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THE EFFECT OF STUDENTS' ENGAGEMENT ON ACADEMIC ACHIEVEMENT IN DIFFERENT STAGES OF THEIR ACADEMIC CAREER FROM A DROPOUT PERSPECTIVE

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Abstract

In this study, the effect of students' engagement on their academic achievement through the course of their school careers was investigated. This was achieved by measuring the effects of individual components of engagement on the achievement of 1281 students from the Dutch region Twente. Differences in these effects for students of different stages in their career were measured using a moderated regression approach. For every component of the tested engagement model, an effect on achievement could be found, but the kind of effect differed depending on the stage of the students' school career and whether effects on mathematics or language achievements were measured. The results indicate that in order to understand the relationship between student engagement and achievement, one has to consider the different components of engagement in the context of the students' stage in their school career.

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1. Introduction

Students' engagement in school and their school performance or achievements are essential focal points of educational research. School-effectiveness research, for example, often uses standardized test results as an indicator for the performance of a school (e.g. Luyten, Visscher, and Witziers (2005). Educational Psychology often focuses on motivational concepts (such as engagement, interest or self-efficacy) and their effects on achievement (e.g. Fredricks, Blumenfeld, and Paris (2004). Therefore, analyzing the relationship between engagement and achievement can play an important role in understanding the development of a student's school career and in predicting whether or not they manage to successfully finish their education or drop out. Dropout is a central problem for the educational system of many nations and currently receives great political attention. The term refers to students who fall out of the educational system without graduating. Students who drop out of the educational system often experience not only financial problems (Alexander & Entwistle, 2000), but also social and emotional problems (Arnett, 2000). Furthermore, dropout is a severe problem not only for those directly affected, but also for society in general due to the severe effect on a nation's economy. Besides the high costs of unemployment, the economy loses the potential talent of the school leavers. In 2009 the percentage of the population aged 18-24 without upper secondary education was 14,4% and thus the previous Europe-wide goal of a dropout rate lower than 10% was not achieved (Wozowczyk & Massarelli, 2010). Recent theoretical approaches to student dropout (see 2.1) suggest that the relationship between student engagement and achievement plays a key role in conceptualization and predicting dropout. Of particular interest is its development through the course of a student's school career. In this study, the relationship between engagement and achievement is analyzed for different cohorts of students from primary to pre-vocational and vocational education. It aims at understanding which engagement factors are specifically relevant for the language and mathematics achievements of students at a specific point in their career and which generalizations can be made across all cohorts, to provide a theoretical basis for age-specific prevention measures.

2. Literature Review

This review is separated into 4 sections. First, previous approaches to the understanding of the dropout process are presented (section 2.1) The second part (section 2.2) reviews research findings about the main concepts that are identified in the first section. In the third part (section 2.3), the implications for the study and the research questions are presented.

2.1 Recent conceptual approaches to the understanding of dropout.

Comprehensive dropout models often take the form of a structural equation model, with a selection of risk factors and their relationships (Battin-Pearson et al., 2000). These models vary greatly in terms of which variables are included and how they are related, which is not surprising given that they are based on different schools, different states and different numbers and types of respondents. Some studies also provide more practical methods of dropout prediction, such as one from Henry, Knight and Thornberry (2012) who use a combination of 5 risk factors with fixed criteria (e.g. more than 20% absence, more than one suspension). The number of risk factors related to a student then acts as his dropout potential. The choice to focus on the relationship between engagement and achievement on the one hand, and on differences between cohorts on the other hand stems from two conceptual approaches on dropout that receive increasing attention in recent literature. One of them, the dropout-typology approach, distinguishes different categories of dropouts that are characterized by their engagement and achievement. The life course perspective, on the other hand, sees dropout as a long process that can already begin in the early years of students' school careers and therefore suggests to identify predictors of dropout at multiple stages in their career. The two approaches are discussed below.

2.1.1 The life course perspective on dropout. Alexander, Entwisle, and Kabbani (2001) analyse the dropout process from a life-course perspective. Rather than treating student dropout as a single event, they conceptualize it as a development that takes place over years and is influenced both directly and indirectly by a set of interrelated risk-factors. In contrast to most other development studies, the life-course perspective is not limited to a specific period of life, but covers the whole biography of the student. Alexander et al. (2001) refer to various studies that indicate that many risk-factors leading to dropout can already be identified in the first grade, but early influences on the academic career of students can be found even earlier, in the first 6 years of the children's lives, before they attend a public school. In recent years, evidence has grown that enriching pre-school experiences can provide enduring advantages. Reynolds, Temple, Suh-ruu, Arteaga, and White (2011) analysed the development of 1400 children after 25 years and found that at the age of 28, those that attended a pre-school program had higher levels of education, socioeconomic status, health behaviour and lower criminal behaviour. Schweinhart et al. (2005) examined the life's of 123 African-Americans born in poverty and found that at the age of 40, those that received a preschool program were more likely to graduate from high school, hold a job and are less likely to show criminal behaviour. However, the sample of both studies consisted primarily of disadvantaged African-American children and more large-scale studies over a long period of time are necessary to generalize these findings. Barnett (1995) pointed out that preschool effects can compensate for a deficient environment at home, making a larger effect for disadvantaged children plausible. Of particular interest in life-course approaches are repeating patterns of risk-factors that can become a vicious circle: Finn's (1989) frustration-self-esteem model describes, how low academic achievement at the beginning of one's school career can impact self-esteem negatively, which in turn can lead to a further decline in achievement. In contrast, high academic achievement can lead to high self-esteem, which further influences achievement positively. Research has also shown that a similar reciprocal relationship exists between self-concept and academic achievement (Marsh & Martin, 2011). Thus, whether a student's development resembles an upward or a downward spiral is often determined at the very beginning of the process. This train of thought is in line with studies investigating early academic achievement - it evidently functions as a strong predictor of later achievement and dropout (J. D. Finn, Gerber, & Boyd-Zaharias, 2005) This argumentation is further supported by Garnier, Stein, and Jacobs (1997) who conducted a longitudinal study over 19 years in which they identified direct predictors of school dropout in the students' early childhood years, such as family lifestyles and values. The life-course perspective suggests a research approach to dropout that is based on identifying predictors of dropout in the beginning of one's school career.

