = .76): *When I am improving in my schoolwork I try even harder.* Competition (α = .80): *I am only happy when I am one of the best in class.* Social Concern (α = .73): *It is very important for students to help each other at school.* Social Power (α = .82): *At school I like being in charge of a group.* Praise (α = .83): *At school I work best when I am praised.* Affiliation (α = .68): *I do my best work at school when I am working with others.* Token (α = .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.*

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3   In a 'chance model' exactly half of the respondents would be assigned to a dominant achievement goal. 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 (Zijsling, 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.

Homework Effort/procrastination.

From the Homework Scale (Trautwein et al., 2006), the 5-item subscale Homework Effort was used to measure the conscientiousness exhibited by the student in doing homework assignments; Cronbach's α =. 77 for this scale. A sample item is: *I often do my homework just before the lesson or during breaks.*

2.2.4 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 0.8% for *token* and 4.2% for *affiliation*; the average percentage was 2.1%. SPSS was used for all analyses; its Expectation Maximization (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 ten scale variables. Finally, we profiled the various DAG groups through Discriminant analysis; the details of which are made available in the supplementary files. In this analysis, functions that maximize the differences between the DAG groups are formed through combinations of the scores on the ten 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 .05 or .01 significance level. Therefore, we set the significance criterion at $p < .001$ throughout all analyses.

2.3 RESULTS

2.3.1 The prevalence of the dominant achievement goal

In our sample of 7,008 students, 6,204 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 (3,108 students, 45.4%), followed by the mastery-avoidance goal (2,001 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.

2.3.2 The prevalence of the dominant achievement goal 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 = 7,008) is 110.1, $p < .001$. Apparently, the proportion of students without a DAG gets larger as the track level gets lower, and this effect 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 = 6,204) = 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%.

Table 2.3 *Dominant Achievement Goal (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 = pre-university education, B = higher general secondary education, C = prevocational education theoretical track, D = prevocational education middle track , E= prevocational education basic track

As Table 2.3 shows, the regularity of this pattern is interrupted twice in track D, with the performance-avoidance and the mastery-approach goal groups.

The lower part of Table 2.3 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%, whereas there is a modest decline in the percentage of students with a performance goal from track A to D of 7.6%, followed by an increase of 6% from D to E, thus bringing the net decrease to a very modest 1.6% .

2.3.3 Sex, dominant achievement goal, 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 ($df = 1$, $N = 7,008$) = 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 ($df = 3$, $n = 6,204$) = 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 ($df = 4$, $n = 3,489$) = 65.2, $p < .001$] and for girls [χ^2 ($df = 4$, $n = 3,519$) = 34.5, $p < .001$], b) the two approach goals increased, and c) the two avoidance goals decreased .

2.3.4 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 ($\Lambda = 0.863$: $F = 26.28$; $df = 40, 26,522$; $p < .001$). The univariate results were significant ($p < .001$) on eight of the ten 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 ten 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 2.4 we present the means and standard deviations of the five DAG groups together with the overall means and overall standard deviations on all ten 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.

We calculated the effects sizes (Cohen's *d*) of the significant group differences revealed by the post hoc contrast testing mentioned above, see Table 2.5. The leftmost part of Table 2.5 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 performance-avoidance, the mastery-approach and the mastery-avoidance group, respectively. As an example, the quantity .18 to the right of 'token' and beneath 'Mastery Avoid-

ance' in the middle of Table 5 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.

Table 2.4 *Group means, mean differences and overall standard deviation on the ISM subscales, Self-Efficacy and Homework Effort*

	None	Performance Approach	Performance Avoidance	Mastery Approach	Mastery Avoidance	SD
Task	−0.22	3.90	−0.19	−0.09	−0.16	0.65
Effort	−0.27	3.26	−0.42	−0.28	−0.45	0.71
Competition	−0.62	3.05	−0.85	−1.03	−1.18	0.86
Social power	−0.16	2.22	−0.22	−0.39	−0.36	0.89
Praise	−0.17	2.93	−0.29	−0.35	−0.45	0.85
Token	−0.18	3.09	−0.33	−0.34	−0.51	0.86
Self-Efficacy	−0.31	3.85	−0.37	−0.33	−0.43	0.61
Homework Effort	−0.09	3.60	−0.18	−0.06	−0.12	0.61
Social concern	−0.10	3.09	−0.08	−0.07	−0.03	0.77
Affiliation	−0.07	3.36	−0.11	0.00	−0.07	0.80

Note. In Table 4, 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.

Finally, we used Discriminant Analysis to profile the five groups of students. The ten scale variables were used to discriminate maximally between the five groups. There turned out to be three significant ($p < .001$) discriminant functions; see Table 2.S.1 of the supplemental materials. 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 ten 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

Table 2.5 *Size of the significant contrasts (Bonferroni; α < .001).*

	Performance Approach				Performance Avoidance			Mastery Approach		Mastery Avoidance
	Performance Avoidance	Mastery Approach	Mastery Avoidance	none	Mastery Approach	Mastery Avoidance	none	Mastery Avoidance	none	none
task	0.19		0.16	0.22					0.13	
effort	0.42	0.28	0.45	0.27	−0.14		−0.15	0.17	−0.18	−0.18
comp	0.86	1.03	1.18	0.62	0.17	0.33	−0.24	0.16	−0.40	−0.56
socp		0.39	0.36		0.17				−0.23	−0.20
praise	0.29	0.35	0.45			0.15		0.10	−0.17	−0.27
token	0.32	0.34	0.50			0.18		0.17	−0.16	−0.33
s.eff.	0.38	0.33	0.42	0.42					−0.11	−0.11
home	0.18				−0.12					

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.

2.4 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. Second, we aimed to replicate and extend findings concerning achievement goals in general and motivation, using the PIM.

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. Of particular interest is the orderly way in which the distribution of DAGs varies with track. Our review of the literature led us to hypothesize 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 inter-personal 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, 2012b). 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 (Murayama & Elliot, 2012b).

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 operationalization 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 or not significant. 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 2x2 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 inter-personal 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, maybe with the exception of the small performance-approach goal group, do not seem to have very distinct motivational profiles. In the light of the ongoing debate concerning the adaptability of the various achievement goals this gives educators somewhat more freedom to act according to circumstances.

2.4.1 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 generalizability 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 (Urdan & Mestas, 2006) remain unknown, although these may relate differently to various outcomes, such as attainment, interest and wellbeing.

2.4.2 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 a 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 swim in other ponds, there may be an opposite effect in lower tracks, with a gradual grow in perceived competence and a higher prevalence of mastery goals as a result.

2.4.3 Conclusions

A large percentage of students has a dominant achievement goal. 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.

Chapter 3

The Dominant Achievement Goal and Academic Outcomes across Tracks in High School

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ABSTRACT

The grades on the school subjects Dutch, English and math of 12665 students in the third grade of Dutch secondary education (US grade 9) were investigated in relation to educational track-level and dominant achievement goal (DAG). The performance approach goal group scored significantly higher on the three subjects than the performance avoidance group, the mastery approach group, the mastery avoidance group and the group without a DAG (the NDAG group). Furthermore, the magnitude of the differences with the other DAG groups decreased with decreasing track level, suggesting that the DAGs' adaptive value varies systematically with ability level. For the three school subjects the differences between the performance approach group and the other groups were of the same size, suggesting that the DAG is associated with the same processes regarding various school subjects. The implications of these findings are discussed.

3.1 INTRODUCTION

The main purpose of this study was to explore the relation of a student's dominant achievement goal (DAG) with academic outcomes in a tracked system for secondary education. Although the achievement goal approach has become increasingly important in clarifying motivational processes (Kaplan & Maehr, 2006), resulting in several hundred of research papers and dozens of reviews and meta-analyses, it has scarcely been investigated in the context of tracked educational systems. This is remarkable as tracking is a common feature of secondary and tertiary education systems in many countries as for instance France, Germany, the Netherlands and the Russian Federation. Scheltinga, Kuyper, Timmermans, and van der Werf (2016) found systematic differences in DAG adoption at different tracks, which might result in systematic differences in academic outcomes as well. It may very well be that the adaptive value of achievement goals varies with ability level and therefore varies within tracks, which, of course, could have implications for educational practice. The current study therefore focuses on the following question: Does the association of the DAG and academic outcomes vary across tracks? Moreover, as the research regarding the impact of achievement goals on different school subjects is very scarce indeed, we were interested in the following question as well: Does the association of the DAG and academic outcomes vary across different school subjects? In order to realize these objectives we studied students' DAG in a large panel study in the Netherlands, i.e. COOL[5-18]. In the following overview of the literature we will focus on 1) the achievement goal approach, 2) the association between achievement goals and academic outcomes of students in general, 3) consistency of the association between achievement goals and academic outcomes for various subjects in secondary education, 4) the dominant achievement goal approach, and 5) dominant achievement goals in tracked educational systems.

3.1.1 The achievement goal approach

In the last three decades a growing body of evidence shows the importance of achievement goals in clarifying motivational processes. Very influential within the achievement goal approach is the 2x2 achievement goal framework (Elliot & McGregor, 2001), which postulates 2 dimensions, namely *definition* and *valence.* The dimension *definition* bifurcates the convictions persons have about what constitutes competence. If competence is defined as doing well relative to others, the resulting goal is called a *performance goal.* If, on the other hand, competence is defined as doing well relative to self-referenced standards or task requirements, the resulting goal is called a *mastery goal.* The dimension *valence* comprises the person's valence regarding the goal. A focus toward success or positive consequences is called an *approach goal,* and a focus away from failure or negative consequences is called an *avoidance goal.* Combining both dimensions yields four types of goals: performance-approach goals, performance-avoidance goals, mastery-approach goals and mastery-avoidance goals.

Readers interested in the history of achievement goal theory are encouraged to consult Elliot (2005).

Meta-analyses of achievement goal research in various domains of life show the four achievement goals to have clearly different characteristics. Performance-approach goals are, generally, positively related to need for achievement (but less strongly so than mastery-approach goals), perceived competence (but less strongly so than mastery-approach goals) and competitiveness (Baranik et al., 2010). Performance-avoidance goals are, generally, positively related to competitiveness (although less strongly so than performance-approach goals) and negative affect, but negatively related to help seeking, positive affect, perceived competence, cognitive ability (Baranik et al., 2010), self-evaluation and self-reactions (Cellar et al., 2010). Mastery-approach goals are, generally, positively related to interest, need for achievement, perceived competence, positive affect, help seeking (Baranik et al., 2010), self-monitoring and self-evaluation (Cellar et al., 2010). Mastery-avoidance goals are, generally, positively related to negative affect and negatively related to cognitive ability and help seeking (Baranik et al., 2010).

3.1.2 The achievement goal and academic outcomes

In the last decades two patterns have emerged concerning the relation between achievement goals and academic outcomes. One pattern consists of positive relations between both performance-approach and mastery-approach goals with academic outcomes. This pattern of relations was found, for instance, by Daniels et al.(2008) and in the meta-analyses by Baranik et al. (2010) and by Cellar et al. (2010). Baranik et al. (2010), for example, found that the correlation between academic outcomes (i.e., grade point average, exam performance or performance on math-related tasks) and mastery-approach, and between academic outcomes and performance-approach goals was .10 and .13, respectively. The second pattern consists of a positive relation between performance-approach and academic outcomes in combination with a null relation between mastery-approach goals and academic outcomes (e.g.,Elliot & McGregor, 2001; Barron & Harackiewicz, 2001; Senko & Harackiewicz, 2005; Elliot & Murayama, 2008; Harackiewicz et al., 2008; Senko & Miles, 2008; Senko et al., 2011). In both patterns, performance-avoidance goals are negatively related to academic outcomes (Murayama & Elliot, 2012b), while mastery-avoidance goals are slightly negatively or uncorrelated to academic outcomes (Baranik et al., 2010), and, furthermore, in both patterns the correlations are weak at best.

Blaga (2012), Huang (2012), and Hulleman et al. (2010) suggest on the basis of their meta-analyses that the different patterns probably stem from different operationalizations of the achievement goals. If performance-approach goal items are normatively framed (e.g., "I try to do better in my courses than other students") and do not hint at evaluative aspects, then these goals correlate on average .14 with academic outcomes. If performance-approach goal items focus on evaluative aspects (e.g., "…that the teacher thinks I am the best student.",

"… that others think I am smart"), then these goals correlate -.14 with academic outcomes. The correlation between mastery approach goals and academic outcomes declines from .14 to .05 when more items can be categorized as mastery-performance, which means that they contain goal-related language (e.g. "The main reason I study is….."), refer to learning, improving or mastering (e.g. "I strive to constantly learn and improve in my courses.") and are framed in an approach manner (e.g. "The opportunity to do challenging work is important to me"). Hulleman and his colleagues (2010) conclude that similar labels ('performance approach goals' or 'mastery approach goals') are applied to essentially different constructs. Hence, when we speak of, for instance, mastery approach goals, it is essential to know the method and measure used.

3.1.3 The achievement goal and school subjects

Although much work has been done regarding achievement goals and academic outcomes, which has been measured as grade point average, final exam scores, performance on specific exams, and class performance as assessed by teachers (Blaga, 2012), relatively little work has been done regarding the effect of achievement goals upon different school subjects. Bong (2004) performed factor analysis on various motivation related measures, inter alia mastery, performance-approach and performance-avoidance goals, and subsequently associated the resulting latent factors with general school learning and the school subjects Korean, English and Mathematics. The performance-approach and performance-avoidance goals showed strong correlation across school subjects and general school learning, whereas mastery goals were only moderately correlated across these areas, which suggests that mastery goals are subject specific while performance goals generalize across several subjects. Ho and Hau (2008) found in a sample of 1950 seventh-grade Hong Kong Chinese students that the achievement in the school subjects mathematics and English had small positive relations to both mastery goals and performance approach goals, but a small negative relation to performance avoidance goals. In contrast, Tang (2006), distinguishing performance goals and learning (mastery) goals in a sample of 396 Taiwanese eight graders, found that learning Mathematics was promoted by performance goals, contrary to learning Language Art, where mastery goals proved to be beneficial instead. These last results suggest that achievement goals may differ in impact upon various school subjects.

A different perspective was taken by Sparfeldt, Buch, Wirthwein, and Rost (2007), who looked at the school subjects Math, Physics, Chemistry, German Language, English Language and History, and found subject specific goal orientations (i.e. mastery goals, performance approach goals, performance avoidance goals and work avoidance goals) for each school subject in a sample of 1210 students from grades 7 to 10. Within each school subject, however, a similar pattern of relations between goal and academic outcomes was found: mastery goals and performance approach goals correlated moderately positive, work

avoidance goals moderately negative, and performance avoidance goals did not correlate with grades, respectively.

3.1.4 The dominant achievement goal

To assess achievement goals in educational settings, generally a few Likert-type survey items are used to measure each goal, which results in an individual score on all achievement goals. Widely used instruments constructed in that manner are the Patterns of Adaptive Learning Scale (Midgley et al., 2000) and the Achievement Goal Questionnaire-Revised (Elliot & Murayama, 2008).

An alternative approach is to identify a persons' dominant achievement goal (DAG), because in a specific context persons tend to prefer one particular achievement goal over the other goals (Van Yperen, 2006). The instrument we used to measure that preferred achievement goal, which was introduced by Van Yperen (2006), consists of performance-approach and performance-avoidance items that are normatively framed and of mastery-approach and mastery-avoidance items that refer to improving; hence this instrument should generate results that are in line with the second pattern of results concerning achievement goals and academic outcomes described above. Further details regarding our instrument are given in the method section below. Generally, about 85% of the participants have a DAG (Scheltinga et al., 2016). It has been found that individuals with different DAGs have distinct profiles which, generally, are in line with the extant empirical data concerning the traditional achievement goal approach (De Lange et al., 2010; Van Yperen, 2006).

The DAG approach is similar to goal induction in experimental research, which makes it more straightforward to compare results over methods (Van Yperen, 2006). Indeed, in experimental research, a person's assigned or freely adopted achievement goal is assumed to be the dominant achievement goal in that setting. In the DAG approach, as in the experimental approach, the different achievement goals are examined as variables that vary between subjects (Van Yperen, 2006). In contrast, within the survey approach persons receive a score upon each achievement goal, and thus the individuals' achievement goals are examined as within-subject variables. Hence, an advantage of the DAG approach is, that "goal origin (personally adopted vs. assigned), operationalization (continuous vs. categorical), and method (correlational vs. comparing group means) are not confounded, allowing possible differences in results to be explained more unequivocally in terms of goal origin" (Van Yperen, 2006, p.1433).

To date, five publications using the DAG approach are available, viz. Van Yperen (2006), De Lange et al. (2010), Van Yperen et al. (2011), Van Yperen and Orehek (2012) and Scheltinga et al., (2016). However, in only one publication results concerning the association between DAG and academic outcomes were presented. Van Yperen (2006) compared the final course grades of 109 sophomore and 170 junior students from various science majors to compare the means of the various DAG groups. Students with dominant perfor-

mance avoidance goals had a lower mean grade, but only relative to students with dominant performance approach goals. Differences with and between other DAG groups did not reach statistical significance (Van Yperen, 2006).

3.1.5 Tracked systems and achievement goals

Many countries, for instance France, Germany, Greece, Italy, the Netherlands and the Russian Federation have tracked educational systems. However, studies on the relations between educational tracks and achievement goals are scarce. To our knowledge Paulick (2011), Paulick et al.,(2013), and Scheltinga et al. (2016) are the only publications on this subject. In the context of the German educational system with three ordered tracks, Paulick (2011) and Paulick et al. (2013), using a three-goal model (i.e., performance-approach goals, performance-avoidance goals and mastery-approach goals) found the associations within each track between achievement goals and academic outcomes were weak at best. However, academic outcomes were negatively predicted by performance-approach goals in the highest track only but positively predicted in all tracks by mastery-approach goals (Paulick et al., 2013), which suggests that achievement goals may impact academic outcomes differently per track.

In the context of the Dutch secondary educational system with five ordered tracks, Scheltinga et al. (2016) found a remarkably regular shift in prevalence pattern of the DAGs across tracks; both approach goals and the group without a DAG did become less, while both avoidance goals did become more prevalent in higher tracks, respectively. In addition, the changes along the valence dimension were far more pronounced than those along the definition dimension; the prevalence of the approach and of the performance goals decreased 44.4% and 7.6%, respectively. The relation DAG - academic outcomes was not part of that study.

3.1.6 The present research

The present research is conducted in the context of Dutch secondary education, which is compulsory until age 18 and which is, furthermore, highly tracked. Track A (pre-university education) prepares students for university in 6 years; track B (higher general secondary education) provides a general education for 5 years and gives access to higher professional education (but not to university). Tracks C, D, and E (pre-vocational education tracks) take 4 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 to university). Compared to 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).

With regard to the association of DAG and Track we expect, based upon our review of the extant literature above, 1) the performance approach group to be positively associated with academic outcomes, especially in higher tracks, 2) the performance avoidance group to be negatively associated with academic outcomes, especially in higher tracks, and 3) the mastery approach group to be unrelated to academic outcomes regardless of track. In addition, with regard to the association of DAG and school subjects, we expect, 4) the performance approach group to show the highest mean on all school subjects, 5) that the means of the performance approach group are virtually identical on the three school subjects, 6) the performance avoidance group to show the humblest mean on all school subjects, and 7) that the means of the performance avoidance group are virtually identical on the three school subjects.

3.2 METHOD

3.2.1 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 during the spring of 2011 by the Groningen Institute for Educational Research (GION), a department of Groningen University. We made use of student questionnaire data from the third year of secondary education (equivalent to US grade 9) concerning DAG, track, and grades on the school subjects Dutch Language, English Language and Mathematics, gender, intelligence and self-efficacy. Additional administrative data were provided by the schools. Authorization for the gathering and subsequent analysis of the data was approved by the students' parents. More information can be found on the COOL[5-18] website.

3.2.2 Participants

The total sample for participation in the student questionnaire was 15,035 students in grade nine of Dutch secondary education (approximately age 15), spread over 134 schools. We excluded 2370 students from our analyses because they either did not fill in their gender (124), could not be assigned to a specific track (286) or had not answered all six achievement goal items (2064).

This reduced the sample size to 12,665 students, spread over 834 classes in 123 schools. Table 3.1 shows the division of the students over the tracks and makes a comparison with nationwide population data. It is clear that, in our sample, students in tracks C, D and E were under-represented and students in the higher tracks, especially track B, were over-represented. As a consequence, we had to be cautious in interpreting results of overall analyses.

Table 3.1 *Sample (S) data and comparison with population (P)*

	Sample (S)		Population (P)		Difference
Track	N	%	N	%	S-P
A	3863	27.7	41858	23.8	+3.9
B	3968	28.4	38234	21.8	+6.6
C	3450	24.7	49106	27.9	-3.2
D	1618	11.6	26637	15.2	-3.6
E	1071	7.7	19932	11.3	-3.6
total	13970	100.1	175767	100.0	.1

Note. A = pre-university education, B = higher general secondary education, C = prevocational education theoretical track, D = prevocational education middle track , E= prevocational education basic track

3.2.3 Variables

Of focal interest in this study were the criterion variables *student achievement in Dutch Language, English Language* and *Mathematics* and the predictor variables *Dominant Achievement Goal* and *School Track*. Gender, IQ and Self-Efficacy functioned as covariates in the analyses of student achievement. Gender plays a minor role in achievement goal theory in general (e.g. Gherasim, Butnaru, & Mairean, 2012; Nie & Liem, 2013), but in the context of DAG research Scheltinga et al. (2016) found girls to have a lower prevalence of both approach goals. IQ was used as a covariate because prior cognitive ability has been found to be differently related to achievement goal adoption (Baranik et al., 2010, Senko et al., 2011). Lastly, self-efficacy is regarded as an antecedent of achievement goal adoption; high self-efficacious persons tend to adopt approach goals (Cellar et al., 2010; Elliot, 2005; Elliot & McGregor, 2001). The variables and their instrumentation are discussed below.

Grades Dutch Language, English Language and Mathematics.
Dutch grades range from 1 to 10, one decimal being allowed. Generally, a student receives three times per year a 'school report' with grades for all subjects. These grades are typically based on several tests and other assessments during the lessons. In the student questionnaire the question '*What was the grade on your last school report for these subjects? NB: Whole digits in the first box, decimals in the second box.*' was included under which was printed 1. Dutch, 2. English, 3. Mathematics, each followed by two boxes in which the students could mark their grades in one decimal.

Dominant achievement goal.
Van Yperen's (2006) method was used to determine the DAG; see Table 3.2. 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 <u>most important</u> in school ...'* the student had a choice between two statements representing different achievement goals, e.g. *'to get higher grades than to which I am normally capable'* or *'not to get lower grades than most of my classmates'*. The performance-approach goal was indicated by *'to get higher grades than most of my classmates'*, whereas *'not to get lower grades than most of my classmates'* indicated the performance-avoidance goal. The mastery-approach goal was represented by *'to get higher grades than to which I am normally capable'* and the mastery-avoidance goal by *'not to get lower grades than to which I am normally capable'*. For each goal, there were three relevant contrasts.

Table 3.2 *The instrument used to determine the Dominant Achievement Goal (DAG) in 2011*

For each item, choose either A or B			
This year, I find it <u>most important</u> in school ...			
A		**B**	
1) ☐ to get *higher grades* than most of my classmates	òr	☐ *not* to get *lower grades* than most of my classmates	
2) ☐ to get *higher grades* than to which I am normally capable	òr	☐ *not* to get *lower grades* than to which I am normally capable	
3) ☐ to get *higher grades* than most of my classmates	òr	☐ to get *higher grades* than to which I am normally capable	
4) ☐ *not* to get *lower grades* than to which I am normally capable	òr	☐ *not* to get *lower grades* than most of my classmates	
5) ☐ *not* to get *lower grades* than most of my classmates	òr	☐ to get *higher grades* than to which I am normally capable	
6) ☐ *not* to get *lower grades* than to which I am normally capable	òr	☐ to get *higher grades* than most of my classmates	

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 and people who did not answer all six questions are excluded from the analyses. Students, who for instance chose *'not to get lower grades than most of my classmates'* on all three occasions in which that option was presented were assigned to a dominant performance-avoidance goal, while students who chose thrice *'to get higher grades than to which I am normally capable'* were assigned to a dominant mastery-approach goal.

Track.

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

Data on the participants' gender were provided by the schools. We used 'boy' as the reference category, which was coded as 0 while 'girl' was coded as 1.

IQ.

In COOL[5-18] intelligence is measured by the Niet-Schoolse Cognitieve Capaciteiten Test [Non-Scholastic Cognitive Capacities Test], (Van Batenburg & Van der Werf, 2004), with μ=100 and σ=15. Although this test consist of five subtests, for the purpose of this study we used the score on the entire test, which had a stratified *α* of .91 (Zijsling, Keuning, Naayer, & Kuyper, 2012).

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 .83 (Zijsling et al., 2012); an example item is: *Even if the work is hard, I can learn it.*

The distributional characteristics of the variables are presented in Table 3.3.

