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Enhancing performance and motivation in lower secondary education

Wijsman, L.A.

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Enhancing Performance and Motivation in Lower Secondary Education

Lindy Wijsman

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Enhancing Performance and Motivation in Lower Secondary Education

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Lindy Ariadne Wijsman

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in 1989

Promotores
Prof. Dr. P.M. Westenberg
Prof. Dr. J.H. van Driel, The University of Melbourne, Australia

Copromotor
Dr. N. Saab

Promotiecommissie
Prof. Dr. C.A. Espin
Prof. Dr. A.E.M.G. Minnaert, Rijksuniversiteit Groningen
Prof. Dr. T.T.D. Peetsma, Universiteit van Amsterdam
Dr. K.F.A. Stroet

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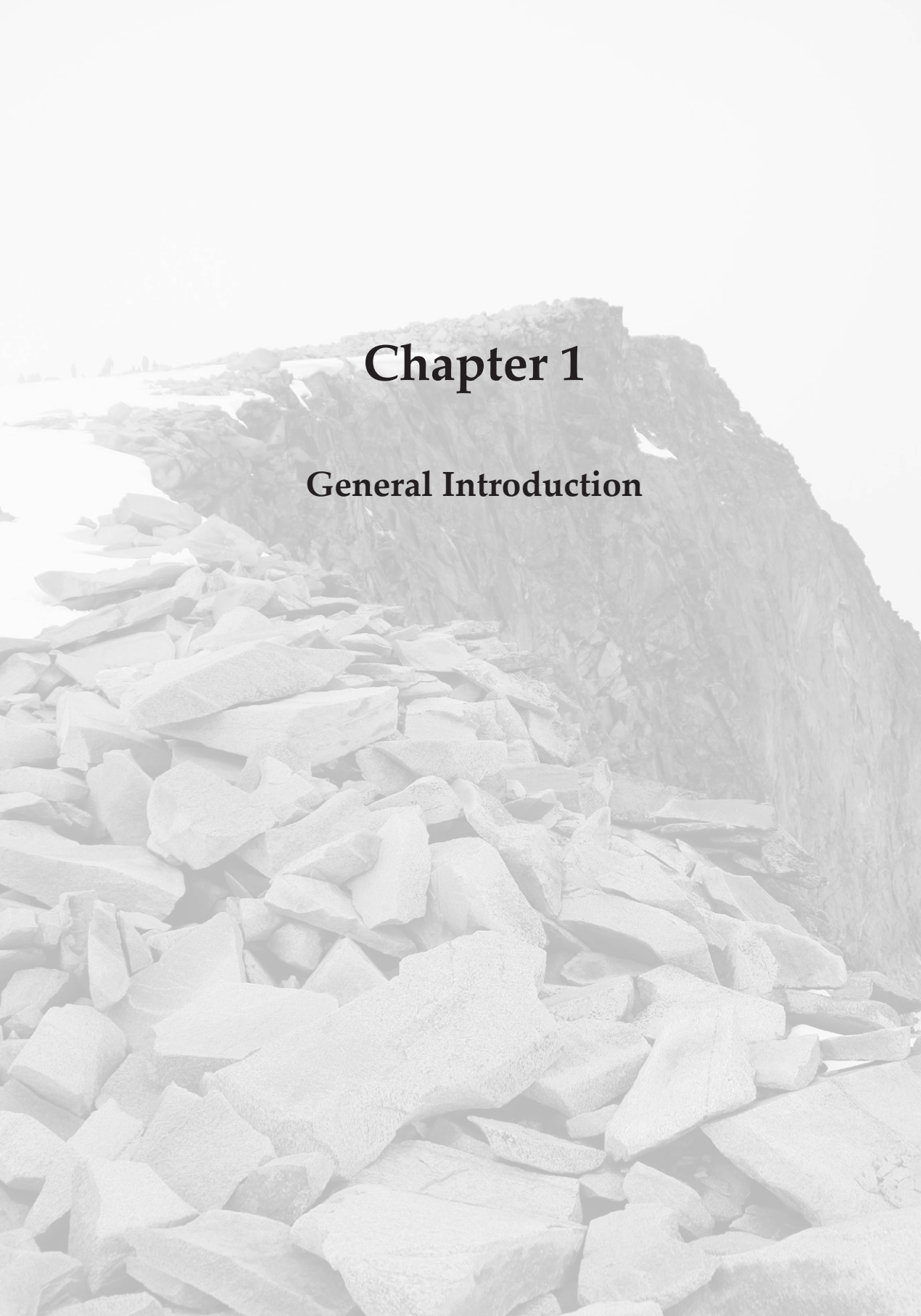

Chapter 1

General Introduction

1

1.1 **Introduction**

Secondary school is an important period in the lives of adolescents. Students start their secondary education around the age of 12 years, and this brings about many changes as compared to primary education. The secondary school environment means for students that they have to change classrooms between the lessons, are taught by different teachers for every subject, have many different subjects, with more emphasis on performance. At the same time, students become adolescents and reach an age at which puberty is an important characteristic of their lives. Their friends become more important, as do hobbies and weekend jobs. These changes in adolescents' lives have many consequences for their attitudes towards school.

It is a well-known phenomenon that motivation for school decreases among adolescents in secondary education (e.g. Eccles, Lord, & Midgley, 1991; Gnambs & Hanfstingl, 2016; Gottfried, Fleming, & Gottfried, 2001; Peetsma, Hasher, van der Veen, & Roede, 2005). This decline in academic motivation occurs most consistently during early adolescence until 15 or 16 years of age (Gillet, Vallerand, & Lafranière, 2012; Gottfried et al., 2001). This is a shame because various motivation concepts and performance have many times been shown to be related (e.g. Guay & Vallerand, 1997; Hidi & Harackiewicz, 2000; Lepper, Henderlong Corpus, & Iyengar, 2005; Steinmayr & Spinath, 2009; Wigfield & Cambria, 2010). Performance level influences school success and may ultimately affect one's life too. Moreover, one may not have learned as much as one could have during secondary school and therefore miss out on certain opportunities in study choices or further career.

The motivation and performance declines may emanate from the individual student, but are equally or even more likely to arise from characteristics of the learning environment. Education professionals in several countries have acknowledged that the education system does not encourage students to meet up to their academic potential. Sometimes, the learning environment is typified as a *culture of C's*; referring to students' tendency to do only what is required instead of meeting their own full potential (De Boer, Minnaert, & Kamphof, 2013).

The general aim of this dissertation is to investigate more specifically how student performance and motivation develop and relate to each other during lower secondary education, and whether an innovation could positively change these rather negative developments. If one wants to improve student performance and motivation, a good place to start is the learning environment. Therefore, this dissertation takes place in the context of an innovation in the learning environment, called GUTS. The aim of GUTS was to increase both performance and motivation among students in lower secondary education through a combination of intrinsic motivation stimulation and an external incentive. The remainder of the introduction first describes the motive for the

present study, followed by the theoretical foundation and the context of the dissertation, and finally an overview of the following chapters is presented.

1.2 Motive for the Present Study

To progress from one grade to the next in Dutch secondary education, students need to meet a specific set of criteria. Schools have some freedom to determine these criteria, but in each school the bottom line is defined by the lowest allowable performance level, and that is a report card grade of a 6 on a scale of 1 (extremely poor) to 10 (perfect). Overall, students need to obtain at least a six for their subjects to march on to the next grade. At the same time, performances higher than the standard do not have consequences for students' progress in school. Moreover, among peers it is generally deemed uncool to show that you are putting effort into your schoolwork (Mijs & Paulle, 2016). This might create a focus on the lowest possible grade rather than aiming for higher grades and might encourage students to lower their efforts as this will create more free time for their hobbies and friends. Therefore, the performance standard may be a reason for the culture of C's, a so much criticised phenomenon in Dutch education. While Dutch students generally perform well in international comparisons, the OECD (2016, p. 79) wrote that "some of the most promising students in the Netherlands are not reaching their full potential". In addition, motivation of students is low in comparison to other countries (OECD, 2016). This issue has also been addressed in the Dutch media widely (Hoogstad, 2012; Pietersen, 2013; Roeters et al., 2014; van Gaalen, 2017; van Walsum, 2016).

To address the culture of C's, Michiel Westenberg and Jan van Driel in 2012 wrote a project proposal for an innovation in secondary education to increase both student performance and motivation through challenging students to discover and develop their talents. This proposal was subsidised by the Dutch ministry of Education, Culture, and Science. The innovation was implemented in close collaboration with Wolfert Bilingual, a secondary school in the western part of the Netherlands. The research proposal included two PhD projects, one about the performance and motivation of secondary school students, and a second about teachers' views on and practices in differentiation. The present dissertation is the result of the former PhD project.

1.3 Theoretical Foundation of this Dissertation

Two concepts are central in this dissertation: performance and motivation. Both concepts are defined in the following subsections.

1.3.1 Performance

Performance in this dissertation is defined in terms of report card grades. In Dutch education, report card grades are important performance measures, which are attained for every subject a student takes. End-of-the-year report card grades are composed of results on different tests and assignments throughout the school year. For instance, one report card grade for history and one for mathematics is accomplished, which both are averages of results on various tests in that subject throughout the school year. These grades are important determinants of how school careers proceed. Report card grades are common in the practice of schools; however, they are not used in research often. This lack of research into report card grades originates from the often-used judgement that a report card grade is an unreliable and subjective measure of performance (Bowers, 2011; Brookhart et al., 2016). This judgement originated from a low correlation between report card grades and standardised measures of knowledge (Bowers, 2011). However, it is now known that this low correlation can be explained by the fact that report card grades do not solely measure academic knowledge, as do standardised measures of knowledge. Grades are composed of multiple dimensions such as a cognitive, a subject-specific, and a common grade dimension (Klapp Lekholm & Cliffordson, 2009). As such, this makes report card grades good predictors of educational success to use in research, as success is dependent on all these types of factors (Bowers, 2011; Klapp Lekholm & Cliffordson, 2009). Moreover, it has been shown that report card grades which consist of multiple measurements provide an overview of a student's average performance level for each subject during that year (van der Lans, van de Grift, & van Veen, 2015).

1.3.2 Motivation

1.3.2.1 Self-Determination Theory

This dissertation uses self-determination theory (SDT) to define motivation. The general idea of SDT is that every human is inherently active, curious and interested to learn, inclined to undertake challenges, and is growth oriented in nature (Deci & Ryan, 2000; Niemiec & Ryan, 2009; Stroet, 2014). This also holds for adolescents. However, it does not have to mean that one is always active, curious to learn and inclined to undertake challenges in every setting, or in case of academic motivation, for every school subject. Rather, it is likely that one is enthusiastic about some subjects and not about others.

Self-determination theory distinguishes the quality of motivation from its quantity (Ryan & Deci, 2000, 2002). The more self-determined one feels, the better the quality of the motivation is (Ryan & Deci, 2002). In SDT, two types of motivation are distinguished: autonomous and controlled motivation (Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009). If autonomously motivated, behaviour originates from within the self or behaviour is accepted to be personally relevant or to be integrated with one's personal values and goals

(Ryan & Deci, 2002). Controlled motivation includes motivation due to a feeling of pressure from within oneself or from the environment (Ryan & Deci, 2002). One shows behaviour purely to receive a reward or to avoid punishment, or to avoid a feeling of guilt or shame.

Autonomous motivation relates to positive school outcomes, as has both theoretically been reasoned (Ryan & Deci, 2000), and empirically been investigated (e.g. Guay & Vallerand, 1997; Vansteenkiste et al., 2009). To understand motivation, SDT stresses a need to comprehend people's basic psychological needs for autonomy, competence, and relatedness (Deci & Ryan, 2000). Only if these needs are fulfilled, one can feel fully self-determined. Social contexts are very important to influence the fulfilment of needs, and individual differences in motivation and personal growth (Ryan & Deci, 2000).

1.3.2.2 Need-supportive teaching to stimulate motivation

Teaching is a social activity that can stimulate volitional academic motivation through support of student basic psychological needs for autonomy, competence, and relatedness. Teachers can support or thwart students' need for autonomy, can provide structure or chaos, which affects the need for competence, and can show involvement or rejection, affecting the need for relatedness (Stroet, 2014). Autonomy and competence play the most important role in stimulation of intrinsic motivation (Deci & Ryan, 2000). The role of relatedness is more distant, but also important for maintaining intrinsic motivation. This dissertation, when describing need-supportive teaching, focuses on fulfilment of the needs for autonomy and competence. The *need for autonomy* refers to perceiving oneself as the origin of one's behaviour, and the *need for competence* indicates the need to feel effective in interaction with the environment and to feel able to show one's capacities (Ryan & Deci, 2002).

To fulfil students' need for autonomy, a teacher can employ autonomy-supportive teaching. An autonomy-supportive teacher adopts the student perspective, is open to thoughts, feelings, and behaviour of students, and stimulates the autonomous self-regulation (Reeve, 2009; Stroet, 2014). Autonomy support does not mean complete freedom, but is perceived self-determination within boundaries or guidelines. Therefore, structure is an important aspect of need-supportive teaching too, mainly to fulfil the need for competence. Structure comprises of clear expectations and goals, guidelines and rules, and informative feedback (Koestner & Losier, 2002; Reeve, 2002). If a teacher provides structure, teaching fulfils the need for competence by providing students with the feeling of control over their school outcomes (Stroet, 2014).