2.1.2 Dropout typologies. Research on dropout typologies focuses on the characterization of subgroups that drop out for different reasons. Instead of using a single category of dropouts, typologies are created that typically consist of 3-5 categories. Bowers and Sprott (2012) analyzed six different studies and were able to find 4 categories that match the categories used in these studies:

- Students disrupting school show problem behaviour and low academic achievement.
- Students struggling with academics show low academic achievement (without problem behaviour)
- Students that are bored with the process are disengaged, but can earn high grades.
- Quiet dropouts possess characteristics similar to graduates, but fail to overcome certain obstacles. (e.g. separation of parents)

Assuming that problem behaviour represents a form of disengagement, these groups can be characterized by the terms engagement and achievement (see table 1). Students disrupting school and struggling with academics are probably the most typical groups in dropout-research. In contrast, students bored with the process are seldom recognized as studies about dropout often concentrate on low-achieving students. However, studies suggest that even highly gifted student are a serious group to consider (Renzulli & Park, 2000).The quiet dropouts closely resemble graduates and are therefore difficult to identify. Fortin, Marcotte, Potvin, Royer, and Joly (2006) even found this group to be the most numerous at-risk-group. Fortin et al. (2006) used a slightly different typology of dropouts and included two groups that do not resemble any of the earlier defined groups. One of them is the "depressive type", which is characterized by strong symptoms of depression such as family problems, sadness and thinking about suicide. The second group is the "antisocial covert behaviour type", which shows less strong, but above average depression symptoms and antisocial behaviour like lying and theft, which are beyond the scope of teachers. The dropout typology approach highlights the complexity of the relationship between Engagement and Achievement, but it should be noted that within this approach, only disengagement and problem behaviour are explicitly described, without a clear conceptualization of the engagement concept. Also, a life-course perspective is not taken and no difference is made between language and math achievements.

Table 1

Engagement and achievement in the dropout categories of Bowers and Sprott (2012)

Dropout Group	Engagement	Achievement
Disrupting School	Low	Low
Struggling with Academics	Normal	Low
Bored with the process	Low	Normal
Quiets	Normal	Normal

2.2 Research on Engagement and Achievement.

The two theoretical approaches described above do not use one coherent conceptualization of engagement that can be tested. Bowers and Sprott (2012) only distinguish disengagement and problematic behaviour and the life-course perspective does not rely on any specific model of the concept. In order to provide a clear operationalization of both achievement and engagement, both concepts, their relationship and their development through the student's school career are discussed in section 2.2.1. and 2.2.2.

2.2.1 Academic Achievement in the course of student's school career. Achievement is generally measured by the test results of the student. The measurement can be a simple grade-point-average or focus on results in a specific domain. Language and mathematics are two common domains in the academic literature and measures of academic achievement often do not separate between them. However, there is empirical evidence suggesting that different factors can determine success in these domains. For example, Landsheer, Maassen, Bisschop, and Adema (1998) found a negative correlation between social competence and mathematics**,** but not language achievement, which they contrast with the predominant assumption that academic achievement and social competence are positively correlated. The transition to secondary education can play an important role in understanding changes in academic achievement. Students face different academic challenges, socialize with new peers and are educated by different teachers. This transition is often associated with a number of negative outcomes, which are difficult to separate from age-effects as they could also be associated with puberty and related social and emotional changes. Examples are declines in motivation, self-esteem, self-concept and academic achievement (Niehaus, Rudasill, & Rakes, 2012). Gutman and Eccles (2007) explained this problem with the person-environment theory, concluding that secondary schools often do not provide an environment that fits the psychological needs of adolescents. In their review of the effects of school transfer in English schools, Galton, Morrison, and Pell (2000) point to the fact that around 40% of the students experience a hiatus in their academic progress, which can be linked to student anxiety (Galton et al., 2000) and the focus on establishing new friendships (Pratt & George, 2005), but Galton et al. (2000) also highlight a discontinuity in curriculum and teaching approaches. When students switch to secondary education, the "big-fish-little-pond-effect"(Davis, 1990) is important to take into consideration. It suggests that student switching to a weaker environment evaluate their own achievements higher than before (even with a constant actual performance) as they compare themselves with the other, lower achieving students.

2.2.2 Engagement in the course of the student's school career. Several distinct, yet related concepts fall under this category. First of all, it is important to clarify the definition of engagement that is applied in this study. The term "engagement" comprises two constructs that are frequently used in research with divergent terminologies. The first one represents a person's drive or energy to perform a certain action. This construct is usually named "motivation" or "motivational factor" (Thoonen, Sleegers, Peetsma, & Oort, 2011). A review of studies over motivation by Vansteenkiste, Lens, and Deci (2006) reveals that it has been consistently identified as a strong predictor of high academic achievement. The second construct measures whether someone actually turns his motivation into concrete behaviour. This construct is named "motivational behaviour" by Thoonen et al. (2011), but the term "student engagement" can be used interchangeably. Crumpton and Gregory (2011) define school engagement as a behavioural manifestation of motivation. To avoid further confusions with engagement as the comprehensive term for both constructs, only the term "motivational behaviour" is used in this study. Conceptualizations of both motivational factors and motivational behaviour are described in this section. Thoonen et al. (2011) provide an overview over three components of motivational factors: The expectancy, affective and value component. These components are described in the following.

Expectancy component. This component refers to the individual's belief in his own abilities. This component is often addressed using the term "self-efficacy" .Self-efficacy is a concept used to explain in how far a person beliefs in his own competence to reach a specific goal. It is constantly identified as an important predictor of academic achievement (Komarraju & Nadler, 2013). It affects the motivation of a student as those with higher self-efficacy tend to persist longer, work harder and seek assistance, if necessary (Linnenbrink & Pintrich, 2012). An important component of self-efficacy is the perceived locus of control. Students who belief that they are in control of their achievements show higher self-efficacy than those who perceive outside factors (e.g. luck, the attitude of teachers) as determining their success (Peterson & Stunkard, 1992). Self-efficacy is also treated as a component of general self-esteem, which can be defined as the extent to which individual value, appreciate or like themselves (Cardoso, Ferreira, Abrantes, Seabra, & Costa, 2011). Research on the effects of self-esteem led to ambiguous results and does not provide necessary evidence to confirm that self-esteem positively influences academic achievement. Most studies found a non-significant or a significant, but very weak relationship between these two concepts (Baumeister, Campbell, Krueger, & Vohs, 2003). Humphrey (2004) analyses the causes for these weak relationships. He criticizes that measures of self-

esteem focus mainly on global self-esteem, instead of concentrating on academic self-esteem, a concept resembling self-efficacy. Another construct similar to self-efficacy is the academic self-concept, which measures how students evaluate their own competence. A study by Ferla, Valcke, and Cai (2009) reveals that both constructs differ both conceptually and empirically. The main differences are the more affective nature of the academic self-concept and the focus on past events instead of a particular task in the future. Furthermore, an academic self-concept relies more on social comparison instead of the student's individual achievements. Ferla et al. (2009) also found that academic-self concept is a stronger predictor of affective constructs such as well-being or social relations, whereas self-efficacy is the stronger predictor of academic achievement. Research suggests that students' self-efficacy and self-concept differ according to their age and experience. Nicholls (1984) analysed the development of students' self-concept and found that their primary source of information shifts in the course of their school career from being mostly self-referential to more socially oriented. According to Ruble (1983), this shifts to an external reference point occurs at the age of 9, implying that for students of this age, the peer group becomes an important influence on student's self-concept.