3.2.4 Attrition

The 2370 students with missing values on either the DAG instrument, Gender or the variable Track were not included in the analyses. Furthermore, Table 3.3 shows that not all students did report their grades on the three school subjects. Comparing the data of students involved in the analysis with that of students who were left out showed some attrition bias; there was a significant difference between the IQ scores (Cohen's *d*=.14, *t*(13762)=4.02, *p*<.001) and the Mathematics grades (Cohen's *d*=.11, *t*(13762)=4.40, *p*<.001) of the students in the analyses compared to the excluded students.

Table 3.3 *Distributional Characteristics*

	N	Min.	Max.	*M*	*SD*	%
Grade Dutch	13768	.0	9.9	6.72	.95	
Grade English	13757	.0	9.9	6.78	1.23	
Grade math	13620	.0	9.9	6.68	1.37	
Gender (girl)	14911					51.12
self-efficacy	14796	1.00	5.00	3.51	.65	
IQ	13764	44.49	152.38	100.24	14.87	

Although significant these differences may be qualified as constituting a near zero effect. Since effects of IQ on academic outcomes were taken into account in every analysis, this selectivity will be minimized as a much as possible. There was no attrition bias for the vari-

ables School Grade Dutch (Cohen's d=-.02, t(13766)=.72, p=.471), School Grade English (Cohen's d=.00, t(13755)=.00, p=1, Gender (Cohen's d=.01, χ(1, N=14911)=.37, p=.54) and Self-Efficacy (Cohen's d=-.02, t(14794)=.37, p=.65) .

3.2.5 Analytic strategy

The data were analyzed using three-level multilevel multivariate models (Snijders & Bosker, 2012) because the self-reported grades Dutch, English and Mathematics are nested in students (level 1), classes (level 2) and schools (level 3) and ignoring the nested structure data might have led to an overestimation of statistical significance as a result of underestimated standard errors of the regression coefficients. For all models the MLwiN 2.29 software (Charlton, Rabasch, Browne, Healy, & Cameron, 2017) was used.

First, an multivariate unconditional model (Model 1) with Grade Dutch, Grade English and Grade Math as dependent variables was estimated to establish whether our data justified the use of multi-level multivariate analyses, i.e. whether there was a significant amount of variance/covariance at the class and school level and, if that proved to be the case, to compute the Intraclass Correlation (ICC). The significance of the variance/covariance components on school and class level can be determined by evaluating the ratio of the estimated coefficient and the associated standard error against the standard normal distribution. The ratio of the between-cluster variance to the total variance, the Intraclass Correlation (ICC) indicates the part of the total variance in the School Grades accounted for by the school and the school+class level. The ICC may be interpreted as the correlation among observations within the same level, e.g. classes within schools or pupils within a class.

Second, we included Sex, IQ and Self-Efficacy as covariates (Model 2). In this and subsequent models we applied centering around the class mean at student level, centering around the school mean at class level and centering around the grand mean at school level to the variables IQ and Self-Efficacy, thus following the recommendations of Enders and Tofighi (2007) regarding level 1 predictors as object of primary interest. Subsequently, we added DAG and Track to estimate their influence beyond that of the student characteristics (Model 3). We used the NDAG group as the reference category when adding the DAG because the characteristics of the other groups are the tenets of achievement goal research and, furthermore, the NDAG group generally is considered not to have a specific profile. For the addition of the variable Track the basic level pre-vocational training track, i.e. track E was used as reference category. Finally, we added the interaction of DAG and Track to examine whether the DAG exerts a comparable influence across tracks (Model 4).

3.3 RESULTS

3.3.1 The prevalence of the DAG

In our sample of 12665 grade nine students, 10,427 students (82.3 %) had a DAG, consequently the other 2238 students (17.7%) could not be assigned a DAG. The most common DAG was the mastery avoidance goal (45.7%), followed by the mastery approach goal (21.2%), while the performance avoidance goal group (10.2%) and the performance approach goal group (5.3%) were much smaller. Table 3.S1 of the Supplementary Files gives the distribution of the DAG across Tracks and Gender.

3.3.2 Academic outcomes in the unconditional model

Model 1, the unconditional model, showed that the average school grades on the school subjects Dutch (6.7), English (6.8) and Mathematics (6.7) are approximately the same.

Table 3.4. *Variance-covariance matrix with S.E. and correlations (bold) for the random part of Model 1 on the three levels*

	Dutch	English	math
School level			
Dutch	.044 (.010)	.023 (.009)	.019 (.011)
English	**.444**	.059 (.014)	.028 (.013)
math	**.283**	**.362**	.105 (.021)
Class level			
Dutch	.129 (.010)	.059 (.009)	.035 (.009)
English	**.370**	.197 (.016)	.044 (.011)
math	**.238**	**.282**	.176 (.016)
Student level			
Dutch	.722 (.009)	.306 (.009)	.310 (.010)
English	**.318**	1.281 (.016)	.193 (.013)
math	**.287**	**.134**	1.617 (.021)

Moreover, see Table 3.4, Model 1 revealed that there are significant amounts of variance and covariance on school, class and student level, meaning that on all three levels factors operate that are associated with differences in grades on and between all three school subjects. The ICC(school) for Grade Dutch, Grade English and Grade Math are .05, .04 and .06, respectively and, in the same order the ICC(school+class) are .20, .16 and .15; this indicates that the school grades tend to resemble each other a little per school and to a somewhat larger degree per class. Table 3.4 displays the correlations of the three school grades on the three levels below the diagonal; in general, these correlations can be qualified as moderate.

On all levels the correlation between Dutch and English (.44, .37, .32 on school, class, and student level, respectively) is significantly larger than the correlation between Dutch and Math (.28, .24 and .29); the statistics being N=123, z=1.73, p=.083 on school level; N=834, z=2.18, p=.029 on class level; N=11925, z=2.94, p=.003. Furthermore, on class and on student level the correlation between English and Dutch is significantly larger than the correlation between English and Math (.28 and .13); the statistics are N=834, z =2.55, p=.010; N=11925, z=17.58, p<.001, respectively. Thus, both languages seem to have more in common with each other than with Math. In addition, on the student level the correlation between Math and Dutch is significantly larger than the correlation between Math and English (N=11925, z=14.69, p<.001); the forces operating at the different levels seem to affect the three school subjects differently.

3.3.3 Academic outcomes, student characteristics, DAG and track

The results of Models 2 and 3 are summarized in Table 3.5.

In Model 2, the student characteristics Gender, IQ and Self-Efficacy were, in that order, added to the unconditional model. Each added variable resulted in an significantly better model fit; the associated values for the difference in -2*loglikelihood between Model 1 and Model 2 are χ^2 (9, N =11925) =2448.39, p < .001. Being a girl is associated, in this model, with a .4 higher Grade Dutch, with a very modestly (i.e. .1) higher Grade English and with a non-significant difference (i.e., rounded in one decimal .0) regarding Grade Math. In contrast, higher scores on IQ and on Self-Efficacy are associated with higher grades on all three school subjects; especially on Math. For instance, a difference of one SD in IQ points is associated with differences in Grade Dutch, Grade English and Grade Math of .1, .1, and .4, respectively. Likewise, a difference of one SD in Self-Efficacy is associated with differences in Grade Dutch, Grade English and Grade Math of .2, .2 and .3, respectively.

Next, we estimated a model in order to examine whether DAG and Track were related to student academic outcomes after accounting for student characteristics; the results are given as Model 3 in the right part of Table 3.5. The variables DAG and Track were added to the model in that order. Each added variable resulted in an significantly better model fit; the associated values for the difference in -2*loglikelihood between Model 2 and Model 3 are χ^2 (24, N =11925) =289.89, p < .001. As mentioned above, the reference category for the addition of the DAG was the NDAG group, meaning that the model shows to differences of the other DAG groups with the NDAG group. Likewise, we used track E (basic level pre-vocational education) as reference category for the addition of the variable Track.

Regarding the variable DAG, Model 3 shows that there are significantly higher scores on Grade Dutch, Grade English and Grade Math for the performance approach group (the differences being .24, .25 and .24, respectively). In addition, there is a modest but significant effect on Grade Dutch for the mastery avoidance group of .04 compared with the NDAG group, while the differences with the other goal groups do not reach significance. In order

Table 3.5 *Student Characteristics, DAG, Track and their Effect on Grades Dutch, English and Math*

	Model											
	2. Student Characteristics						**3. Student Characteristics, DAG and Track**[1]					
	Grade Dutch		Grade English		Grade Math		Grade Dutch		Grade English		Grade Math	
Fixed Part	β	SE	β	SE	β	SE	β	SE	β	SE	β	SE
Characteristic												
Intercept	6.525***	.028	6.721***	.033	6.698***	.0039	6.605***	0.054	6.501***	0.067	6.895***	0.076
Gender (girl)	.419***	.016	.095***	.022	-.023	.023	0.416***	0.016	0.093***	0.022	-0.024	0.024
IQ	.006***	.001	.005***	.001	.027***	.001	0.006***	0.001	0.005***	0.001	0.027***	0.001
Self-Efficacy	.255***	.012	.308***	.017	.507***	.018	0.246***	0.013	0.294***	0.017	0.495***	0.019
Pap							0.237***	0.038	0.249***	0.052	0.236***	0.056
Pav							-0.017	0.030	-0.030	0.042	-0.023	0.045
Map							-0.001	0.025	-0.014	0.034	0.014	0.037
Mav							0.043*	0.022	-0.021	0.031	0.013	0.033
Track A							0.064	0.062	0.577***	0.076	0.015	0.084
Track B							-0.278***	0.061	0.058	0.075	-0.288***	0.083
Track C							-0.188***	0.058	0.152*	0.071	-0.316***	0.078
Track D							-0.064	0.055	0.184**	0.069	-0.475***	0.075

The Dominant Achievement Goal and Academic Outcomes across Tracks in High School

Table 3.5 *Student Characteristics, DAG, Track and their Effect on Grades Dutch, English and Math (continued)*

| | Model | | | | | |
| | **2. Student Characteristics** | | | **3. Student Characteristics, DAG and Track[1]** | | |
	Grade Dutch	Grade English	Grade Math	Grade Dutch	Grade English	Grade Math
Random Part						
Variance at school level	.047*** .011	.058*** .014	.104*** .021	0.045*** 0.010	0.056*** 0.013	0.097*** 0.020
Variance at class level	.136*** .010	.194*** .016	.191*** .016	0.113*** 0.009	0.145*** 0.013	0.159*** 0.015
Variance at student level	.648*** .009	1.233*** .017	1.405*** .019	0.646*** 0.009	1.123*** 0.017	1.403*** 0.019
Total variance	.831	1.488	1.700	0.804	1.324	1.659
ICC school	.057	.039	.061	0.056	0.042	0.059
ICC school +class	.220	.170	.174	0.197	0.152	0.154
Model Fit						
-2*loglikelihood:	102698.388			102408.500		
Number of schools	123			123		
Number of classes	834			834		
Number of students	11925			11925		

*: $p<.05$, **: $p<.01$, ***: $p<.001$

to complete the picture, we estimated this model with the other DAG groups as reference categories as well. A summary of the results is given in Table 3.S2 of the Supplementary Files; regardless of the group used as reference the performance approach group always has a significantly higher mean Grade Dutch, English and Grade Math. We found virtually identical differences of the performance approach group with the other goal groups: on Grade Dutch the range is .20 to .26, on Grade English the range is .25 to .27 and on Grade Math the range is .22 to .26.

In addition, the mastery avoidance group has a slightly higher Grade Dutch than the other goal groups (aside from the performance approach group); these differences range from .04 to .06.

Regarding the variable Track, tracks B and C show significantly lower means (-.28 and -.19, respectively) on Grade Dutch than track E. A similar pattern was found with Grade Math; with the exception of track A all tracks have a significantly lower mean on Grade Math than track E; the differences being -.29 for track B, -.32 for track C and -.48 for track D, respectively. However, regarding Grade English the differences are all positive and significant (.58, .15 and .18 for track A, track C and track D, respectively); all tracks have a higher Grade English than track E. Finally, in Model 3 the covariance of Grade Math with Grade Dutch (β=.01, SE=.01) and of Grade Math with Grade English (β=.01, SE=.01) is insignificant at school level (z=1.20, p=.12 and z=1.12, p=.26, respectively).

3.3.4 Academic outcomes, DAG, track and DAG-track interaction

The results of our final model (Model 4), in which the interaction terms of the variables DAG and Track were added, are presented in Table 3.6. In Model 4, track E and the NDAG group were used as reference groups; adding the interaction terms led to an improvement of the model fit: χ^2 (48, N =11925) =78.20, p=.004.

The positive association of the performance approach goal with the three school subjects, which ranged from 0.24 to .25 in Model 3, disappeared in Model 4. Indeed, all single DAG terms in Model 4 are small and statistically insignificant, implying that the overall effect of the DAG is the consequence of stronger effects in some and no effects in other tracks. In contrast, adding the interaction terms to the model did not alter much the relations of the variable Track with the three school subjects: track A has a significantly higher mean on Grade English (.50); tracks B and C have a significantly lower mean on grade Dutch (of - .28 -.23, respectively) and grade Math (of -.24 and -.42, respectively); track D has a higher mean on grade English (of .22) but a lower mean on grade Math (of -.53). Taken together this means that merely the significance of the higher mean on grade English track C when compared to track E disappears.

Four of the 48 interaction terms reach significance at .05 level; i.e. the interaction concerning Grade Dutch of the performance approach group with track A (z=2.56, p=.005), the interactions concerning Grade English of the performance approach group with track

A (z=2.07, p=.019) and with track C (z=1.70, p=.045) and the interaction of the mastery approach group with track B (z=1.81, p=.035) .

A further three interaction terms reach significance at .10 level; two of these concern Grade English, i.e. the interaction of the performance approach group with track B (z=1.57, p=.058) and the interaction of the performance avoidance group with track C (z=-1.35, p=.089). The last significant term concerns Grade Math, i.e. the interaction of track C and the mastery avoidance group with z=1.37 and p=.085. ; of these, five terms involved grade English and one term was associated with each of the other school subjects. In the Supplementary Files Table 3.S3 displays the variance-covariance and correlation matrices of Models 2 and 4, respectively. Finally, to establish the differences per track per school subject across DAG groups, we used Model 4 to estimate the grades, after which we subtracted the smallest value per subject per track; the results are presented in Table 3.7.

As can be seen, the performance approach group is strongly associated with the highest estimates on the three school subjects for most tracks, especially for the higher tracks; moreover, the differences taper off with decreasing track level. In Table 3.S5 of the Supplementary Files the zero-order correlations between our main variables are presented with regard to the performance-approach group and the aggregated other groups of Track A.

Table 3.6 *Student Characteristics, DAG, Track, DAG*Track and Their Effect on Grades Dutch, English and Math*

	Model					
	4. Student Characteristics, DAG, Track and DAG*Track[1]					
	Grade Dutch		Grade English		Grade Math	
Fixed Part	β	SE	β	SE	β	SE
Characteristic						
Intercept	6.603***	0.067	6.545***	0.086	6.926***	0.096
Gender (girl)	0.415***	0.016	0.090***	0.022	-0.026	0.024
IQ	0.006***	0.001	0.005***	0.001	0.027***	0.001
Self-Efficacy	0.246***	0.013	0.293***	0.017	0.494***	0.019
Pap	0.074	0.105	0.050	0.144	0.192	0.159
Pav	0.042	0.106	0.033	0.143	-0.078	0.156
Map	0.081	0.082	-0.128	0.112	0.031	0.124
Mav	0.019	0.084	-0.027	0.115	-0.093	0.127
Track A	0.093	0.085	0.498***	0.111	0.054	0.122
Track B	-0.280***	0.081	-0.061	0.104	-0.238***	0.115
Track C	-0.229***	0.077	0.137	0.101	-0.420***	0.109
Track D	0.008	0.078	0.217*	0.104	-0.529***	0.114
Pap*TrackA	0.345**	0.135	0.383**	0.185	0.257	0.202

Table 3.6 *Student Characteristics, DAG, Track, DAG*Track and Their Effect on Grades Dutch, English and Math* (*continued*)

	Model					
	4. Student Characteristics, DAG, Track and DAG*Track[1]					
	Grade Dutch		Grade English		Grade Math	
Pap*TrackB	0.158	0.132	0.285*	0.181	0.050	0.198
Pap*TrackC	0.171	0.127	0.295**	0.174	0.008	0.190
Pap*TrackD	0.044	0.140	-0.164	0.192	-0.161	0.212
Pav*TrackA	-0.099	0.124	0.057	0.169	-0.123	0.182
Pav*TrackB	-0.054	0.120	-0.020	0.163	-0.072	0.177
Pav*TrackC	-0.022	0.121	-0.222*	0.164	0.156	0.179
Pav*TrackD	-0.099	0.134	-0.020	0.163	0.156	0.199
Map*TrackA	-0.139	0.100	0.047	0.137	-0.128	0.149
Map*TrackB	-0.065	0.095	0.235**	0.130	-0.098	0.142
Map*TrackC	-0.037	0.094	0.105	0.129	0.111	0.142
Map*TrackD	-0.133	0.104	0.122	0.142	0.051	0.157
Mav*TrackA	-0.009	0.097	0.057	0.133	0.036	0.146
Mav*TrackB	-0.026	0.093	-0.094	0.128	0.065	0.141
Mav*TrackC	-0.099	0.094	-0.030	0.129	0.195*	0.142
Mav*TrackD	-0.066	0.104	-0.181	0.143	0.144	0.158
Random Part						
Variance at school level	0.044***	0.010	0.057***	0.013	0.097***	0.020
Variance at class level	0.113***	0.009	0.146***	0.013	0.159***	0.015
Variance at student level	0.645***	0.009	1.227***	0.016	1.400***	0.019
Total variance	0.802		1.430		1.656	
ICC school	0.055		0.040		0.059	
ICC school +class	0.196		0.142		0.155	
Model Fit						
-2*loglikelihood:	102330.3014					
Number of schools	123					
Number of classes	834					
Number of students	11925					

Note 1. In model 4 the group without a DAG serves as the reference group for the variable DAG and track E serves as the reference group for the variable Track

*: *p*<.10, **:*p*<.05, ***: *p*<.001.

Table 3.7 *Spread in Grades per track based on Model 4[1]*

	A	B	C	D	E
Dutch					
Pap	.477	.244	.245	.175	.074
Pav	.001	.000	.020	.000	.042
Map	.000	.028	.044	.005	.081
Mav	.068	.057	.118	.010	.019
ndag	.058	.012	.000	.057	.000
English					
Pap	.357	.335	.534	.094	.178
Pav	.174	.013	.000	.221	.161
Map	.113	.107	.166	.312	.000
Mav	.000	.067	.132	.000	.101
ndag	.084	.000	.189	.208	.128
Math					
Pap	.650	.309	.200	.031	.285
Pav	.000	.061	.078	.078	.015
Map	.104	.000	.142	.082	.124
Mav	.144	.039	.102	.051	.000
ndag	.201	.067	.000	.000	.093

Note1. Per track and per subject the smallest predicted
value was subtracted from the other predicted values

3.4 DISCUSSION

The main purpose of this study was to explore the relation of a student's DAG with academic outcomes in a tracked system for secondary education.

More specifically, we wanted a) to study the association of the DAG with academic outcomes across tracks and b) to study the association of the DAG with academic outcomes across different school subjects. We will look at these questions in turn after a short account of the student characteristics Gender, IQ and Self-Efficacy. Gender, IQ and Self-Efficacy proved to have relevant and significant relations with the three school grades, the exceptions being the relations of Gender with Grade English and Grade Math, of which the former was not relevant and the latter relevant nor significant. Self-efficacy and IQ had stronger associations with Grades English and Math than with Grade Dutch. These results are in line with the findings of Haag and Götz (2012), who found in a German sample that students

think of a) Math that it is difficult, that one needs talent to get good grades and that the grade is important for school success, of b) German language that it is relatively easy, that one does not really need talent to get good grades and that the grade is not very important for school success, and of c) English language that it is relatively easy, that one does not need a very much talent but that the grade is important for school success. The role of gender may be associated with the fact that girls are more inclined to exert effort than boys and are less prone to behavioral self-handicapping (Hirt & McCrea, 2009; McCrea, Hirt, & Milner, 2008).

The introduction of the variable Track led to puzzling results regarding the differences in grades across school subjects. Systematic changes with track E, the reference category, became apparent: all other tracks score higher on grade English, furthermore, three tracks score lower on grades Dutch and Math. We are not aware of generally accepted explanations for these findings. The first author taught Math in the lower regions of the Dutch educational system in an earlier stage of his career; there and then it was not unusual to give grades with a motivational intention to convince the pupils that they were able to get good grades on their own level. Our results concerning grade Math are in accordance with such practices, and, to some extent, the results concerning grade Dutch as well. Of fundamental interest is the question whether the association of the DAG with academic outcomes varies across tracks; our expectation being that the performance approach group would be positively associated with academic outcomes, especially in higher tracks. These expectations proved to be true, see Tables 6 and 7. In tracks A, B and C the performance approach group consistently shows the highest score and the magnitude of the difference tends to diminish in that order. In tracks D and E the performance approach group has the highest score in three of the six instances; in addition, the differences in these tracks are small compared to the higher tracks. In summary one can say that *only* the performance approach group plays a significant role, notably in the higher tracks and most notably in track A. The adaptive value of the other goal groups is rather constant across tracks, namely about zero. As a consequence, our expectations concerning a negative association and a null relation between academic outcomes and respectively the performance avoidance and mastery approach group, were not confirmed. The relevance for educational practice is further diminished by the fact that the prevalence of the performance approach group decreases from 10.1% in track E to 3.8% in tracks B and A, see Table 3.S1 of the supplementary files. These results are in line with the results of Paulick (2011) and Paulick et al. (2013), who found in the tracked German school system relations between goals and academic outcomes that were weak at best, and with the conclusion of the meta-analysis of Huang (2012). Nevertheless, if the DAG instrument could be adapted so as to tap more adequately into the characteristics of the mastery goals of the 2x2 framework, research might show these goals to be more potent in higher tracks as well. In lower tracks achievement goals probably need scaffolding to function properly, maybe because the experience with failure in learning has led to more self-handicapping

which in turn may have led to an unwillingness to exert the needed effort in order to protect self-esteem. Moreover, as personal goal adoption is influenced by the students' perception of the classroom goal structure (Meece, Anderman, & Anderman, 2005; Murayama & Elliot, 2009; Schwinger & Stiensmeier-Pelster, 2011) , it probably is a good idea to look at differences in classroom goal structures across tracks and to stimulate teachers to actively promote adaptive achievement goals. Furthermore, besides goal orientations (Sparfeldt et al., 2007), self-handicapping is school subject specific as well (Schwinger, 2013), which is another reason for teachers to actively install adaptive goal structures.

The association of the DAG with academic outcomes across school subjects yielded some puzzling results as well. The introduction of the DAG showed that the performance approach group has an .24 or .25 higher mean on the school grade Dutch, English and Math, while the mastery avoidance group has a higher grade Dutch than the other goal groups, but these last differences are more impressive in statistical significance than in magnitude. These result were obtained with the NDAG group as a reference category; in table 3.S2 of the Supplementary Files the significant differences are given after repeating our analysis with each of the goal groups as the reference category. We expected the performance approach group to have the highest mean on all school subjects; our results indeed show strong support for that expectation. Furthermore, we expected similar means for the performance approach group on the three school subjects, and that expectation was fulfilled by our results as well. We expected, in contrast, the performance avoidance group to have the lowest means on the three school subjects, a hypothesis for which we did not find support. However, our expectation that the means of the performance avoidance group would be virtually identical on the three school subjects was confirmed. These last two facts both stem from the circumstance that in our sample only the performance approach group had significant and relevant associations with academic outcomes. These results are easier to reconcile with other research using the DAG than with the achievement goal research in general. The dominant performance approach goal group probably constitutes an group that is highly motivated; Van Yperen (2006) and Scheltinga et al. (2016) found that group to score very high on a host of motivation related constructs, while the other goal groups did not have such strong profiles. It may be that the DAG instrument does not succeed very well in tapping into the characteristics of the mastery goals, but it certainly succeeds in selecting a very potent performance approach group.

3.4.1 Strengths and limitations of the present study and suggestions for future research

Obviously, the size of our sample gives our results a solid basis. Furthermore, this is one of the very few studies dedicated to achievement goals across different tracks and the very first study that looked at the relation of the DAG with academic outcomes across tracks. Moreover, the use of multilevel modelling makes it very unlikely that the results we presented are inflated.

A weakness lies in the fact that as a consequence of attrition bias, which constituted a near zero but nevertheless significant effect, the results concerning the grades math should be interpreted with some caution. Another weakness may be the use of students' self-reported school grades, as there is some evidence that performance oriented students, compared to mastery oriented students, are more inclined to cheat (Stephens & Gehlbach, 2007; Van Yperen et al., 2011), although we do not see the possible gain in misrepresenting school grades in an anonymous survey.

A limitation of our research is that, although we demonstrate that the grades on the three school subjects have significant amounts of variance (and covariance) on school level, class level and student level, we did not use variables on the other levels. There are nevertheless forces at play on higher levels that influence school grades besides track, achievement goal, gender, intelligence and self-efficacy. Among those forces are probably the dimensions *valence* and *definition* on both school and class level. Further research might look into the direct and cross-level effects of these dimensions on academic outcomes.