1.3.2.3 Extrinsic incentives in relation to motivation and performance

In addition to need-supportive teaching to stimulate autonomous motivation, in an academic setting there are also some external factors affecting student motivation and performance. Students take many subjects in secondary school

which they all have to pass, although they may not be autonomously motivated for all subjects. This may, then again, mean that students need some extrinsic incentive such as a reward or another driving force to stimulate their motivation and performance for their non-autonomously motivated subjects. In self-determination theory, incentives are defined in terms of rewards for positive behaviour. The influence of extrinsic incentives on motivation and performance has been topic of study, inferring various and sometimes conflicting plausible mechanisms (Deci, Koestner, & Ryan, 1999). Addressing the relation between extrinsic incentives and intrinsic motivation, Cognitive Evaluation Theory (CET, Ryan & Deci, 2002) within SDT postulates that incentives negatively influence self-determination through a feeling of control and pressure from outside the individual to perform an activity. On the other hand, incentives are theorised to possibly provide information about one's competence; i.e. incentives may show whether one is capable at a certain task or not. This may increase perceived competence; one of the basic psychological needs which need to be fulfilled to stimulate autonomous motivation. Whether extrinsic incentives then negatively or positively relate to intrinsic motivation depends on the strength of the detrimental effect on autonomy as compared to the advantageous effect on competence.

Furthermore, empirical research has stressed the importance of the types of incentives to determine its relation to intrinsic motivation and performance. Several meta-analyses have consistently shown that more controlling types of incentives negatively affect intrinsic motivation, whereas less controlling types of incentives did not do this (Cameron & Pierce, 1994; Deci et al, 1999; Cerasoli, Nicklin, & Ford, 2014). For example, Cameron and Pierce (1994) found a negative effect on free time spent on the task only after removal of expected tangible rewards that were provided for doing the task, regardless of the result. For other types of rewards, including verbal praise, unexpected tangible rewards, and rewards for performing to a set of standards, and for another measure of intrinsic motivation, namely attitude, non- or even increasing effects were found. Regarding the relation between extrinsic incentives and performance, intrinsic motivation in terms of working autonomously, being absorbed in the task, drawing on personal resources, and maintaining a broad focus, was found to predict quality of performance best. Moreover, extrinsic incentives were the best predictors of quantity of performance; that is noncomplex, repetitive performance that requires chiefly focus and drive. It was also found that the presence of extrinsic incentives boosted the link between intrinsic motivation and performance (Cerasoli et al., 2014), especially if the incentives were indirectly tied to performance; such as receiving a compliment when reciting the correct answer in class which does not directly affect performance on the following test.

The present dissertation defines extrinsic incentive in terms of a performance standard as a driving force. This driving force has a direct relation to performance level and is assumed to contribute to a motivation and performance increase.

1.3.2.4 General and specific motivation

Dependent on the perspective employed, academic motivation is defined more general or specific (Bong, 2001; Hornstra, van der Veen, & Peetsma, 2016). General motivation is motivation towards school or learning in general, however, students can differ in their motivation for various tasks or subjects. Therefore, the present dissertation uses both perspectives at various moments.

When we refer to *general motivation*, motivation for school in general is studied. In this situation, students' overall affect towards school is central. Motivation for school in general is of interest in this dissertation because it provides a perspective to study the so-called culture of C's, and the declining levels of motivation during adolescence. *Specific motivation* in the present dissertation is distinguished into motivation for specific types of subjects that are perceived positively or negatively. We name these subjects *favoured* and *disfavoured* subjects. Favoured subjects are operationalised as subjects which students like and would like to spend extra time on, and disfavoured subjects are defined as subjects which students do not like and would not like to spend extra time on. For a favoured subject, the autonomous motivation is expected to be higher than for a disfavoured subject, as 'liking a subject' is a typically autonomously motivated emotion (Ryan & Deci, 2000). When a student favours a subject, (s)he has a positive emotion towards this subject, and (s)he enjoys learning the subject. Learning enjoyment towards a subject has been found to originate from a pre-existing interest in the learning content, activity, or subject itself, or when a student felt competent at a subject (Hagenauer & Hascher, 2010). On the other hand, learning enjoyment was also found to be impeded when the learning content was judged boring, when a student disliked the subject in general, or when (s)he felt incompetent (Hagenauer & Hascher, 2010).

1.4 **Context of this Dissertation: GUTS**

The innovation studied in the present dissertation is GUTS (Differentiated Challenging of Talent in School; or in Dutch Gedifferentieerd Uitdagen van Talent op School). GUTS is an innovation that was developed collaboratively by Leiden University and Wolfert van Borselen School Group. Wolfert van Borselen School Group is a group of schools for public education containing all types of secondary education. This group of schools falls under supervision of a board, which contains 78 schools for primary, secondary and special needs education.

Specifically, from Leiden University, the institute of Psychology and ICLON, and from Wolfert van Borselen one school, Wolfert Bilingual, participated. GUTS was implemented in this school between September 2013 and July 2016. Wolfert Bilingual is a bilingual secondary school in the province South-Holland in the Netherlands that provides senior general secondary (havo) and pre-university education (vwo). Senior general secondary education prepares

for higher professional education, and pre-university education prepares for university. These are the two highest level school types in the Netherlands. The school educates approximately 850 students in total every year. Wolfert Bilingual can be typified as an innovative school, constantly thinking of ways to improve the education and to stand out. The school has received the by the government issued predicate 'Excellent School' for several years in a row. Additionally, the school has an international and societal focus, stimulating the students to contribute to the society in multiple ways by, for example, a system of community and service points which students have to achieve, and offering Chinese and Spanish as extra subjects.

The aim of GUTS was to increase both performance and motivation among students in lower secondary education through a combination of intrinsic motivation stimulation and an external incentive (see Westenberg, 2012). GUTS consists of two elements: (a) talent lessons as intrinsic motivation stimulation and (b) an increased promotion standard as extrinsic incentive. In order to capitalize on the combined effects of intrinsic and extrinsic factors, while avoiding potentially aversive effects of an extrinsic incentive, we use a positive approach by focusing on students' talents instead of deficits. The basic idea is that a student does not have to be good at and enjoy every subject, but that every student selects certain subjects that they like to excel at, which ultimately affects their subject-specific and general performance and motivation level. It is rare to perform poorly at something one enjoys (Cerasoli et al., 2014).

In GUTS, it is important that every student is included and stimulated. An underlying idea is that everyone has certain talents, or is able to excel at something. Rather than focusing only on excellent or gifted students, GUTS focuses on all students. In this view, GUTS defines talent as a combination of competence in a subject, and a drive to work on that subject. This definition of talent is similar to Gagné's (1985, 2004) reasoning, which states that the expression of talent in terms of performance depends on a combination of a student's ability, personal factors such as motivation, and context factors such as school. Additionally, an important nuance in our definition is that talent development is something for all students (Barab & Plucker, 2002) instead of only for the gifted ones.

1.4.1 Talent lessons

Goal of the talent lessons in GUTS was to stimulate student autonomous motivation for a subject chosen by the students for the talent lessons, and to stimulate motivation for school in general, through positively approaching students in a subject they liked. The talent lessons focus on students' strengths and aim to fulfil students' need for autonomy. When feeling autonomous, one's behaviour is perceived in accordance with one's interests and values, and activities are experienced as volitional (Ryan & Deci, 2002). In a school setting, the need for autonomy can be fulfilled through autonomy-supportive teaching,

which means that teachers incorporate students' interests and values through offering choice, fostering relevance and showing respect (Stroet, Opdenakker, & Minnaert, 2013; Vansteenkiste et al., 2012). If students perceive autonomy support, they experience more motivation and engagement in school (Reeve, 2006; Stroet et al., 2013). The talent lessons were shaped using four design principles, to enhance performance and motivation. The first design principle was *autonomy*. Choosing a subject for the talent lessons offered some choice to the students to spend time on one of their interests. Also, during the talent lessons, as much choice as possible was offered regarding the topic or learning activity. Second, the teacher *differentiated* between the students, which means that the teacher took differences between students into account (Tomlinson et al., 2003). This provides students with positive affect and motivation towards learning (Tomlinson et al., 2003). Finally, *higher order thinking tasks* and *enrichment* were also included as principles in the talent lessons as aspects that challenge and interest students and make them acquainted with topics that are not included in the regular curriculum which may be perceived as interesting.

In practice, the talent lessons consisted of two cycles of eight 100-minute lessons per school year. For every cycle, students chose a different subject in which they received these talent lessons in addition to the regular lessons of the subject. Students from seventh and eighth grade and senior general secondary and pre-university education took the talent lessons jointly. This kind of flexible grouping has been found to positively affect student achievement (Rubie-Davies, Peterson, Sibley, & Rosenthal, 2015).

1.4.2 Promotion standard

A higher promotion standard was implemented as an extrinsic incentive. This means that students participating in GUTS had to achieve an average 7 on their report card at the end of the school year. Generally, in the Netherlands an average report card grade of 6 is enough for a student to proceed to the next grade. In GUTS, however, if a student achieved a 6 in one subject, which was still sufficient for that one subject, an 8 should be achieved in another subject to reach the overall performance standard. In this way, students could differentiate their achievement between subjects, giving everyone the opportunity to excel in some subjects to compensate for other subjects.

In different ways the higher promotion standard was thought to change the behaviour of students. Firstly, by asking more from students, it becomes worthwhile to perform at a higher level because one simply has to. Most students will only put effort into an activity when they think this effort is valuable (Wigfield & Eccles, 2000). Secondly, asking more of students may positively contribute to their self-efficacy if students see that they are able to perform at a higher level with some extra effort. The higher promotion standard may also have a self-fulfilling prophecy effect through the higher expectations. It has previously been found that high teacher expectations stimulate students to achieve higher

(Rubie-Davies et al., 2015). Thirdly, students respond differently to low and high grades. Whereas low grades strengthen the decline of involvement with school in general, high grades reduce this decline in involvement (Poorthuis, 2012). Lastly, the promotion standard may affect the culture of C's among peers in schools through students' and peers' views on what is cool or uncool in school. When everyone excels at some subjects, which compensates lower performance in other subjects, it may become more normal and less uncool to show effort and achieve high grades.

1.4.3 Implementation process

The implementation of GUTS was a collaboration between Leiden University and Wolfert Bilingual. During the implementation, regular meetings were scheduled between the institutions and decisions were made collaboratively. Also, several evaluation moments with teachers, students, and parents were used to improve the innovation.

The performance standards were discussed in the first year of the implementation, and accordingly in every school year. It was decided that an average report card grade of a 7 was an unconditional pass to the next grade. Additionally, for everyone who performed under an average 7 it was discussed whether they could pass or not. Some students who achieved under an average 7 could pass anyways if the teachers saw a good reason for this, such as circumstances in the home situation of the student.

In the first year, it was decided that the talent lessons would take place on Wednesday afternoons, and that students would first have coach conversations with the talent coach to be supported in their choice of subject for the talent lessons. The talent coaches were teachers of Wolfert Bilingual. Teachers attended multiple afternoons in which they discussed and received instructions about how to conduct coach conversations as well as the talent lessons. Students presented the project they worked on during the talent lessons for their parents at the end of each of the two talent lessons cycles. From the school year 2014-2015 onwards the talent lessons took place at various days of the week. Furthermore, the coach conversations developed into conversations about the learning goals a student formulated for the talent lessons. This coaching task was transferred to the teachers of the talent lessons because they were in a better position to decide on the student's learning goals. Based on teacher and student feedback the talent lessons for grade 7 and 8 were graded, and the lessons were included in the regular time schedule (as of school year 2015/2016). Finally, a 'personal project' was initiated for students in grade 9. The design principles of this project were the same as for the talent lessons. The personal project prepares students for a larger project in their final year of secondary school (*profielwerkstuk* in grade 11/12).

1.5 **Overview of the Chapters**

This dissertation focuses on performance and motivation of lower secondary school students between grade 7 and 9. Three assumptions are at its heart: (1) that motivation declines during secondary school, (2) that motivation and student performance are interrelated, and (3) that combining intrinsic motivation stimulation and extrinsic incentives is important to enhance motivation and performance in lower secondary education.

The chapters of this dissertation all cover both performance and motivation. However, some chapters emphasize performance more than motivation or the other way around. Figure 1.1 provides a schematic overview of the emphasis of the following chapters.

Chapter 2 describes a longitudinal study on the performance development in lower secondary education of students in nine schools. Aim was to investigate how students' report card grades develop between grades 7 and 9. Much is known about motivation development in secondary education, but the development of performance in terms of report card grades was underexposed. Based on the assumptions that motivation declines during lower secondary education, and that motivation and performance are related, two research questions were formulated in this chapter: (a) Does student performance decline during lower secondary education?; and (b) Is this trend moderated by (1) gender, (2) school type or (3) initial level?