Value component. The value component refers to the perceived importance and desirability of the student's goals. In research on the students' goal orientation, a distinction between two concepts is often applied: Students with a mastery orientation (also named task-goal orientation) are focused on their own professional development and the mastery of a particular task. In contrast, students with an ability-goal orientation (also named performance-oriented or ego-oriented) focus primarily on others' perception of the students' abilities (Anderman, 2003). Studies on goal orientation suggest that mastery orientation is the more desirable alternative as ability-goal orientations often lead to self-handicapping strategies and students with this orientation develop lower levels of mastery (Urdan, Midgley, & Anderman, 1998). According to Anderman & Midgley (1997), teachers can strengthen the mastery orientation by emphasizing personal improvement instead of focusing on competition and earning good grades. Another frequently used conceptualization is the distinction between intrinsic and extrinsic motivation. Extrinsic motivation refers to external motivators, such as money or status. Intrinsic motivation, which is generally seen as the more desirable alternative, refers to the enjoyment of executing a particular task. Studies on motivation consistently report that intrinsic motivation enhances productivity, deep learning as well as higher academic and workplace achievement (Crumpton & Gregory, 2011). Intrinsic motivation is closely related to mastery-goal orientation as intrinsically motivated students tend to be more task-oriented (Simons, Vansteenkiste, Lens, & Lacante, 2004). Another possible dimension of the value component is the future time prospect. Peetsma and Van der Veen (2008) explain that students develop realistic future time prospects from the age of 11 to 18 and that a positive influence on the students' long term prospects can improve motivational behaviour. Setting long-term goals also reflects the student's ability to delay gratification. A wide body of psychological research attests this construct positive outcomes. An especially interesting finding in relation with the life-course perspective can be found in a review by Mischel, Shoda, and Rodriguez (1989) in which delayed gratification in 4-year old children was associated with a number of positive outcomes later in life such as better self-regulation and academic achievement. Peetsma and Van der Veen (2008) argue that student's delay of gratification decreases after the transition to secondary school, which also affects the development of future time prospects negatively.

Affective component. The affective component comprises the student's feelings and emotions about the school environment. This component is closely related to general wellbeing at school. Taking this component into account is essential as individuals do not behave entirely rationally. Their motivation is also determined by relations with peers and teachers. The significance of peer relations for at-risk students becomes clear with the finding by Pratt and George (2005) that whether or not students find friends in the first month after they change the school is the single greatest predictor of subsequent success. Future dropouts tend to be rejected by their school peers and feel less popular (Ellenbogen & Chamberland, 1997). Also, according to Ellenbogen and Chamberland (1997) at-risk students tend to have more friends who drop out. They assume that this is caused by being part of a social network that does not validate school. In contrast, having friends who support one's academic achievements has a positive influence on the success of the school career, which emphasizes the importance of a feeling of school belonging. Research indicates that a sense of school belonging positively influences the academic motivation of a student (Anderman, 2003). Dornbusch, Erickson, Laird, and Wong (2001) found that school attachment is associated with less frequent deviant

behaviour, regardless of the gender or ethnic group of the respondents. However, there is little consensus about whether school belonging is an individual or a school-level construct and whether a deficiency in school belonging should be countered by efforts directed towards the individual or the school. Ma (2003)found that differences in school belonging differed more within schools than between schools and depends particularly on the student's self-esteem. Still, students who show strong attachment to their peers, but feel less bonded to their school and teachers, show more misconduct, indicating that all three factors should be taking into account. The quality of the teacher-child relation has also been consistently linked to high engagement and academic achievement and fewer emotional and behavioural problems (Roorda, Koomen, Spilt, & Oort, 2011). Conflicting relationships on the other hand, can have a negative effect on academic achievement and increase the dropout risk (Lessard, Poirier, & Fortin, 2010). The student's relationship with his teachers and with his parents show some similar patterns. Gambone, Klem, and Connel (2002) argue that a positive relationship with one caring adult, whether it is a teacher or a parent, can act as a protective factor against academic risk. Accordingly, a positive relationship with a teacher is especially relevant for children with deficient maternal education (Hamre & Pianta, 2005).Another group of children who profit especially from teacher-child relationships are those that struggle with academic demands, but they are also less likely to develop such a relationship (Blacher, Baker, & Eisenhower, 2009). While a positive relationship is generally related to positive outcomes, researchers have taken different perspectives on which characteristics a positive relationship should embody. According to Ellenbogen and Chamberland (1997) teachers should address the student's basic needs for relatedness, competence and autonomy by caring and expressing interest, providing structure (e.g. setting clear goals) and supporting autonomy. If teachers are able to fulfil these needs, the student's engagement will increase, which in turn leads to higher academic achievement (Roorda et al., 2011).

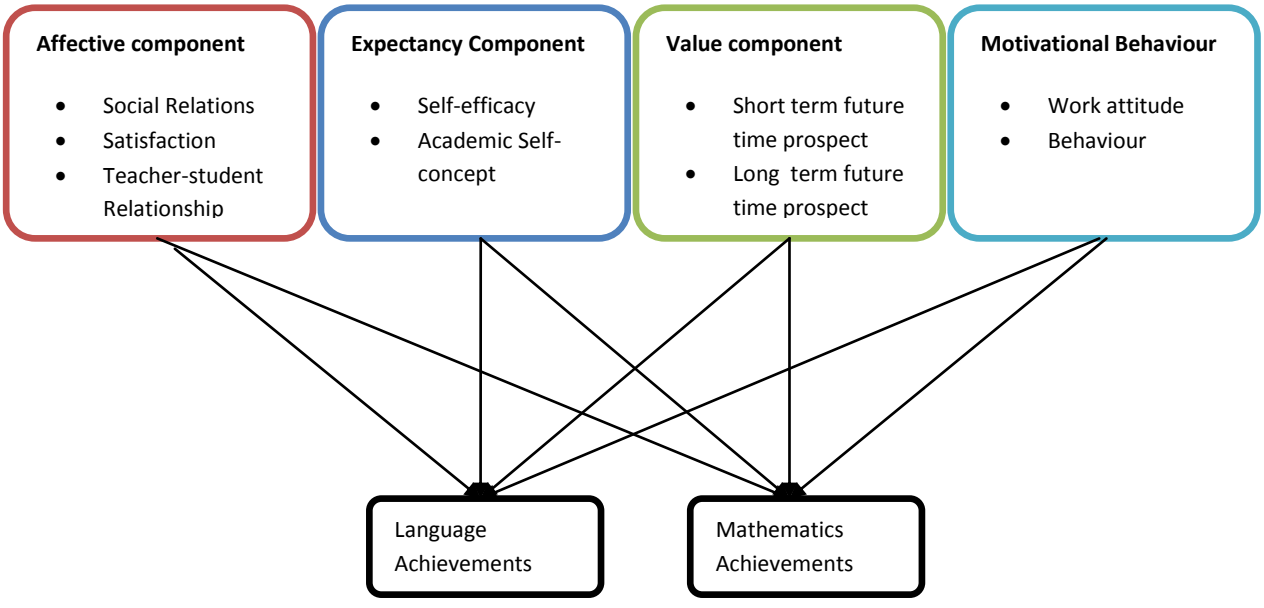
Motivational Behaviour. This concept refers to the behavioural manifestation of motivation. Fredricks et al. (2004), in their review of the current state of the concept student engagement (not to be confused with the comprehensive term "engagement" that is used in this study), distinguish cognitive, behavioural and emotional engagement. Behavioural engagement is the most active and observable form of engagement. It represents active participation indicated by class attendance, rule compliance and involvement in learning and academic tasks (Archambault, Janosz, Fallu, & Pagani, 2009).Class absence is a frequent risk-factor in dropout literature. Disturbing Behaviour, treated as the opposite of rule compliance, can be seen as a negative indicator of behavioural engagement. Rule compliance is indicated by adhering to classroom norms, following the teacher's rules and the absence of problem behaviour. Involvement in learning and academic tasks (work attitude) is indicated through the contribution to classroom discussions, asking questions, concentration, effort and persistence (Fredricks et al., 2004). Cognitive engagement refers to the students' mental investment in a learning task. Students who are cognitively engaged show more effort in understanding complex problems and master new skills. In that sense, cognitive engagement shares characteristics of the mastery-goal orientation and intrinsic motivation described in the previous section. Researchers measuring cognitive engagement often concentrate on the student's use of metacognitive strategies, such as setting goals, planning and reflecting upon their own progress (Fredricks et al., 2004) The third category "emotional engagement" is closely related to the affective component of motivation. It represents the emotional reactions to the school environment and is indicated by a broad array of concepts such as wellbeing, self-esteem or the social relations with teachers and with peers. In their review, Fredricks et al. (2004), also investigated studies that analyzed the relationship between engagement and student achievement. Their findings suggest that out of the three components, behavioural engagement is the strongest predictor of academic success. This is not surprising, as indicators such as class attendance are strong predictors of low achievement and dropout themselves. Cratty (2012) analysed an entire third grade of North Carolina's high schools and found that absenteeism was directly linked to dropout risk. Of the students that were absent for more than 21 days, 55% dropped out of school (as opposed to a mean of 19%). Even students that were absent for 1-2 weeks showed a significant increase in dropout risk.