In addition, the difference in grades across tracks, which seems to be systematic but distinct per school subject, requires further research. Furthermore, there is abundant room for further studies in which the DAG questions are rephrased in terms of specific school subjects and/or specific time frames as school year, semester or month. Finally, although research has shown that mastery goals buffer students against self-handicapping (Deppe & Harackiewicz, 1996; Leondari & Gonida, 2007; Ntoumanis et al., 2009), our results suggest that performance approach goals may do so as well, which is a promising idea to test experimentally.

Chapter 4

The Relation between Students' Dominant Achievement Goal and their Examination Results on four School Subjects

ABSTRACT

The aim of this study was to explore the relationship between students' dominant achievement goal (DAG) and relevant performance outcomes several semesters later. Exam grades Dutch, Math A, Math B and English from the 2013 and 2014 examinations of the second highest, respectively highest, educational track of Dutch secondary education were associated with students' DAG, gender, self-efficacy and prior ability, measured in 2011. In general, the DAG had an influence above and beyond gender, self-efficacy and perceived prior performance, that varied by school subject and by track; moreover there were significant interactions of the DAG with these variables that varied by school subject and track as well. The group without a DAG generally fared less well than the other goal groups, while the performance-approach and mastery-avoidance groups occasionally fared better. The implications of these finding are discussed.

4.1 INTRODUCTION

The primary aim of this study was to explore the association of Dutch students' dominant achievement goal (DAG) in their third year of secondary education (comparable to US grade 9) with the results of their final examinations. Although the achievement goal approach spawned thousands of research papers, relatively few are dedicated to academic results on the longer term and only a handful of articles address the DAG.

Below we will give a short introduction to the achievement goal approach and in particular to the 2x2 achievement goal framework (Elliot & McGregor, 2001). Thereafter we will explain, in some detail, the DAG approach. Furthermore, we will pay attention to the relationship of achievement goals with gender, self-efficacy and prior ability; in that section we will present our expectations regarding the outcomes of our study as well.

4.1.1 The achievement goal approach

Brought into circumstances in which they have to perform, people adopt so-called achievement goals to assess, value, and respond to the situation (Elliot, 2005). Therefore, achievement goals are of interest and have been studied in many domains of life, notably in the domains of work (Baranik et al., 2007; de Lange et al., 2010; Van Yperen & Orehek, 2013), sports (Nien & Duda, 2008; Ntoumanis et al., 2009; Puente-Díaz, 2012) and education (Blaga, 2012; Harackiewicz et al., 2002; Nie & Liem, 2013; Wirthwein et al., 2013), the domain in which our study was conducted.

An influential and seminal conceptualization of the achievement goal construct is the 2x2 achievement goal framework (Elliot & McGregor, 2001). This framework distinguishes two bi-polar dimensions, namely *definition* and *valence,* thus giving rise to four achievement goals. The *definition* dimension is based upon the convictions a person may foster about what defines competence and the poles are called a *mastery orientation* and a *performance orientation*, respectively; the former being the conviction that success means understanding and mastering the skill or subject matter, the latter that success lies in demonstrating the required competence. The approach-avoidance distinction (Elliot & Covington, 2001) forms the *valence* dimension of which the *approach* pole implies an orientation towards achieving positive/desirable outcomes, while the *avoidance* pole implies the opposite, that is an orientation to avoid negative/undesirable outcomes. Combining the poles results in four achievement goals: mastery-approach goals, mastery-avoidance goals, performance-approach goals and performance-avoidance goals, each with characteristics derived from the constituent dimensions.

The meta-analyses of Baranik et al. (2010), and Huang (2011), show that, for instance, the mastery-approach goal has in general strong positive ties with measures of interest, help seeking, perceived competence and positive affect while the mastery-avoidance goal is negatively related to interest but positively to negative affect. The mastery-approach goal

is considered adaptive because of its association with various variables that are thought to have a positive impact upon job-fulfillment, sports results or learning, while the mastery-avoidance goal is considered to be less adaptive as a consequence of its association pattern. In addition, the performance-approach goal is associated with high levels of competitiveness, perceived competence and need for achievement, while the performance-avoidance goal is linked to high levels of negative affect and competitiveness and to low levels of help seeking and perceived competence, respectively (Baranik et al., 2010; Huang, 2011). Consequently, the performance-avoidance goal is almost universally seen as the least adaptive goal orientation, but the adaptability status of the performance-approach goal is still a subject of debate (Harackiewicz, Barron, & Elliot, 1998; Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002; Senko et al., 2011).

Ever since the advent of the achievement goal approach there has been a keen interest in the association of the four distinct goal orientations with various performance indicators, such as GPA, examination scores, supervisor rated job performance, or ranking in tournaments (Blaga, 2012). Recent meta-analyses (Huang, 2012; Hulleman et al., 2010; Van Yperen et al., 2014; Wirthwein et al., 2013) show that both approach goals have an overall positive, but both avoidance goals an overall negative correlation with performance outcomes, respectively. Moreover, the performance-approach goal overall correlation with performance outcomes is somewhat higher than that of the mastery-approach goal; the former varies between .13 and .19, while the latter varies between .9 and .12. The above values can be transformed to Cohen's d as respectively $.26 < d < .39$ and $.18 < d < .24$ (see Luyten, 2003, appendix 2). In addition, the performance-avoidance goal is more negatively associated with performance outcomes than the mastery-avoidance goal is; the former varies between -.11 and -.20 (which implies $-.22 < d < -.41$), while the latter varies between -.10 and -.12 (which is $-.20 < d < -.24$). Taken together, these associations can be qualified as generally small and occasionally medium in effect size.

Perhaps these weak relations are the consequence of a mismatch between the specificity of the achievement goal instrument used and that of the performance outcome instrument. There is accumulating evidence that various aspects of school life are domain specific, which in general means school subject specific. Examples are homework effort (Trautwein et al., 2006), emotions like enjoyment, boredom, and anxiety (Goetz, Frenzel, Pekrun, & Hall, 2006), autonomous and controlled motivation (Chanal & Guay, 2015) and, of relevance here, achievement goal adoption (Hornstra, van der Veen, & Peetsma, 2016; Magson, Craven, Nelson, & Yeung, 2006; Sparfeldt et al., 2007). Although mastery goals are probably less domain specific than performance goals (Hornstra et al., 2016), stronger results may be expected if matching measures are used. Wirthwein et al. (2013) found in their meta-analysis that significantly higher correlations were obtained in studies in which the specificity of the mastery-approach goal matched the specificity of the achievement indicator. The performance-avoidance goal behaved in a similar fashion, i.e. in studies with

matching specificity generally stronger negative correlations were found, but that effect did not reach significance.

In spite of the above-mentioned interest in the association of the achievement goals from the 2x2 framework with various performance outcome measures, there are to date no results reported that cover a time span larger than a year. Short-term studies obviously do not reflect potential long-term benefits of specific goal preferences. One might, moreover, question the viability of the achievement goal approach if goal effects were limited to at most medium term outcomes, especially in the light of the weak associations reported above. But perhaps the *dominant* achievement goal, which is introduced in the next section, is a promising alternative to the standard measurement of the goals of the 2x2 framework.

4.1.2 The dominant achievement goal

The bonds between personality and goal orientation have been studied by, amongst others, Elliot and Thrash (2002, 2010) and Wang and Erdheim (2007). Achievement goals that are close to a subjects' personality might have a more consistent impact on achievement attainment because they reduce the subjects' receptivity for state induced goal cues that are less close to their personality (Cellar et al., 2010). The above suggests that the dominant achievement goal (DAG) is eminently suited for longitudinal studies. In the last decade a couple of studies showed that most people have a DAG (de Lange et al., 2010; Fernandez-Rio et al., 2014; Scheltinga et al., 2016; Scheltinga, Timmermans, & van der Werf, 2017; Van Yperen, 2006; Van Yperen et al., 2011; Van Yperen & Orehek, 2013; Van Yperen & Renkema, 2008). In domains such as education, the workplace or sports, people tend to prefer one specific achievement goal over the other goals from the 2x2 achievement goal framework (Elliot & McGregor, 2001). The prevalence of the DAG is rather high; about 85% of students in secondary education have a DAG (Scheltinga et al., 2016). Percentages of comparable magnitude are found within each domain (e.g., the workplace, education, sports) in which the DAG is tested (Fernandez-Rio et al., 2014; Van Yperen et al., 2011).

Furthermore, Van Yperen (2006) found the profiles of the four dominant achievement goal groups to be in line with the doctrine of the achievement goal approach that mastery approach goals and performance avoidance goals are the most, respectively least, adaptive form of competence-based regulation, with the performance approach goals and the mastery avoidance goals somewhere in between. In addition, the group without a DAG was found not to have a distinct profile (Van Yperen, 2006).

Another benefit of the DAG approach is that "goal origin (personally adopted vs. assigned), operationalization (continuous vs. categorical), and method (correlational vs. comparing group means) are not confounded, allowing possible differences in results to be explained more unequivocally in terms of goal origin" (Van Yperen, 2006, p. 1433), which is exactly what one would look for in studies that span a considerable time span. Furthermore,

the measurement of the DAG is more directed towards traits than towards states, which is likely to generate a rather stable outcome, relatively close to the subjects' personality.

Results regarding the association of the DAG with performance outcome measures, however, are reported only by Scheltinga et al. (2017) and Van Yperen (2006). In the latter study, Van Yperen (2006) used the average score on final course grades of 109 sophomore and 170 junior students enrolled as majors in the science department at a university in the Netherlands to examine the various DAG groups. The means of the performance approach and the performance avoidance group proved to be the highest, respectively lowest, of the five DAG groups, but only the difference between these two groups reached statistical significance. Scheltinga et al. (2017) studied the self-reported school grades in Dutch, Math, and English of 13,970 students in the third grade of Dutch secondary education (comparable to US grade 9) with regard to DAG group and concluded that the performance-approach group scored highest on all three subjects. In addition, the differences between the other DAG groups were in general negligible. In both publications the results emphasize the positive association of performance-approach goal with performance outcomes, but a positive association of the mastery-approach goal or a negative association of the mastery-avoidance goal with performance outcomes was found in neither publication. Thus, the results of the dominant achievement goal to date only partially confirm the expected pattern.

Furthermore, the results of Scheltinga et al. (2017) rely on self-reported school grades, which especially the performance-approach group may have presented in a too favorable light (Van Yperen et al., 2011). Moreover, because the results of Van Yperen (2006) are based on grades that were partly produced several semesters before the DAG was measured, we do not know the specific goal that the students endorsed at the time they produced those grades. The above leads us to conclude that both the 2x2 achievement goal conceptualization and the DAG suffer from a distressing lack of results that tie the goals to various performance outcome measures, especially after a somewhat larger period of time.

4.1.3 The present study

In the current study we relate the dominant achievement goal measured in the third grade of secondary education to examination results two or three years later; we used data, including the DAG, gathered in 2011 from students in the third grade of secondary education and combined those with their final examination results in grade 5, respectively grade 6. The difference between the two points in time is 5, respectively 7, semesters. At our disposal were the examination grades on the subjects Dutch, MathA, MathB, and English; in order to create an additional global achievement indicator we used the aggregate of the examination grades as a separate variable.

Our intention was to study the influence of the DAG on relevant performance outcomes above and beyond that of gender, self-efficacy, and perceived prior performance. Self-efficacy (see for instance Bakan Kalaycıoğlu, 2015) and prior ability (see for instance Bergold, Wendt,

Kasper, & Steinmayr, 2017) are relatively strong and consistent predictors of academic performance, while gender is of importance because girls, being underrepresented at both the low and the high end of the proficiency spectrum and overrepresented in the middle range, tend to be more successful at school than boys (Bergold et al., 2017). If gender, self-efficacy, or perceived prior performance are associated with examination results, then the question whether their influence varies across the various DAG groups is interesting in and of itself.

The data were gathered in the Dutch secondary educational system, which consists of five tracks varying in level of difficulty. The highest track (track A) prepares students for university in six years, while the second highest track (track B) aims at higher professional education in 5 years. The other three tracks offer prevocational education at advanced, middle and basic levels; these tracks give access to senior secondary vocational education.

Data of the two highest tracks were used for the present research. Probably, *track* itself is a factor by which the results vary. For instance, the prevalence of the various DAG groups was found to differ systematically across tracks; in higher tracks there are less students without a DAG, more students with a mastery-avoidance goal and less students with an approach goal (Scheltinga et al., 2016, 2017). In addition, the (positive) association of the performance-approach group with self-reported grades English, Dutch, and Math existed primarily in higher tracks, while the other goal groups generally did not show significant associations with these school subjects in any track (Scheltinga et al., 2017).

Our study is primarily exploratory because to date there has been little research into the DAG and none at all into its predictive value for long term performance. Nevertheless, we now formulate a handful of tentative expectations based on the results discussed above. We expect, after accounting for the influence of gender, self-efficacy and perceived prior performance, that (E1a) as a consequence of the temporal distance of the goal measurement and the achievement outcome, the magnitude of the differences in academic performance between groups of students with a different DAG will be very modest, (E1b) only the performance-approach group will show relevant positive associations with the outcome variables, (E1c) especially the group without a DAG will produce below average results. Furthermore, we expect that (E2) in track A the DAG will show more significant associations with outcome variables than in track B, (E3a) the association of the DAG with the average examination grade will be stronger than with the separate school subjects as a result of matching specificity, and (E3b) the association of the DAG with the different examination grades will be comparable in magnitude. We do not have clear expectations regarding the interaction of the DAG with gender, self-efficacy and perceived prior performance.

4.2 METHOD

4.2.1 Procedure

We made use of student questionnaire data from the COOL[5-18] database, segment Secondary Education. These data are available for researchers via DANS (Data Archiving and Network Systems, The Netherlands, http://www.dans.knaw.nl/). The COOL[5-18] project studied children's school career from ages 5 through 18. For our purposes the 2011 dataset from the third year of secondary education (equivalent to US grade 9) was merged with data of the final exams of track B in 2013 and of track A in 2014, respectively. From the 2011 data we obtained the students' score on DAG, gender, self-efficacy, as well as the pupils self-reported school grades in the subjects Dutch language, Math, and English language (Zijsling et al., 2012), while the 2014 and 2013 data (Keizer-Mittelhaëuser, Naayer, Zijsling, & Timmermans, 2015; Keuning, Zijsling, Naayer, & Timmermans, 2015) supplied the students' examination grades on Dutch Language, Mathematics A, Mathematics B, and English Language. Authorization for the data collection and analysis was obtained from the students' parents. The COOL[5-18] website can be accessed for further information.

4.2.2 Participants

From track A, 3356 students of the sixth and final grade (equivalent to US grade 12), participated in the 2014 data gathering wave (Keizer-Mittelhaëuser et al., 2015). Of these students, 1153 were involved in completing the 2011 student questionnaire as well and 1125 pupils (of which 616 were girls), spread over 41 schools, could be assigned to a DAG group. Likewise, from track B, 6962 students of the fifth and final grade, participated in the 2013 data gathering wave (Keuning et al., 2015). Of these students, 2295 were involved in completing the 2011 student questionnaire as well and 2117 pupils (of which 1226 girls were girls), spread over 72 schools, could be assigned to a DAG group.

4.2.3 Variables and instruments

Exam results, Dutch language, mathA, mathB, English language.
Available to us were examination scores on the school subjects Dutch, MathA, MathB, and English of both track A (2014) and track B (2013). Dependent on the combination of school subjects, students either take MathA or MathB; of these varieties MathB is generally considered to be more difficult. The languages Dutch and English are compulsory for every student. For examples of the examination questions we refer to Keizer-Mittelhaëuser et al. (2015) regarding track A and to Keuning et al. (2015) regarding track B. The reliabilities of the examination grades in Greatest Lower Bound (GLB) form ((Ten Berge & Sočan, 2004) were in track A: Dutch .48, MathA .76, MathB .78, and English .75 (Keizer-Mittelhaëuser et al., 2015) and in track B: Dutch .51, MathA .77, MathB .82, and English .83 (Keuning

et al., 2015). As can be seen, the examination scales Dutch for track A and B show a below standard reliability. The upper bounds of validity equals the square root of the alphas, these are .69 and .71 for track A and B, respectively. In the case of low alphas, the associations between variables will generally be significantly attenuated. Because the examination grades Dutch have the desirable property of meaningful content coverage, we decided that this low reliability should not be a major obstruction to their use, thereby following Schmitt (1996).

In addition, we used the mean aggregate of the scores on Dutch, Math and English as a proxy for overall Exam Result. Although in the Dutch educational system grades range from 1 to 10, rounded to one decimal place, we use for ease of interpretation the standard z-form for all non-categorical variables. The distributional characteristics of the variables are presented in Table 4.1.

Table 4.1 Distributional Characteristics

	N	Min.	Max.	*M*	*SD*	%
Track A (vwo)						
Dutch	852	2.6	9.7	6.5	1.1	
Math A	440	3.3	9.7	6.5	1.2	
Math B	487	2.5	9.9	6.7	1.4	
English	1015	3.0	8.9	6.8	1.0	
Gender (girl)	1125 (616)					54.8
Self-efficacy	1108	1.7	5.0	3.7	.6	
Grade Dutch 11	1080	1.0	9.9	7.2	.9	
Grade Math 11	1081	3.0	9.8	7.3	1.2	
Grade Eng 11	1082	2.0	9.9	7.3	1.0	
Track B (havo)						
Dutch	2112	1.0	9.3	6.3	.9	
Math A	1314	1.0	9.5	6.3	1.2	
Math B	541	1.5	9.5	6.5	1.3	
English	1895	2.4	9.6	6.6	1.3	
Gender (girl)	2117 (1226)					57.9
Self-efficacy	2097	1.0	5.0	3.5	.6	
Grade Dutch 11	2033	.0	9.9	6.7	.9	
Grade Math 11	2031	.0	9.9	6.7	1.3	
Grade Eng 11	2031	.0	9.9	6.7	1.1	

Dominant achievement goal.

The DAG was assessed with the instrument introduced by Van Yperen (2006), see Table 4.2. In six statements students have to make a forced choice between two goals from the 2x2 achievement goal framework (Elliot & McGregor, 2001); each goal is pitched against every

other goal once. Each goal thus takes part in three contrasts. If a particular goal is preferred thrice, that goal is that student's DAG. If no goal is chosen thrice, the student is supposed not to have a dominant goal. A consequence of the instrument is that only students that answered all six statements can be assigned to one of the five DAG groups.

Table 4.2 *The instrument used to determine the Dominant Achievement Goal (DAG) in 2011*

	For each item, choose either A or B			
	This year, I find it <u>most important</u> in school ...			
	A			**B**
1)	☐	to get *higher grades* than most of my classmates	òr	☐ *not* to get *lower grades* than most of my classmates
2)	☐	to get *higher grades* than to which I am normally capable	òr	☐ *not* to get *lower grades* than to which I am normally capable
3)	☐	to get *higher grades* than most of my classmates	òr	☐ to get *higher grades* than to which I am normally capable
4)	☐	*not* to get *lower grades* than to which I am normally capable	òr	☐ *not* to get *lower grades* than most of my classmates
5)	☐	*not* to get *lower grades* than most of my classmates	òr	☐ to get *higher grades* than to which I am normally capable
6)	☐	*not* to get *lower grades* than to which I am normally capable	òr	☐ to get *higher grades* than most of my classmates

Gender.

Data on the participants' gender were provided by the schools; 'boy' was coded as 1 while 'girl' was coded as 2.

Self-efficacy.

A six item subscale of the Patterns of Adaptive Learning Scale (Midgley et al., 2000) was used to measure perceived self-efficacy; Cronbach's α for this scale was .83 (Zijsling et al., 2012). An example item is: *Even if the work is hard, I can learn it.*

Perceived Prior Performance.

The 2011 student questionnaire asked the students to report their most recent school report grade on the subjects Dutch language, Math, and English language. These grades were used as a measure of Perceived Prior Performance. The mean aggregate of the self-reported school grades was used when predicting overall exam success while the specific subject grade was used when predicting the corresponding exam grade. As a consequence there was a double role for the 2011 school report grade on Math, which we used as a measure of Perceived Prior Performance for examination grades MathA and MathB.

4.2.4 Generalizability

Our data stem from two gathering waves per track; and our sample contains the students that participated in both the 2011 and the 2013 (2014) gathering wave *and* completely filled in the DAG instrument. Obviously, it is necessary to know to what extent our results may be generalized to the population of the respective tracks A and B. To answer this question we compared the examination results on Dutch Language, MathA, MathB, English Language and the distribution of Gender of our sample with those of the nationwide sample used to define the grading norms of, respectively, track A (see Keizer-Mittelhaëuser et al., 2015) and track B (see Keuning et al., 2015). Tables 4.S1a and 4.S1b of the Supplementary Files present the relevant data.

There was no significant bias in our sample when compared to the nationwide sample of track A for the variables Dutch (Cohen's d = .04, $t(27885)$ = 1.04, p = .30), MathA (Cohen's d = .06, $t(15592)$ = 1.17, p = .24), MathB (Cohen's d = .04, $t(14711)$ = .87, p = .39), English (Cohen's d = .00) and Gender (Cohen's d = .02, $\chi2(1, N = 36574)$ = 1.98, p = .10). However, two significant differences were found in track B; our sample had a lower average score English (Cohen's d = .11, $t(33988)$ = 4.59, p < .001) and contained a higher proportion girls (Cohen's d = .04, $\chi2(1, N = 51915)$ = 21.82, p < .001). The difference concerning English may be qualified as very small and that for gender as a near zero effect. There was no bias in our sample of track B for the variables Dutch (Cohen's d = .00), MathA (Cohen's d = .02, $t(32735)$ = .65, p = .51), and MathB (Cohen's d = .07, $t(11336)$ = 1.58, p = .11). With regard to the above we may conclude that our sample allows generalization of results beyond our sample.

4.2.5 Analytic Strategy

Because the structure of our data conceptually is hierarchical and ignoring that fact may lead to an overestimation of statistical significance as a result of underestimated standard errors of the regression coefficients, we analysed the data by means of two-level regression models (Snijders & Bosker, 2012). Nevertheless, we verified that the use of multi-level models, as compared to single-level models, did lead to a significant improvement in model fit, i.e. that a significant amount of variance was associated with the school level. The four examination grades were analysed using multivariate models, while univariate models were used when Exam Result was involved. The change in model fit as determined by the difference in -2*loglikelihood was evaluated against a chi-square distribution with the appropriate degrees of freedom, which, as the overall variance is broken down into the school and the student level variance, equals 1 in the univariate and 10 in the multivariate case, respectively.

In track A the difference in -2*loglikelihood between the single-level unconditional model and the two-level unconditional model of Exam Result was 6.13, which leads to $\chi^2(1, 1119)$ = 6.13, p =.01. Likewise, the single-level model of the four exam grades differed 49.33 in -2*loglikelihood from the two-level model, and thus $\chi^2(10, 1119)$ = 49.33, p < .01.

See Table 4.S2 of the Supplementary Files, which contains these models for both tracks. In track B the corresponding values regarding Exam Result and the exam grades are $\chi^2(1, 2116)$ = 48.45, p <.01 and $\chi^2(10, 2116)$ = 178.66, p <.01, respectively. In all these instances the two-level models thus are the more effectual ones.

To the two-level models we subsequently added as predictors a) the variables gender, self-efficacy and perceived prior performance and the DAG, b) the interactions gender*goal, self-efficacy*goal, and perceived prior performance*goal. As an extra service to the interested reader we present in Tables 4.S3 and 4.S4 of the Supplementary Files models in which Gender, Self-efficacy and Perceived Prior Performance (4.S3), respectively the DAG (4.S4) are added to the unconditional model.

When comparing, we always used the students without a DAG, having the least known profile, as the reference group. Consequently, all significant contrasts found are differences in average score on outcome variables between students without a DAG and students with a particular dominant achievement goal. For all models the MLwiN 3.00 software (Charlton et al., 2017) was used.

4.3 RESULTS

4.3.1 The models with gender, self-efficacy, perceived prior performance, and DAG

We first present the results for track A; the results for track B can be found next.

Track A, the DAG and exam result.
Adding Gender, Self-efficacy and Perceived Prior Performance to the unconditional model regarding Exam Result led, see Table 4.S3 of the Supplementary Files, to a significant improvement in model fit; $\chi^2(3, N = 1081)$ = 259.268, $p < .01$. However, the subsequent addition of the DAG to the model with Gender, Self-efficacy, and Perceived Prior Performance regarding Exam Result, led - see Table 4.3 - to an improvement in model fit that did not reach significance; $\chi^2(4, N = 1081)$ = 4.96, $p = .29$.

The variables Gender and Perceived Prior Performance had a significant association with Exam Result; girls scored somewhat lower than boys and the Perceived Prior Performance score from 2011 was positively associated with Exam Result in 2014.

After accounting for the influence of Gender, Self-efficacy, and Perceived Prior Performance there proved to be one significant contrast; the students with a performance-approach goal had a higher score on Exam Result than the students without a DAG; β = .23, SE = .12, z = 1.98, $p = .02$.