Chapter 3 investigates the relations between autonomous and controlled motivation and performance in favoured and disfavoured subjects of students in three secondary schools. The positive relation between autonomous motivation and performance is well known. However, the relation between controlled motivation and performance, especially in secondary education is less documented. Furthermore, a distinction between subjects based on students' affect towards these subjects can provide meaningful information as to how to stimulate students' performance and motivation in various subjects. Three research questions were posed: (a) To what extent does autonomous motivation positively predict performance, and to what extent and in what direction does controlled motivation predict performance?; (b) What are the levels of autonomous and controlled motivation and performance in students' favoured and disfavoured subjects?; and (c) What are the roles of autonomous and controlled motivation in predicting performance in students' favoured and disfavoured subjects?

Proceeding to C*hapter 4*, the dissertation moves on to the context of GUTS. The motivating aspects of the talent lessons were central in Chapter 4. This chapter first studied, by means of structured interviews, the extent to which students perceived autonomy support and structure during the talent lessons. Student perceptions were studied because these determine how an innovation may affect students. Furthermore, this chapter investigates by

means of questionnaires how autonomy support and structure in the talent lessons related to motivation and self-efficacy for the subject. The study posed two questions: (a) To what extent do students experience and value the need-supportive elements of talent lessons?; and (b) How does need support during talent lessons relate to subject motivation and self-efficacy?

Chapter 5 describes a study on how performance and motivation for school, well-being and self-esteem developed among students in GUTS. This longitudinal case study compared report card grades and measures of motivation for school, well-being, and self-esteem of students in GUTS with students in other learning environments. Two research questions guided this study: (a) To what extent is GUTS related to a higher performance level?; and (b) How is GUTS related to motivation for school, well-being and self-esteem?

Finally, *Chapter 6* provides an overview of the main findings from chapters 2 to 5, followed by a discussion of these findings and the implications of the research, both theoretically and for education practice.

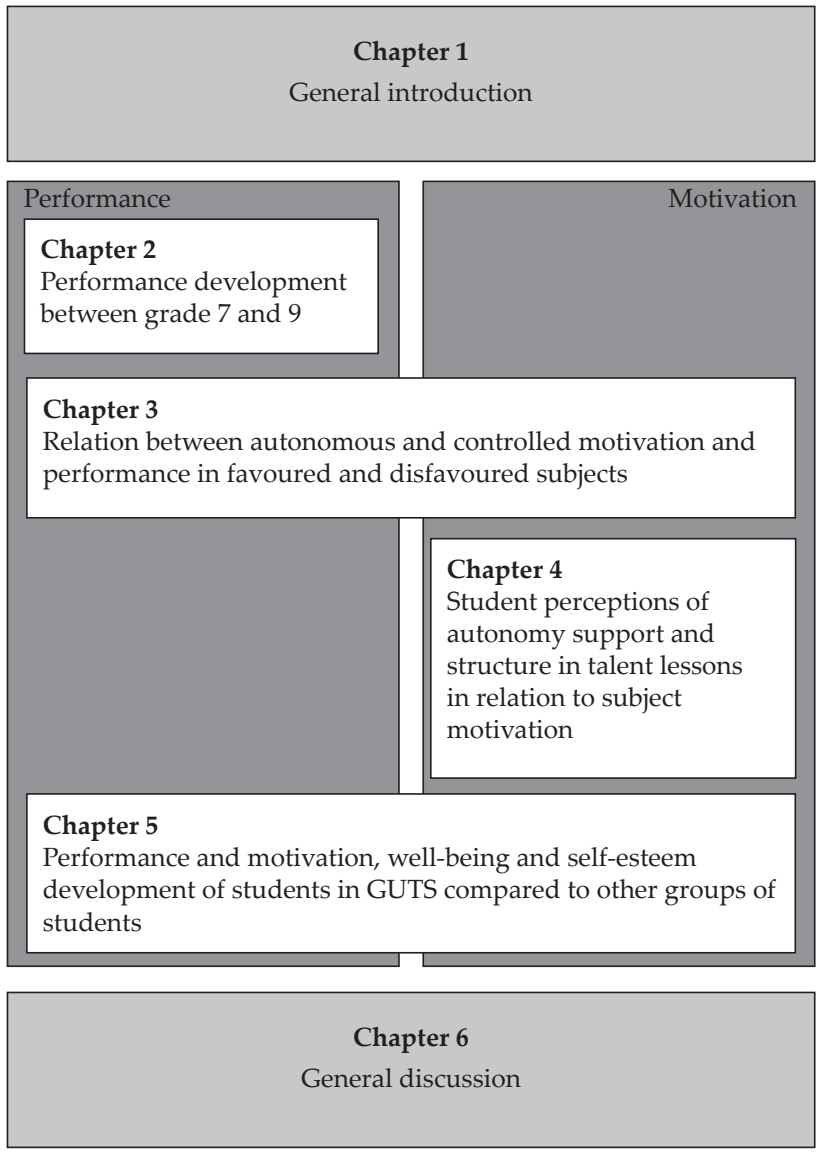

Figure 1.1 Schematic overview of the chapters in this dissertation, showing the relation between the key concepts performance and motivation.

Chapter 2

Declining Trends in Student Performance in Lower Secondary Education

This chapter is based on:
Wijsman, L., Warrens, M. J., Saab, N., van Driel, J. H., & Westenberg, P. M. (2016). Declining trends in student performance in lower secondary education. *European Journal of Psychology of Education, 31*, 595-612. doi:10.1007/s10212-015-0277-2.

Abstract

Student performance is related to motivation to learn. As motivation generally declines during lower secondary education, one might expect performance to decline as well during this period. Though, until now, it has been unclear whether this pattern exists. In this chapter, we examined student performance during lower secondary education from a developmental perspective. Participants were 1544 Dutch secondary school students across three grades (grades 7 to 9). To investigate student performance trends, we analysed report card grades by using hierarchical linear modelling with two levels (level 1, time point; level 2, student). Potential moderators to be examined were (1) gender, (2) school type, and (3) initial level. A linear decline in report card grades from grade 7 to 9 was found for boys and girls, in all school types, and regardless of initial level. Two variables moderated the steepness of the decline: school type and initial level. Gender and school type had a main effect on performance level. The same pattern was observed for the subset of 'core subjects'—Dutch, English and mathematics. Motivational and cognitive factors that may explain the performance decline are discussed.

2.1 Introduction

Student performance in lower secondary education is related to motivation to learn at school. Across various empirical studies, a clear pattern emerges: If a student is more motivated to learn, he or she performs better in school (e.g. Guay & Vallerand, 1997; Pintrich & de Groot, 1990; Robbins, Lauver, Le, Davis, & Langley, 2004). Notably, a consistent finding in research on academic motivation is that motivation tends to decline after the transition from primary to secondary education (Eccles, Lord, & Midgley, 1991; Gottfried, Fleming, & Gottfried, 2001; Peetsma, Hasher, van der Veen, & Roede, 2005). This decline in academic motivation occurs most consistently during early adolescence, until 15 or 16 years of age (Gillet, Vallerand, & Lafranière, 2012; Gottfried et al., 2001). Given the interdependence of academic motivation and student performance, one might expect performance to decline as well during the early years of secondary education. However, it is unclear whether performance level decreases with a similar pattern to motivation. This study is the first to present data on performance development, in terms of report card grades of all subjects.

2.2 Conceptual Framework

2.2.1 Age trends in student performance

To our knowledge, only two studies report on age trends in student performance during the early secondary school years. Peetsma et al. (2005) reported a general decline in student perfor- mance in a cross-sectional study of 12- to 16-year-olds across four countries: the Netherlands, Switzerland, Czech Republic and eastern parts of Germany. Student performance was assessed using report card grades in mathematics and the mother tongue on the last report card of the year. These school grades were made comparable across countries. Mean scores of investment and performance level decreased with increasing age (i.e. three consecutive age cohorts). A limitation of this study with regard to a developmental perspective on performance is that the concepts were investigated in a cross-sectional study. In a longitudinal study, Gottfried, Marcoulides, Gottfried, Oliver, and Guerin (2007) reported a decline in mean levels of math performance during the early high school years. These researchers used percentile grades on a standardised test to compare student performance between the ages of 9 and 17. The percentile grades were norm-referenced and corrected for grade level and age. As the authors described, this performance measure therefore measures 'the relative change in standing and not absolute value in change over time' (Gottfried et al., 2007, p. 319). Moreover, as the results of this study are limited to mathematics, it is unclear whether similar conclusions can be drawn for other subjects. This limitation also holds for the study of Peetsma et al. (2005), which was limited to mathematics and the mother tongue.

The present study reports on changes in performance levels of young adolescents (12 to 15 years) in lower secondary education. Similar to the performance measure used by Peetsma et al. (2005), we used end-of-the-year report card grades and extended this with a longitudinal approach across a 3-year time span and the inclusion of all school subjects. In the Netherlands, level of student performance is determined with grades received for different tests and assignments throughout the school year, which are taken together on a report card. Report card grades therefore reflect the student's performance level for each subject at the end of each school year. At the end of the school year, report card grades determine whether a student is allowed to advance to the next grade. If grades fall below a predetermined level, the student is advised to switch to another school type or retake the same grade. School grades as measures of student performance, therefore, are important determinants of how students' school careers proceed. These measures are common in practice; however, their trends have not been studied thoroughly.

Based on reports of declining trends in motivation (e.g. Eccles et al., 1991; Gottfried et al., 2001; Peetsma et al., 2005), and the interdependence of motivation and performance (e.g. Guay &Vallerand, 1997; Pintrich & de Groot, 1990; Robbins et al., 2004), we expected to observe an overall declining trend in student performance. It is unclear though whether student performance declines for all subjects at a similar pace. For example, Gottfried et al. (2001) found a significant decline in intrinsic motivation for three important academic subjects—math, science and reading—between the ages of 9 and 16 but did not observe a decline in motivation for social studies. Jacobs, Lanza, Osgood, Eccles, and Wigfield (2002) observed that task value declined across the domains of mathematics, language and sports, although the extent and rate of decline varied. In the present study, we compared the developmental trend across all subjects with the trend for three subjects—Dutch, English and mathematics. These subjects are considered the three 'core subjects' in the Netherlands, which means that every student in every type of education is expected to obtain sufficient knowledge of and skills in these subjects. The greater importance attached to these subjects may lead to a different performance trend; e.g. the performance decline for these highly valued subjects might be less steep than for performance across all subjects. In the present study, we compared the developmental trend for performance on the core subjects with the trend for overall student performance.

2.2.2 Moderators of development of student performance

Trends in student performance might be moderated by several factors. A first potential moderating factor in development of performance level is gender. Research has indicated that girls tend to perform at a higher level than boys in secondary education (Duckworth & Seligman, 2005; Eccles, 1987; Fischer, Schult, & Hell, 2013; Wigfield & Wagner, 2005). For example, Duckworth and Seligman

(2005) showed that high school girls obtained higher grades than the boys. This difference was attributed to boys being less self-disciplined in their studies than girls. However, no difference in performance level was found when this was measured using a norm-referenced skills test. Regarding the development of boys' and girls' performance, different patterns have been suggested. On the one hand, Hill and Lynch (1983) argue that during adolescence, gender role expectations intensify, resulting in increased behavioural differences between boys and girls. On the other hand, Jacobs et al. (2002) argue that differences in self-competence and task values between boys and girls converge during adolescence. Watt (2004) found no evidence for either a gender intensification or convergence hypothesis when focusing on mathematics and English self-perceptions, task values and task perceptions. Also, Mok, McInerney, Zhu, and Or (2014) found that gender did not affect the growth rate of mathematics scores on a vertically equated scale between grades 3, 6 and 9. Overall, research into the developmental patterns of adolescent boys' and girls' motivation and performance does not provide a clear hypothesis of performance trends. The present study considers to what extent different performance trends and diverging or converging growth trajectories can be seen amongst boys and girls.

A second potential moderator of student performance development is school type. In the Dutch school system, secondary education consists of different school types or tracks. At the transition from primary to secondary school, on average at the age of 12, each student is placed in a pre-vocational, senior general secondary or pre-university education track. This is done based on a combination of the primary school teacher's advice and a test score on a national ability test (CITO-test). The only study conducted in the Netherlands on student performance (Dutch and mathematics) at different school types found no specific relation between school type and developmental trends in student performance between grades 7 and 9 (Veenstra, 1999). In the present study, we explored potential differences in performance development across all school subjects for students at different school types.

A third potential moderator of performance development may be the student's average performance level in seventh grade (the first year after the transition to secondary school). Some students obtain relatively high performance levels and, due to their greater ability or motivation levels, they might maintain their relatively high performance level throughout lower secondary education. The literature offers no guidance in this respect; it is unclear whether high performers maintain this level or whether they are subject to the same decline as the other students in their class. Indeed, due to the regression-to-the-mean effect, high scorers may display a relatively strong decline during this period. In the present study, we investigated whether high performers in grade 7 might follow a different developmental trend from the low to average performers.