2.3 Conclusion

Both conceptual approaches to dropout presented in 2.2. provide important implications for the study of dropout. The life-course perspective suggests to not only investigate the characteristics of students at the time they drop out, but also consider earlier developments that might have initiated the "downward spiral" that ultimately led to dropout. The dropout typology approach highlights the complexity of the relationship between student engagement and achievement and suggests that while dropout might occur as a result of a mutual relationship between engagement and achievement, this describes only one of the dropout groups ("disrupting school"). The mutual relationship between engagement and achievement certainly does not explain dropout solely. Taking a life-course perspective, however, might explain differences in the strength of this relationship by considering characteristics of different stages in a student's developmental process. Therefore, analysing and comparing the effect of engagement on achievement for students of different ages is a logical step to take in order to gain new insights about the dropout process and represents the main focus of this study. For this study, the effect is compared for different cohorts of students. Because the life-course perspective highlights early predictors of dropout, students from elementary schools are integrated in the study together with students from the lower levels of secondary and vocational education. Achievements in the form of mathematics and language test results represent the outcome variables as they are present throughout the student's school career. As the literature review has shown, engagement is more difficult to operationalize. The engagement conceptualization described by Fredricks et al. (2004) and the motivation components by Thoonen et al. (2011) show some similarities, but differ in certain aspects. The key difference between them is that motivation describes an attitude or a 'driving force' to perform a particular task, whereas Engagement or motivational behaviour measures the actual performance of these tasks. The additional value of the classification in three components lies in the inclusion of indicators that are not directly measurable. While cognitive engagement cannot be directly observed, it still measures a behavioral outcome rather than an attitude. The differentiation becomes more difficult with the categories " affective motivation" and "emotional engagement". Both concepts use very similar indicators and cannot be distinguished as simply.

Figure 1:

The Engagement Model and its components.



For a coherent picture of students' engagement, motivational concepts that lead to this engagement and their behavioural manifestations both have to be considered and are integrated into one conceptualization, consisting of the following elements: The affective component, with satisfaction, social relations and the teacher-student relationship as indicators. These indicators cover the students relation with peers and teachers and the general satisfaction and attachment to school.

For the expectancy component, both self-efficacy and self-concept are included. The value component is indicated by the long term and short term future-time-prospects, which provides information about their interest in current school activities as well as their long-term goal setting. The fourth component of the model is the motivational behaviour and indicates how well students behave. This component is simplified in comparison to the conceptualization of Fredricks et al. (2004) and focuses on behavioural engagement, which was identified as the strongest of the three dimensions. Two indicators are used in this study: The first one measures behaviour that is in line with class-rules (e.g. absence of disturbing behaviour). The second, work attitude measures the accuracy and effort that the student displays during his learning task. Figure 1 gives an overview of the conceptualization used in this study. The arrows indicate regression effects on language and math achievements. Based on the implications of both approaches to dropout, the following main research question is formulated:

To what extent does the effect of student engagement on academic achievement differ between Dutch students from different cohorts?

Subquestions**:**

(1) *Which components of engagement predict mathematics and language achievements?*

(2) *In how far do the effects of the components of engagement differ between the cohorts?*

3. Method

3.1 Respondents

In total, data of 1281 Dutch students is used in this study. These students are spread over four cohorts: Cohort 1 and 2 represent students from the second and fourth year of primary education (named "groep 4" and "groep 7" in the Dutch education system). Cohort 3 ("VMBO") represents students from the first year of secondary education. In the Dutch system, there are three different levels of secondary education of which VMBO is the one with the lowest level. Students from cohort 4 ("MBO") are in the first year of their vocational education. The number of students per cohort, the mean age, the number of schools and the non-response are summarized in table 4. As there are teacher- and student-reported variables (see section 4.1), there are separate non-response numbers for them. For the collection of the data, school boards from the region Twente in the Netherlands were asked to participate in the study. The boards agreed to let one or more of the schools they are connected with participate in the study. Two premises for a school to be selected were that they do not already participate in another research project and that at least 15 students per class can participate and at least one class per school and cohort. The students from cohort 1 and 2 are from the same 13 participating schools. For cohort 3, all schools belong to the same organization, but employ different locations with different school directors.

Table 2:
Number of Respondents participating in the study and corresponding non-response, mean age and number of schools.