Table 4.3 *Goal with Gender, Self-Efficacy and Prior Ability Track A*

	Exam Result		Dutch		Track A Math A		Math B		English	
	β	SE	β	SE	β	SE	β	SE	β	SE
Fixed Part										
Intercept	-0.070	0.077	-0.383**	0.114	0.169	0.170	-0.213	0.134	0.108	0.103
Gender	-0.121**	0.047	0.188**	0.071	-0.069	0.097	-0.143	0.080	-0.297**	0.059
Self-Efficacy	0.047	0.025	0.103**	0.036	0.003	0.052	0.096*	0.045	0.096**	0.030
PerPriorPer	0.367**	0.035	0.173**	0.035	0.393**	0.059	0.409**	0.052	0.366**	0.030
Pap	0.230*	0.116	0.424**	0.172	-0.015	0.242	0.220	0.190	0.085	0.149
Pav	0.126	0.101	0.115	0.150	-0.094	0.205	0.194	0.175	0.153	0.129
Map	0.120	0.090	0.265*	0.137	-0.058	0.193	-0.039	0.151	0.007	0.116
Mav	0.145	0.076	0.332**	0.113	-0.041	0.162	0.113	0.123	0.058	0.097
Random Part										
Var school	0.013	0.008	0.026	0.016	0.054	0.031	0.100	0.041	0.049	0.020
Var student	0.535	0.023	0.973	0.048	0.907	0.064	0.726	0.049	0.792	0.036
Total var	0.548		0.999		0.961		0.826		0.841	
ICC school	0.024		0.026		0.056		0.121		0.058	
Model Fit										
-2*loglikelihood:	2408.895		7136.608							
# schools	41		41							
# students	1081		1079							

*: *p*<.05, **: *p*<.01.

89 | The Relation between Students' Dominant Achievement Goal and their Examination Results on four School Subjects

Track A, the DAG and the four examination grades.

Here we started with adding Gender, Self-efficacy, and Perceived Prior Performance to the unconditional model regarding the four examination grades as well. That led to a significant improvement in model fit; χ^2(12, N = 1081) = 450.62, p < .01, see Table 4.S3. The subsequent incorporation of the DAG in the model with Gender, Self-efficacy and Perceived Prior Performance regarding the four examination grades led to an insignificant improvement in model fit; χ^2(16, N = 1081) = 20.69, p =.19. As Table 4.3 shows, Gender was positively associated with Dutch language but negatively with English language. Self-efficacy had meagre positive associations with both languages and MathB. Moreover, Perceived Prior Performance had in general moderately strong positive associations with all examination grades.

After accounting for the influence of Gender, Self-efficacy, and Perceived Prior Performance there were still significant contrasts between the DAG groups on the examination grade for Dutch language; the students with a performance-approach goal and those with a mastery goal (approach as well as avoidance) had significantly higher mean scores than the students without a DAG. The statistics are for the performance-approach goal group β = .42, SE = .17, z = 2.47, p < .01; for the mastery-approach goal group and the mastery-avoidance goal group they are β = .27, SE = .14, z = 1.93, p = .03 and β = .33, SE = .11, z = 2.94, p < .01, respectively.

Track B, the DAG and Exam Result.

We followed the order as with Track A and thus we began by adding Gender, Self-efficacy, and Perceived Prior Performance to the unconditional model regarding Exam Result, which led to a significant improvement in model fit; χ^2(3, N = 2033) = 201.991, p < .01, see Table 4.S3. Adding DAG to the model with Gender, Self-efficacy, and Perceived Prior Performance regarding Exam Result, led - see Table 4.4 - to a significant improvement in model fit; χ^2(4, N = 2033) = 10.94, p = .03. Perceived Prior Performance had a small but significant positive association with Exam Result. The DAG had a significant influence in this model as well; the NDAG group had a significantly lower score than the mastery-avoidance group. The relevant statistics are β = .11, SE = .05, z = 2.38, p <.01. None of the other contrasts reached significance.

Track B, the DAG and the four examination grades.

Adding Gender, Self-efficacy, and Perceived Prior Performance to the multivariate unconditional model regarding the four examination grades, see Table 4.S3, led to a significant improvement in model fit; χ^2(12, N = 2033) = 1215.20, p < .01. Adding DAG to the model with Gender, Self-efficacy, and Perceived Prior Performance regarding the four examination grades, led to a significant improvement in model fit; χ^2(16, N = 2033) = 29.59, p = .03. As Table 4.4 shows, Gender was positively associated with Dutch language but negatively with MathA, MathB, and English language. Self-efficacy had no significant associations with any

examination grade but, in contrast, Perceived Prior Performance had in general moderately strong positive associations with all examination grades. After accounting for the influence of Gender, Self-efficacy and Perceived Prior Performance there still was a significant contrast of the DAG with regard to the examination grade for Dutch language; students with a mastery-avoidance goal had a higher mean than the students without a DAG, β = .18, SE = .07, z = 2.69, p < .01.

4.3.2 The Interaction of DAG with gender, self-efficacy and perceived prior performance

As before, we first present the results for track A; the results for track B can be found next.

Track A, the DAG*covariate interactions and the four examination grades.
As above, the addition of the interaction terms to the multivariate DAG-model regarding the four examination grades did not lead to a significant improvement in model fit; $\chi^2(48, N = 1079) = 35.13$, p = .92. There were no significant main effects for gender. Self-efficacy retained a significant effect on Dutch language, while Perceived Prior Performance was positively associated with MathB and English language. Three significant interaction effects emerged in the final models concerning track A; two of these were related to Perceived Prior Performance, DAG and Dutch language.

The first two significant interactions - see Figure 4.1 - imply that students with a dominant performance-approach or mastery-avoidance goal in combination with a high Perceived Prior Performance (+1 SD) have on average a higher score on Dutch language than the students without a DAG, while that effect does not exist for the combination of the DAG with a low Perceived Prior Performance score (-1 SD). The statistics are β = .33, SE = .17, z = 1.98, p =.02 for the performance-approach group and β = .23, SE = .11, z = 2.13, p =.02 for the mastery-avoidance group.

Table 4.4 *Goal with Gender, Self-Efficacy and Prior Ability Track B*

	Track B									
	Exam Result		Dutch		Math A		Math B		English	
	β	SE	β	SE	β	SE	β	SE	β	SE
Fixed Part										
Intercept	-0.100*	0.050	-0.305**	0.070	0.157	0.084	-0.275*	0.127	0.018	0.072
Gender	-0.035	0.032	0.243**	0.045	-0.238**	0.053	-0.212**	0.083	-0.279**	0.046
Self-Efficacy	-0.021	0.017	-0.021	0.022	-0.031	0.028	-0.049	0.044	-0.031	0.024
PerPriorPer	0.128**	0.024	0.118**	0.022	0.257**	0.029	0.350**	0.053	0.337**	0.022
Pap	0.092	0.082	0.130	0.114	-0.044	0.147	0.298	0.190	0.012	0.120
Pav	0.096	0.065	0.092	0.089	0.112	0.107	0.305	0.171	0.047	0.095
Map	0.009	0.054	0.023	0.074	-0.062	0.091	-0.149	0.138	0.060	0.079
Mav	0.114*	0.048	0.175**	0.065	-0.007	0.079	0.059	0.120	0.125	0.070
Random Part										
Var school	0.025	0.007	0.058	0.016	0.081	0.023	0.169	0.052	0.040	0.013
Var student	0.438	0.014	0.813	0.026	0.780	0.032	0.769	0.050	0.865	0.029
Total var	0.463		0.871		0.861		0.938		0.905	
ICC school	0.054		0.071		0.094		0.180		0.044	
Model Fit										
-2*loglikelihood:	4151.250		14762.101							
# schools	72		72							
# students	2033		2033							

*: *p*<.05, **: *p*<.01.

Table 4.5 *Complete Models Track A*

	Exam Result		Dutch		Math A		Math B		English	
	β	SE	β	SE	β	SE	β	SE	β	SE
Fixed Part										
Intercept	-0.050	0.102	-0.331*	0.147	0.330	0.281	-0.362*	0.168	0.102	0.134
Gender	-0.197	0.138	-0.002	0.209	-0.475	0.311	0.039	0.229	-0.304	0.176
Self-Efficacy	0.128	0.072	0.237*	0.103	0.110	0.191	0.201	0.114	0.143	0.086
PerPriorPer	0.346**	0.110	-0.011	0.094	0.222	0.210	0.531**	0.176	0.398**	0.110
Pap	0.162	0.165	0.315	0.239	-0.145	0.387	0.452	0.305	-0.003	0.211
Pav	0.051	0.145	-0.040	0.212	-0.260	0.357	0.351	0.227	0.109	0.182
Map	0.186	0.129	0.234	0.193	-0.277	0.336	0.189	0.208	0.136	0.162
Mav	0.095	0.110	0.269	0.159	-0.261	0.300	0.242	0.172	0.045	0.141
Girl*pap	0.031	0.232	0.169	0.346	0.309	0.517	-0.611	0.380	0.133	0.299
Girl*pav	0.197	0.214	0.442	0.326	0.459	0.444	-0.130	0.374	0.115	0.265
Girl*map	-0.143	0.185	0.121	0.286	0.437	0.397	-0.429	0.322	-0.277	0.235
Girl*mav	0.122	0.151	0.204	0.228	0.485	0.337	-0.122	0.252	0.040	0.192
S-Effic*pap	-0.023	0.119	-0.105	0.165	-0.103	0.279	-0.079	0.202	0.091	0.144
S-Effic*pav	-0.080	0.108	-0.109	0.158	-0.046	0.244	-0.392*	0.189	0.004	0.126
S-Effic*map	-0.083	0.100	-0.099	0.144	-0.026	0.241	0.024	0.170	-0.101	0.121
S-Effic*mav	-0.105	0.079	-0.173	0.114	-0.150	0.203	-0.134	0.129	-0.071	0.095
PerPriorPer*pap	0.113	0.172	0.329*	0.166	0.204	0.309	0.009	0.259	-0.077	0.153
PerPriorPer*pav	0.048	0.168	0.180	0.146	0.212	0.270	-0.097	0.233	0.040	0.151
PerPriorPer*map	-0.058	0.137	0.132	0.122	0.094	0.260	-0.239	0.210	-0.033	0.134
PerPriorPer*mav	0.035	0.120	0.226*	0.106	0.202	0.223	-0.126	0.190	-0.034	0.117

The Relation between Students' Dominant Achievement Goal and their Examination Results on four School Subjects

Table 4.5 *Complete Models Track A (continued)*

	Exam Result		Dutch		Math A		Math B		English	
	β	SE	β	SE	β	SE	β	SE	β	SE
Random Part										
Var school	0.013	0.008	0.028	0.017	0.053	0.031	0.112	0.045	0.046	0.019
Var student	0.530	0.023	0.960	0.048	0.902	0.064	0.707	0.047	0.788	0.036
Total var	0.543		0.988		0.955		0.819		0.834	
ICC school	0.024		0.028		0.058		0.137		0.055	
Model Fit										
-2*loglikelihood:	2398.640		7101.546							
# schools	41		41							
# students	1081		1079							

*: $p<.05$, **: $p<.01$.
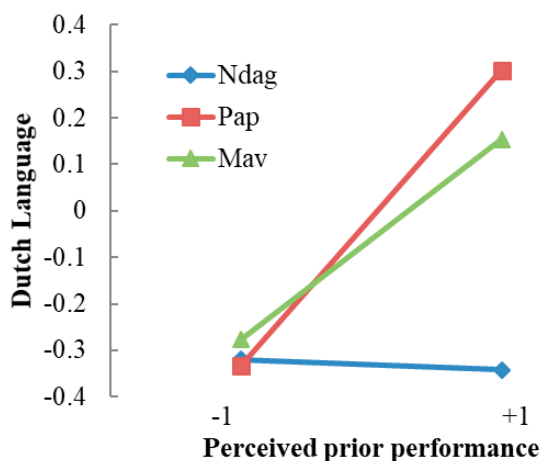
Figure 4.1. *The average Dutch language scores in track A of the performance-approach goal group, the mastery-avoidance group and the group without a dominant goal at 1SD below, respectively above, the mean of Perceived prior performance*

The third significant interaction found concerned MathB and involved Self-efficacy and the performance-avoidance goal; the statistics are β = -.39, SE = .19, z = -2.07, p =.01. The students who combined a performance-avoidance goal with a low self-efficacy score (-1 SD) had a significantly higher MathB score than the NDAG/low self-efficacy combination; this effect disappeared in the combination with high (+1 SD) self-efficacy scores, see Figure 4.2.
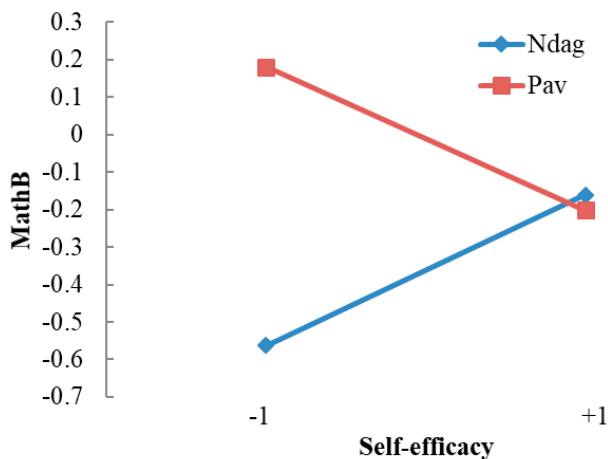
Figure 4.2. *The average MathB scores in track A of tthe performance-avoidance goal group and the group without a dominant goal at 1SD below, respectively above, the mean of Self-efficacy*

Table 4.6 *Complete Models Track B*

	Sumscore		Dutch		Math A		Math B		English	
	β	SE	β	SE	β	SE	β	SE	β	SE
Fixed Part										
Intercept	-0.172**	0.061	-0.331**	0.085	0.012	0.102	-0.411**	0.158	-0.061	0.087
Gender	0.138	0.087	0.302**	0.122	0.123	0.143	-0.017	0.231	-0.094	0.126
Self-Efficacy	-0.002	0.046	0.020	0.060	-0.106	0.074	0.099	0.124	-0.048	0.065
PerPriorPerf	0.053	0.064	0.185	0.110	0.403**	0.080	0.417**	0.132	0.246**	0.055
Pap	0.068	0.134	0.076	0.181	-0.088	0.235	0.147	0.339	0.175	0.192
Pav	0.163	0.090	0.070	0.126	0.212	0.153	0.663**	0.221	0.170	0.131
Map	0.072	0.076	0.032	0.106	0.186	0.134	0.081	0.193	0.109	0.111
Mav	0.216**	0.066	0.235**	0.092	0.177	0.110	0.149	0.171	0.220*	0.097
Girl*pap	-0.195	0.171	0.007	0.238	-0.348	0.302	0.139	0.395	-0.381	0.250
Girl*pav	-0.163	0.138	0.047	0.193	-0.289	0.226	-0.811*	0.395	-0.261	0.200
Girl*map	-0.153	0.110	-0.027	0.154	-0.482**	0.184	-0.298	0.294	-0.133	0.160
Girl*mav	-0.220*	0.098	-0.114	0.137	-0.425**	0.161	-0.154	0.257	-0.212	0.141
S-Effic*pap	0.068	0.083	0.011	0.112	0.387**	0.157	-0.010	0.193	-0.002	0.121
S-Effic*pav	0.018	0.071	-0.030	0.094	0.051	0.116	-0.251	0.202	0.066	0.103
S-Effic*map	-0.044	0.059	-0.031	0.077	0.045	0.099	-0.234	0.151	-0.005	0.083
S-Effic*mav	-0.035	0.052	-0.062	0.067	0.084	0.083	-0.136	0.139	0.017	0.073
PerPriorPer*pap	0.242	0.139	-0.073	0.134	-0.328	0.193	-0.041	0.228	0.185	0.130
PerPriorPer*pav	-0.011	0.105	-0.054	0.119	-0.173	0.126	-0.147	0.202	0.220*	0.096
PerPriorPer*map	0.073	0.079	-0.058	0.115	-0.075	0.098	-0.111	0.171	0.026	0.073
PerPriorPer*mav	0.108	0.074	-0.144	0.124	-0.209*	0.090	-0.024	0.154	0.124*	0.063

Table 4.6 *Complete Models Track B (continued)*

	Sumscore		Dutch		Math A		Math B		English	
	β	SE	β	SE	β	SE	β	SE	β	SE
Random Part										
Var school	0.025	0.008	0.058	0.016	0.085	0.024	0.172	0.052	0.039	0.013
Var student	0.436	0.014	0.811	0.026	0.764	0.031	0.747	0.049	0.859	0.029
Total var	0.461		0.869		0.849		0.919		0.898	
ICC school	0.054		0.067		0.100		0.187		0.043	
Model Fit										
-2*loglikelihood:	4138.609		14707.103							
# schools	72		72							
# students	2033		2033							

*: $p<.05$, **: $p<.01$.

The Relation between Students' Dominant Achievement Goal and their Examination Results on four School Subjects

Track B, the DAG*covariate interactions and exam result.

Now we turn to the results for track B. Adding the interaction terms of DAG with Gender, Self-efficacy and Perceived Prior Performance to the model regarding Exam Result, did not lead - see Table 4.6 - to a significant improvement in model fit,: $\chi^2(12, N = 2033) = 12.64$, $p = .40$. In the final model there was a significant main effect regarding DAG; the students with a mastery-avoidance goal had a significantly higher score than the students without a DAG; $\beta = .22$, $SE = .07$, $z = 3.27$, $p < .01$. In addition, the mastery-avoidance goal was involved in the only significant interaction term, the other interacting variable being gender; $\beta = -.22$, $SE = .10$, $z = -2.24$, $p = .01$. The interaction shows, see Figure 4.3, that for boys, but not for girls, there is a bonus of having a mastery-avoidance goal, as compared to not having a DAG.

Figure 4.3. *The average Exam Result scores in track B of boys and girls of the mastery-avoidance goal group and the group without a dominant goal*

Track B, the DAG*covariate interactions and the four examination grades.

Adding the interaction terms to the multivariate DAG-model regarding the four examination grades did not lead to a significant improvement in model fit; $\chi^2(48, N = 2033) = 55.00$, $p = .23$. Gender had one significant main effect with regard to Dutch language while Self-efficacy had none. In contrast, Perceived Prior Performance showed significant main effects in relation to MathA, MathB and English language.

With regard to Dutch language the students with a mastery-avoidance goal had a significantly higher score than the NDAG atudents; $\beta = .24$, $SE = .09$, $z = 2.55$, $p < .01$. In addition, with regard to MathA we found four significant interaction terms; two of these involved Gender, while Self-efficacy and Perceived Prior Performance each were associated with one significant interaction term. Concerning Gender the statistics for the mastery-approach goal and the mastery-avoidance goal were $\beta = -.48$, $SE = .18$, $z = -2.62$, $p < .01$ and $\beta = -.43$, $SE = .16$, $z = -2.64$, $p < .01$, respectively.
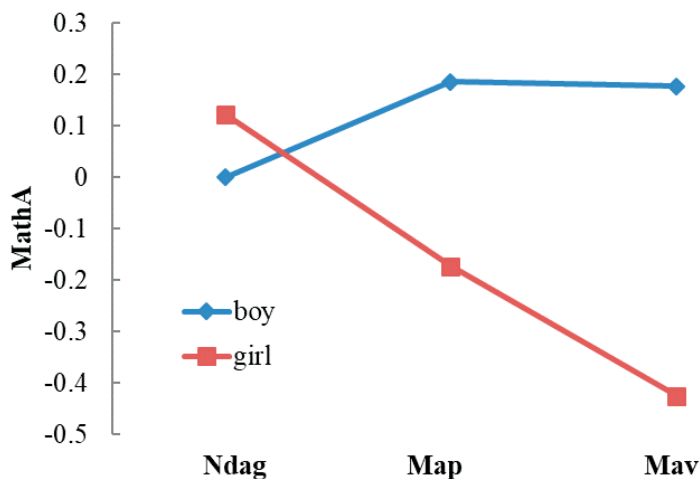
Figure 4.4. *The average MathA scores in track B of boys and girls of the mastery-approach goal group, the mastery-avoidance group and the group without a dominant goal*

These interactions imply, see Figure 4, that endorsing one of the mastery goals, as compared to not having a DAG, is associated with significantly lower MathA exam grades – for girls, not for boys. The third significant interaction regarding MathA involves the performance-approach goal and Self-efficacy; the statistics are β = .39, *SE* = .16, *z* = 2.46, *p* < .01; the performance-approach goal combined with a high Self-efficacy score (+1 SD) is associated with higher MathA scores than the NDAG/high Self-efficacy combination, while the opposite holds for the low Self-efficacy (-1 SD) combination, see Figure 4.5.
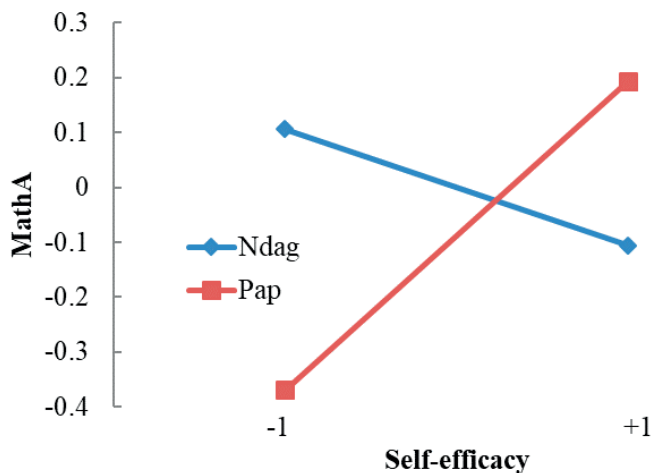
Figure 4.5. *The average MathA scores in track B of the performance-approach goal group and the group without a dominant goal at 1SD below, respectively above, the mean of Self-efficacy*

Finally, the Perceived Prior Performance with mastery-avoidance interaction with regard to MathA has β = -.21, SE = .09, z = -2.32, p = .01 as relevant statistics; the interaction shows that having a mastery-avoidance goal buffers against the impact of a low (-1 SD) Perceived Prior Performance, see Figure 4.6.

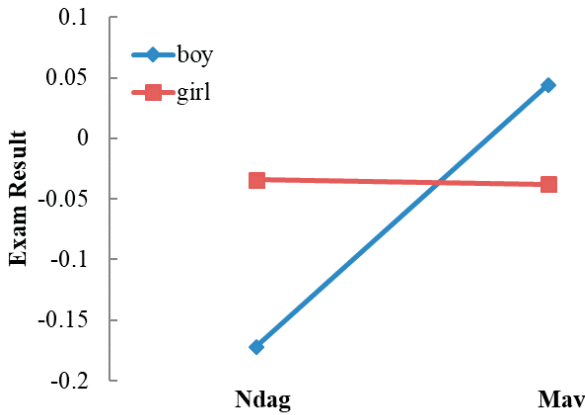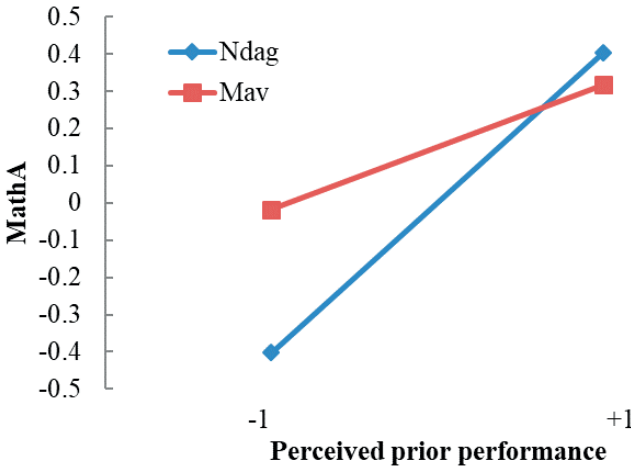**Figure 4.6.** *The average MathA scores in track B of the mastery-avoidance goal group and the group without a dominant goal at 1SD below, respectively above, the mean of Perceived Prior Performance*

MathB turned out to have a remarkable connection with the DAG. More in particular, MathB had a substantial link with the performance-avoidance group, β = .66, SE = .22, z = 3.00, p <.01 while that same group was involved in a significant interaction with Gender as well, β = - .81, SE = .40, z = -2.05, p =.01. The association of the performance-avoidance group with MathB is qualified by Gender in the sense that for boys, but not for girls, belonging to that group is associated with a higher score on MathB, see Figure 4.7.

The examination score on English language showed, with regard to the DAG, a significant main effect and two significant interaction effects. The significant main effect was found for the mastery-avoidance goal, β = .22, SE = .10, z = 2.27, p = .01; the significant interactions, depicted in Figure 4.8, involved Perceived Prior Performance with both avoidance goals (performance-avoidance β = .22, SE = .10, z = 2.29, p = .01, mastery-avoidance β = .12, SE = .06, z = 1.97, p = .01).