2.2.3 This study

In the current study, we examined student performance during the early years of secondary education from a developmental perspective, by analysing report card grades across three grades. Two research questions guided data analysis: (a) Does student performance decline during lower secondary education?; and (b) Is this trend moderated by (1) gender, (2) school type or (3) initial level?

2.3 Method

2.3.1 Participants

The data for the current study consisted of the end-of-the-year report card grades of 1544 students who started secondary education in 2010, and for whom data was available from grade 7 to 9. The students were in schools which are part of a network of the Leiden University Graduate School of Teaching, in which collaboration is focused on teacher education. The participating group of students is a cross section of the Dutch secondary school population, as it includes students from (a) all three school types (see next paragraph), (b) rural, suburban and urban regions, and (c) different socioeconomic backgrounds. Boys (49%) and girls were approximately equally represented in the sample.

The students came from all three school type levels, which in the Netherlands means that they were in either the pre-vocational, the senior general secondary or the pre-university school type. These school types are of increasing levels of difficulty. Pre-vocational education prepares for senior vocational education, senior general secondary education prepares for higher professional education, and pre-university education prepares for university. In addition to these three levels, so-called 'combination classes' are provided in grades 7 and 8, which are a combination of pre-vocational and senior general secondary, or of senior general secondary and pre-university education. These combination classes give students the opportunity to experience which school type fits best. Combination classes do not exist in the ninth grade. By that time, all students are assigned to one of the three school types. Table 2.1 presents the distribution of students across school types in grade 7 (including combination classes) and in grade 9 (no combination classes). Table 2.1 also shows the changes in school type that were made between grades 7 and 9. It shows that in total, 628 students stayed in the same school type between grades 7 and 9, 371 students changed to a higher-level school type, and 538 students changed to a lower school type.

Table 2.1

Crosstab of changes in school types between grades seven and nine

Grade 7 \ Grade 9	1	2	3	4	5	Total
1. Pre-vocational	356	-	13	-	-	369
2. Pre-vocational/senior general	150	-	159	-	15	324
3. Senior general	2	-	10	-	3	15
4. Senior general/pre-university	103	-	261	-	181	545
5. Pre-university	4	-	18	-	262	284
Total	615		461		461	1537

Note. Light grey boxes represent students who changed to a higher-level school type (total = 371).
Middle grey boxes represent students who changed to a lower school type (total = 538).
Dark grey boxes represent equivalent school types in grades seven and nine (total = 628).
The total number of students adds up to 1537 due to 7 missing scores on school type in grade seven.

2.3.2 Procedure

The participating secondary schools broadly represent the student population in the Nether- lands as they included all school types in a mixture of urban and rural regions. Most schools offer a combination of school types; a few schools offer a single school type. Especially in the Dutch context, most schools offer multiple school types under one roof, in order to make sure that students can stay in the same school, even if they have to make a change in school type. We asked all schools in the Leiden University Graduate School of Teaching network for permission to use report card grades of the first 3 years of secondary school of cohort 2010/2011. Nine out of the 13 invited schools participated, and these schools included all school types and were located in different cities and townships.

Student performance data were collected from school records. To gather the report card grades, the researcher either went to the schools to derive data on the spot in collaboration with the IT manager, or the school sent the data via email. We only included participants in the analyses for whom we had performance scores of grades 7, 8 and 9. Students generally do not repeat a class in the Netherlands but do change school type if necessary. Since most of the participating schools offer multiple school types, also if a student changed school type during these years, he or she could still be included in the study. No information was available about the percentage of students who had left the school, for example because of moving to another city. Anonymity of students in the dataset was guaranteed by ascribing every participant a random number before the data were used in analyses.

2.3.3 Measures

Student performance was indexed using the end-of-the-year report card grades from the first 3 years of secondary school (grades 7, 8 and 9). Report card grades in the Netherlands range between 1 (extremely poor) and 10 (outstanding). Grades below 6 are considered insufficient (i.e. not passing), whereas a grade of 6 or higher is considered sufficient (i.e. passing). End-of-the-year subject grades are composed of the grades for all tests that a student takes in a particular school year for that subject.

To study overall performance trends, we averaged the end-of-the-year report card grades across all school subjects into an overall end-of-the year report card grade. In addition, we created a core subjects grade by taking the average end-of-the-year report card grades for Dutch, English and mathematics.

2.3.4 Analyses

We analysed developmental performance patterns in grades 7 to 9 using multilevel regression analyses with two levels (Snijders & Bosker, 2012). Level 1 consisted of time point within a student, and level 2 was student. First, we tested a model with time as a level 1 indicator of multiple time points (model 1a). Next, we added the moderating variables gender (boys, girls; models 1b and 1c) and school type in grade 9 (pre-vocational, senior general and pre- university; models 1d and 1e). School type in grade 9 was chosen as the reference school type because it is considered to have the best predictive value for the school type in higher secondary education. Moreover, the mentioned models 1a to 1e were fitted for both overall performance and performance in the core subjects Dutch, English and mathematics.

In a second model, we added to model 1a the variable change in school type between grades 7 and 9 (up, equal or down; see Table 2.1). Performance level may be affected by a change in school type. For example, if a student moves from senior general to pre-university education, this might lead to declining report card grades, whereas a move from senior general to pre-vocational education might lead to higher grades. Such changes in report card grades may affect performance trends between grades 7 and 9. To control for this possibility, we added the variable 'change in school type' in model 2.

In models 1a to 2, fixed and random effects of time were included, while in models 1b to 2, also fixed effects of the group variables were included. In models 1c and 1e, cross-level interactions were added between time and the group variables. Both linear and piecewise linear models were fitted. Piecewise linear models have more parameters and therefore a better fit. For ease of interpretation and because the group trends in the piecewise linear models were very similar to the linear trends, only the results of the linear multilevel models are presented. Descriptive statistics were provided in order to comprehend whether high initial performance causes student performance to develop differently from the general developmental pattern. Data from all 3 years were

normally distributed. The level 1 residuals were normally distributed for all multilevel models. Furthermore, for all models, the plots of predicted values versus residuals showed no non-random patterns. We therefore concluded that the assumptions of the multilevel models are reasonably well met.

2.4 Results

Descriptive statistics provided in Table 2.2 are consistent with the expected decline in student performance in lower secondary education. The average overall mean report card grade for all students dropped from 7.10 (*SD* = 0.53) in grade 7 to 6.83 (*SD* = 0.54) in grade 8 and 6.57 (*SD* = 0.55) in grade 9. This declining trend was observed for the different school types and for boys and girls.

Table 2.2
Performance levels in grades 7 to 9

	n	Performance grade 7 *(SD)*	Performance grade 8 *(SD)*	Performance grade 9 *(SD)*
School type grade 9				
Pre-vocational	615	6.90 *(0.53)*	6.69 *(0.57)*	6.44 *(0.51)*
Senior general	464	7.01 *(0.42)*	6.70 *(0.40)*	6.46 *(0.50)*
Pre-university	465	7.45 *(0.47)*	7.15 *(0.51)*	6.83 *(0.57)*
Gender				
Boys	753	7.00 *(0.51)*	6.73 *(0.50)*	6.48 *(0.51)*
Girls	791	7.20 *(0.54)*	6.93 (0.56)	6.65 *(0.58)*
Total	1544	7.10 *(0.53)*	6.83 *(0.54)*	6.57 *(0.55)*

Note. School type grade 9 was used as the grouping variable for school type. Pre-vocational consists of basic advanced, mixed, and theoretical streams; senior general and pre-university also include bilingual variants.

The results of the different models that were tested are shown in Table 2.3. Model 1a serves as a variance component model, dividing the intercept variance into different variance components at both levels (Hox, 2010). From this model, we calculated that 74% of the variance in report card grade was located at the higher (student) level. This means that 26% of the variance is located at the first—time point—level. Multilevel analysis was justified, as a high percentage of variance was located at the second level (74%, $z = 21.27$, $p < .001$). Time is a significant predictor of student performance in model 1a ($t(1542) = -39.60$, $p < .001$). With every grade (one time point), end-of-the-year report card grades decrease by 0.27. There is a significant correlation between the intercepts and the slopes of the regression lines of the students ($z = -7.64$, $p < .001$). The negative correlation ($r = -.38$) indicates that students with a relatively high mean report card grade in grade 7 show a relatively fast decline between grades 7 and 9.

Table 2.3

Multilevel models for performance with gender, school type, and change in school type as predictors

	Model 1a	Model 1b	Model 1c	Model 1d	Model 1e	Model 2
			Fixed effects			
Intercept	7.10 (.01)**	7.19 (.02)**	7.20 (.02)**	7.51 (.02)**	7.55 (.02)**	7.42 (.02)**
Level 1 Time	-0.27 (.01)**	-0.27 (.01)**	-0.28 (.01)**	-0.27 (.01)**	-0.31 (.01)**	-0.36 (.01)**
Level 2						
Boys		-0.19 (.03)**	-0.21 (.03)**	-0.19 (.02)**	-0.19 (.02)**	
Boys*Time			-0.02 (.01)			
Pre-voc.				-0.47 (.03)**	-0.54 (.03)**	
Sen. Gen.				-0.43 (.03)**	-0.46 (.03)**	
Pre-voc.* Time					0.08 (.02)**	
Sen. Gen.* Time					0.04 (.02)*	
Equal						-0.16 (.03)**
Down						-0.67 (.03)**
Equal * Time						0.08 (.01)**
Down * Time						0.17 (.02)**
			Random effects			
σ^2_e (residual)	0.08 (.003)	0.08 (.003)	0.08 (.003)	0.08 (.003)	0.08 (.003)	0.08 (.003)
σ^2_{u0} (intercept)	0.23 (.011)	0.22 (.010)	0.22 (.010)	0.17 (.009)	0.17 (.009)	0.15 (.008)
σ^2_{u1} Slope	0.03 (.003)	0.03 (.003)	0.03 (.003)	0.03 (.003)	0.03 (.003)	0.03 (.003)
σ^2_{u0u1} Covariance	-0.03 (.004)	-0.03 (.004)	-0.03 (.004)	-0.03 (.004)**	-0.02 (.004)	-0.01 (.004)
-2LogLikelihood	5546.21	5480.09	5478.83	5140.41	5116.06	4993.80

Note. Reference groups are groups with the highest performance level: girls (as compared to boys), pre-university (as compared to the other school types), and changing to a higher school type (as compared to the other change in school type groups). Standard errors are in parentheses. Model 1a = variance component model, Model 1b = Model 1a + main effect gender, Model 1c = Model 1b + interaction effect gender, Model 1d = Model 1b + main effect school type, Model 1e = Model 1d + interaction effect school type, Model 2 = Model 1a + main and interaction effects change in school type.
* $p < .05$, two-tailed. ** $p < .001$, two-tailed.

2.4.1 Moderator 1: gender

Model 1b tested the potential gender differences in the performance development. The main effect of gender was a significant predictor. This model fitted the data significantly better than model 1a ($\chi^2 = 66.12$, $df = 1$, $p < .001$). Model 1b shows that on average boys initially score lower than girls (intercept girls = 7.19, intercept boys = 7.00). Model 1c extended the previous model with a cross-level interaction between time and gender. This interaction was non-significant ($t(1550.46) = 1.12$, $p = .26$). The decline of student performance, therefore, is the same for these two groups over time. Also, model fit did not increase using model 1c, when compared with model 1b ($\chi^2 = 1.26$, $df = 1$, $p = .26$). When compared with model 1a, gender explains 4.8% of the variance in end-of-the-year report card grades at the student level, which is a moderate effect size (Snijders & Bosker, 2012).

2.4.2 Moderator 2: school type

Model 1d was fitted in order to test whether performance development differs across school types, with gender also taken into account. This model shows that school type is a significant predictor. Model 1d significantly improved model 1b ($\chi^2 = 339.68$, $df = 2$, $p < .001$). Model 1e extended the latter model through a cross-level interaction between time and school type. This addition increased model fit ($\chi^2 = 24.35$, $df = 2$, $p < .001$). Model 1e shows that in grade 7, girls in pre-university education (7.55) score highest on average, while boys at pre-vocational education score lowest (6.81). When compared with model 1b, school type explains 24.2% of the variance in performance at the student level, which is a very substantial effect size. In model 1e, gender and school type together explain 28.7% of the variance in performance. Thus, the common variance between gender and school type is only 0.3%, which shows that the two predictors are practically independent.

Figure 2.1 visually represents model 1e, showing the effects of both gender and school type over time. This figure shows no interaction effect of time and gender, thus boys' and girls' performance developed at the same pace between the grades. Girls did score higher than boys in all three grades, due to the found main effect. An interaction between time and school type was found, meaning that the developmental pattern was not the same for every school type. In Figure 2.1, we see that students in pre-university education perform highest when compared with students in the other school types in all three grades. The expected performance decline was observed for all three school types with similar steepness for pre-university and senior general secondary education and a less steep decline for pre-vocational education.