Cohort	Number of students	Non-Response (self-reported)	Non-Response (teacher-reported)	Mean age (SD in months)	Number of schools
1 (Groep 4)	351	9 (2,5%)	0 (0%)	7years 8months (6m)	13
2(Groep 7)	340	26 (7,6%)	11 (3,2%)	10years 8months (5m)	13
3(VMBO)	435	31 (7,1%)	24 (5,5%)	13years11months (10m)	5 (locations)
4(MBO)	155	39 (25,1%)	37 (23,9%)	18years (30m)	3 (departments)
Totaal	1281	105 (8,2%)	74 (5%)		21

3.2 Instruments

The study uses data from the Dutch research project 'Preventie in de keten' (roughly translated to "Prevention in the process"). In this project, the motivation of Dutch students and their academic achievement in the year 2011/2012 is measured for four cohorts of students (see section 3.1). The data consists of motivation variables that are measured both through self- and teacher-reported questionnaires. Academic achievement is measured through tests by the Dutch organization "CITO". They provide standardized tests for every cohort and were taken in the mid-year 2011/2012 for students from the primary schools. The measured variables are summarized below (see table 3). The value component is not measured for cohort 1 and 2 as the theory predicts that students develop realistic future time prospects after primary education. Self-efficacy and the teacher-reported variables were measured with the same questions for every cohort. self-concept was not measured for cohort 3 and 4 due to the similarity with self-efficacy and the already high number of items in the questionnaire. Social Relations, satisfaction and academic self-concept were measured differently for cohort 1/2 and cohort 3/4 in that age-specific formulations were used. Also, these variables are measured with 4-point-scales for cohort 1 and 2. All other variables are measured with a 5-point-likert scale.

Table 3:
Overview of the components of the engagement model with measured cohorts, example questions and references.

Component	Indicators	Cohorts	Example	Reference
Affective	Social relations	1-4	" I have many friends in school"	De Volder en de Lee (2009)
	Satisfaction	1-4	" I feel at home in school"	
	Teacher-student relationship (teacher-reported)	1-4	"The student talks openly with me"	
Expectancy	Self-efficacy,	1-4	" I can do almost everything at school if I keep trying."	(Midgley et al., 2000)
	academic self-concept	1+2	" I work slower than others in my class" (negative)	
Value	Short term future time prospects	3+4	"I like that I learn all sorts of new things this year"	Peetsma and Van der Veen (2008)
	Long term future time prospects	3+4	"I like fantasizing about my future study or job"	
Motivational behavior	Work attitude (teacher-reported)	1-4	" The student works precisely"	(Midgley et al., 2000)
	Behaviour (teacher reported)	1-4	"The student abides by the rules"	
Academic Achievement	Language Grades	1-4	CITO tests mid-year 2011/2012	
	Mathematics Grades	1-4	CITO tests mid-year 2011/2012 (Only vocabulary results for cohort 4 and 5)	

3.3 Procedure.

Student assistants visited each class to let students fill in their questionnaire and make the standardized tests. The teachers of every class filled in one questionnaire for each individual student to measure student's motivational behaviour and the teacher-student-relationship. The results were then manually transcribed to a database and recoded. All variables that were measured on a 4-point scale were recoded to make them comparable to those measured on a 5-point-scale. All variables shown in table 3 were standardized per cohort using multiples of the standard deviation (z-score) to make the results comparable between cohorts. Regression analyses are executed with academic achievement as the outcome variable in the form of language and mathematics test results and the components of engagement as the independent variables. The analyses are drawn for each cohort and each variable individually, providing an overview of the explained variances of each variable, corresponding to subquestion (1). The regression model is $y = b_0 + b_x + \varepsilon$ where the dependent variable y represents the math or language test results and the independent variable x the score on the measured variable of the regression model. Subsequently, a moderated regression method is applied to analyze whether the effect of the independent variable differs between the cohorts (subquestion 2). Hartmann and Moers (1999) explain that this method can be understood as a simple regression model that is enhanced with an interaction term between the first independent variable (the engagement variable) and the second (the moderator, in this case the cohort). The regression model is defined as $y = b_0 + b_1x_1 + b_2x_2 + b_3(x_1 * x_2) + \varepsilon$, where x_1 is the predictor variable (e.g. self-efficacy) and x_2 the moderator (cohort). $x_1^*x_2$ measures the interaction of both. For each variable of the motivation model, an interaction effect with the cohort of the student is tested . For example, the regression model for Self-efficacy with language test results as outcome variables is defined as $y_{language} = b_0 + b_1x_{selfeff} + b_2x_{cohort} + b_3(x_{selfeff} * x_{cohort}) + \varepsilon$. b_1 measures a main effect of self-efficacy, b_2 a main effect of the cohort and b_3 measures the interaction. A significant $b_3$therefore indicates that the effect of self-efficacy differs between cohort 2 and 3.

4. Results

In this section the results of the analyses described in 3.3 are presented. First, descriptive statistics are shown in form of the means and standard deviations of each variable and their internal consistency (section 4.1). Subsequently, the results of the regression analyses are show (section 4.2). For each regression analysis, one table displays the standardized beta (ß), the explained variance (R^2) and significance (p) of the regression models per cohort and does this separately for mathematics and language test results. In addition, section 4.3 describes the interaction effects between each predictor variables and the cohort.

4.1 Descriptives

Table 4 displays the means and standard deviation for each variable of the engagement model. Each item is measured with a 5 point-scale. The different number of valid cases follows from different numbers of missing values of the teacher-and student-reported variables (see table 2). The variable "academic self-concept" is only measured for cohort 1 and 2 and the two "future time prospect" variables only for cohort 4 and 5. Table 5 shows the internal consistency of every item. Reliabilities for the teacher reported variables (teacher-student-relationship, behaviour, work attitude) are consistently above a Cronbach's alpha value of 0.75. The values of the student's self-reported variables range mostly between 0.6 and 0.8 with the exception of the lower values of the variable "Future time prospect long term" in cohort 3 and 4 (0.56 and 0,55) and "academic self-concept" and "social relations" show low values in cohort 1 (0.55 and 0.47).

Table 4:
Means and standarddeviations for each variable.

Variable	Cohort 1		Cohort 2		Cohort 3		Cohort 4	
	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)
Self-efficacy	343	3.96 (0.71)	314	3.69 (0.60)	403	3.65 (0.50)	116	3.7 (0.54)
Academic self-concept	343	4.06 (0.67)	314	3.77 (0.54)				
Satisfaction	343	4.02 (0.50)	314	3.70 (0.54)	403	3.75 (0.66)	116	3.69 (0.61)
Social Relations	343	3.21 (0.47)	314	4.29 (0.48)	403	4.04 (0.49)	116	3.94 (0.52)
Teacher-student-relationship (teacher-reported)	351	4.12 (0.44)	330	4.00 (0.51)	431	3.84 (0.49)	118	3.64 (0.40)
Future time prospect long term					403	4.04 (0.47)	116	3.95 (0.49)
Future time prospect short term					403	3.86 (0.72)	116	3.94 (0.76)
Work attitude (teacher-reported)	351	2.43 (0.82)	330	2.39 (0.89)	431	2.30 (0.81)	118	2.24 (0.64)
Behaviour (teacher-reported)	351	2.95 (0.74)	330	2.90 (0.73)	431	2.70 (0.81)	118	2.82 (0.64)

Table 5:
Reliabilities of the analyzed variables per cohort.