The combination of a mastery-avoidance or a performance-avoidance goal with a higher Perceived Prior Performance (+1 SD) in the third grade of secondary education in track B is associated with a significantly higher examination score English language in the fifth grade, as compared to the group without a DAG, while these groups scores look very much alike at lower (-1 SD) Perceived Prior Performance level.
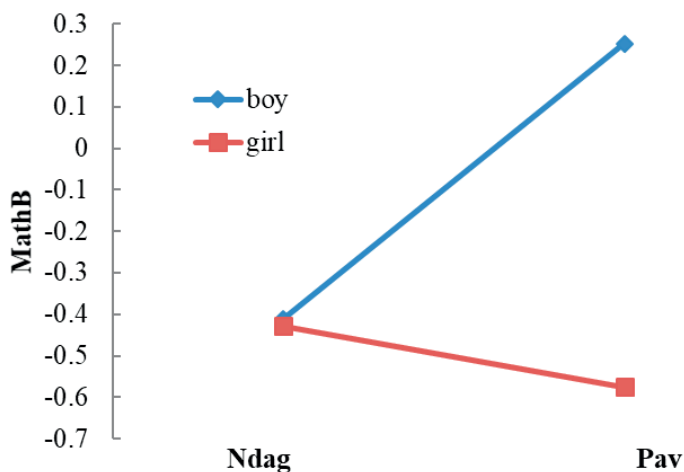
Figure 4.7. *The average MathB scores in track B of boys and girls of the performance-avoidance goal group and the group without a dominant goal*
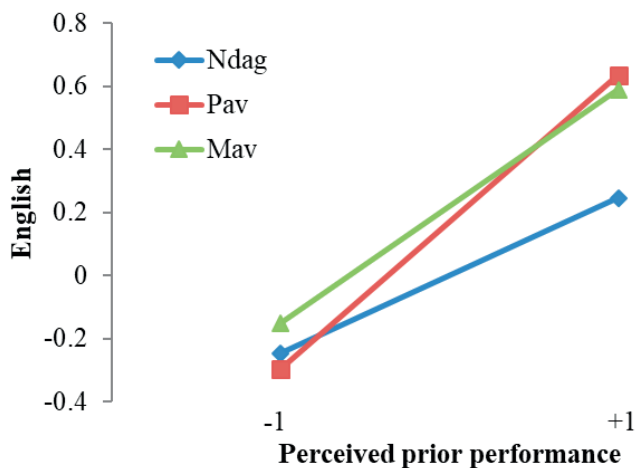
Figure 4.8. *The average scores English in track B of the performance-avoidance group, the mastery-avoidance goal group and the group without a dominant goal at 1SD below, respectively above, the mean of Perceived prior performance*

4.4 DISCUSSION

This study had as a primary aim to establish whether there was any effect of the DAG upon performance outcomes several semesters later. In particular we tested for the second highest track (B) and highest track (A) of Dutch secondary education whether students' DAG, measured in 2011, could be associated with examination grades for the subjects Dutch,

MathA, MathB, English, and overall Exam Result, in 2013 (track B) and 2014 (track A), respectively. Five, respectively seven, semesters elapsed between the measurement of DAG in the third grade and the final examinations. In order to get a better view of the contribution of the DAG we tested if its effects existed above and beyond the combined influence of gender, self-efficacy and Perceived Prior Performance, which were measured in 2011 as well. An additional aim of our study was to explore the effect of the interaction of the DAG with the covariates.

We will look at the results through the lens of the expectations that we formulated earlier. The first three expectations were dedicated to the association of the various dominant achievement goals with the examination outcomes. Our first expectation (E1a) was that, as a consequence of the elapsed time, the association of the various DAG's with the examination results would be very modest. And yes, we can safely conclude that this expectation was to a large extent supported by the data; on only four of the 10 exam outcome measures there were significant differences between categories of students with a different dominant achievement goal.

A second expectation (E1b) was that only the performance-approach goal would show relevant associations with outcome variables. This expectation was not supported in the sense that, apart from the performance-approach goal, the mastery-approach and mastery-avoidance goals produced significant results as well. The results for the performance-approach goal are in accordance with the bulk of achievement goal results (Huang, 2012; Wirthwein et al., 2013), but the absence of significant negative associations with regard to the results of the performance-avoidance goal and the outcome variables are not. A quick look in Tables 4.3 and 4.4 shows this result is not a consequence of the use of the students not having a DAG as the reference group; if we would not have admitted that group in our sample, the school results of the mastery-approach goal still would have been more humble than those of the performance-avoidance goal. Furthermore, the results of the mastery-avoidance goal are not in line with the general results (Baranik et al., 2010), but they are in line with some of the DAG research (Scheltinga et al., 2017) and in line with results obtained with adults (Senko & Freund, 2015).

The third expectation (E1c) stated that especially not having a DAG would produce poor school outcomes; an expectation that was primarily based on the results of Scheltinga et al. (2016, 2017). Our results show that in case of significant differences there was never a higher score associated with not having a DAG, which supported our expectation; the students who did not have a DAG 5 or 7 semesters earlier, still pay the price at the final examination date. This result indicates that having a DAG is beneficial in itself, perhaps because of the availability of an established set of cognitions, beliefs, and affect (Scheltinga et al., 2016).

Another expectation (E2) was dedicated to the difference between the highest and the second highest track; essentially we expected that the influence of the DAG would be more pronounced in track A, although the elapsed time between its measurement and the examina-

tion was 7 instead of 5 semesters. This expectation was based on a study of the DAG in relation to grades on school subjects across tracks, which showed that the effects of the DAG were stronger in higher tracks (Scheltinga et al., 2017). Although there were in the present study, see (E1a), only scarce morsels of evidence, we must nonetheless conclude that our expectation was supported. For the most part the coefficients regarding the DAG are larger in track A than in track B. Furthermore, although the sample of track B was about twice the size of that of track A, there were twice as much significant differences in the latter compared to the former track. We conclude that the impact of the DAG has more importance in track A than in B, and we suspect that the same is true for other achievement-related constructs, like perceived prior performance, intrinsic motivation, fear of failure, and self-efficacy. Maybe the tracks function as a set of sieves that retains students based upon facets of their achievement and achievement-related characteristics and passes the other students to lower tracks.

The final two expectations, (E3a) and (E3b), were about the strength of the association of the DAG with Examination Result and the four examination grades. We expected (E3a) that the DAG would be stronger related with Exam Result than with the very specific examination grades Dutch, MathA, MathB and English, because Exam Result and DAG are both more general. This expectation was supported; the DAG was related to Exam Result but only to one out of four examination grades, namely to Dutch. In contrast, the association of the general measure DAG with the very specific measure Dutch was stronger than the association with the general measure Exam Result; these effects existed in both tracks. Our very last expectation (E3b) was that the association of the DAG with the four examination grades would be comparable in magnitude. As in both tracks there only was a significant relation to the examination grade Dutch language but not to the other grades, this expectation was clearly not supported. Our results thus do not support the idea that achievement goals are highly domain general (cf. Hornstra et al., 2016).

We did not formulate expectations about the results of the models in which the DAG was studied alongside its interactions with the covariates Gender, Self-efficacy and Perceived Prior Performance. Although we did not have specific expectations, we were nevertheless surprised by our results; we found it remarkable that the DAG did yield sparse main effects but a larger harvest of interactions. As a consequence, the DAG had relations, directly or by interaction with all but two outcome measures, the exceptions being MathA and English in track A. All goal groups participated in at least one interaction, but the students with a mastery-avoidance and those with a performance-avoidance goal were especially prone to be involved in interactions. In track A there were no interactions in which gender played a role, while in track B both math varieties and exam result were involved in an interaction with gender. Maybe it is not beneficial for girls to endorse a mastery goal when they take Math classes. In addition, maybe it is beneficial for boys to endorse a DAG (i.e. instead of NDAG) when taking MathB classes.

Although the covariates were not the prime target of our study, we deem it proper to give a short account of the results concerning Gender, Self-efficacy and Perceived Prior Performance in the models including DAG. Of these three variables Self-efficacy had the most humble associations with Examination Result and the four examination grades in both tracks. Probably self-efficacy beliefs do not stand the test of time very well because these results are in contrast to the general trend in which self-efficacy is a strong predictor of performance, see for instance Coutinho and Neuman (2008) or Scheltinga et al. (2017). In contrast Perceived Prior Performance was firmly associated with the four examination grades in both tracks. Gender had a positive relation to the examination grades Dutch, but showed negative relations with Exam Result and English in track A and with MathA, MathB, and English in track B. The finding that girls score on average lower exam grades English than boys is puzzling because generally girls have higher scores on language related tasks.

4.4.1 Limitations and strengths of the present study and suggestions for future research

Perhaps the most important limitation of the present study stems from the circumstance that, although we do know which goal the students had in the third grade of secondary education, we do not have data on their DAG in any point in time in between, nor do we have corresponding data about the DAG they had at the time of the examination. It is, moreover, quite possible that the DAG of an individual student varies across time as well as across school subjects, be it in quality or in intensity.

Another intriguing fact which we hesitantly add to the limitations is that the DAGs that appeared to be less adaptive have a lower prevalence in the examination year than in the third grade, the year the DAG was measured, see Table 4.S5 of the Supplementary Files. In the examination year there was an overrepresentation of the performance-approach goal in track A; in track B an overrepresentation of the mastery-avoidance goal and an underrepresentation of the NDAG group. If a certain goal is associated with higher marks, then perhaps students that endorse that goal have a somewhat larger chance to be promoted to the next grade. Another possibility might be that the endorsement of adaptive goals may lead to a differential growth in intelligence, more or less analogous to the results from Bergold and Steinmayr (2016). Such mechanisms might lead to a situation in which the students with the more successful achievement goals are overrepresented in the examination year of the highest tracks. Of course there are, apart from these possibilities, myriads other potential reasons why students from the 2011 data gathering wave did not participate in the 2013 or 2014 examinations, with a different distribution as a result.

A further limitation is our restriction to the two highest tracks, which give access to university (track A) and to higher professional education (track B); the other four tracks prepare much more for vocational training. As a consequence, the temptation to generalize the results to (Dutch secondary) education as a whole has to be severely bridled.

Yet another limitation is the DAG instrument itself. Although the instrument is user-friendly, the nature of the forced choice method does not permit the computation of standard psychometric properties. In addition, filling in the instrument in a completely random way would lead to the assignment of a DAG to one half of the respondents and of NDAG to the other half. Of the 2^6 = 64 possible patterns for answering the items, 32 lead to the assignment of a DAG, 8 to each DAG; the other 32 patterns result in NDAG.. However, we have no reason to assume that the instrument was filled in carelessly. On most variables subjects still receive a score if a limited amount of items is left blank, but to obtain a score on the DAG only completely filled in instruments were eligible. The subjects in our sample thus had to have enough conscientiousness to complete the instrument; but if they filled it in carelessly that probably would have attenuated the results.

This is the very first study that links the DAG, and thus the 2x2 achievement goal framework, to relevant performance outcomes several semesters later, which is an obvious strength. Other key strengths of this study are its contribution to a) determining the value of having a DAG, as opposed to not having a DAG, b) confirming the value of the performance-approach goal with regard to performance outcomes, c) rehabilitating the mastery-avoidance goal as an possible adaptive achievement goal.

In addition, we see our finding that school subjects do not have to manifest the influence of achievement goals on the surface but may show it in the interaction of goal with gender, self-efficacy and perceived prior performance instead, as a strength as well. A further strength is that we made it plausible that the DAG works differently in different educational tracks. Moreover, we consider it a strength that our results suggest that the influence of the DAG varies across school subjects.

A fruitful area for future work would be to use the DAG rephrased in terms of specific school subjects. Also, future research could look into the stability of DAG adoption from the higher grades of primary school, during secondary education and beyond. Thirdly, we only stand at the beginning of the process of mapping the various interactions of the DAG with other variables. Finally, there is ample room for intervention studies, which could focus on stimulating students to endorse one of the four goals of the 2x2 framework.

4.4.2 Conclusion

Even after several semesters students with different dominant achievement goal are associated, above and beyond the influence of gender, self-efficacy and perceived prior performance, with (somewhat) different examination results. The effects vary per school subject and per track; however, the students that did not have a DAG generally exhibited the lowest average scores. Furthermore, several interactions of the DAG with gender, self-efficacy and perceived prior performance were found. Finally, the results only partially reinforce the tenets of the 2x2 achievement goal framework.

Chapter 5

General Conclusions and Discussion

The final chapter of this thesis will summarize, discuss, and reflect upon the results of the empirical chapters and will ponder the current state of the achievement goal approach, both theoretically and practically. In addition, the empirical results give rise to a discussion regarding the merits and limitations of the studies and to recommendations for future research. However, for the benefit of the reader this chapter starts in section 5.1 with a short recapitulation of achievement goal theory and the three key issues that overarch the empirical studies presented in the preceding chapters. Sections 5.2 and 5.3 are dedicated to the main findings and the general discussion, respectively.

5.1 THE AIM: CONTRIBUTING TO ACHIEVEMENT GOAL THEORY

Achievement goals can be loosely described as the basic mindset persons use in situations in which they have to perform, for instance in sports, at work, and, of course, in education. The last three decades have shown an increased scientific interest in achievement goals. However, as the first chapter shows, this interest did not lead to generally accepted definitions, assumptions, methods, or results, with regard to achievement goals.

The construct *achievement goal* has been associated with factors that influence personal goal adoption that vary considerably in their distance from the core of the person. Close to the core are the Big Five personality traits (Sorić, Penezić, & Burić, 2017), dispositional motivation (Bartels, Magun-Jackson, & Ryan, 2010), approach and avoidance temperaments (Elliot & Thrash, 2010), perfectionism (Damian, Stoeber, Negru, & Băban, 2014) and traits (Cellar et al., 2010). At an intermediate distance from the core are situated order of birth (Carette, Anseel, & Van Yperen, 2011), perceived parental attachment (Bal & Barušs, 2011), and academic achievement (King & McInerney, 2016). Perhaps a little further from the core lie social class (Jury, Smeding, Court, & Darnon, 2015), and classroom goal structure (Givens Rolland, 2012). Still farther away are cultural differences (Dekker & Fischer, 2008). Most of these possible influences are relatively stable, which gives some weight to the plausibility of a dominant achievement goal. Furthermore, there is a tradeoff between the specificity and the value of the achievement goal concept. If the goal orientation with regard to a specific school subject (mathematics is popular in this regard), as opposed to school in general, is measured, then the relationship with the performance indicator may be higher, but on the other hand you may lose some of the general usefulness of the concept. There are indications that, taking into account what has been said in the previous sentence, for optimal prediction the specificity of the goal orientation measure should match the specificity of the performance indicator (Wirthwein, Sparfeldt, Pinquart, Wegerer, & Steinmayr, 2013)

In this thesis the 2x2 achievement goal framework (Elliot & McGregor, 2001) is used as the basis for the empirical studies. This framework uses two dimensions with two poles

each to define four achievement goals. Two fundamentally different convictions of what comprises competence form the dimension *definition.* Being competent may be viewed as performing better than others or as being able to completely master the subject matter or skill; the first conviction forms the *performance* pole of the definition dimension, the second conviction forms the *mastery* pole of the definition dimension. The so-called *valence* dimension reflects the two attitudes persons may have toward the achievement at hand; conceiving the situation as an opportunity to earn success forms the *approach* pole, while seeing the situation as an opportunity to avoid failure forms the *avoidance* pole of the valence dimension. The combination of the poles' names across the dimensions yields four achievement goals: *performance-approach goals, performance-avoidance goals, mastery-approach goals* and *mastery-avoidance goals.*

In school settings both approach goals are positively associated with achievement while both avoidance goals are not. In addition, mastery goals, but not performance goals, are positively associated with interest. Consequently, mastery-approach and performance-avoidance goals are generally seen as most, respectively, least commendable in school settings; these goals are considered to be the most, respectively least, *adaptive* goals in the context of education.

Traditionally, achievement goals are assessed either through Likert scales (i.e., when correlation methods are used) or through a manipulation check (i.e., when an experimental method is used). In this thesis, however, the goals of the 2x2 achievement goal framework are studied by means of the Dominant Achievement Goal (DAG); that is, the goal subjects prefer over the other goals in a given situation (Van Yperen, 2006). The DAG is assessed by pitting, in a pair wise fashion, each of the four goals against the other goals. Consequently, five groups of subjects result; four of these consist of subjects having a DAG, for instance a dominant performance-approach goal or a dominant mastery-avoidance goal, while the fifth group are the subjects without a consistently preferred goal, the NDAG group. Van Yperen (2006) found, in the context of university education, the profiles of the DAG groups to be generally in line with the body of evidence from other 2x2 achievement goal framework studies; in addition he found the NDAG group not to have a distinct profile. In spite of these results, some knowledge gaps, associated with the DAG, the 2x2 achievement goal framework, and achievement goal theory in general, remained; these knowledge gaps gave rise to the issues leading to the empirical work of this thesis.

Three key issues concerning the 2x2 achievement goal framework overarched and guided the studies presented in the empirical chapters of this thesis. The first key issue was whether the profiles of the four DAG groups were conform the profiles that evolved over time from research with regard to the 2x2 achievement goal framework; a related issue was whether the group without a DAG had a distinct profile as well. The review of the DAG studies presented in Chapter 1 shows that only one study (i.e., Van Yperen, 2006) had investigated the association between the DAG and academic achievement, and that, furthermore, the results were

only partially in accordance with the profiles of 2x2 achievement goal framework. The second key issue was whether long term results for the 2x2 framework could be demonstrated, because long term results for the full 2x2 framework are published only once. Bjørnebekk et al. (2013) tested long term effects of the full 2x2 achievement goal framework in an educational (in this case: university) setting; only the performance-avoidance goal exhibited a significant (negative) correlation with the last course grade two years later. Lastly, the third key issue was whether results of achievement goal theory can be generalized to a wider (school) population than the cognitively most gifted subjects. A large part of social sciences' results, including the results from the 2x2 achievement goal framework (see Wirthwein et al., 2013), are obtained by using samples of undergraduates which makes generalization to other age groups or the general population problematic (Peterson, 2001; Sears, 1986).

All results presented in the empirical chapters are based upon data from students in secondary education in the Netherlands, which is a system consisting of five tracks that vary in level of difficulty. In all analyses data from students in third grade, when the students are about 15 years of age, were used; for the analyses in chapter 4 data collected in third grade were coupled with data from the examination in grade five or six. The data were gathered in the context of the longitudinal project COOL[5-18], which followed children's school career from age 5 until 18. Data pertaining to school performance were collected and progress in selected school subjects measured. More information can be found on the COOL[5-18] website (http://www.cool5-18.nl/).

The answers to the three key issues will be summarized in the next section.

5.2 GENERAL CONCLUSIONS

5.2.1 Corroborating that the DAG/NDAG profiles fit the 2x2 achievement goal framework

The extent to which the profiles of the groups of students with a specific DAG resemble the profiles of the corresponding achievement goal of the 2x2 framework was investigated in the empirical chapters 2, 3 and 4.

In the second chapter the five dominant achievement goal groups were compared with regard to a) task-involvement, effort-expenditure, competition, group leadership, affiliation, social concern, praise, and token; these variables constitute the Inventory of School Motivation (McInerney & Sinclair, 1991), b) perceived self-efficacy (Midgley et al., 2000) and c) the homework scale (Trautwein et al., 2006). Inspection of group means showed that the dominant performance-approach group had the highest means on *all* these variables; a result that is hard to fit into the mold of the 2x2 achievement goal profiles which leads one to expect the mastery-approach group to score at least ex aequo on self efficacy or effort expenditure. In contrast, the dominant mastery-avoidance group had the lowest mean on

effort expenditure, competition, sensitivity to praise and self-efficacy, which is in line with the 2x2 achievement goal framework. The other two groups, i.e. the dominant performance-avoidance and the dominant mastery-approach groups, mostly had intermediate positions. 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 versus performance-approach combination and the mastery-approach versus performance-avoidance combination (Elliot & McGregor, 2001); the results presented in chapter 2 support that. In addition, the significant differences between the various goal groups could, with a few exceptions in effort expenditure, competition and self-efficacy, be qualified as small, which is in line with the achievement goal results as well (Huang, 2011, 2012, 2016). This, of course, severely limits the practical relevance of achievement goals for educational practice.

The NDAG group, when compared to the performance-approach group, scores lower on task involvement, effort expenditure, competition and self-efficacy. Furthermore, the task involvement variable was most prominent in separating the NDAG group from the performance-approach group. Possibly the NDAG group is not easily motivated by novel and challenging assignments. The way the NDAG group scores on the Inventory of School Motivation, in combination with the contrast with the performance-approach group paints a bleak picture with regard to its school success.

In the third chapter the DAG groups were compared with regard to grades on the subjects Dutch, English, and Math. Generally, the 2x2 achievement goal framework renders significant positive correlations between grades and the performance-approach and the mastery-approach goals, while, in contrast, significant negative correlations are found between grades and the two avoidance goals. The results reported in chapter three were only partially in accordance with the above. The performance-approach group had a significantly higher mean grades on the three school subjects than the other goal groups; and, in addition, that group had means of comparable magnitude on the three school subjects. However, in contrast, the mastery-avoidance group had a slightly higher grade Dutch than the other goal groups (aside from the performance-approach group). Furthermore, and in contrast with the general results of the 2x2 framework as well, there were no significant differences between the other goal groups, the NDAG group included. Thus, in its present form, the DAG instrument does not discriminate enough between the groups of the 2x2 framework.

In the fourth chapter the DAG groups of the second highest and highest track were compared with regard to results on the final examination. The DAG was measured in the third grade of secondary school while the final examination took place two, respectively three years later. On (only) four out of the 10 exam outcome measures there were significant differences between students with a different dominant achievement goal. In the next section the results are discussed in more detail; in this context, however, it is sufficient to say that these differences were associated with the performance-approach group, the mastery-approach group, and the mastery-avoidance group. The first two results are conform the

profiles of the achievement goal research, but the absence of significant negative associations of the performance-avoidance group and the outcome variables are not.

Part of the research presented in chapter two was dedicated to paint a motivational portrait of the five DAG groups using the eight variables of the Inventory of Student Motivation and, in addition the scores on the Homework and Self-efficacy scales. A multivariate analysis of variance showed that the differences in motivational characteristics between the five groups were significant and that the univariate results were significant on eight of the ten scales. To find out where these differences were located, the significance of the group differences was tested with post hoc contrasts, following the Bonferroni procedure (α = .001); this procedure compensates for the fact that on the basis of chance alone some of the differences between the DAG groups could be found to be significant.

In contrast, in chapters three and four, the analyses were conducted by means of two and three level models. The aim in those cases was to find out if the use of the DAG would lead to better predictions of grades on some school subjects (chapter three) or on the final examination (chapter four). Furthermore, the influence of the DAG was examined above and beyond the influence of other variables (gender, IQ, and self-efficacy in chapter two, gender, perceived prior performance and self-efficacy in chapter three). These so-called covariates were added to the model before the DAG was, which means that the variance due to these variables already was accounted for. Better predictions imply that the model with the added variable DAG explains significantly more of the variation of the school or examination grades; the model is said to have in that case a better model fit. The difference in model fit is expressed as the difference in -2*loglikelihood and can be evaluated against a chi-square distribution with the appropriate degrees of freedom. A larger number of degrees of freedom makes it more difficult to reach significance, which compensates for the increase in variables. Thus, although it seems like a large amount of variables being tested, it boils down to testing just the variable DAG on a small amount of target variables.

The DAG profiles thus partially match the profiles of 2x2 achievement goal framework. The dominant performance approach goal group seems to be a group that is motivated to a degree that the other DAG groups can only display their profiles relative to one another in its shadow, see Van Yperen (2006) and Scheltinga et al. (2016). With regard to the profile of the NDAG group one may conclude that a) it is about the size of the performance-avoidance goal group, b) it bears the closest resemblance to the performance-approach group, but has a lower appreciation of challenging and difficult tasks, and c) it in general shows mediocre results.

5.2.2 Long term results of the 2x2 achievement goal framework and the DAG

In the fourth chapter the long term effects of the DAG on examination grades in the cognitive most challenging (track A), respectively second cognitively most challenging track (track

B) of Dutch secondary education were explored. The students' DAG were established in the third grade of secondary education and their examinations took place seven (track A) respectively five (track B) semesters later. Available for the analysis were the examination scores on the subjects Dutch language, Math A, Math B and English language. In addition, the aggregate of these scores was used as a measure for examination success.

The association of the DAG groups with the examination results was, as expected, very modest; on only four of the 10 exam outcome measures there were significant differences. In track A, when compared to the NDAG group, the performance-approach goal group had a higher mean examination score and all groups with the exception of the performance-avoidance group had significantly higher means on Dutch language. These effects disappeared, however, after adding the interactions of goal with gender, of goal with self-efficacy, and of goal with prior performance to the models. In track B the mastery-avoidance group had a higher mean examination score and a higher Dutch language score than the NDAG group. However, the addition of the interaction terms of goal and gender, of goal and self-efficacy and of goal and prior performance to the models, revealed a higher English language score for the mastery-avoidance group and a higher Math B score for the performance-avoidance group as well.