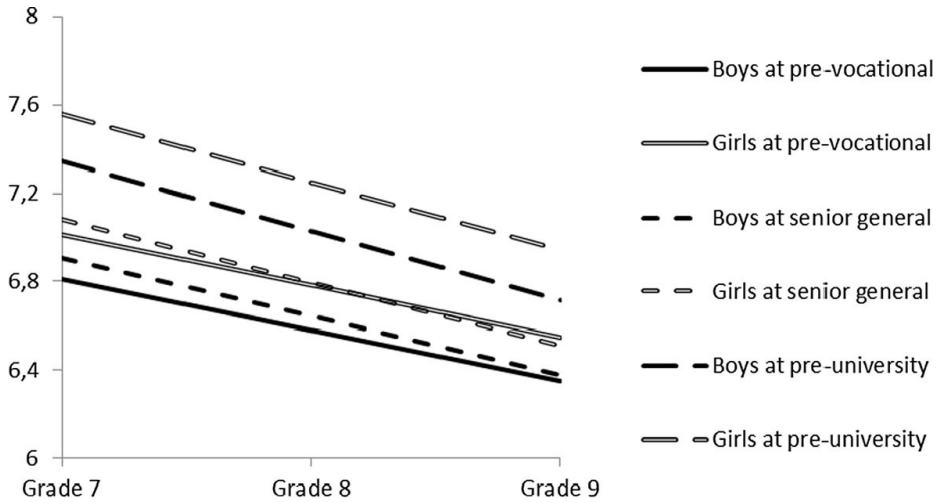

Figure 2.1. Performance in grade 7 to 9 of boys and girls at different school types.

2.4.3 Moderator 3: initial performance level

The negative correlation (r = −.38) between time and performance level as reported in model 1a showed that performance of students who start at a higher level generally declines at a faster rate. As a next step, we distinguished the performance development of students who started at a high performance level at the end of grade 7, in order to analyse whether this specific group of students shows a different developmental pattern than students with moderate to low report card grades. In grade 7, 92 students (6.0%) have an average report card grade equal to or greater than an 8. Of these 'high performers', only 19 students (20.7%; and 1.2% of the total sample) still performed at that level by the end of grade 9. These students are all in pre- university education, and 16 of them are girls. This means that most students who start at a high performance level also show the downward trend.

2.4.4 Performance in the core subjects

Models 1a to 1e in Table 2.3 each illustrate downward trends in overall student performance. Similar to these models, models 1a to 1e in Table 2.4 show performance development in the core subjects. In general, models 1a to 1e in Table 2.4 show that performance development in the three core subjects is equal to that of all subjects. The performance level is somewhat lower for the core subjects, but the developmental trend is the same and declines between grades 7 and 9.

Table 2.4

Multilevel models for performance in core subjects (Dutch, English, and mathematics) with gender and school type as predictors

	Model 1a	Model 1b	Model 1c	Model 1d	Model 1e
			Fixed effects		
Intercept	6.95 (.02)**	7.09 (.02)**	7.07 (.03)**	7.36 (.03)**	7.45 (.03)**
Level 1 Time	-0.27 (.01)**	-0.27 (.01)**	-0.25 (.01)**	-0.27 (.01)**	-0.34 (.02)**
Level 2					
Boys		-0.28 (.03)**	-0.26 (.04)**	-0.28 (.03)**	-0.28 (.03)**
Boys * Time			-0.02 (.02)		
Pre-voc.				-0.35 (.03)**	-0.50 (.04)**
Sen. Gen.				-0.45 (.04)**	-0.54 (.05)**
Pre-voc. * Time					0.14 (.02)**
Sen. Gen. * Time					0.08 (.02)**
			Random effects		
σ^2_e (residual)	0.18 (.006)	0.18 (.007)	0.18 (.007)	0.18 (.007)	0.18 (.007)
σ^2_{u0} (intercept)	0.39 (.020)	0.37 (.020)	0.37 (.020)	0.32 (.018)	0.32 (.018)
σ^2_{u1} Slope	0.05 (.006)	0.05 (.006)	0.05 (.006)	0.05 (.006)	0.04 (.006)
σ^2_{u0u1} Covariance	-0.07 (.009)	-0.07 (.009)	-0.07 (.009)	-0.06 (.008)	-0.06 (.008)
-2LogLikelihood	8619.74	8532.91	8531.63	8373.45	8336.08

Note. Reference groups are groups with the highest performance level: girls (as compared to boys) and pre-university (as compared to the other school types). Standard errors are in parentheses. Model 1a = variance component model, Model 1b = Model 1a + main effect gender, Model 1c = Model 1b + interaction effect gender, Model 1d = Model 1b + main effect school type, Model 1e = Model 1d + interaction effect school type.
* $p < .05$, two-tailed. ** $p < .001$, two-tailed.

From model 1a, we calculated that 68.4% of the variance in report card grades for the core subjects was located at the student level. This model shows that time was a significant predictor of the mean grade ($t(1540.62) = -28.13$, $p < .001$). With every year (one time point), the mean grade for all core subjects taken together decreases by 0.27. The negative correlation between intercept and slope ($r = -.49$) indicates that students with a relatively high mean report card grade in grade 7 show a relatively fast decline between grades 7 and 9. Model 1b shows that on average boys initially score lower than girls (intercept girls = 7.09, intercept boys = 6.82). This model fitted the data significantly better than model 1a, which included only time as a predictor ($\chi^2 = 86.83$, $df = 1$, $p < .001$). Compared with model 1a, gender explains 4.5% of the variance of the mean grade at the student level. Model 1c was fitted in order to check whether the slopes of boys and girls were equal. This model did not improve the previous model ($\chi^2 = 1.28$, $df = 1$, $p = .26$), and the cross-level interaction between time and gender was non-significant ($t(1548.36) = -1.13$, $p = .26$). Performance development in the

core subjects, therefore, is the same for these two groups over time. The main effect of school type is a significant predictor in model 1d. This model fitted the data better than model 1b ($\chi^2 = 159.46$, $df = 2$, $p < .001$). Cross-level interactions between time and the school types were added in model 1e, which appeared to be significant for both pre-vocational education ($t(1539.32) = 6.14$, $p < .001$) and senior general secondary education ($t(1538.09) = 3.50$, $p < .001$). Model 1e represented the data better than the previous model ($\chi^2 = 37.37$, $df = 2$, $p < .001$). In model 1e, gender and school type together explain 19.4% of the variance in performance. Thus, the common variance between gender and school type is only 0.1%. Performance development in the separate subjects Dutch, English and mathematics showed similar downward patterns.

2.4.5 Changes in school type

Finally, we assessed possible effects of changing school type using a multilevel model. Model 2 in Table 2.3 (p.30) extends model 1a by including the variable change in school type with the following three categories: students who stayed in an equivalent school type across lower secondary school (equal), students who rose to a higher-level school type (up) and students who dropped to a lower level school type (down). Figure 2.2 is a visual representation of model 2. The figure shows that there are different intercepts in grade 7. Furthermore, the figure shows downward trends for each group, and a significantly different relation between performance and time for the three groups (interaction between change in school type and time). This declining trend was steepest for the group of students that rose to a higher-level school type, and least steep for those students who dropped to a lower level school type. When we study performance of students who dropped to a lower-level school type, the performance decline was somewhat steeper for students who changed from a combined senior general/pre-university to a senior general level ($M_{\text{performance}}$ grade 7 = 6.96, $M_{\text{performance}}$ grade 9 = 6.42; performance difference = −0.54), than for students who dropped from a combined senior general/pre-university ($M_{\text{performance}}$ grade 7 = 6.62, $M_{\text{performance}}$ grade 9 = 6.42; performance difference = −0.20) or a combined pre-vocational/senior-general ($M_{\text{performance}}$ grade 7 = 6.60, $M_{\text{performance}}$ grade 9 = 6.43; performance difference = −0.17) to a pre-vocational level. Moreover, all groupings dropped to a lower performance level between the seventh and ninth grade, regardless of staying at the same school type or not. Even students who changed to an 'easier' school level still decreased in their performance level.

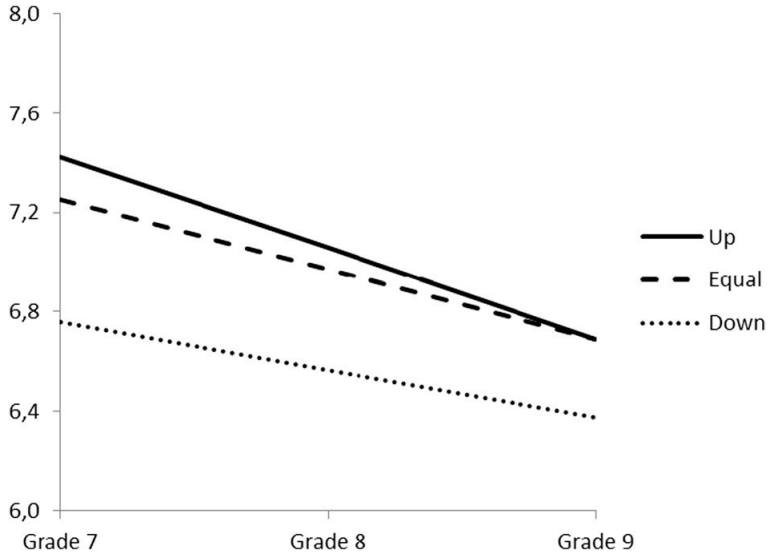

Figure 2.2. Line diagram of performance for students grouped according to change in school type.

2.5 Discussion

In the present study, we investigated to what extent an overall declining pattern in student performance in lower secondary education was apparent, and to what extent this pattern was moderated by gender, school type and initial performance level. Additionally, the models were also evaluated for performance in the core subjects. The results were as hypothesised and showed a clear linear decline in overall student performance as well as for the core subjects Dutch, English and mathematics. This decline in student performance corresponds with a decline in investment and academic performance in the same age period as reported by Peetsma et al. (2005) and Gottfried et al. (2007). Due to the longitudinal approach and the inclusion of several moderators, the present study provides more detailed and compelling evidence for declining student performance in lower secondary education.

The performance decline was found regardless of the moderators that were distinguished in this study: gender, school type and initial level. These moderators, however, did sometimes affect the performance level itself or the strength of the performance decline. First, boys start at a lower performance level than girls after the transition to secondary education, and their performance subsequently decreases in a pattern similar to that found for girls. This means that performance declines for girls and boys but that girls maintain their relative advantage. A similar developmental pattern for boys and girls is in line with the findings of research by Mok et al. (2014) and Watt (2004), who did not find

evidence for a gender intensification or gender convergence hypothesis. Watt (2004) observed an already existing difference between boys and girls at the start of their school career. Research findings in Belgium regarding differences between boys and girls have been explained by using culture perspectives, stating that boys' culture is less study-oriented than girls' culture (van Houtte, 2004). In addition, research in America has shown that girls are more self-disciplined in studying than boys (Duckworth & Seligman, 2005).

Second, when we grouped students based on their school type—pre-vocational, senior general and pre-university—we found that students at all school types showed the expected performance decline. At the same time, an interaction between school type and time was found. The results showed that the decrease in performance level is steepest for pre-university students. Pre-university students started with the highest performance level in grade 7 and showed the steepest decline. Nonetheless, by the end of grade 9, students in pre-university education still have the highest performance level. While students in senior general secondary education had higher performance levels than pre-vocational students in grade 7, by the end of grade 9 both groups have equal performance levels.

Third, the linear decline in student performance was observed regardless of initial performance level. At the same time, performance of students with a high initial level generally declined at a faster rate than performance of students who started at a lower level. In addition, a group of 92 high performers was identified in grade 7, of whom only 19 students were able to maintain this level into the ninth grade. Thus, only very few students are able to maintain a high performance level during lower secondary education.

2.5.1 Explaining the performance decline

Motivational and cognitive factors may play a role in the observed performance decline. In order to perform well, students need to be motivated to put effort into their schoolwork, and they have to be able to keep up with the increasing cognitive demands as they proceed through secondary school.

2.5.1.1 Motivational factors related to performance development.

We hypothesised the performance decline on the basis of two underlying assumptions: (1) that motivation declines during secondary school, and (2) that motivation and student performance are interrelated. The motivation decline is found for various facets of motivation, such as intrinsic motivation (Pintrich & de Groot, 1990; Wigfield & Wagner, 2005), mastery goal (Shim, Ryan, & Anderson, 2008) and time investment (Peetsma et al., 2005). Therefore, when explaining the performance decline during secondary school, several motivational factors may be important.

A first motivational factor related to the question of putting effort into schoolwork is utility value. This concept describes the perceived usefulness of

an academic subject in the present and the future. Usefulness of a school subject for students' lives is not always clear to them. Utility value was found to decline for both boys and girls between grades 7 and 11 in the context of mathematics (Chouinard & Roy, 2008; Watt, 2004). In the context of the present study, utility value may influence performance. Besides a lack of relevancy of school subjects for students' lives, the Dutch grading system may also be a factor in explaining decreasing utility value. Grading in the Netherlands ranges between 1 and 10, but a 6 is generally sufficient to pass a test and to advance to the next grade. Therefore, there seems to be no reason to invest extra effort to obtain higher grades. This *culture of C's*, that is reaching a sufficient result with minimal effort, is currently often discussed in Dutch politics. The Dutch Inspectorate of Education (2014) ascertained that both the intrinsic and the extrinsic motivation of Dutch students were at a low level compared with those in other countries.