Variable	Cohort 1	Cohort 2	Cohort 3	Cohort 4
Selfefficacy	0.73	0.79	0.71	0.74
Academic self-concept	0.55	0.70		
Satisfaction	0.47	0.70	0.71	0.64
Social Relations	0.74	0.69	0.73	0.75
Teacher-student-relationship	0.86	0.89	0.87	0.82
Future time prospect long term			0.56	0.55
Future time prospect short term			0.76	0.83
Work attitude	0.83	0.89	0.88	0.82
Behaviour	0.83	0.78	0.82	0.80

4.2 Regression Analyses

In this section, the regression effects of every indicator of the engagement model on mathematics and language achievements are presented for each cohort separately. For each regression, the standardized beta-coefficient (ß), the coefficient of determination (R^2) and the significance (p) are displayed. The results are shortly described for each component of engagement.

4.2.1 The effects of the expectancy component on academic achievement. With the exception of cohort 4, the beta values show that the effect of self-efficacy on both language and math achievements increases for students from a higher cohort (see table 6), except for cohort 3. For the mathematics outcome, the effects has a moderate beta of 0.117 in cohort 1, but increases towards 0.396 in cohort 4. For the language outcome, this effect begins with a negative beta of 0.105, but increases to a positive value of 0.301. Every regression for cohort 2 and 4 is also highly significant with $p<0.001$. The beta values of Academic self-concept also shows an increase of cohort 2 above cohort 1 with both language and mathematics test results as dependent variables. The differences between the regression effects of self-efficacy and self-concept for the different cohorts are significant for language and math outcomes (see table 10), with the exception of self-efficacy differences for the math outcomes. This regression model has a p-value slightly above the significance level of 0.05 (P=0.072).

Table 6:
Regression effects of variables of the expectancy component on math and language achievements

Expectancy Component	Math			Language		
	ß	r^2	p	ß	r^2	p
Self-efficacy						
Cohort 1	0.117	0.010	0.051	-0.105	0.011	0.088
Cohort 2	0.298	0.086	0.000***	0.177	0.032	0.002**
Cohort 3	0.195	0.036	0.000***	0.095	0.009	0.059
Cohort 4	0.396	0.149	0.000***	0.301	0.091	0.001**
Academic Self- concept						
Cohort 1	0.126	0.016	0.036*	0.027	0.001	0.665
Cohort 2	0.345	0.119	0.000***	0.205	0.042	0.000***

* p<0.05, **p<0.01, ***p<0.001

4.2.2 The effects of the affective component on academic achievement. The affective component, indicated by the student's reported satisfaction, social relations and the teacher-reported relationship with students, shows distinct patterns for the four cohorts (see table 7). The beta values of the regression models with satisfaction as a predictor are negative or just above zero for cohort 1 and 2, with no significant regression effect. For cohort 3 and 4, however, the effects increase. The regressions on the language test results are highly significant for these two cohorts. The regressions on mathematics test results are insignificant, but show an increase as well. Accordingly, the interaction effects between the satisfaction variable and the cohort is significant for both language and math outcomes (see table 10). The effects of social relations on mathematics and language achievements are highly significant ($p<0.01$) for cohort 1, but the regression effects are much lower for cohort 2 and 3. The effect on language test results for students in cohort 4 is also significant. However, a significant interaction effect with the cohort can only be found for the regression on mathematics tests results (see table 10). The teacher-student-relationship predictor for language outcomes is significant for cohort 1, 2 and 3, but not for cohort 4. In contrast, the effect on mathematics outcomes begin with a small beta of 0.035 in cohort 1, but increase towards a significant beta of 0.205 in cohort 4. Still, interaction effects for both variables are not significant (see table 10).

Table 7:

Regression effects of variables of the affective component on math and language achievements

Affective Component	Mathematics			Language		
	ß	R^2	p	ß	R^2	p
Satisfaction						
Cohort 1	-0.075	0.006	0.209	0.025	0.001	0.686
Cohort 2	-0.093	0.009	0.107	-0.039	0.001	0.499
Cohort 3	0.016	0.000	0.748	0.139	0.019	0.006**
Cohort 4	0.161	0.026	0.095	0.280	0.078	0.003**
Social relations						
Cohort 1	0.193	0.037	0.001***	0.171	0.029	0.005***
Cohort 2	0.118	0.014	0.040*	0.074	0.005	0.196
Cohort 3	-0.015	0.000	0.767	0.054	0.003	0.287
Cohort 4	0.108	0.012	0.163	0.247	0.061	0.010**
Teacher-student relations						
Cohort 1	0.035	0.001	0.559	0.161	0.026	0.007**
Cohort 2	0.027	0.001	0.630	0.092	0.026	0.003**
Cohort 3	0.074	0.005	0.141	0.145	0.021	0.004**
Cohort 4	0.205	0.042	0.034*	-0.118	0.014	0.228

* p<0.05, **p<0.01, ***p<0.001

4.2.3 The effects of the value component on academic achievement. The long term future time perspective significantly predicts the language grades for cohort 3 and 4 (see table 8).The short term future time prospect, however, only predicts the language outcomes for cohort 4 significantly and none of the two variables show a significant effect on the math test results. Also, no significant interaction effect between the predictor variables and the cohort can be found (see table 11).

Table 8:
Regression effects of variables of the value component on math and language achievements.

Value Component	Mathematics			Language		
Cohort	ß	R^2	p	ß	R^2	p
future time prospect long term						
Cohort 3	-0.022	0.001	0.594	0.207	0.043	0.000***
Cohort 4	0.132	0.016	0.192	0.199	0.040	0.038*
future time prospect short term						
Cohort 3	0.027	0.000	0.667	0.068	0.005	0.179
Cohort 4	0.126	0.017	0.174	0.209	0.044	0.030*

* p<0.05, **p<0.01, ***p<0.001

4.2.4 The effects of the behavioural motivation component on academic achievement. The effects of the "behaviour" predictor (see table 9) on mathematics results are significant for cohort 4 (ß=0.201, p=0.038), but not for cohort 1,2 and 3. Regression effects on language test results show the opposite pattern: The beta values for the regression effects on language test results are the highest for cohort 1 and decrease with each higher cohort. For cohort 1,2 and 3, the regression effects are significant. For the variable "behaviour", no significant interaction effect with the cohort can be found. The variable "Work attitude" is a highly significant predictor of language and mathematics outcomes for cohort 1 and 2 (p<0.001). However, regression effects of the predictor for students of cohort 3 are not significant . The regression effect for students of cohort 4 on language test results is similarly low, but the effects on mathematics test results are highly significant. A significant interaction effect with the cohort, however, can only be found for regressions on language test results (see table 11).

Table 9:

Regression effects of variables of the Behavioural motivation component on math and language achievements.