It goes without saying that the above results do not have practical implications whatsoever; however they are not without theoretical interest. The empirical results reported in chapter four show that the dominant goal in third grade did have some consequences for final exam achievement several semesters later, above and beyond the influence of gender, perceived ability and self-efficacy. If one realizes that, in all likelihood, the students were in the meantime never informed about the pros and cons of various achievement goals, these results may be called impressive. As a consequence of the lack of long term achievement goal research to date, the results presented in chapter four cannot be evaluated against well-founded expectations. However, to find that the mastery-avoidance group is associated with long term positive results is nevertheless remarkable, although that same group surprisingly appeared with positive results with regard to report grades Dutch.

Not having a DAG was, as expected, associated with rather poor long term results; in case of significant differences there was never a higher score associated with the NDAG group. This result indicates that having a DAG is beneficial in itself, perhaps because of the availability of an established set of cognitions, beliefs, and affect (Scheltinga et al., 2016).

5.2.3 Generalization of the 2x2 achievement goal framework and the DAG to a wider school population

In the second, third and fourth chapter the issue whether the DAG varied across cognitive levels (educational tracks) was explored. The percentage of students with a DAG increased with increasing cognitive level; thus, in tracks with higher cognitive demands the percentage of students with a DAG is higher as well. In addition, there is a systematic change in

the prevalence of the various DAG goal across cognitive level. With increasing cognitive demand, the relative size of (1) the performance-approach goal group shrinks, (2) the mastery-approach goal group shrinks a lot, and (3) the mastery-avoidance goal group grows considerably. These results were found in the chapter two dataset and in the chapter three dataset both, with slightly different formulations of the DAG-instrument. Moreover, this systematic change was found in chapter four, in which only data from the two highest tracks were used, as well. Thus, in general: the higher the cognitive demands of the educational track, the stronger the tendency to prefer an avoidance goal orientation. The systematic change across tracks is a very important theoretical and practical result as it implies that the motivational structures in the highest tracks cannot be generalized to the other tracks.

Chapter 3 shows that the differences in school subject grades between the goal groups were most prominent in the cognitively most challenging levels and decrease in less challenging levels. Chapter 4 suggests that the influence of the DAG on the examination results is more pronounced in track A than in track B, although the elapsed time between the measurement of the DAG and the examination was 7 instead of 5 semesters. This implies that the goals of the 2x2 achievement goal framework may have stronger effects on cognitively more challenging levels.

Higher tracks have higher performance standards. In addition, students in higher tracks have, in general, larger intellectual capacities than students in lower tracks. This may lead to a diminished perceived competence in higher tracks - the Big-fish-little-pond-effect (Marsh et al., 2008); swimming with other big fish in a small pond may lead to doubt with regard to one's efficacy – with a higher prevalence of performance goals as a result. In contrast, because the big fish swim in other ponds, there may be an opposite effect in lower tracks, with a gradual grow in perceived competence and a higher prevalence of mastery goals as a result. Furthermore, in cognitively less challenging tracks achievement goals probably need scaffolding to function properly, because experience with failure in learning may lead to more self-handicapping which in turn may lead to an unwillingness to exert the needed effort in order to protect self-esteem.

5.3. SUGGESTIONS FOR FUTURE RESEARCH

5.3.1 Considerations with regard to achievement goal research

There are several limitations to this thesis; several are mentioned in the empirical chapters.

However, certain limitations apply to the entire thesis and beyond. The effect sizes reported in the chapters two, three and four, for instance, are mostly small, which is in line with the results of achievement goal research in general. Studies synthesizing findings of several meta-analyses (for instance Hattie, 2009, 2012; Richardson, Abraham, & Bond, 2012; Schneider & Preckel, 2017) offer a basis to compare results of achievement goal research

with other constructs associated with performance outcomes. Schneider and Preckel (2017) rank ordered 105 variables associated with achievement in higher education; in their review of meta-analyses a performance(-approach) goal orientation takes place 60 with $d = .28$, a learning (=mastery) goal orientation reaches rank 69 with $d = .24$, while a performance-avoidance goal orientation with a $d = -.28$ is found at place 99. For comparison the effect sizes of some other variables upon academic performance are listed here: Effort Regulation $d = .75$, Achievement Motivation $d = .64$, Academic Self-Efficacy $d = .58$, Intelligence $d = .47$, Help Seeking $d = .35$, Time spent studying $d = .32$, Socioeconomic Status $d = .25$, Academic Self-handicapping $d = -.37$, Test Anxiety $d = -.43$ (Schneider & Preckel, 2017). The upshot of the above results is that the goals of the 2x2 framework do not have an impressive impact upon achievement. There are several explanations possible for this rather sad state of affairs; four possible explanations will be clarified here.

One possible explanation is that the various achievement goal systems come from different theoretical sources and have been operationalized in very different ways, even if the goals have the same label (Hulleman et al., 2010). The label 'performance-approach' is used, for instance, for two distinct goals; one of those is measured by items that refer to trying to get better grades than other students, while the other is measured by items that refer to impress teachers, parents, and relevant others. The former goal has a positive but the latter a negative relation with achievement (Senko & Dawson, 2017).

Another possible explanation for the modest effect sizes lies in the considerable differences in saliency between various achievement goal systems, which was revealed by a study by Lee and Bong (2016) who asked students "What are the reasons that you study? Please write down the five most important reasons that you study in descending order of importance.". The results showed that the goals of the 2x2 framework are mentioned the least; these goals are, alas, not very salient in the perceptions of the average student. The most frequently given answers could be classified as social status goals, which is essentially a non-competence goal variety.

Thirdly, students endorsing mastery goals should use the requirements of the task itself and their own former performance as a standard to measure progress towards competence. Essentially, they should not use the performance of others to measure their progress. However, they do (Régner et al., 2007). They do so, it seems, inevitably, and it takes an explicit reminder to return to their own former achievement for evaluating their progress (Van Yperen & Leander, 2014). In addition, in the end the high stake examinations wait; thus the students need to know where they stand and thus normative information will be necessary and hence salient.

Lastly, personal goal adoption is influenced by the students' perception of the classroom goal structure (Meece et al., 2005; Murayama & Elliot, 2009; Schwinger & Stiensmeier-Pelster, 2011). As a consequence, their personal goal choice may be influenced, altered or overruled by their perception of the goals on classroom and school level. The influence of

school variables upon the achievement goals is demonstrated as well by the meta-analysis by Wirthwein et al. (2013) which shows that the positive correlation of performance-approach and mastery-approach scores is significantly lower if standardized achievement test scores are used as opposed to GPA, exam grades, semester grades or the performance on a specific task. In addition, the negative association of the performance avoidance score with performance indicators is significantly more negative in studies in which exam grades or achievement test scores are used as performance indicators than in studies that used GPA, semester grades or the performance on a specific task. The extent to which assessment depends upon the individual teacher thus seems to be associated with the impact of the various achievement goals.

The above leads to some recommendations. Future research should, of course, try to unravel the various goals and labels, and future research should focus on goals that have a substantial basis in the considerations of students, as for instance the so called work avoidance ("At school I want to do as little work as possible") goal (Dowson & McInerney, 2004; King, 2014; King & McInerney, 2014). As educators know, that goal is an educational reality and thus an excellent candidate for further examination. Furthermore, the adaptive quality of mastery goals cannot be unleashed if there remains a gap between the ideological principles and the high stake normative grading at the end. This leads to the desirability of research into the possibility of alternative ways of grading.

5.3.2 Considerations regarding the DAG instrument and its content

The DAG instrument divides a sample in groups. A person in one group differs from a person in another group with regard to the dominant goal, thus the variation generated by the instrument is variation between persons. This resembles to a certain degree what happens in an experimental induction; if in an experiment someone is assigned a performance-avoidance goal, that goal is supposed to be dominant in that person in that experiment. In that case, the variation generated by the induction is variation between persons. In general, however, instruments used to measure achievement goals, as for instance the AGQ-R, do not divide a sample into groups. Instead, they assign a score to each of the achievement goals for a person filling in the questionnaire. The variation generated by the instrument is variation within persons. It would be nice if despite the difference in method there would be a certain uniformity in results; Table 1.2 and Table 1.3 in chapter one do indeed suggest that to be the case with regard to performance. The results presented in this thesis, however, were only partially in accordance with the desired uniformity. Maybe this is a consequence of weaknesses of the DAG instrument itself.

However, a weakness is not that the DAG instrument would deny the possibility of the endorsement of other achievement goals. The various DAG groups can be examined with regard to the endorsement of the four goals of the 2x2 framework, see for instance

Table 3.S4. One can see that, for instance, the dominant mastery-approach group strongly endorses the mastery-avoidance goal as well.

Different groups have different associations with, for instance, school grades or task-involvement. For instance, the performance-approach group is associated with higher grades and better exam results than the other groups, while both the performance-avoidance group and the group without a DAG dwell at the bottom of the range. Thus it seems that the DAG's performance-approach goal, which is of the variety trying to get higher grades than the class-mates, functions quite well.

It may be that the saliency of the mastery goals of the DAG instrument is not very high, but it certainly succeeds in selecting a (rather small but) very potent performance-approach group. This phenomenon is common in the studies that feature the DAG. It may be possible that here lies a fundamental difference between an induced and an self-assigned achievement goal; inducing (as in experimental research) a performance-approach goal happens to subjects that for the most part would not choose that goal voluntarily and thus have rather strong experiences with endorsement of other goals that came to them more naturally. However, the performance-approach DAG group deliberately and freely chose that goal over the alternatives.

In contrast, the insensitivity of the DAG instrument to the differences between the other goals is obviously an limitation. It seems that especially the mastery goals do not discriminate sufficiently. Perhaps the absence of a goal which the subject can wholeheartedly endorse is part of the problem. In future research revisions of the DAG instrument should be tested in which the goals are not completely selected on the basis of theoretically derived clarity, but in the daily experience of the intended population. Another part of the problem may be the formulation of the instrument, which might be experienced as rather vague and general: "to do better" (in what respect?), "than others" (which others, how many?), "in school" (what subjects?), "this year" (ever, always?). In future research revisions of the DAG instrument should be tested with formulations in various degrees of precision.

Perhaps the most important limitation of this thesis is that, although we do know which goal the students had in the third grade of secondary education, we do not have data on their DAG in first grade and primary school, any point in time in between, or the time of examination. It is, moreover, quite likely that the DAG of an individual varies across time and subjects, be it in quality or in intensity.

Lastly, the empirical results of this thesis suggest that not having a DAG is ominous with regard to school success. The group without a DAG and the performance-avoidance group score low on all school subjects in every track; moreover, these groups score low on the exam subjects as well. There are, therefore, practical reasons to advise research into the causes and correlates of not having a dominant goal. Of practical value as well is that the DAG instrument appears to be a suitable tool for checking which pupils are approaching the danger zone; in this regard the DAG instrument is the only achievement goal instrument

with practical relevance. The use of any of the other instruments would yield scores that are only useful in combination with the results of a large sample of which the intended student is a representative item.

5.3.3 Considerations regarding the size of the DAG instrument

The DAG instrument uses propositions with which the achievement goals are pitted against each other, preceded by a stem. The stem was 'This year, I find it most important in school …". A proposition is 'to do better than others', which represented a performance-approach goal. Every goal is represented by (just) one proposition. This method leads to a parsimonious and elegant instrument, when compared to, for instance, the Achievement Goal Questionnaire Revised (Elliot & Murayama, 2008) which consists of three questions per goal.

A limitation, however, is the absence of a measure for the instrument's reliability. Another limitation is that when filling in the instrument carelessly would nevertheless lead to a large chance of being assigned to a DAG group. As the 2x2 framework has four goals the DAG instrument consists of 3+2+1=6 propositions in which the student has to make a choice for one out of two goals, leading to $4x2^3$=32 possibilities to obtain a DAG out of a total of 2^6=64 possible response patterns. Thus, if someone would fill in the instrument completely at random, the possibility to be assigned a DAG is 32/64=0.5. If the instrument was extended to cover five goals, 4+3+2+1=10 propositions would be needed, leading to $5x2^6$=320 possibilities for a DAG out of a total of 2^{10}=1024 possible response patterns, with a chance of a random DAG of 320/1024≈0.313. In the case of six goals the figures would be 15 propositions, $6x2^{10}$=6144 DAG possibilities, 2^{15}=32768 patterns, and a 6144/32768≈0.188 random DAG chance. Systems of 7 or more goals would not be parsimonious anymore.

The preceding sentences show that expanding the instrument to five or six goals would lead to DAG assignments with a substantially smaller random DAG risk. As a consequence, the DAG groups would contain less students that filled in the instrument carelessly, and thus the resulting groups would reflect the relevant characteristics more purely.

5.3.4 Considerations regarding wider populations

Scientific knowledge regarding motivation and other constructs generally results from investigating a specific group of pupils; very often the subjects stem from the highest levels of the educational system. This makes it unlikely that results of educational research will be fully applicable across cognitive levels. One of the nice qualities of the COOL[5-18] data is that they cover the entire track range of secondary education. With regard to the 2x2 achievement goal framework the data show that the influence of goal on school performance decreases from higher to lower track. This may be the consequence of the research method used: the data come from paper and pencil surveys only, which especially the lower tracks of secondary education may have found somewhat cumbersome. An indication to that effect may be found in the Dutch part of the 2015 Program for International Student Assessment (PISA),

which shows that a) the average reading skills score for track A to E decrease in that order, b) from 2006 to 2015 the average reading skills for tracks A and B remain constant while the reading skills decrease steadily for tracks C, D and E, c) the overall percentage of low-literate students rises from 12% in 2003 to 18 in 2015 (Feskens, Kuhlemeier, & Limpens, 2016).

Hence, a first recommendation is to examine by other methods whether achievement goal theory can be used meaningfully in the less cognitively challenging levels of our educational building. Observational studies, followed by structured interviews, could be used to probe a) what is salient for students in cognitively less challenging tracks, and b) how do these students orient themselves in situations in which they have to perform.

Secondly, although this thesis used not just the most gifted students only, the samples were limited to one age group, that is adolescents of about 15 to 20 years of age. Future research could look into DAG adoption from the higher grades of primary school, during secondary education and beyond. Other age groups probably have other achievement goal preferences (Senko & Freund, 2015).

Thirdly, the empirical results suggest that higher cognitive challenge has unfortunate side effects, i.e. an increase in avoidance tendencies. The DAG pattern across tracks in the third year of secondary education probably results from a gradual systematic change that starts at the transition from primary education and becomes more pronounced over time. Perhaps the pattern is a consequence of the fact that students in the higher tracks have much more to lose. Future opportunities and thus prospective income is related to track level and not performing as well as the other students may cause migrating downward through the tracks. This makes it relevant to monitor the achievement of the peers, a force pressing towards a performance goal, and, in addition, to hide your weaknesses from your teacher, coach or tutor, a force pressing towards a avoidance goal. Here lie important issues for future research.

Lastly, the above shift along the valence dimension justifies a practical recommendation. A performance-approach goal orientation has an effect of $d = .28$ and a performance-avoidance goal orientation an effect of $d = -.28$ on performance indicators(Schneider & Preckel, 2017). These effects are small, but their difference (.56) forms a medium effect. Furthermore, avoidance goals are negatively associated with quite a lot of variables that are positively related to performance and growth; the results presented in chapter 2 show that the avoidance groups score below most of the other groups on the variables effort expenditure and self-efficacy. It probably is a good idea to stimulate teachers to actively promote adaptive achievement goals.

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Appendices

SUPPLEMENTARY FILES CHAPTER 2

We profiled the various DAG groups through Discriminant analysis, using the ten 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 maximizes 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.

Table 2.S1 *Discriminant Analysis: Standardized CDF Coefficients and structure matrix*

	Standardized coefficients			Structure matrix		
	F1	F2	F3	F1	F2	F3
Task	−0.22	0.29	0.71	0.04	0.41	0.55
Effort	0.12	0.78	−0.37	0.35	0.57	0.06
Competition	1.04	−0.29	0.39	0.94	−0.14	0.10
Social concern	−0.16	−0.57	0.42	−0.02	−0.05	0.37
Social power	−0.22	−0.45	−0.02	0.30	−0.37	0.01
Praise	−0.09	−0.21	−0.30	0.37	0.02	−0.22
Affiliation	0.06	0.30	0.06	0.02	0.30	0.06
Token	0.06	0.28	−0.64	0.41	0.18	−0.37
Self-efficacy	0.16	0.18	0.32	0.37	0.29	0.41
Homework effort	0.01	0.05	−0.02	0.09	0.38	0.10

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 a mean of –.16.

The left part of Table 2.S1 contains the 'standardized 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.

SUPPLEMENTARY FILES CHAPTER 3

Table 3.S1 *DAG-percentages per Track overall and by Gender*

sex			track					Total
			A	B	C	D	E	
boy	goal	pap	5.2	4.7	6.9	9.4	11.5	6.6
		pav	11.5	12.0	11.3	12.1	11.8	11.7
		map	19.4	20.0	20.6	21.8	19.9	20.2
		mav	52.2	45.3	35.1	27.4	18.8	40.1
		ndag	11.7	18.0	26.0	29.3	38.1	21.5
	Total		100.0	100.0	100.0	100.0	100.0	100.0
girl	goal	pap	2.6	2.9	5.2	6.2	8.3	4.1
		pav	8.0	8.6	9.6	9.8	8.1	8.8
		map	14.6	21.8	26.9	29.0	27.7	22.1
		mav	66.3	54.9	43.8	31.0	24.8	51.0
		ndag	8.4	11.9	14.5	24.0	31.1	14.0
	Total		100.0	100.0	100.0	100.0	100.0	100.0
Total	goal	pap	3.8	3.8	6.0	7.8	10.1	5.3
		pav	9.6	10.2	10.5	11.0	10.2	10.2
		map	16.8	20.9	23.8	25.3	23.2	21.2
		mav	59.8	50.4	39.5	29.1	21.3	45.7
		ndag	9.9	14.8	20.2	26.7	35.1	17.7
	Total		100.0	100.0	100.0	100.0	100.0	100.0

Table 3.S2 *Significant Differences between DAG groups with respect to School Subjects*

		pap	pav	map	mav
pav	Dutch	-0.257			
	English	-0.272			
	Math	-0.262			
map	Dutch	-0.241	*n.s.*		
	English	-0.258	*n.s.*		
	Math	-0.228	*n.s.*		
mav	Dutch	-0.196	0.061 [a]	0.045 [b]	
	English	-0.253	*n.s.*	*n.s.*	
	Math	-0.223	*n.s.*	*n.s.*	
ndag	Dutch	-0.240	*n.s.*	*n.s.*	-0.044 [c]
	English	-0.253	*n.s.*	*n.s.*	*n.s.*
	Math	-0.238	*n.s.*	*n.s.*	*n.s.*

Note 1. The table reads from left to right.

Note 2. [a] : *p*=.017; [b]: *p*=.019; [c]: *p*=.023, *n.s.: not significant.*

Table 3.S3 *Variance-covariance matrix with S.E. and correlations (bold) for the random part of Model 2 and Model 4 on the three levels*

	Model 2			Model 4		
	Dutch	English	math	Dutch	English	math
School level						
Dutch	.047 (.011)	.021 (.009)	.015 (.011)	.044 (.010)	.021 (.009)	.012 (.010)
English	**.402**	.058 (.014)	.023 (.013)	**.414**	.057 (.013)	.014 (.012)
math	**.219**	**.299**	.104 (.021)	**.178**	**.186**	.097 (.020)
Class level						
Dutch	.136 (.010)	.064 (.010)	.049 (.010)	.113 (.009)	.035 (.008)	.030 (.008)
English	**.394**	.194 (.016)	.061 (.012)	**.269**	.146 (.013)	.039 (.010)
math	**.303**	**.319**	.191(.016)	**.224**	**.254**	.159 (.015)
Student level						
Dutch	.648(.009)	.266(.009)	.241 (.009)	.645(.009)	.264 (.009)	.237 (.009)
English	**.298**	1.233(.017)	.109 (.013)	**.296**	1.227(.016)	.108 (.013)
math	**.252**	**.083**	1.405 (.019)	**.250**	**.082**	1.400 (.019)

The right side of Table 3.S3 shows that Model 4 has significant amounts of variance and covariance on all three levels; however, just as in Model 3, the covariance between Math/Dutch and English/Math did not reach significance on school level.

In Table 3.S3 the correlations of the grades on the three school subjects are displayed below the diagonal. In Model 4 the correlation on school level between Dutch and English is significantly larger than the correlation between Dutch and Math (N=123, z=2.18, p=.03) and between English and Math (N=123, z=2.10, p=.04). However, on the class level no significant differences were found, while on student level all three correlations were pair-wise significantly different: the correlation Dutch/English is larger than the correlations Dutch/Math and English/Math (N=11925, z=3.93, p<.001; N=11925, z=19.65, p<.001, respectively) and the correlation Dutch/Math is larger than the correlation English/Math (N=11925, z=15.8, p<.001). If we compare the correlations of Model 2, the model with student characteristics but without the variables DAG, Track and the interaction terms with the correlations of Model 4 we observe no significant changes on school and student level but three significant changes on class level; the correlations Dutch/English, Dutch/Math and English/Math are significantly smaller (N=834, z=2.87, p=.002; N=834, z=1.73, p=.042; N=834, z=1.44, p=.073, all p's one tailed) in Model 4. Furthermore, in Model 4 the ICC(school) and ICC(school+class) for Grade Dutch, Grade English and Grade Math were .07, .05, .07, and .21, .18 and .17, respectively, while in Model 2 the ICC(school) and

ICC(school+class) for these variables in that order were .06, .04, .06 and .22, .17 and .17, respectively.

Table 3.S4 shows the level of endorsement of the 2x2 achievement goals by the various DAG groups. The DAG instrument was accompanied by four questions in which of each of the 4 goals of the 2x2 framework was asked on a 7-point Likert scale (absolutely 7 ……… absolutely not 1) to what extent that goal was important to the student.

Table 3.S4 *Mean level of endorsement and the standard deviations (within parentheses) of the four achieve-ment goals by the five DAG groups*

goal	pap	pav	map	mav
Dagpap	5.31 (1.43)	5.10 (2.00)	5.11 (1.49)	4.77 (1.97)
Dagpav	3.56 (1.49)	4.84 (1.62)	4.11 (1.50)	4.72 (1.65)
Dagmap	3.80 (1.60)	4.69 (1.75)	5.59 (1.20)	5.13 (1.86)
Dagmav	3.22 (1.52)	4.45 (1.66)	4.10 (1.47)	5.30 (1.58)
Ndag	4.10 (1.66)	4.73 (1.80)	4.79 (1.50)	4.81 (1.81)

As can be seen, the DAGpap group has a high mean on the other goals as well, the exception being the mastery avoidance goal. The DAG avoidance groups find the other avoidance goal personally relevant as well, but, in contrast, the DAG mastery approach group does not endorse the performance approach goal to a relevant degree. These results are in agreement with the results of Van Yperen and Orehek (2013) and Scheltinga et al. (2016).

Table 3.S5 *Zero-order correlations in Track A for the performance approach group (above the diagonal) versus the other DAG groups (below the diagonal)*

	Dutch	English	Math	Self-efficacy	IQ	Gender
Dutch		.402**	.374**	.244**	.158	.271**
English	.329**		.208*	.278**	.300**	.069
Math	.352**	.220**		.292**	.366**	.016
Self-efficacy	.204**	.173**	.375**		.114	-.090
IQ	.164**	.129**	.275**	.171**		-.012
Gender	.236**	.047**	-.019	-.197**	-.055**	

*: $p<.05$, **: $p<.01$.

The performance approach group is associated with higher mean grades on the three school subjects Dutch language, English language and Math, especially in the highest track. In Table 3.S5 the zero-order correlations in track A of the main dependent and independent variables are given; above the diagonal the data on the performance approach goal group and below the diagonal the data on the rest of the DAG groups together

SUPPLEMENTARY FILES CHAPTER 4

Table 4.S1a *Distributional Characteristics of Calibration Sample*

	N	Min.	Max.	*M*	*SD*	%
Track A (vwo)						
Dutch	27035	0	49	28.4	5.5	
Math A	15154	0	82	49.8	10.6	
Math B	14226	0	76	47.3	12.5	
English	29792	0	49	34.6	5.6	
Gender (girl)	35449 (18562)					52.4
Track B (havo)						
Dutch	32000	0	47	26.9	5.0	
Math A	31352	0	79	51.3	11.2	
Math B	10789	0	80	51.6	11.6	
English	32000	0	47	33.3	6.6	
Gender (girl)	49681 (26247)					52.8

Table 4.S1b *Distributional Characteristics of Sample*

	N	Min.	Max.	*M*	*SD*	%
Track A (vwo)						
Dutch	852	7	46	28.2	5.8	
Math A	440	20	78	49.2	10.8	
Math B	487	13	75	47.8	12.2	
English	1015	14	46	34.6	5.7	
Gender (girl)	1125 (616)					54.8
Track B (havo)						
Dutch	2112	0	43	26.9	4.7	
Math A	1314	0	77	51.2	10.7	
Math B	541	6	77	50.7	11.5	
English	1895	11	46	32.6	6.7	
Gender (girl)	2117 (1226)					57.9

4.5.1 The unconditional single-level and two-level models

The Intraclass Correlation (ICC), which may be interpreted as the correlation among two randomly drawn observations within the same higher level unit, e.g., two random students from the same school, varies considerably between school subjects. In track A the ICC varies between .03 for Dutch language and .10 for MathB; in track B the ICC varies between .04 for English language and .17 for MathB.