Two additional explanations have been offered for the motivational decline in secondary school. First, a misfit between the student and the environment was reported (Eccles, Wigfield, Harold, & Blumenfeld, 1993). This so-called stage-environment misfit means that the school environment does not fit the needs of students, leading to friction between what a student wants and the opportunities offered by the school. This friction is linked to negative development of motivation and self-perceptions (Eccles et al., 1993). The second is a shifting relevance of life domains for adolescents (Peetsma, 1997, as cited in Peetsma & van der Veen, 2011). This means that the value of other life domains, such as social value, becomes larger than the value of school.

Juvonen and Murdock (1995) investigated the social value of putting effort into schoolwork in three age groups. They found that 10- and 12-year-olds were eager to show their teachers and peers that they worked hard, while amongst 14-year-olds, this was not done. The social value of effort changed between these age groups, as the 14-year-olds saw diligence as positive to teacher approval but negative to peer popularity. The age group in Juvonen and Murdock's study is similar to that in our study, and social value may be an important factor in decreasing performance. Students may sometimes fear being downgraded in the peer group, or even being bullied because others think they are showing off. Another reason for adolescents to put less effort into their schoolwork is that they tend to believe that ability is a stable internal trait (Anderman & Maehr, 1994).

As a final motivational factor, Duckworth and Seligman (2005) argue that, with regard to performance at school, self-discipline becomes especially important in secondary education. It may be that students lack self-discipline in studying and therefore have a relatively low level of performance. As the school curriculum requires more independence of students when they proceed to higher grades, it is possible that their self-discipline is not strong enough to cope.

2.5.1.2 Cognitive factor related to performance development

Cognitive ability might also be a contributing factor to the observed performance decline. As secondary school proceeds, subject content changes in nature. The ultimate learning goals often contain higher-order skills such as evaluating and creating (Krathwohl, 2010), instead of less complex skills such as remembering and understanding. The more complex the skills, the more demanding the cognitive challenge for students. The skills distinguished in Bloom's taxonomy are also used in the assessment of subjects. The assessments, therefore, become cognitively more demanding over the years. In order to be able to master the more difficult cognitive activities, metacognitive skills need to be developed. Metacognitive skills refer to the procedural knowledge necessary to reflect on one's learning activities (van der Stel & Veenman, 2010). These skills develop in adolescence, and especially during grades 7 to 9 at about 12 to 15 years of age (van der Stel & Veenman, 2010). In addition, neuroscientific research has shown that the frontal cortex is involved in metacognition (Fernandez-Duque, Baird, & Posner, 2000) and this part of the brain continues to develop during adolescence (Steinberg, 2005). Therefore, metacognition during the first years of secondary education may not be fully developed yet, making it more difficult for students to keep up with more complex tasks at school.

2.5.2 Implications

Implications of the present study focus on possible strategies to tackle the performance decline. The proposed motivational and cognitive explaining factors are used to structure these implications. When reasoning from the motivational factor, an intervention focused on strengthening the utility value of school subjects may be helpful. Hulleman, Godes, Hendricks, and Harackiewicz (2010) studied an example of such an intervention. In their study, the authors found that a writing intervention that encouraged students to discover how school tasks are connected to their own lives increased utility value perceptions, which in turn predicted increased performance and interest. The effects were strongest for low-scoring students. Second, from a motivational perspective, an intervention could focus on the social value of effort. Such an intervention should focus on peer-interaction, as older students see effort as a negative influence on peer popularity (Juvonen & Murdock, 1995). A third intervention from a motivational perspective could focus on increasing self-discipline. In order to increase self-discipline, a focus on strengthening volitional strategies may be in place. Volitional strategies refer to persistence in task focus and effort investment, also in a context that may contain distractions (Boekaerts, van Nuland, & Martens, 2010). An example for strengthening volitional strategies in order to increase students' focus on learning goals is a strategy training in good work habits (Boekaerts & Corno, 2005). Additionally, a teacher can model effective strategies (Boekaerts et al., 2010).

Reasoned from the cognitive factor, and the possible lack of metacognitive skills, a training of these skills may help students to better be able to keep up with increasingly difficult subject content. Metacognitive skills training for instance has led to increased mathematics performance on a criterion-referenced test including mathematics problems, and a better attitude towards mathematics in students scoring low on mathematics (Cardelle-Elawar, 1992). Training on metacognitive skills and working memory additionally led to improved arithmetic problem solving skills in 8- to 10-year-olds (Cornoldi, Carretti, Drusi, & Tencati, 2015).

2.5.3 Limitations and recommendations for future research

The observed performance decline is explained in terms of motivational and cognitive factors. The data set for the present study was derived from regular school records, and these records did not include data on motivation and cognition. In future studies, it would be important to include the assessment of these factors and to investigate their relationship with the performance decline. Our recommendation is to include motivational and cognitive measures such as social value, utility value, self-discipline and metacognitive skills in future research.

This study specifically studied report card grades as a performance measure, because these are the performance measures which in schools are used to determine one's school career. Therefore, report card grades are very important in daily educational practice. In this study, report card grades were the only dependent variable, and future research can include other measures of performance, such as scores on standardised tests, or vertically equated scores, to investigate whether the decreasing performance level can be replicated with other performance measures. This may be useful, since report card grades are influenced by different factors such as ability, motivation and effort of a student, but also the curriculum and the way the subject content was tested and graded. It was beyond the scope of the present paper to disentangle the various factors that influence report card grades. Moreover, it may be interesting to replicate the results with different performance measures such as vertically equated scores, as these scores are specifically meant to map ability differences between grades.

Our study sample constitutes a cross section of the Dutch secondary school population. We did not expect differential effects of socio-economic background and living area (rural or urban) on the observed performance decline, but we were unable to test this with the data provided by the schools. In future research, these variables could be explicitly tested to rule out that these factors affect the performance decline.

The present study focused on the performance of students in lower secondary education, as this period seems especially relevant for a decline in performance. In future studies, it would be worthwhile to include older adolescents also. According to the motivation literature, motivation seems to

decline in early adolescence but appears to rebound in middle adolescence. The motivation literature does show a slight increase in motivation around the age of 16 (e.g. Gottfried et al., 2001), and it would be interesting to investigate whether this would translate into increasing student performance during the second half of secondary education.

Chapter 3

Relations of Autonomous and Controlled Motivation with Performance in Secondary School Students' Favoured and Disfavoured Subjects

This chapter is based on:
Wijsman, L., Saab, N., Warrens, M. J., van Driel, J. H., & Westenberg, P. M. (2018). *Relations of autonomous and controlled motivation with performance in secondary school students' favoured and disfavoured subjects.* Manuscript submitted for publication.

Abstract

Whereas autonomous motivation is generally linked to positive school outcomes, the effect of controlled motivation is less clear. In secondary school, controlled motivation seems important as it is likely that students favour some subjects more than others for a number of reasons. In this chapter, we asked secondary school students ($N = 918$) to identify two favoured and two disfavoured subjects. Hierarchical linear modelling was performed to investigate the relationship of autonomous and controlled motivation with performance in these subjects. Results showed that autonomous motivation positively predicted performance in both types of subjects. The effect of controlled motivation on performance was negative, and this effect was larger for disfavoured subjects. High autonomous motivation in favoured subjects may attenuate the negative effect of controlled motivation on performance. For teaching practice, this means it may be advisable to focus on stimulation of autonomous motivation in all subjects.

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3.1 Introduction

Autonomous motivation as defined in Self-Determination Theory (SDT; Ryan & Deci, 2002) is important to enhance positive school outcomes. Nevertheless, it is unlikely that students' autonomous motivation is high for all subjects in school, as students favour some subjects more than others for a number of reasons. For example, in Dutch secondary schools, students have to take up to 15 mandatory subjects every year, especially in lower secondary school. These subjects are not only completely different in their content, but are also taught by different teachers, comprise different types of tasks, and the class composition may differ for each subject. Therefore, it seems unlikely that all students favour all subjects in school. Hence, autonomous motivation for a disfavoured subject may be relatively low, requiring the presence of some other reason to perform at a sufficient level. This reason may be controlled - the other type of motivation distinguished in SDT (Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009) - including pressure from within yourself, or from others.

It is as yet unknown whether various motivation types may differentially relate to performance in favoured and disfavoured subjects. Autonomous motivation may be crucial for performance in favoured subjects, whereas for disfavoured subjects controlled motivation might be more important to compensate for a potential lack of autonomous motivation.

In the present study, we asked secondary school students to identify two favoured and two disfavoured subjects and investigated the relationship of autonomous and controlled motivation with performance in these subjects.

3.2 Conceptual Framework

3.2.1 Performance in school

Students' cognitive performance is assessed in various ways in education, and the implications of the assessments differ between countries. However, in general, these assessments become especially important in secondary education and play an important role in students' school careers. In the Netherlands, report card grades are important performance measures, which contain multiple subject grades composed of results on different tests and assignments throughout the school year. At the end of the school year, the report card grades therefore provide an overview of a student's average performance level for each subject during that year (van der Lans, van de Grift, & van Veen, 2015). Based on a predetermined school standard for this average performance level in all subjects, a student can proceed to the next grade or not.

Moreover, research confirmed the importance of report card grades, which are associated with the possibility for drop-out or graduation from high school (Bowers, 2011). The lower the school grades, the higher the chance of drop-out,

and the higher the grades, the more likely the chance of graduation. Therefore, report card grades have important predictive validity for the student's school career. In Chapter 2 of this dissertation we have shown that report card grade levels tend to decrease between grades 7 and 9 in secondary education. This means that, on average, students start with higher report card grades at the beginning of their secondary education than they have in grade 9, while the standards are the same in all grades. Decreasing report card grades are worrisome because of the importance in terms of the aforementioned link with drop-out and graduation from secondary education.

Report card grades have been classified as unreliable and subjective measures in the past (Bowers, 2011; Brookhart et al., 2016), partly because correlations with standardised achievement tests – which measure academic knowledge - are merely between 0.5 and 0.6. Consequently, report card grades and standardised tests have 25-35% common variance (Bowers, 2011). Accordingly, report card grades do not represent academic knowledge only, but are composed of multiple dimensions such as a cognitive, a subject-specific, and a common grade dimension (Klapp Lekholm & Cliffordson, 2009). This makes report card grades good predictors of educational success, as success is dependent on all these types of factors (Bowers, 2011; Klapp Lekholm & Cliffordson, 2009). The cognitive dimension of grades refers to one's knowledge and capacities. Regarding subject-specific factors that contribute to report card grades, one can think of specific interest (Klapp Lekholm & Cliffordson, 2009). For example, a student who is interested in a particular topic will study more for the exam on this topic than a student who is not interested, yielding a better grade for the interested student. In addition, the common grade dimension possibly contains factors such as parents' background and involvement and students' gender and general motivation which contribute to grades (Klapp Lekholm & Cliffordson, 2008, 2009; Thorsen & Cliffordson, 2012).

3.2.2 Autonomous and controlled motivation in relation to performance

Numerous researchers have reviewed the relations between several motivational variables and performance in school (See for examples of reviews and a meta-analysis Hidi & Harackiewicz, 2000; Robbins et al., 2004; Wigfield & Cambria, 2010). In SDT (Ryan & Deci, 2000, 2002), motivation is defined by its quality. The more self-determined, the better the quality of the motivation is (Ryan & Deci, 2002). Self-determined motivation has both theoretically been reasoned (Ryan & Deci, 2000), and empirically been investigated (e.g. Guay & Vallerand, 1997; Vansteenkiste et al., 2009) to be related to positive school outcomes within SDT.

In SDT, two types of motivation are distinguished; autonomous or volitional motivation on the one hand, and controlled motivation on the other hand (Vansteenkiste et al., 2009). Autonomous motivation consists of intrinsic and well-internalised extrinsic motivation. Intrinsically motivated behaviour truly comes from within the self. Well-internalised extrinsic motivation is defined

in terms of identified or integrated behaviour regulation. If well-internalised extrinsically motivated, behaviour is accepted to be personally relevant (i.e. identified regulation) or to be integrated with one's personal values and goals (i.e. integrated regulation) (Ryan & Deci, 2002). Controlled motivation includes motivation due to a feeling of pressure from within oneself or from the environment (Ryan & Deci, 2002). External and introjected regulations are the foundations of this type of motivation (Vansteenkiste et al., 2009). When behaviour is externally regulated, one shows behaviour purely to receive a reward or to avoid punishment. Introjected regulations include behaviour that is somewhat more internalised, but is not part of one's integrated self (Ryan & Deci, 2002).