Behavioural Motivation	Mathematics			Language		
	ß	r^2	p	ß	r^2	p
Behaviour						
Cohort 1	-0.023	0.001	0.693	0.156	0.024	0.009**
Cohort 2	0.047	0.002	0.399	0.138	0.019	0.013*
Cohort 3	0.040	0.002	0.442	0.125	0.016	0.016*
Cohort 4	0.201	0.041	0.038*	0.092	0.008	0.345
Work Attitude						
Cohort 1	.239	0.057	0.000***	0.342	0.117	0.000***
Cohort 2	.205	0.042	0.000***	0.328	0.105	0.000***
Cohort 3	0.013	0.000	0.800	0,050	0.002	0.338
Cohort 4	0.294	0.087	0.002**	0.064	0.004	0.512

* p<0.05, **p<0.01, ***p<0.001

4.3 Interaction effects.

Table 10 provides an overview of the moderated regression models that were described in section 3.3. Each interaction model consists of three predictors: The variable of the engagement model, the cohort variable and the product of both. The unstandardized B and the significance p are displayed for each predictor . A main effect of the predictor variable (e.g. self-efficacy) indicates a significant effect of this variable on achievements when no separation between cohorts is made. When the product of the engagement and the cohort variable is significant, an interaction effect is found. As the outcome variables are standardized per cohort, no main effect of the cohort can be found. However, the regression analyses are executed using list-wise deletion, which means that students with either missing test results or questionnaire results are excluded from the analysis. Therefore, the main effects are not exactly zero. In total, 7 of the 18 regression models show a significant interaction effect between the predictor variable and the cohort. Each component of the engagement model shows at least one significant interaction effect, with the exception of the value component.

Table 10 :
Regression models displaying main- and interaction effects of the expectancy and affective component with the cohort using mathematics and language outcomes

Regression models	**Math**			**Language**		
	B	**p**	**R^2 of the model**	**B**	**p**	**R^2 of the model**
Self-efficacy			0.050			0.004
Self-efficacy	0.224	0.000***		.089	0.004**	
Cohort	-0.003	0.928		.001	0.977	
Self-efficacy * cohort	0.056	0.072		.103	0.002**	
Self-concept						0.023
Self-concept	0.229	0.000***	0.068	.114	0.007**	
Cohort	0.016	0.690		.022	0.595	
Self-concept *cohort	0.104	0.009**		.088	0.036*	
Satisfaction			0.005			0.012
Satisfaction	-0.024	0.438		.073	0.018	
Cohort	-0.005	0.867		.002	0.952	
Satisfaction * cohort	0.068	0.025*		.087	0.008**	
Social Relations			0.012			0.010
Social Relations	0.087	0.005**		0.112	0.000***	
Cohort	-0.004	0.907		0.010	0.767	
Social Relations *cohort	-0.065	0.038*		-0.001	0.962	
Teacher-student relationship			0.005			0.020
Teacher-student Relationship	0.063	0.035*		0.133	0.000***	
Cohort	0.000	0.988		0.014	0.646	

* p<0.05, **p<0.01, ***p<0.001

Table 11 :

Regression models displaying main- and interaction effects of the value and behavioural motivation component with the cohort using mathematics and language outcomes.

Regression models	**Math**			**Language**		
	B	**p**	**R^2 of the model**	**B**	**p**	**R^2 of the model**
Future time prospect short term			0.004			0.013
Future time prospect short term	0.018	0.692		0.105	0.000***	
Cohort	-0.011	0.823		-0.015	0.760	
Future time prospect short term * cohort	0.067	0.162		0.061	0.203	
Future time prospect long term			0.004			0.042
Future time prospect long term	0.053	0.241		0.206	0.000***	
Cohort	-0.006	0.892		-0.010	0.837	
Future time prospect long term * cohort	0.043	0.366		-0.005	0.922	
Behaviour			0.021			0.033
Behaviour	-0.042	0.174		-0.132	0.000***	
Cohort	0.001	0.976		0.018	0.559	
Behaviour * cohort	-0.051	0.108		0.023	0.470	
Work attitude			0.026			0.048
Work attitude	-0.156	0.000***		-0.208	0.000***	
Cohort	-0.001	0.980		0.028	0.367	
Work attude *cohort	-0.047	0.127		0.130	0.000***	

* p<0.05, **p<0.01, ***p<0.001

5. Discussion

In this study, the effect of students' engagement on academic achievement through the course of their school careers was investigated. For every component of the tested engagement model, an effect on achievement could be found, but the kind of effect differed depending on the stage of the students' school career and whether effects on mathematics or language achievements were measured. Therefore, no general statement about the effect of engagement on achievement can be made without considering the differences between the four cohorts and the two achievement domains that were included in the analysis. Some components show increasing effects for students in a later stage of their career, others show decreasing or non-linear effects. Furthermore, these effects differ for mathematics and language achievements. These results indicate that in order to understand the relationship between student engagement and achievement, one has to consider the different components of engagement in the context of the students' stage in their school career. This allows practitioners and researchers to identify the key mechanisms that can influence particular groups of students positively and to develop appropriate interventions. The following sections discuss these mechanisms in more detail by interpreting the effects of the four components of engagement on student achievement.

5.1 The effects of the components of engagement on student achievement.

5.1.1The expectancy component. Both indicators of the expectancy component show an increasing effect as the student reaches later stages of his school career, with the exception of cohort 3. As highlighted in the literature review (Nicholls, 1984), students at the beginning of their school career evaluate their own competence based on previous experience. Children from cohort 1 just started gaining experiences and therefore can hardly make appropriate judgments about their own competence, which is confirmed by the insignificant results for cohort 1 in this study. The effect of self-efficacy on math and language outcomes increases in cohort 2 and become significant, confirming that students gain competence in judging their efficacy in the course of their school career. The role of age becomes even more explicit for the sample of cohort 4 students. The self-efficacy scale represents a strong predictor of both math and language scores, highlighting the meaningfulness of the construct in the course of the student's school career. Although this finding supports the thesis that a sense of a student's own competence increases with age, the results for cohort 3 do not support this thesis. One possible explanation for this issue is related to the new environment that these students find themselves in. As described in the literature, school transitions are generally associated with a number of negative changes. In this special case, however, students find themselves in an environment with lower achieving student. The big-fish-little-pond-effect (see section 2.2.2) might contribute to diffusing the relationship between self-efficacy and achievement, thus explaining the lower explained variance. The general self-efficacy scale does not include items about social comparison, so no clear explanation can be made about this issue, but for cohort 1 and 2 an interesting finding regarding comparison is the following: For Cohort 1 and 2, the academic self-concept is measured in addition to self-efficacy. As Ferla et al. (2009) explain, one key difference between both concepts is the source of evaluation: In contrast to self-efficacy, perceptions of academic self-concept rely strongly on a comparison with others. As part of their socialization experience, they define their self-concept more and more through comparing themselves with their peers, which can be confirmed by the stronger effects for the students from cohort 3, in line with Ruble's (1983) and Nicholl's (1984) findings.