Table 4.S2 *Unconditional single-level and Unconditional two-level Models*

Track A Unconditional single-level Models

	Exam Result		Dutch		MathA		MathB		English	
	β	SE	β	SE	β	SE	β	SE	β	SE
Intercept	-0.008	0.024	-0.036	0.035	-0.033	0.048	0.005	0.043	0.007	0.032
RandomPart										
Var	0.642	0.027	1.098	0.053	1.053	0.071	0.957	0.061	1.026	0.045
Model Fit										
-2*loglikeliho	2679.256		7808.974							
# students	1119		1119							

Track A Unconditional two-level Models

	Exam Result		Dutch		MathA		MathB		English	
	β	SE	β	SE	β	SE	β	SE	β	SE
Intercept	-0.008	0.034	-0.035	0.050	-0.039	0.066	0.027	0.076	0.005	0.049
RandomPart										
Var school	0.016	0.009	0.028	0.017	0.053	0.032	0.100	0.043	0.037	0.018
Var student	0.628	0.027	1.071	0.052	1.004	0.069	0.874	0.057	0.994	0.045
Total var	0.644		1.099		1.057		0.974		1.031	
ICC school	0.025		0.025		0.050		0.103		0.036	
Model Fit										
-2*loglikeliho	2673.124		7759.644							
# schools	41		41							
# students	1119		1119							

Track B Unconditional single-level Models

	Exam Result		Dutch		MathA		MathB		English	
Intercept	-0.041	0.015	-0.012	0.021	-0.023	0.026	-0.066	0.042	-0.091	0.023

Table 4.S2 *Unconditional single-level and Unconditional two-level Models (continued)*

Track A Unconditional single-level Models

	Exam Result		Dutch		MathA		MathB		English	
	β	SE	β	SE	β	SE	β	SE	β	SE
RandomPart										
Var	0.471	0.014	0.899	0.028	0.920	0.036	0.986	0.060	1.038	0.034
Model Fit										
-2*loglikeliho	4412.625		16185.541							
# students	2116		2116							

Track B Unconditional two-level Models

	Exam Result		Dutch		MathA		MathB		English	
	β	SE	β	SE	β	SE	β	SE	β	SE
Intercept	-0.049	0.026	-0.049	0.039	-0.036	0.044	-0.100	0.072	-0.066	0.037
RandomPart										
Var school	0.024	0.007	0.057	0.016	0.065	0.021	0.167	0.052	0.040	0.014
Var student	0.448	0.014	0.845	0.026	0.854	0.034	0.838	0.053	1.002	0.033
Total var	0.472		0.902		0.919		1.005		1.042	
ICC school	0.051		0.063		0.071		0.166		0.038	
Model Fit										
-2*loglikeliho	4364.177		16006.881							
# schools	72		72							
# students	2116		2116							

4.5.2 Models with gender, self-efficacy and perceived prior performance (without the DAG)

Table 4.S3 *Models with Gender, Self-efficacy and Perceived prior ability*

Track A models with Gender, Self-efficacy and Prior Ability

	Exam Result		Dutch		MathA		MathB		English	
	β	SE	β	SE	β	SE	β	SE	β	SE
Intercept	0.058	0.042	-0.107	0.060	0.056	0.095	0.024	0.086	0.186**	0.060
Gender	-0.120**	0.047	0.183**	0.069	-0.108	0.103	-0.187*	0.083	-0.326**	0.062
Self-efficacy	0.045*	0.025	0.042	0.036	0.037	0.053	0.088	0.047	0.053	0.033
PerPriorPer	0.374**	0.035	0.401**	0.051	0.307**	0.085	0.394**	0.060	0.396**	0.048
RandomPart										
Var school	0.014	0.008	0.023	0.015	0.044	0.029	0.099	0.042	0.041	0.019
Var student	0.537	0.023	0.950	0.047	0.979	0.069	0.758	0.051	0.882	0.040
Total var	0.551		0.973		1.023		0.857		0.923	
ICC school	0.025		0.024		0.043		0.116		0.044	
Model Fit										
-2*loglikeliho	2413.856		7309.029							
# schools	41		41							
# students	1081		1081							
Track B										
Intercept	-0.029	0.032	-0.201**	0.047	0.153**	0.057	-0.229**	0.086	0.094*	0.045
Gender	0.095	0.081	0.258**	0.044	-0.245**	0.053	-0.206**	0.083	-0.266**	0.046
Self-efficacy	-0.025	0.016	-0.025	0.022	-0.036	0.028	-0.040	0.044	-0.036	0.023
PerPriorPer	0.129**	0.024	0.118**	0.022	0.259**	0.029	0.339**	0.053	0.337**	0.022
RandomPart										
Var school	0.025	0.008	0.057	0.016	0.082	0.024	0.171	0.052	0.040	0.013

Table 4.S3 *Models with Gender, Self-efficacy and Perceived prior ability* (*continued*)

Track A models with Gender, Self-efficacy and Prior Ability

	Exam Result		Dutch		MathA		MathB		English	
	β	SE	β	SE	β	SE	β	SE	β	SE
Var student	0.441	0.014	0.819	0.026	0.782	0.032	0.784	0.051	0.867	0.029
Total var	0.466		0.876		0.864		0.955		0.907	
ICC school	0.054		0.099		0.095		0.180		0.044	
Model Fit										
-2*loglikeliho	4162.186		14791.686							
# schools	72		72							
# students	2033		2033							

*: *p*<.05, **: *p*<.01

4.5.3 The DAG-only models

In track A the two-level DAG-only model concerning Exam Result – see Table 4.S4 - had a -2*loglikelihood of 2661.451; the corresponding value of the unconditional model was 2673.124, which indicates a significant improvement of the model fit; χ^2(4, N=1119) = 11.67, p = .02. On the variable Exam Result all DAG groups score higher than the NDAG group; the largest difference (β = .41, SE = .12) is found with the performance-approach group and this difference is significant (z = 3.32, p < .01). Likewise, the multivariate Track A DAG-only model with the four examination grades had a -2*loglikelihood of 7726.991 and the corresponding value of the unconditional model was 7759.644, also indicating as significant improvement of the model fit; χ^2(16, N=1119) = 32.65, p < .01. The performance-approach group shows the highest score on the four examination grades and in two instances these differences with the NDAG group reach significance, i.e. Dutch language (β = .58, SE = .17, z = 3.30, p < .01) and MathB (β = .43, SE = .20, z = 2.18, p = .01). Moreover, on the variable Dutch language the score of the mastery-avoidance group was significantly higher than that of the NDAG group as well; the statistics are β = .35, SE = .11, z = 3.11, p < .01. In contrast, MathA and English language did not show significant associations with the DAG, although the differences with the NDAG group were in the expected direction.

In track B the unconditional model concerning Exam Result had a -2*loglikelihood of 4364.177 and the corresponding value of the DAG-only model was 4351.936. This implies that the DAG-only model had a superior model fit, because the difference is statistically significant; χ^2(4, N=2116) = 12.24, p = .02. On the variable Exam Result the mastery-avoidance group showed a significant difference with the NDAG group; the statistics are β = .10, SE = .05, z = 2.17, p = .02. Furthermore, the multivariate unconditional model for all four examination grades had a -2*loglikelihood of 15972.335 and the corresponding value of the DAG-only model was 16006.881, which also indicates an improved model fit; χ^2(16, N=2116)=34.55, p<.01. Thus, adding the DAG led to a better model fit. In the model with the four examination grades the score of the mastery-avoidance group was significantly higher than that of the NDAG group on the variable Dutch language, with β = .22, SE = .06, z = 3.41, and p <.01. We did not find additional significant differences.

Table 4.S4 *Unconditional and DAG-only Models*

Track A Unconditional Model

	Exam Result		Dutch		MathA		MathB		English	
	β	SE	β	SE	β	SE	β	SE	β	SE
Intercept	-0.008	0.034	-0.035	0.050	-0.039	0.066	0.027	0.076	0.005	0.049
RandomPart										
Var school	0.016	0.009	0.028	0.017	0.053	0.032	0.100	0.043	0.037	0.018
Var student	0.628	0.027	1.071	0.052	1.004	0.069	0.874	0.057	0.994	0.045
Total var	0.644		1.099		1.057		0.974		1.031	
ICC school	0.025		0.025		0.050		0.103		0.036	
Model Fit										
-2*loglikeliho	2673.124		7759.644							
# schools	41		41							
# students	1119		1119							
Track A DAG-only Models										
Intercept	-0.128	0.077	-0.320**	0.110	-0.074	0.155	-0.082	0.135	-0.012	0.104
Pap	0.405**	0.122	0.575**	0.174	0.177	0.244	0.433*	0.199	0.287	0.162
Pav	0.122	0.107	0.108	0.153	-0.087	0.209	0.213	0.186	0.176	0.141
Map	0.077	0.095	0.248	0.139	0.015	0.196	-0.047	0.159	-0.024	0.126
Mav	0.125	0.080	0.354**	0.114	0.055	0.161	0.123	0.131	-0.021	0.105
RandomPart										
Var school	0.016	0.009	0.028	0.017	0.052	0.031	0.101	0.043	0.039	0.019
Var student	0.621	0.027	1.051	0.051	1.002	0.069	0.861	0.056	0.986	0.044
Total var	0.637		1.079		1.054		0.962		1.025	

Table 4.S4 *Unconditional and DAG-only Models (continued)*

Track A Unconditional Model

	Exam Result		Dutch		MathA		MathB		English	
	β	SE	β	SE	β	SE	β	SE	β	SE
ICC school	0.025		0.026		0.049		0.105		0.038	
Model Fit										
-2*loglikeliho	2661.451		7726.991							
# schools	41		41							
# students	1119		1119							

Track B Unconditional Model

	β	SE	β	SE	β	SE	β	SE	β	SE
Intercept	-0.049	0.026	-0.049	0.039	-0.036	0.044	-0.100	0.072	-0.066	0.037
RandomPart										
Var school	0.024	0.007	0.057	0.016	0.065	0.021	0.167	0.052	0.040	0.014
Var student	0.448	0.014	0.845	0.026	0.854	0.034	0.838	0.053	1.002	0.033
Total var	0.472		0.902		0.919		1.005		1.042	
ICC school	0.051		0.063		0.071		0.166		0.038	
Model Fit										
-2*loglikeliho	4364.177		16006.881							
# schools	72		72							
# students	2116		2116							

Track B DAG-only Models

	β	SE	β	SE	β	SE	β	SE	β	SE
Intercept	-0.109*	0.047	-0.186**	0.067	0.040	0.081	-0.162	0.124	-0.116	0.072
Pap	0.095	0.081	0.142	0.112	0.017	0.151	0.359	0.195	0.038	0.125
Pav	0.048	0.064	0.045	0.087	0.016	0.109	0.194	0.174	0.025	0.100

Table 4.S4 *Unconditional and DAG-only Models (continued)*

Track A Unconditional Model

	Exam Result		Dutch		MathA		MathB		English	
	β	SE	β	SE	β	SE	β	SE	β	SE
Map	-0.016	0.053	0.040	0.073	-0.172	0.093	-0.074	0.141	0.007	0.084
Mav	0.102*	0.047	0.218**	0.064	-0.082	0.080	0.069	0.122	0.082	0.073
RandomPart										
Var school	0.023	0.007	0.058	0.016	0.066	0.021	0.162	0.051	0.040	0.014
Var student	0.446	0.014	0.836	0.026	0.850	0.034	0.829	0.053	1.001	0.033
Total var	0.469		0.894		0.916		0.991		1.041	
ICC school	0.052		0.065		0.072		0.163		0.038	
Model Fit										
-2*loglikeliho	4351.936		15972.335							
# schools	72		72							
# students	2116		2116							

*: $p < .05$, **: $p < .01$

4.5.3 Prevalence of DAG groups in examination year compared to third grade

Prior to the analyses of various models, we compared the prevalence of the five DAG-groups in the examination samples with their prevalence in the third year of secondary education to check for significant differences. In the third year of secondary education the prevalence of the various achievement goals was significantly different from that in the final year for both track A and track B (see Table 4.S5). Track A: $\chi^2(4)$ = 11.44, p = .02; especially the performance-approach group had a significantly higher prevalence in the examination year, as shown by a test for population proportions (Social Science Statistics, 2016) with $z(pap)$ = 3.17, p < .01; the performance-approach group is associated with higher examination grades in this track. In track B there were two significant differences. The proportion in the examination year of the mastery-avoidance group was higher while that of the NDAG group was lower than in 2011; $\chi^2(4)$ = 9.88, p = .04, $z(mav)=1.95$ and p=.05, $z(ndag)$ = 2.74, p < .01; the NDAG group is associated with poorer while the mastery-avoidance goal is associated with better exam results in track B. Thus, the probability of being included in the examination year sample is not the same for each DAG group.

Table 4.S5 *DAG Prevalence*

		Track A		Track B	
		2011	2014	2011	2013
goal	pap	133 (3.8)	68 (6.0)	163 (4.0)	97 (4.6)
	pav	337 (9.6)	103 (9.2)	406 (10.0)	199 (9.4)
	map	589 (16.8)	173 (15.4)	840 (20.7)	439 (20.7)
	mav	2093 (59.8)	664 (59.0)	2048 (50.6)	1126 (53.2)
	ndag	347 (9.9)	117 (10.4)	592 (14.6)	256 (12.1)
	totaal	3499 (100)	1125 (100)	4049 (100)	2117 (100)

Samenvatting

INLEIDING

Een leven zonder doelen is moeilijk voorstelbaar. Bijna iedereen heeft wel eens de intentie gehad om popster te worden, of boerin, om af te vallen, met roken te stoppen, meer te gaan bewegen, de kinderen geduldiger te bejegenen, een moestuin uit/in de grond te stampen, stressniveaus te verminderen, te beginnen met de negende symfonie, of om eindelijk het proefschrift te voltooien. Doeloriëntaties, het onderwerp van dit proefschrift, zijn specifieker dan de doelen hierboven: ze vormen een mentaal kader dat wordt gebruikt in situaties waarin gepresteerd moet worden. Dus zijn doeloriëntaties wijdverbreid in onderwijs, werk en sport (Elliot, 2005, Senko, 2016); dit proefschrift gaat over doeloriëntaties in het onderwijs.

Verschillen in prestaties zijn voor een deel te herleiden tot verschillen in doeloriëntaties, maar daarnaast hangen doeloriëntaties samen met variabelen waarvan bekend is dat ze invloed hebben op de leerprestaties, zoals inspanning, interesse, intrinsieke motivatie, eerdere vaardigheid en valsspelen. Bovendien beïnvloedt de overtuiging van de leerling over hoe de school en/of de klas verschillende doeloriëntaties waardeert diens doeloriëntatie-keuze. Een gevolg van het bovenstaande is dat kennis omtrent doeloriëntaties veel mogelijkheden biedt om (onderwijs)theorie aan (onderwijs)praktijk te koppelen op het niveau van school, klas en leerling. Het is dus begrijpelijk dat het bestuderen van doeloriëntaties sinds de eerste voorlopige formuleringen in de jaren tachtig van de vorige eeuw een aanzienlijke groei heeft doorgemaakt.

De resultaten van het toenemende aantal doeloriëntatie-studies leidden tot verschillende aanpassingen van de oorspronkelijke ideeën. Het aantal doeloriëntaties groeide: theorieën met twee (Ames & Archer, 1988), drie (Elliot & Church, 1997), vier (Elliot & McGregor, 2001) en zes (Elliot et al., 2011) verschillende doeloriëntaties verschenen. Aan de andere kant adviseerde Huang (2012) om, op basis van de verklaarde variantie in academische prestaties, over te gaan op andere constructen, wat neerkomt op een zero-goal theorie. Andere aanpassingen zijn het opperen en onderzoeken van een werkvermijdingsdoel, dat wil zeggen het doel om zo weinig mogelijk te doen (King, 2014; King & McInerney, 2014) en van sociale doelen, dat wil zeggen oriëntaties op sociale doelen als status, de goedkeuring van relevante anderen, of het behoren tot een groep (Dowson & McInerney, 2004). Ook ontstonden (deels onopgeloste) discussies: of het mogelijk is meerdere doeloriëntaties tegelijk te onderschrijven (Barron & Harackiewicz, 2001; Senko et al.,2011), of bepaalde doeloriëntaties de aandacht van de wetenschappelijke wereld verdienen (Brophy, 2005) en of dezelfde etiketten worden gebruikt voor kwalitatief verschillende doeloriëntaties (Blaga, 2012; Hulleman et al., 2010). Als laatste: recentelijk heeft een studie de aandacht gevestigd op het opmerkelijke feit dat veel doeloriëntaties nauwelijks werden genoemd door leerlingen die geïnterviewd werden over hun redenen om te leren (Lee & Bong, 2016).

Het onderzoek naar doeloriëntaties is dus levendig, divers, opwindend en enigszins chaotisch. Die omstandigheden maken het noodzakelijk om duidelijk te maken welke

doeloriëntatie-theorie in dit proefschrift wordt gebruikt en welke problemen er in worden onderzocht. In de volgende twee subparagrafen wordt dat toegelicht.

I.i Het 2x2-doeloriëntatie-kader

In dit proefschrift wordt het 2x2-doeloriëntatie-kader (Elliot & McGregor, 2001) gebruikt als uitgangspunt voor empirisch onderzoek. Dit kader maakt gebruik van twee dimensies met elk twee polen om vier doeloriëntaties te onderscheiden. De *definitie*-dimensie omvat twee fundamenteel verschillende overtuigingen met betrekking tot competentie: competent zijn kan worden gedefinieerd als beter presteren dan anderen *of* als in staat zijn om het onderwerp of de vaardigheid volledig te beheersen; de eerste overtuiging vormt de prestatiepool van de definitiedimensie, de tweede overtuiging vormt de leerpool van de definitiedimensie[5]. De *koers*-dimensie weerspiegelt de twee richtingen die een persoon kan gaan bij een prestatie: benaderen omdat de situatie een kans op succes biedt, of vermijden vanwege de kans op falen. Het benaderen en het vermijden vormen de streefpool, respectievelijk de vermijdingspool van de koers-dimensie. Het combineren van de definitie-dimensie met de koers-dimensie levert vier doeloriëntaties op: prestatiestreefdoelen, leerstreefdoelen, prestatievermijdings-doelen en leervermijdingsdoelen.

In het onderwijs hangen beide streefdoelen positief samen met leerresultaten en beide vermijdingsdoelen niet. Bovendien hangen de leerdoelen wel, maar de prestatiedoelen niet, positief samen met interesse. Dientengevolge worden in onderwijssituaties de leerstreefdoe-len als het meest nastrevenswaardig gezien en de prestatievermijdingsdoelen als het meest voor ontmoediging in aanmerking komend.

Traditioneel worden doeloriëntaties van leerlingen gemeten door middel van Likert-schalen (indien correlationele methoden worden gebruikt) of door middel van een manipulatiecheck (indien de experimentele methode wordt gebruikt). In dit proefschrift wordt echter de Domi-nante Doelorientatie (DODO) op basis van het 2x2-doeloriëntatie-kader beschouwd; dat wil zeggen de doeloriëntatie waaraan personen in een bepaalde situatie de voorkeur geven boven de andere (Van Yperen, 2006). De DODO wordt bepaald door zes vragen waarin telkens uit twee verschillende doeloriëntaties gekozen dient te worden: als een leerling een bepaalde doeloriën-tatie stelselmatig verkiest boven de andere is die doeloriëntatie blijkbaar *dominant*. Dusdoende komt men tot vijf groepen leerlingen; vier daarvan zijn groepen met een DODO, bijvoorbeeld de groep met een dominant prestatiestreefdoel of een dominant leervermijdingsdoel, terwijl de vijfde groep de leerlingen bevat zonder een consistent voorkeursdoel (de NODODO-groep). Van Yperen (2006) vond de kenmerken van de DODO-groepen in het algemeen overeen-stemmen met de resultaten van ander onderzoek naar de doeloriëntaties uit het 2x2-kader; daarnaast vond hij dat de NODODO-groep geen specifiek profiel had.

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5 De naamgeving van de doeloriëntaties is ontleend aan Noordzij, Van Hooft, Van Mierlo, en Born, (2018)

I.ii Cruciale kwesties 2x2-doeloriëntatiekader

Drie cruciale kwesties met betrekking tot het 2x2-doeloriëntatiekader vormden een leidraad voor de empirische hoofdstukken van dit proefschrift. De eerste cruciale kwestie is of de profielen van de vier DODO-groepen overeenkomen met de profielen die in de loop van de tijd zijn ontstaan door onderzoek in het 2x2-doeloriëntatiekader. Een aanpalende vraag was of de NODODO-groep ook een eigen en onderscheidend profiel had. Het overzicht van de DODO-onderzoeken in hoofdstuk 1 laat zien dat slechts één onderzoek het verband tussen de DODO en academische prestaties had onderzocht en dat de resultaten slechts gedeeltelijk in overeenstemming waren met de profielen van het 2x2-doeloriëntatiekader.

De tweede cruciale kwestie was er of langetermijneffecten van het 2x2-kader (en de DODO) konden worden gevonden, omdat langetermijnresultaten voor het volledige 2x2-kader tot dusverre slechts eenmaal zijn onderzocht (namelijk in Bjørnebekk et al., 2013).

De derde cruciale kwestie tenslotte, was of resultaten van onderzoek naar doeloriëntaties kunnen worden gegeneraliseerd naar een bredere (school)populatie dan de cognitief meest begaafde leerlingen. Een groot deel van de sociaalwetenschappelijke resultaten, inclusief de resultaten omtrent het 2x2-doeloriëntatiekader (en de DODO), is gebaseerd op steekproeven van studenten (hoger onderwijs), waardoor generalisatie naar andere groepen of de algemene bevolking problematisch is, of op zijn minst niet zomaar verondersteld mag worden.

De resultaten in de empirische hoofdstukken zijn gebaseerd op gegevens van leerlingen in het voortgezet onderwijs in Nederland, een systeem dat bestaat uit vwo, havo en vmbo. Het systeem omvat in essentie vijf schooltypes omdat het vmbo onderverdeeld is in een theoretisch-gemengde leerweg (vmbo gl/tl) , een kader-beroepsgerichte leerweg (vmbo kb) en een basis-beroepsgerichte leerweg (vmbo bb). In alle analyses zijn gegevens van leerlingen uit de derde klas gebruikt; voor de analyses in hoofdstuk 4 zijn gegevens verzameld in de derde klas gekoppeld aan examengegevens uit klas vijf (havo) of zes (vwo). De gegevens zijn verzameld in het kader van het longitudinale project COOL[5-18], dat de schoolcarrière van leerlingen volgde vanaf hun 5e tot hun 18e levensjaar. In dat project zijn de vorderingen van leerlingen in bepaalde vakken gemeten en gegevens samenhangend met schoolprestaties verzameld. Meer informatie is te vinden op de COOL[5-18]-website (http://www.cool5-18.nl/).

II ALGEMENE CONCLUSIES EN DISCUSSIE

II-i DODO profielen en het 2x2 raamwerk

De mate waarin de profielen van de groepen leerlingen met een specifieke DODO lijken op de kenmerken van het overeenkomstige prestatiedoel van het 2x2-kader, werd onderzocht in de empirische hoofdstukken 2, 3 en 4.

In het tweede hoofdstuk zijn de vijf dominante doeloriëntatiegroepen vergeleken op a) taakbetrokkenheid, mate van inspanning, competitiedrift, bazigheid, erbij willen horen,

sociale betrokkenheid, gevoeligheid voor lof en gevoeligheid voor bewijzen van deelname; deze variabelen vormen samen de Inventory of School Motivation (McInerney & Ali, 2006), b) vertrouwen in eigen kunnen (self-efficacy) en c) de inspanning met betrekking tot het huiswerk. De prestatiestreefdoel-groep bleek het hoogste gemiddelde te hebben op al deze variabelen. Dit resultaat strookt niet geheel met het 2x2-kader; daarvoor zou de leerstreefdoel-groep ten minste ex aequo moeten scoren op vertrouwen in eigen kunnen en mate van inspanning. In overeenstemming met het 2x2 kader had de dominante leervermijdingsdoel-groep het laagste gemiddelde op mate van inspanning, competitiedrift, gevoeligheid voor lof en vertrouwen in eigen kunnen. De andere twee groepen, d.w.z. de dominante prestatievermijdingsdoel- en de dominante leerstreefdoel-groep, hadden meestal tussenposities. In het 2×2- doeloriëntatiekader zouden de grootste afstanden moeten bestaan tussen doelen die geen label delen, dus de leerstreefdoel&prestatievermijdingsdoel combinatie en de prestatiestreefdoel&leervermijdingsdoel combinatie; de resultaten in hoofdstuk 2 ondersteunen dat. De verschillen tussen de verschillende groepen zijn klein, met enkele uitzonderingen (namelijk mate van inspanning, competitiedrift, vertrouwen in eigen kunnen); ook dit is in overeenstemming met de resultaten van het 2x2 doeloriëntatiekader.