Controlled motivation has a different motivation source than autonomous motivation, and has a nonself-determined origin. That is, controlled and autonomous motivation were initially placed on a continuum of internalisation. While controlled motivated behaviours are not or only slightly internalised, autonomous behaviours are internalised to a greater extent. (Non-) internalised behaviours were originally found to correlate in a quasi-simplex way (Ryan & Connell, 1989); i.e. intrinsic motivation correlated most with self-determined and less with nonself-determined extrinsic motivation. However, more recent studies have reported that autonomous and controlled motivation are orthogonal dimensions of motivation, based on low to moderate positive or negative correlations of the concepts (Brunet, Gunnell, Gaudreau, & Sabiston, 2015; Lepper, Corpus, & Iyengar, 2005). Different scholars have investigated whether autonomous and controlled motivation can appear at the same time in one person (Ratelle, Guay, Vallerand, Larose, & Senécal, 2007; Vansteenkiste et al., 2009). These so-called person-centred analyses showed that it is possible to have different types of motivation in one situation.

Although much research into the relation between autonomous types of motivation and school performance has been conducted (Fortier, Vallerand, & Guay, 1995; Guay & Vallerand, 1997; Lepper et al., 2005; Niemiec & Ryan, 2009), only a handful of studies investigated the direct relation between controlled types of motivation and performance. The results of these studies are ambiguous as to the effects of controlled motivation on performance (see Gillet, Vallerand, Lafrenière, & Bureau, 2013). From an SDT perspective, one would expect controlled motivation to negatively predict performance due to its nonself-determined origin (Ryan & Deci, 2002). This was indeed found in a literature review on educational studies using SDT (Guay, Ratelle, & Chanal, 2008). In an empirical study, Lepper et al. (2005) found a negative correlation between extrinsic motivation and both overall and subject-specific GPA. On the other hand, non-effects were also found; for example, controlled motivation was not found to be substantially related to the pursuit of personal goals (Koestner, Otis, Powers, Pelletier, & Gagnon, 2008). Additionally, in a review of strategies to academically motivate unmotivated students the additional benefits of

extrinsic motivation, in addition to intrinsic motivation were stressed (Hidi & Harackiewicz, 2000). Positive effects of controlled motivation were found in various studies, especially in a sports context. For instance, successful athletes showed high levels of controlled motivation, which positively related to sports experiences and outcomes (Chantal, Guay, Dobreva-Martinova, & Vallerand, 1996; Langan et al., 2016).

Langan et al. (2016) studied the separate effect of controlled motivation in addition to autonomous motivation and summarised three competing hypotheses for the joint role of controlled and autonomous motivation in sports performance. The first was the SDT-based hypothesis, the second the buffering hypothesis, and the third the additive hypothesis. The SDT-based hypothesis states that autonomous motivation is positive, while controlled motivation is negative by definition. The buffering hypothesis states that autonomous motivation has a protective role against the negative effects of controlled motivation. The additive hypothesis states that a combination of high autonomous and high controlled motivation leads to the most positive outcomes. The researchers found evidence for all three hypotheses, dependent on the measure for controlled motivation that was used. For example, using the Behavioural Regulation in Sport Questionnaire (BRSQ), some support for the SDT-based and the buffering hypothesis was found. On the other hand, using the Sport Motivation Scale (SMS), support was found for the additive and buffering hypotheses (Langan et al., 2016). These ambiguous findings regarding controlled motivation point at the importance of studying motivation and performance in the context of specific moderators.

3.2.3 Moderators of motivation and performance

Levels of motivation and performance and relations between these concepts are moderated by various factors, as was for example indicated by the ambiguous influence of controlled motivation on various outcomes (see Gillet et al., 2013). We discuss moderators that have been found to affect both motivation and performance.

A moderator studied in motivation research is gender. Specifically, the relation between motivation and performance has been studied for boys and girls separately. Differences have been found between motivational and personality factors influencing boys' and girls' performance (Freudenthaler, Spinath, & Neubauer, 2008). Whereas for boys, intrinsic motivation, school anxiety and performance avoidance goals predicted school performance, for girls, self-esteem and work avoidance were more important predictors.

Additionally, type of education, discerning secondary and higher education, was found to influence motivation and its correlates (Ratelle et al., 2007). In higher education students choose a study track fitting their preferences, as opposed to (lower) secondary education, where every student has to take a similar programme. Ratelle et al. (2007) found that secondary school students

were either solely controlled motivated, or had moderate or high levels of both autonomous and controlled motivation. Students with solely autonomous motivation were not found among secondary school students, while they did appear in higher education. In contrast, Vansteenkiste et al. (2009) did find the possibility of solely autonomous motivation among secondary school students and students in higher education. In terms of learning outcomes, Ratelle et al. (2007) concluded that students in higher education showed similar outcomes if they demonstrated solely autonomous motivation or a combination of high controlled and high autonomous motivation. An exception was found for persistence, which was higher for the solely autonomously motivated students. Furthermore, secondary school students showing high controlled and high autonomous motivation demonstrated highest persistence and achievement levels. Somewhat divergent, Vansteenkiste et al. (2009) concluded that being solely autonomously motivated leads to the best learning outcomes in terms of for example GPA and metacognitive strategy use. These studies provide evidence for the (non-)existence of various consequences of controlled motivation in secondary school and in higher education, and show that the appearance of motivation is context sensitive.

Moreover, a context sensitive moderator that influences motivation and performance is the affect towards the teacher. It was found that when students like their teacher, they have motivational and performance benefits (Montalvo, Mansfield, & Miller, 2007). Emotional factors, such as how enthusiastic a student is about a teacher may therefore also influence both motivation and performance levels for this subject.

Furthermore, a moderator that has been studied is the extent to which student motivation is specific for the domain or subject in school (Bong, 2001; Eccles, Wigfield, Harold, & Blumenfeld, 1993; Green, Martin, & Marsh, 2007; Hornstra, van der Veen, & Peetsma, 2016). Investigating specificity of motivation across subjects, it has been concluded that some concepts such as valuing were more subject specific than other concepts such as anxiety (Green et al., 2007). These researchers investigated English, mathematics and science. Enjoyment has also been defined as a factor highly-specific to the subject in a study comparing the subjects mathematics, German, Latin and English (Goetz, Frenzel, Pekrun, & Hall, 2006). Likewise, other research showed that various motivation constructs such as effort and self-efficacy in language and motivation in upper primary education were domain-specific, and correspondingly predicted achievement in this specific domain (Hornstra et al., 2016).

3.2.4 This study

A moderator that may influence the relation between motivational constructs and school performance is the student's judgement of a subject as favoured or disfavoured. This study aims to explore the relations of autonomous and controlled motivation with performance in students' favoured and disfavoured

subjects. We focus on the role of controlled motivation specifically, because in secondary education it is unlikely that a student is highly autonomously motivated for every subject.

Favoured subjects are operationalised as subjects which students like and would like to spend extra time on, and disfavoured subjects are defined as subjects which students do not like and would not like to spend extra time on. For a favoured subject, the autonomous motivation is expected to be higher than for a disfavoured subject, as 'liking a subject' is a typically autonomously motivated emotion (Ryan & Deci, 2000). When a student favours a subject, (s)he has a positive emotion towards this subject, and (s)he enjoys learning the subject. Learning enjoyment towards a subject was found to originate from a pre-existing interest in the learning content, activity, or subject itself, or when a student felt competent at a subject (Hagenauer & Hascher, 2010). On the other hand, learning enjoyment was found to be impeded when the learning content was judged boring, when a student disliked the subject in general, or when (s)he felt incompetent (Hagenauer & Hascher, 2010).

The levels of controlled motivation in favoured and disfavoured subjects have not been studied, as have the effects of controlled motivation on performance in these two types of subjects. This study investigates whether the roles of autonomous and controlled motivation in performance differ in disfavoured subjects, where in general low levels of autonomous motivation are apparent.

Regarding performance, school subjects which students enjoy, i.e. subjects with higher levels of autonomous motivation, generally are the subjects that they achieve well at (Denissen, Zarrett, & Eccles, 2007).

3.2.5 Research questions

Three research questions are posed in the present study:

(1) To what extent does autonomous motivation positively predict performance, and to what extent and in what direction does controlled motivation predict performance?
(2) What are the levels of autonomous and controlled motivation and performance in students' favoured and disfavoured subjects?
(3) What are the roles of autonomous and controlled motivation in predicting performance in students' favoured and disfavoured subjects?

3.3 Method

3.3.1 Participants

Participants were 918 secondary school students from three different secondary schools. These students were in seventh (n = 450) or in eighth grade (n = 468). Boys (n = 446) were slightly underrepresented in comparison with girls (n =

472). School 1 was a bilingual senior general secondary/pre-university school, and represented 341 students. School 2, also a senior general secondary/pre-university school offering both Dutch and bilingual education, contained 331 students. School 3, a pre-university school, represented 246 students. The schools agreed on participation of their students in the present research. Informed consent was provided by the parents of the students in all three included schools. In addition, for the students in school 1, parents provided active consent because this school participated in a larger study that also used interviews.

3.3.2 Procedure

The participants answered questions about their subject-specific motivation for two favoured and two disfavoured school subjects in June 2015. The same questionnaire was also used in Chapter 4 of this dissertation. It included questions about in total four of the students' subjects. It was specified that the students had to choose two subjects which they 'liked and would like to spend extra time on', and two subjects which they 'did not like, and would not like to spend extra time on'. Therefore, every student answered the questions with regard to the subjects they chose as their favoured or disfavoured subjects. As a consequence, the specific subjects students had in mind while answering the questions differed between students, but the emotion they felt towards these subjects was similar: they either "liked" or "disliked" it.

Questionnaires were administered in students' regular classroom settings, by a teacher or by the first author of this study. Completion of the questionnaire took approximately 30 minutes, and students were instructed to provide their own opinion. Six versions of the questionnaire were used, which differed only in the sequence of the four subjects (favoured subject 1, favoured subject 2, disfavoured subject 1 and disfavoured subject 2) to prevent bias based on answering sequence. The procedure was approved by the Leiden University Psychology Research Ethics Committee.

3.3.3 Measures

Autonomous and controlled motivation were measured in June 2015 using a shortened 8-item version of the originally 16-item version of the academic self-regulation questionnaire used by Vansteenkiste et al. (2009). This questionnaire was based on the Academic Self-Regulation Questionnaire of Ryan & Connell (1989). The items of both scales, completed for the two favoured subjects, were taken together for use in the analyses, as were the items for the two disfavoured subjects. We were not looking for effects on separate subjects; for this reason answers on two favoured subjects provided a more reliable and generalisable view of '(dis)favoured subjects' without the influence of the specific subject.

The subscales 'identified regulation' and 'intrinsic motivation' together formed autonomous motivation ($\alpha_{favoured}$ = .80; $\alpha_{disfavoured}$ = .87). The subscales

external regulation and introjected regulation together formed controlled motivation ($\alpha_{favoured}$ = .80; $\alpha_{disfavoured}$ = .74). An example item for autonomous motivation is: 'I am studying this subject because it is fun'. An example item for controlled motivation is: 'I am studying this subject because my parents force me to'. Questions were answered on a 5-point scale, ranging from completely untrue to completely true. Hence, average levels of autonomous and controlled motivation could vary between 1 and 5.

Performance consisted of end-of-the-year report card grades (July 2015) for the two favoured and two disfavoured subjects selected by the students. A report card grade for a specific subject is the average of multiple test scores a student has obtained throughout the school year. Report card grades range between 1 (extremely poor) and 10 (perfect) for every subject.

Gender and grade (seven or eight) were also included in the study as control variables, as it has been demonstrated that these factors influence motivation and achievement levels (Chapter 2, Wijsman et al., 2016), and the relationship between motivation and achievement (Freudenthaler et al., 2008).

3.3.4 Analyses

First, descriptive analyses were performed to obtain an impression of the distribution of the variables. Second, a correlation analysis was performed to grasp the interrelationships among the measures and to observe whether the correlations are in line with the hypothesised relationships. Paired samples t-tests were then performed to analyse mean differences between favoured and disfavoured subjects. Next, hierarchical regression analyses were performed using MLwiN (version 2.35). Different levels were subject within student, student within class, class within school, and school. Multiple models were tested to answer the research questions about the relations between motivation and performance in general and for favoured and disfavoured subjects. The null-model served as a variance-component model. Secondly, Model 1 included the predictors autonomous and controlled motivation, together with their interaction. To avoid an inflated standard error for the interaction, the two motivation variables were centred around their means. In Model 2, the factors favoured/disfavoured, gender, and grade were added. Thirdly, in Model 3, interactions between favoured and disfavoured subject, gender and the different predictors were added to the model. Lastly, to obtain a parsimonious model the non- significant parameters in Model 3 were removed one by one. The final model was Model 4. Finally, the assumptions of the multilevel models were investigated using various residual plots.