5.1.2 The affective component. The analyses for the affective component generally show divergent effects of the different predictors on math and on language achievement. While the effect of self-reported satisfaction on mathematics test results is not significant for any cohort, the effects on language achievements are significant for cohort 3 and 4. It should be noted, however, that the internal consistency of satisfaction for cohort 1 was very low (see table 5) and that satisfaction was measured with different indicators for cohort 3 and 4. Therefore, although significant differences between the cohorts were found (see table 10), concluding that satisfaction is not relevant for the achievement of younger students would be premature with the given data. Still, the results show clearly that satisfaction is important for language achievements of the older students of cohort 3 and 4. The effect of social relations shows a very different pattern. Effects of social relations are already significant for language and mathematics achievements in cohort 1, highlighting the importance of the early socialization experiences for the students. However, the effects decrease for students of cohort 3 and for cohort 3, the social relations become insignificant for both mathematics and language achievements, which may implicate that many students have acquired enough compensating social

relations outside of their class. For cohort 4, social relations have a stronger effect that is also significant for language outcomes. One possible explanation can be that social relations show their influence not directly through lower achievements, but that a consistent lack of social relations can become a severe handicap when the student has a longer history of social problems. Another explanation might be that, in line with the finding by Pratt and George (2005), students may have especially strong problems finding satisfying social relations after they changed the school and therefore experience academic struggles. In contrast to the effect on mathematics achievement, however, the effects on language achievements do not differ significantly (see table 10). This can be explained by the fact that cohort 1 and 4 show much higher results than cohort 2 and 3 and the regression method used can only identify linear differences (that means decreasing or increasing effects over all four cohorts). The third variable, the teacher-student relations shows contrary results for mathematics and language achievement. The effects on mathematics test results increase per cohort and are significant for cohort 4, while the effects on language test results are significant for every cohort except for cohort 4. This might be explained by the importance that personal contact with teachers has on a student's early language development that is not as important for older students.

5.1.3 The value component. The regression analyses of the value component (see table 8) suggest that the long and short term future time prospects are important predictors of language , but not mathematics achievements. The two predictor variables have a similar effect on language test results for students in cohort 4. For cohort 3, however, only the long-term goals have a significant effect. Peetsma and Van der Veen (2008) argued that students start developing realistic future time prospects at age 11 and this finding supports that in cohort 3, where students have a mean age of 14 years (see table 2), this can already have an impact on achievement. The effect of the short term future prospect, however, can only be found in cohort 4. This indicates that for students in vocational education, setting short-term goals become more important, which might be explained by a decrease in the ability to delay gratification of some students. This might also be explained by the drastic change in the school environment that students from this cohort experience. As students find themselves in an environment with lower-achieving students, their interest in learning activities might change as well. The Language test for cohort 3, however measures the student's vocabulary, which is not expected to change as abrupt. It should be noted, that differences between the cohort 3 and 4 were not significant (see table 11), so speculations about these results should be treated carefully.

5.1.4 The behavioural motivation component . Students' work attitude has a highly significant effect on language and mathematics achievements for cohort 1 and 2, but this effect is much weaker in cohort 3. One possible explanation might be that in this cohort, which represents the lowest level of secondary education in the Dutch education system, the number of students who are engaged in school activities, but do not have the capacities to succeed academically, is higher. This group of students would be classified as "struggling with academics" in the typology of Bower and Sprott (2012). While the effect on language achievements is similarly low for cohort 4, the effect on mathematics achievements are highly significant, suggesting that a positive work attitude can still lead to success in mathematics in the student's later school career. The predictor " behaviour" also has a significant effect on mathematics, but not language test results, which supports the assumption, that behavioural motivation in general is crucial for succeeding in mathematics for students in cohort 4. For cohort 1, 2 and 3, however, exactly the opposite is the case: Only the effects of behaviour on language achievements are significant. Conformism to class rules and pro-social behaviour seem to be much closer related to language development for the majority of the school career. As the effects of the behaviour predictor are very similar to the teacher-student-relationship predictor (see table 7), it seems plausible that for the development of language competence, teacher and students need to be able to cooperate, while students who show problematic behaviour can still succeed in mathematics. The negative correlation that Landsheer et al. (1998) found between social competence and mathematics achievement supports this assumption, although this finding cannot be generalized to cohort 4.

5.2 Limitations of the study.

In general, several limitations should be taken into account before generalizing the findings: First, due to the high number of regression analyses, there is a higher chance of a significant finding by coincidence in one or more cases. Furthermore, the cohorts vary in the number of participants, schools and teachers. With just over a hundred students, the sample from cohort 4 is smaller than the other three cohorts and the significance levels are therefore lower. This also makes it more difficult to

interpret differences between cohort 3 and 4 as even large differences in the r^2 measures can be insignificant. The outcome measure differs between the cohorts. For cohort 3 and 4, only vocabulary outcomes are available and these outcomes can be expected to differ from elementary school tests that also measure text comprehension. Despite the significant findings, the internal consistency of some variables are below 0.6 cohort 1 (see table 5). Finally, as the data consists of one measurement moment only, cause and effect relationships are not always clearly interpretable.

5.5 Implications for future research and practice.

As the above sections have shown, the relationship between engagement and achievement is complex and more detailed analyses are necessary to understand this process. A promising starting point for further research would be the analysis of longitudinal data. This approach will be especially useful for understanding the effects of the transition from primary to secondary education. Furthermore, predictors that show their effects much later in the student's school career can be identified by observing the same students through several years. Future research should also consider the role of the class-level and school-level effects in the student's development to identify, for example, characteristics of the school's management or the teacher's attitude that might influence the process. While this study has provided an interesting starting point, the validity of the dropout typology approach (see section 2.1.2) cannot be tested on the basis of the data in this study as there is no information available about which students will drop out. However, this study lays the groundwork for a combination of this approach with the life-course perspective (see section 2.1.1), which can enhance the understanding of the dropout process. Taking a life-course perspective may deliver answers to the question why someone becomes part of one of the four groups in the terminology of Bowers and Sprott (2012) by identifying in which way the dropout process starts for these students. A student who makes negative experiences at the beginning of his school career might be likely to become a member of the "disrupting school" group, because he experiences a longer vicious circle. These implications highlight the complexity of the topic, which should always be considered in an effort to understand the role of engagement for the student's achievements. This accounts not only for researchers, but also for practitioner's who wants to bring these insights into practice. A teacher trying to support a struggling student should therefore take the student's specific needs at his current age and in his current environment into account and then develop a strategy to cope with these problems. The findings of this study emphasize this approach. Although self-efficacy and the teacher-reported work attitude of the student prove to be fairly consistent predictors of achievements, student's affective reaction towards the school environment and their perceived competence should always be interpreted with regard to socio-emotional and environmental changes in the student's life. In the light of these results, taking a life-course perspective on dropout proves to be a valid approach. There is not a single reason for a decline in academic achievement. While a 12 year old student might be less dependent on satisfying social relations within school, it can mark the beginning of a disengagement process for a six year old. Therefore, it is important to understand these developments early on and to undertake the necessary actions at the start of this process. However, this study has also shown that while some of the components of engagement had the strongest effects in the early years of the student's school career, others became much more important when students enter vocational education. This finding suggests that a proper understanding of the different effects of engagement on achievement can still help to set the right mechanisms in motion that lead to a positive development of students' academic success in every stage of their school career.

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