De NODODO-groep scoort in vergelijking met de prestatiestreefdoel-groep lager op taakbetrokkenheid, mate van inspanning, competitiedrift en vertrouwen in eigen kunnen. Verder bleek de variabele taakbetrokkenheid het belangrijkst voor het scheiden van de NODODO-groep van de prestatiestreefdoel-groep: de conclusie is dat de NODODO-groep mogelijk niet erg open staat voor nieuwe en uitdagende opdrachten.

In het derde hoofdstuk zijn de DODO-groepen vergeleken qua cijfers op de vakken Nederlands, Engels en Wiskunde. Over het algemeen levert het 2x2-kader significante positieve correlaties tussen cijfers en de prestatiestreefdoel- en de leerstreefdoel-groepen, en dito negatieve correlaties tussen cijfers en vermijdingsdoelen. De resultaten in hoofdstuk drie waren gedeeltelijk in overeenstemming met het bovenstaande; de prestatiestreefdoel-groep had een significant hogere gemiddelde score op de drie schoolvakken dan de andere doelgroepen. De leervermijdingsdoel-groep had echter een iets hogere score dan de andere groepen (afgezien van de prestatiestreefdoel-groep) op het vak Nederlands. Ook in tegenstelling tot de algemene resultaten van het 2x2-kader was het ontbreken van significante verschillen tussen de andere groepen, met inbegrip van de NODODO-groep.

In het vierde hoofdstuk zijn de langetermijneffecten van de DODO op examencijfers in de cognitief moeilijkste leerweg (vwo) respectievelijk cognitief een na moeilijkste leerweg (havo) van het Nederlandse voortgezet onderwijs onderzocht. In de derde klas was de DODO gemeten en aan de leerlingen het rapportcijfer Nederlands, Engels en Wiskunde gevraagd. Het examen vond vijf (in het geval van het havo) dan wel zeven (in het geval van het vwo) semesters later plaats. Van het eindexamen waren de scores op de vakken Nederlands, Wiskunde A, Wiskunde B en Engels beschikbaar en aanvullend is het totaal van deze scores gebruikt als een maat voor examensucces. Op (slechts) vier van de in totaal

tien examenuitkomsten zijn significante verschillen tussen DODO-groepen gevonden. In de volgende paragraaf worden de resultaten in meer detail besproken; hier volstaat te zeggen dat deze verschillen betrekking hadden op de prestatiestreefdoel-groep, de leerstreefdoel-groep en de leervermijdingsdoel-groep; de eerste twee resultaten zijn conform de profielen van het onderzoek naar het resultaat, maar de afwezigheid van significante negatieve verschillen met de prestatievermijdingsdoel-groep is dat niet.

De DODO-profielen komen dus gedeeltelijk overeen met de profielen van het 2x2-doeloriëntatiekader. De dominante prestatiestreefdoel-groep lijkt een dusdanig gemotiveerde groep te zijn dat de andere DODO-groepen hun profiel slechts in de schaduw kunnen etaleren, zie Van Yperen (2006) en Scheltinga et al. (2016). Over het profiel van de NODODO-groep kan gezegd worden dat: a) het de grootste overeenkomst vertoont met dat van de prestatiestreefdoel-groep, maar met een lagere waardering voor uitdagende en moeilijke taken, b) het qua omvang op dat van de prestatievermijdings-groep lijkt, en c) het gekenmerkt wordt door in het algemeen matige resultaten.

II-ii Lange termijn effecten van het 2x2 doeloriëntatiekader en de DODO

Zoals hierboven vermeld zijn tussen de verschillende DODO-groepen de eindexamenresultaten van de havo- en vwo-leerlingen vergeleken. De doeloriëntatie was gemeten in klas drie en de examens vonden dus plaats drie, respectievelijk twee jaar later. De scores op de vakken Nederlands, Wiskunde A, Wiskunde B en Engels waren beschikbaar en aanvullend is het totaal van deze scores gebruikt als maat voor examensucces.

Op het vwo had, vergeleken met de NODODO-groep, de prestatiestreefdoel-groep een hogere gemiddelde examenscore en hadden alle groepen (met uitzondering van de prestatievermijdingsdoel-groep) een significant hoger gemiddelde op Nederlands. Deze verschillen verdwenen na toevoegen van de interacties doeloriëntatie-x-geslacht, doeloriëntatie-x-vertrouwen in eigen kunnen en doeloriëntatie-x-rapportcijfer klas drie aan de modellen. Op het havo had de leervermijdingsdoel-groep een hogere gemiddelde examenscore en een hogere score op Nederlands dan de NODODO-groep. Echter, het toevoegen van de interacties doeloriëntatie-x-geslacht, doeloriëntatie-x-vertrouwen in eigen kunnen en doeloriëntatie-x-rapportcijfer klas drie aan de modellen, onthulde ook nog een hogere score Engels voor de leervermijdingsdoel-groep en een hogere Wiskunde B score voor de prestatievermijdingsdoel-groep.

Bovenstaande resultaten tonen aan dat het dominante doel in de derde klas (een paar) consequenties had voor de uiteindelijke examenprestaties meerdere semesters later, naast en boven de invloed van geslacht, rapportcijfer in klas drie en vertrouwen in eigen kunnen. Als men zich realiseert dat de leerlingen naar alle waarschijnlijkheid nooit les hebben gehad over de voor- en nadelen van de verschillende doeloriëntaties, kunnen deze resultaten opmerkelijk genoemd worden. Als gevolg van het ontbreken van onderzoek naar de lange termijn effecten van doeloriëntaties kunnen de resultaten gepresenteerd in hoofdstuk vier

niet worden beoordeeld aan de hand van goed onderbouwde verwachtingen. Desalniettemin is het opmerkelijk dat de leervermijdingsdoel-groep positieve lange termijn resultaten liet zien, hoewel die groep verrassend genoeg ook positieve resultaten bleek te hebben voor de rapportcijfers Nederlands in klas drie.

Het ontbreken van een DODO hing, zoals verwacht, samen met tamelijk slechte resultaten op de lange termijn: in het geval van significante verschillen was er nooit een hogere score voor de NODODO-groep. Dit suggereert dat het hebben van een DODO op zichzelf gunstig is, wellicht vanwege de beschikbaarheid van een voorhanden set cognities, overtuigingen en gevoelens (Scheltinga et al., 2016).

II-iii Generaliseren van 2x2 doeloriëntatiekader en DODO naar andere populaties

In het tweede, derde (en gedeeltelijk in het vierde) hoofdstuk is de vraag onderzocht of de DODO, en in zijn kielzog academische resultaten, variëren over cognitieve niveaus (verschillende schooltypes). Het percentage leerlingen met een DODO nam toe met een stijgende moeilijkheidsgraad; dus in schooltypes met hogere cognitieve eisen (bijvoorbeeld vwo) is het percentage leerlingen met een DODO ook hoger. Daarnaast is er een systematische verschuiving van de grootte van de verschillende DODO-groepen met het cognitieve niveau. De relatieve omvang van (1) de prestatiestreefdoel-groep krimpt, (2) de leerstreefdoel-groep krimpt flink, en (3) de leervermijdingsdoel-groep groeit aanzienlijk, in moeilijkere schooltypes. Deze resultaten zijn gevonden in zowel hoofdstuk 2 als in hoofdstuk 3 ondanks enigszins verschillende formuleringen van het DODO-instrument. Dezelfde systematische verandering bleek in hoofdstuk 4, waarin alleen gegevens van de twee hoogste schooltypes zijn gebruikt. Dus in het algemeen: hoe hoger de cognitieve eisen van het onderwijstraject, hoe sterker de neiging om een vermijdingsdoel te verkiezen.

Het onderzoek in hoofdstuk 3 laat zien dat de verbanden van de DODOs met de rapportcijfers gering zijn in aantal en in effectgrootte, met uitzondering van die van de prestatiestreefdoel-groep. Bovendien worden de effecten kleiner naarmate de moeilijkheidsgraad van de leerweg afneemt; de verschillen tussen de doeloriëntatiegroepen zijn het grootst op het vwo en het kleinst op de vmbo basis-beroepsgerichte leerweg. Hoofdstuk 4 suggereert dat de invloed van de DODO op de examenresultaten meer uitgesproken is in track A dan in track B, hoewel de verstreken tijd tussen de meting van de DODO en het onderzoek 7 in plaats van 5 semesters besloeg.

Het bovenstaande kan betekenen dat de doelen van het 2x2-doeloriëntatie-kader sterkere effecten hebben op cognitief uitdagender niveaus. Hogere schooltypes hebben hogere prestatienormen. Bovendien hebben studenten in hogere schooltypes over het algemeen meer cognitieve vaardigheden dan studenten in lagere schooltypes. Dit kan leiden tot een verminderd vertrouwen in eigen kunnen in de hogere schooltypes - het Big-fish-little-pond-effect (Marsh et al., 2008) - met als gevolg een hoger percentage prestatiedoelen. Omgekeerd

kan, omdat de grote vissen in andere vijvers zwemmen, er een tegengesteld effect zijn in de lagere schooltypes, met een geleidelijke groei van het vertrouwen in eigen kunnen en een hoger percentage leerstreefdoelen als resultaat. Bovendien hebben doeloriëntaties op cognitief minder uitdagende schooltypes waarschijnlijk ondersteuning nodig om goed te kunnen functioneren. Immers, ervaringen met falen in het onderwijs kunnen leiden tot onwil om de nodige inspanningen te leveren om het zelfrespect te beschermen of tot andere vormen van zelfhandicapping.

III SUGGESTIES VOOR TOEKOMSTIG ONDERZOEK

III-i Overwegingen over onderzoek naar doeloriëntaties

Er zijn verscheidene beperkingen aan dit proefschrift; verschillende worden genoemd in de empirische hoofdstukken. Bepaalde beperkingen zijn echter van toepassing op het geheel en zelfs daarbuiten. De effectgroottes die in de hoofdstukken twee, drie en vier worden gerapporteerd, zijn bijvoorbeeld meestal klein, wat in lijn is met de resultaten van onderzoek naar doeloriëntaties in het algemeen. Studies die bevindingen uit meerdere meta-analyses samenvoegen (bijvoorbeeld Hattie, 2009, 2012; Richardson et al.,2012; Schneider & Preckel, 2017) bieden een basis om effecten van doeloriëntaties te vergelijken met effecten van andere begrippen. Schneider en Preckel (2017) rangschikken 105 variabelen gekoppeld aan prestaties in het hoger onderwijs; in hun verzameling staat de (prestatie)streefdoel-oriëntatie op plaats 60 met d = .28, de leeroriëntatie (zowel streefdoel- als vermijdingsdoel-oriëntatie) op 69 met d = .24, terwijl de prestatievermijdingsdoel-oriëntatie met d = -. 28 staat op plaats 99. Ter vergelijking de effectgroottes van enkele andere begrippen: Inspanningsregulering d = .75, Prestatie motivatie d = .64, Intelligentie d = .47, Sociaal economische status d = .25, Testvrees d = -. 43 (Schneider & Preckel, 2017). Kort samengevat: de doelen van het 2x2-doeloriëntatie-kader hebben geen indrukwekkend effect op prestaties. Er zijn verschillende verklaringen mogelijk voor deze nogal trieste stand van zaken; vier mogelijke verklaringen worden hier verduidelijkt.

Een mogelijke verklaring is dat verschillende doeloriëntaties afkomstig zijn uit verschillende theoretische richtingen en op verschillende manieren zijn geoperationaliseerd, zelfs als de doelen hetzelfde etiket dragen (Hulleman et al., 2010). Het label 'prestatiestreefdoel' wordt bijvoorbeeld gebruikt voor twee verschillende doelen; een van deze doelen wordt gemeten met items over het proberen betere cijfers te halen dan andere studenten, terwijl het andere doel wordt gemeten met items over indruk maken op docenten, ouders en relevante anderen. Het eerste doel heeft een positief, maar het tweede een negatief verband met prestaties (Senko & Dawson, 2017).

Een andere mogelijke verklaring ligt in de aanzienlijke verschillen in de mate waarin doeloriëntaties uit verschillende theoretische richtingen herkend en beleefd worden door de

leerlingen. Deze verschillen werden aangetoond door een studie van Lee en Bong (2016) die studenten vroegen: "Wat zijn de redenen dat je leert? Noteer de vijf belangrijkste redenen dat je leert in afnemende volgorde". De resultaten lieten zien dat de doelen van het 2x2-doeloriëntatie-kader het minst worden genoemd.

Ten derde zouden studenten die leerdoelen nastreven, de vereisten van de taak zelf en hun eigen eerdere prestaties als standaard moeten gebruiken om de voortgang te meten. In wezen moet de prestatie van anderen daarvoor niet gebruikt worden. Dat doen ze echter wel (Régner et al., 2007). Ze doen dat onvermijdelijk, en er is een expliciete herinnering voor nodig om terug te keren naar hun eigen eerdere presteren als basis voor het evalueren van voortgang (Van Yperen & Leander, 2014). Bovendien wacht uiteindelijk het examen; daarvoor moeten de leerlingen weten waar ze staan. Om die reden is normatieve informatie nodig en dus saillant.

Ten vierde: de persoonlijke doeloriëntatie wordt beïnvloed door de overtuiging die de leerling heeft over de doeloriëntaties die heersen in de klas en school (Meece et al., 2005; Murayama & Elliot, 2009; Schwinger & Stiensmeier-Pelster, 2011). Hierdoor kan hun persoonlijke doeloriëntatie worden beïnvloed, gewijzigd of overruled door hun perceptie van de doelen op klas- en schoolniveau, met een verwaterd effect als gevolg. De invloed van schoolvariabelen wordt ook aangetoond door de meta-analyse van Wirthwein et al. (2013) waaruit blijkt dat de positieve correlatie tussen prestatiestreefdoelen en leerstreefdoelen aanzienlijk lager is als gestandaardiseerde testscores worden gebruikt in plaats van jaargemiddelde, examencijfers, periodecijfers of de prestaties op een specifieke taak. De mate waarin beoordeling afhankelijk is van de individuele leraar lijkt dus samen te hangen met de impact van de verschillende prestatiedoelen.

Het bovenstaande leidt tot enkele aanbevelingen. Ten eerste zou toekomstig onderzoek zich moeten richten op het ontrafelen van de verschillende doeloriëntaties en etiketten, en voorts op doelen die een stevige basis hebben in de beleving van de leerling, zoals bijvoorbeeld de werkvermijdingsdoeloriëntatie ("Op school wil ik zo weinig mogelijk werk doen", zie Dowson & McInerney, 2004; King, 2014; King & McInerney, 2014). Zoals leraren weten is dat doel een educatieve realiteit en daardoor een prima kandidaat voor verder onderzoek. Ten tweede kan de superieure kwaliteit van de leerstreefdoelen niet ten volle worden benut als er aan het eind van het leertraject een kloof bestaat tussen de ideologische principes (leren als innerlijke verrijking) en het normatieve eindexamen (tenminste 5,5 gemiddeld) dat een groot deel van de toekomst bepaalt. Daarom is onderzoek naar doeloriëntaties in samenhang met andere manieren van beoordeling zeer gewenst.

III-ii Overwegingen over de inhoud van het DODO-instrument

Het DODO-instrument verdeelt een steekproef in groepen. Verschillende groepen hebben verschillende samenhangen met bijvoorbeeld schoolcijfers of taakbetrokkenheid. De prestatiestreefdoel-groep heeft bijvoorbeeld veelal hogere cijfers en betere examenresultaten

dan de andere groepen, terwijl zowel de prestatievermijdings-groep als de NODODO-groep meestal laag scoren. Het lijkt er dus op dat het prestatiestreefdoel van de DODO, die gericht is op het halen van hogere cijfers dan klasgenoten (en niet gericht op het uitblinken in de ogen van derden), goed functioneert. Het mag zo zijn dat de leerdoelen (zowel van de streef- als de vermijdingsvariant) van het DODO-instrument niet erg leven bij de leerling, maar het lukt het instrument zeker om een (kleine doch) zeer krachtige prestatiestreefdoel-groep te selecteren. Dit fenomeen is gebruikelijk in onderzoek met de DODO. Mogelijk is hier sprake van een fundamenteel verschil tussen een geïnduceerde en een zelf aangenomen doeloriëntatie; het induceren (zoals in experimenteel onderzoek) van een doeloriëntatie overkomt proefpersonen die voor het grootste deel niet vrijwillig voor die doeloriëntatie zouden kiezen en dus vrij veel ervaring hebben met doeloriëntaties die van nature bij hen passen. De prestatiestreefdoel-groep via het DODO-instrument verkoos echter bewust en vrijelijk die doeloriëntatie boven de alternatieven.

Daarentegen is de ongevoeligheid van het DODO-instrument voor de verschillen tussen de andere doelen duidelijk een beperking. Het lijkt erop dat vooral de leerdoelen niet voldoende discrimineren. Misschien is de afwezigheid van een doeloriëntatie die de leerling van ganser harte kan onderschrijven een deel van het probleem. In toekomstige onderzoek zouden herzieningen van het DODO-instrument kunnen worden getest waarbij de doeloriëntaties niet enkel worden geselecteerd op basis van theoretische helderheid, maar ook op basis van de dagelijkse beleving. Een ander deel van het probleem is misschien de formulering van de vragen in het instrument, die als vaag en algemeen kan worden ervaren: "om het beter te doen" (in welk opzicht?), "dan anderen" (welke anderen, hoeveel anderen?), "op school "(welke onderwerpen?)," dit jaar "(ooit eens? aan het eind? altijd?). In toekomstig onderzoek zouden herzieningen van het DODO-instrument kunnen worden getest met formuleringen in verschillende mate van precisie.

Misschien wel de belangrijkste beperking van dit proefschrift is dat, hoewel we wel weten welke doeloriëntatie de studenten hadden in de derde klas van het voortgezet onderwijs, we geen gegevens hebben over hun DODO in het eerste leerjaar en op de basisschool, op enig moment daartussenin, of op het tijdstip van het examen. Waarschijnlijk varieert de DODO van een persoon in de tijd en per vak, zowel in kwaliteit als in intensiteit. Ook hier ligt een mooi gebied voor nader onderzoek.

Ten slotte suggereren de empirische resultaten van dit proefschrift dat het niet hebben van een DODO omineus is met betrekking tot schoolsucces. De groep zonder DODO en de prestatievermijdings-groep scoren laag op alle vakken in elke leerweg; bovendien scoren deze groepen ook laag op de examenvakken. Er zijn derhalve praktische redenen om onderzoek te adviseren naar oorzaken en correlaten van het ontbreken van een DODO. Ook van grote praktische waarde is dat het DODO-instrument een geschikt hulpmiddel blijkt om na te gaan welke leerlingen de gevarenzone naderen; daardoor is het DODO-instrument het enige met praktische relevantie. Immers, het gebruik van een van de andere doeloriëntatie-

instrumenten levert scores op die alleen nuttig zijn in combinatie met de resultaten van een grote steekproef waarvan de beoogde student een representatief item is.

III-iii Overwegingen over de omvang van het DODO-instrument

Het DODO-instrument maakt gebruik van beweringen waarmee de doeloriëntaties tegenover elkaar worden gezet, voorafgegaan door een stam. De stam was: "Dit jaar vind ik het het belangrijkst op school om het...". Een bewering is 'beter te doen dan anderen', wat een prestatiestreefdoel is. Elk doel wordt vertegenwoordigd door (slechts) één bewering. Deze methode leidt tot een spaarzaam en elegant instrument in vergelijking met bijvoorbeeld de Achievement Goal Questionnaire Revised (Elliot & Murayama, 2008) die uit drie vragen per doel bestaat.

Een beperking is echter de afwezigheid van een maat voor de betrouwbaarheid van het instrument. Een andere beperking is dat bij onzorgvuldig invullen toch een grote kans bestaat om aan een DODO-groep te worden toegewezen. Omdat het 2x2-raamwerk vier doelen heeft, bestaat het DODO-instrument uit 3 + 2 + 1 = 6 beweringen waarin de leerling moet kiezen voor één van de twee doelen, wat leidt tot $4x2^3$ = 32 mogelijkheden voor een DODO op een totaal van 2^6 = 64 mogelijke antwoordpatronen. Dus als iemand het instrument willekeurig invult, is de mogelijkheid om een DODO te krijgen 32/64 = 0,5. Als het instrument vijf doelen omvat, zijn 4 + 3 + 2 + 1 = 10 beweringen nodig, wat leidt tot $5x2^6$ = 320 mogelijkheden voor een DODO op 2^{10} = 1024 antwoordpatronen, met een kans op een willekeurige DODO van 320/1024≈0.313. In het geval van zes doelen: 15 beweringen, $6x2^{10}$ = 6144 DODO-mogelijkheden, 2^{15} = 32768 patronen en een willekeurige DODOkans van 6144/32768≈0,188.

Uitbreiding van het instrument naar vijf of zes doelen zou leiden tot DODO-groepen met een flink kleiner willekeurig DODO-risico. Dientengevolge zouden de DODO-groepen minder leerlingen bevatten die het instrument slordig invulden en dus zouden de kwaliteiten van de verschillende doeloriëntaties beter tot hun recht komen.

III-iv Overwegingen over generalisatie naar andere groepen

Wetenschappelijke kennis over motivatie en andere constructen komt in het algemeen uit onderzoek van een specifieke groep leerlingen; heel vaak komen de proefpersonen uit de hoogste niveaus van het onderwijssysteem. Dit maakt het onwaarschijnlijk dat resultaten van onderwijsonderzoek volledig van toepassing zijn op andere cognitieve niveaus. Een van de mooie kwaliteiten van de COOL[5-18]-gegevens is dat ze de hele breedte van het voortgezet onderwijs bestrijken. Met betrekking tot het 2x2-doeloriëntatiekader laten de gegevens zien dat de invloed op schoolprestaties afneemt van hogere naar lagere schooltypes. Misschien hangt dat samen met de onderzoeksmethode: de gegevens zijn afkomstig van onderzoek met papier en potlood, wat vooral in de lagere schooltypes van het voortgezet onderwijs lastig gevonden zou kunnen worden. Althans, het Nederlandse deel van het Programme for International

Student Assessment (PISA) uit 2015 laat zien dat a) de gemiddelde score op leesvaardigheid voor vwo, havo, vmbo gl/tl, vmbo kb, vmbo bb in die volgorde steeds lager wordt, b) vanaf 2006 de gemiddelde score op leesvaardigheid voor vwo en havo constant blijft doch gestaag daalt voor de vmbo schooltypes, c) het percentage laaggeletterde leerlingen stijgt van 12% in 2003 naar 18% in 2015 (Feskens et al., 2016).

Vandaar allereerst de aanbeveling om met andere methoden te onderzoeken of de doeloriëntatietheorie zinvol kan worden gebruikt in de cognitief minder uitdagende niveaus van ons onderwijsgebouw. Observationele studies, gevolgd door gestructureerde interviews, zouden kunnen worden gebruikt om te onderzoeken a) wat belangrijk is voor leerlingen in cognitief minder uitdagende schooltypes, en b) hoe ze zich oriënteren in situaties waarin gepresteerd dient te worden.

Ten tweede, hoewel dit proefschrift niet alleen gericht was op de meest begaafde leerlingen, waren de steekproeven beperkt tot één leeftijdsgroep; adolescenten van ongeveer 15 jaar oud. Andere leeftijdsgroepen hebben waarschijnlijk andere doeloriëntaties; (Senko & Freund, 2015).

Ten derde suggereren de uitkomsten dat hogere cognitieve eisen ongelukkige neveneffecten hebben, in casu een toename in vermijdingsneigingen. Dit DODO-patroon over schooltypes in het derde jaar van het voortgezet onderwijs is waarschijnlijk het gevolg van een geleidelijke verandering die begint bij de overgang vanuit het basisonderwijs en die in de loop van de tijd meer uitgesproken wordt. Misschien is dat patroon een gevolg van het feit dat leerlingen in de hogere schooltypes meer te verliezen hebben. Toekomstige kansen, mogelijkheden, gezondheid, en levensduur houden verband met schooltype. Slechter presteren dan anderen kan er voor zorgen dat men neerwaarts door de schooltypes migreert. Dit maakt het belangrijk om prestaties van medeleerlingen in de gaten te houden, een kracht die leidt naar prestatiedoelen, en bovendien om zwakke punten te verbergen voor leraar, coach of mentor, een kracht die leidt naar vermijdingsdoelen. Hier liggen belangrijke kwesties voor toekomstig onderzoek.

Tenslotte leidt bovenstaande verschuiving langs de valentie-dimensie tot een aanbeveling voor de praktijk. Een prestatiestreefdoel-oriëntatie heeft een effect van d = .28 en een prestatievermijdingsdoel-oriëntatie een effect van d = -. 28 op schoolprestaties (Schneider & Preckel, 2017). Deze effecten zijn klein, maar het verschil (.56) vormt een gemiddeld effect. Daarnaast hangen vermijdingsdoelen negatief samen met variabelen die goed zijn voor prestaties en groei; de resultaten uit hoofdstuk twee laten bijvoorbeeld zien dat de vermijdingsgroepen lager dan de meeste andere groepen scoren op inspanning en vertrouwen in eigen kunnen. Het is aanbevelingswaardig om leraren te stimuleren adaptieve doeloriëntaties te promoten.