3.4 Results

3.4.1 Inspection of the data

Not all available data of the study could be used in the analyses. For twenty students one of their subject report card grades was missing, or they had missing scores on two or more predictor variables. Although hierarchical regression analysis can deal with missing data, these students' scores would not contribute to favoured and disfavoured subjects equally. Therefore, these students were removed from the analyses. Furthermore, four students had extremely low report card grades; i.e. more than 3.29 standard deviation below average. To determine whether these four outliers were influential cases, multilevel analyses were performed with and without the 'outliers'. We concluded that the outliers were influential cases and should be excluded from the sample, leaving a sample of $N = 894$.

3.4.2 Relations of autonomous and controlled motivation with performance

Table 3.1 shows the means and standard deviations of autonomous and controlled motivation and overall report card grades, that is, for the favoured and disfavoured subjects together.

Correlations in Table 3.1 show that autonomous motivation was positively related to grade. At the same time, controlled motivation was negatively related to grade. Autonomous and controlled motivation were positively correlated.

Table 3.1

Total means, standard deviations and correlations of autonomous and controlled motivation and report card grade

			Correlations		
	M	***SD***	**1.**	**2.**	**3.**
1. Autonomous motivation	3.09	0.55			
2. Controlled motivation	2.36	0.86	.19**		
3. Report card grade	6.97	0.67	.13**	-.12**	

** $p < .001$

Five multilevel regression analyses were performed to investigate the relations between performance, autonomous and controlled motivation, favoured subjects, gender, and grade. The five models are presented in Table 3.2. To assess the hierarchical nature of the data, a variance component model was fitted first. From this model, we calculated that 31% of the variance in performance was located at the classroom level, 69% of the variance at the student level, and 0% at the subject and school levels. Therefore, the subject and school levels were removed from the multilevel analyses. Model 0 in Table 3.2 is the final variance component model. Because a significant percentage of variance was located at the classroom level, hierarchical regression analyses were deemed appropriate.

Model 1 in Table 3.2 shows that both autonomous and controlled motivation significantly contributed to report card grade. This model fitted better than the variance component model ($\chi^2(3) = 449.7$, $p < .001$). Both main effects were significant, but the interaction effect was not ($z = 1.60$, $p = .11$). Autonomous motivation predicted performance positively, whereas controlled motivation predicted performance negatively. Together, autonomous and controlled motivation explained most classroom level variance in performance (79.6% = (.250 - .051)/.250). The two variables did not account for any of the variance in performance at the student level.

Table 3.2

Multilevel models with performance as the dependent variable

	Model 0	Model 1	Model 2	Model 3	Model 4
			Fixed effects		
Intercept	6.98 (.022)**	6.97 (.019)**	6.83 (.046)**	6.83 (.050)**	6.87 (.041)**
Autonomous		.327 (.015)**	.170 (.025)**	.169 (.036)**	.173 (.025)**
Controlled		-.145 (.020)**	-.122 (.019)**	-.138 (.041)**	-.158 (.027)**
Aut*con		.024 (.015)	.027 (.014)	.013 (.025)	
Favoured			.489 (.065)**	.483 (.066)**	.483 (.064)**
Gender			-.290 (.036)**	-.289 (.036)**	-.288 (.036)**
Grade			-.064 (.037)	-.065 (.037)	
Favoured*aut				.021 (.052)	
Favoured*con				.046 (.066)	.076 (.038)*
Gender*aut				-.014 (.028)	
Gender*con				-.012 (.038)	
			Random effects		
σ^2 classroom	.250 (.039)	.051 (.029)	.053 (.027)	.053 (.027)	.053 (.027)
σ^2 student	.553 (.037)	.559 (.033)	.516 (.031)	.517 (.031)	.518 (.031)
-2LL	4636.3	4186.6	4064.4	4063.1	4067.0

Note. Autonomous = autonomous motivation; Controlled = controlled motivation; Grade = report card grade.

* $p < .05$. ** $p < .01$

Table 3.3

Means, standard deviations, correlations, and paired t-tests for favoured and disfavoured subjects

	Favoured Subjects					***Disfavoured Subjects***					***Paired t-test***	
			Correlations					Correlations				
	M	*SD*	1.	2.	3.	*M*	*SD*	1.	2.	3.	t	df
1. Autonomous	4.14	0.64				2.04	0.79				67.11**	893
2. Controlled	2.29	0.97	.17**			2.43	0.93	.15**			-5.17**	893
3. Grade	7.40	0.67	.16**	-.10*		6.54	0.88	.12**	-.14**		30.83**	893

* $p < .01$. ** $p < .001$

3.4.3 Motivation and performance levels in favoured and disfavoured subjects

Table 3.3 shows mean scores on, and correlations between, the variables for favoured and disfavoured subjects separately. We see clear differences in mean levels of autonomous motivation and report card grade, both being higher for favoured subjects. Controlled motivation was higher for disfavoured subjects. All mean differences were significant, as can be seen from the paired samples t-tests reported in Table 3.3. Autonomous motivation was more present than controlled motivation in students' favoured subjects. Regarding students' disfavoured subjects, controlled motivation was higher than autonomous motivation. Report card grades for favoured subjects were higher than for disfavoured subjects.

3.4.4 Relations between motivation and performance in favoured and disfavoured subjects

The correlations in Table 3.3 show that, for both favoured and disfavoured subjects, autonomous motivation was positively and significantly correlated with both controlled motivation and report card grade. The two correlations were higher for favoured subjects (r = .17 and r = .16) than for disfavoured subjects (r = .15 and r = .12). At the same time, the relation between controlled motivation and report card grade was slightly more negative for disfavoured (r = -.14) than for favoured (r = -.10) subjects.

In Model 2 in Table 3.2, the factors favoured/disfavoured, gender and grade were added. Model 2 fitted better than model 1 ($\chi^2(3) = 122.2$, $p < .001$). Whether a subject is judged as favoured or disfavoured affected the performance level significantly. In this model, also including other predictors, performance in favoured subjects was about half a point (b = .489) higher than for disfavoured subjects. The minimum and maximum report card grade in the sample were 3.65 and 9.55 respectively. On this scale, a difference of half a point is substantial. The average report card grade of boys was significantly lower (z = -8.06, $p < .001$) than the average report card grade of girls. The difference between seventh and eighth grade was not significant (z = -1.73, p = .084). Compared to Model 1, Model 2 accounted for 6.7% of the variance in performance at the student level.

In Model 3, interaction effects were added between favoured/disfavoured subjects, gender and the significant predictors in Model 2. All four interaction effects were not significant at the 5% level.

Finally, to obtain a parsimonious model, we removed the non-significant parameters in Model 3 one by one, starting with the parameter with the highest associated p-value, until we were left with a model with significant predictors only. The final model is Model 4 in Table 3.2. In this model, autonomous motivation was positively related to performance (b = .173). No evidence was presented that would suggest that this relationship was different for favoured and disfavoured subjects. Controlled motivation was negatively related to performance. Moreover, the relationship was different for favoured and

disfavoured subjects (z = 2.00, p = .046). For disfavoured subjects the relation was more negative (b = -.158) than for favoured subjects (b = -.82 = (b = -.158 + b = .076)). These results correspond with the correlations in Table 3.3.

In Model 4, performance in favoured subjects was higher (b = .483) than in disfavoured subjects, and the average report card grade of girls was higher (b = .288) than the average report card grade of boys. With respect to Model 0, the variance component model, Model 4 explained most classroom level variance in performance (78.8% = (.250 - .53)/.250), whereas with respect to Model 1, Model 4 accounted for 7.3% of the variance in performance at the student level.

For Model 1 to 4, both the classroom level and the student level residuals were normally distributed. Furthermore, the corresponding plots of predicted values versus residuals showed no non-random patterns. We therefore concluded that the assumptions of the multilevel models were reasonably well met.

3.5 Discussion

This study aimed to explore the relations of autonomous and controlled motivation with performance in students' favoured and disfavoured subjects. Autonomous and controlled motivation were studied in relation to overall performance, and in favoured and disfavoured subjects separately.

First, a general positive relation of autonomous motivation with performance, and a negative relation of controlled motivation with performance were found. When autonomous motivation was higher, average report card grades were higher too. In contrast, higher levels of controlled motivation were related to relatively low average report card grades. These motivation aspects were independent of one another in predicting performance. These contrasting relations of autonomous and controlled motivation with performance were expected, as they are in line with SDT theorising (Ryan & Deci, 2002) and because especially autonomous motivation has been linked to various positive school outcomes frequently (e.g. Fortier et al., 1995; Guay & Vallerand, 1997; Lepper et al., 2005; Niemiec & Ryan, 2009). While the finding of controlled motivation as a negative predictor of performance was in line with SDT, this adds to the varying empirical findings on the role of controlled motivation. Whereas researchers found negative correlates of controlled motivation in the school context (Deci, Ryan, & Williams, 1996; Lepper et al., 2005; Scott, Deci, Patrick, & Ryan, 1992), less negative or positive effects have been found in other contexts (Chantal et al., 1996; Langan et al., 2016). Therefore, the present study took into account that whether a subject is favoured might act as a moderator in predicting performance.

Second, differences in levels of motivation and performance were found between favoured and disfavoured subjects. It was confirmed that the level of

autonomous motivation was significantly higher in favoured subjects than in disfavoured subjects. Controlled motivation was higher in disfavoured subjects than in favoured subjects, although the difference between the two types of subjects was smaller than for autonomous motivation. This result suggests that in this age group, controlled motivation is always apparent in the school context, even if one judges a subject as favoured. This finding generally seems to align with the conclusion of Ratelle et al. (2007) that no students with solely autonomous motivation could be found in secondary school. When we relate these findings to the developmental literature, adolescence is a period that seems to be characterised with a higher sensitivity for rewards in different brain regions (van Duijvenvoorde, Peters, Braams, & Crone, 2016). This sensitivity affects motivated behaviour, which becomes more focused on external factors. This is in line with motivation research that convincingly showed a general decline in autonomous motivation during adolescence, while controlled motivation is rather stable (Gillet, Vallerand, & Lafrenière, 2011; Gottfried, Fleming, & Gottfried, 2001). Consequently, these theories, in addition to our results, make it reasonable that also in students' favoured subjects, controlled motivation plays a role.

Third, partial evidence was found for the moderating role of favouritism of a subject in the relation between motivation and performance. The positive relation of autonomous motivation with performance was found for both favoured and disfavoured subjects. Controlled motivation, on the other hand, was found to negatively predict performance in both favoured and disfavoured subjects. An interaction-effect was found between controlled motivation and (dis)favouring a subject, showing that controlled motivation was a more negative predictor in disfavoured subjects. In other words, if one does not favour a subject, it is on average more harmful for performance levels to have a high level of controlled motivation than if one favours a subject. In this scenario, one does not like the subject, and on top of that feels forced by others or by pressuring thoughts of oneself to work on it . In the situation of disfavoured subjects, it is likely that controlled motivation is relatively high, while autonomous motivation is relatively low, which may resemble little learning enjoyment. Moreover, learning enjoyment, as Hagenauer and Hascher (2010) refer to, is thought to be the most activating positive emotion in school. If the level of learning enjoyment is low, this may result in inactivity in school. Or, as Vansteenkiste et al. (2009) noted, the presence of controlled motivation in addition to autonomous motivation may not influence cognitive processing negatively, but may lead to poor regulation of study activities and stress. This again, may indirectly lead to relatively low performance levels, via for example exhaustion (LePine, LePine, & Jackson, 2004).

It seems that to take the effect of controlled motivation on performance into account, the subject-specific context should be considered. In our study, favoured and disfavoured subjects were distinguished and these subjects

differed in the extent to which autonomous motivation was present. When referring to Langan et al. (2016), who took into account the joint roles of controlled and autonomous motivation in sports performance, our results seem to suggest a buffering situation, in which the presence of autonomous motivation attenuates the negative effect of controlled motivation. In the context where autonomous motivation is high, the effect of controlled motivation is less negative than in a context with low autonomous motivation. Ratelle et al. (2007) also mentioned the possibly protective role of autonomous motivation against controlled motivation suggesting that controlled motivation is more detrimental when students have not developed autonomous motivation. The present study connects to these thoughts concluding that in favoured subjects, controlled motivation is less negatively prominent in relation to performance than in disfavoured subjects.

3.5.1 Implications

The findings of this study basically support SDT; autonomous motivation is generally strongly and positively related to performance, even when a student disfavours a particular subject. At the same time, it proved useful to distinguish between students' favoured and disfavoured subjects. Not only levels of motivation and performance diverge, but the relation between controlled motivation and performance also differs in these two types of subjects.

Following SDT, autonomous motivation is important to have. If students like a subject, their autonomous motivation is generally high, correlating with high levels of performance. Favouring a subject is a positive emotion or affect, which may cause different positive outcomes with regard to the subject. For example, positive emotions towards school have been linked to higher levels of well-being, higher quality motivation, engagement, better strategy use and higher achievement (Hagenauer & Hascher, 2010). The positive effect of liking a subject on performance suggests that it is important that a student continues favouring this subject. Need-supportive teaching may be employed to continue students' positive affect towards a subject. This entails that the teacher provides the student with autonomy support and structure, and is involved with the students (Stroet, Opdenakker, & Minnaert, 2013). Stroet (2014) developed a rating sheet for behaviours showing need-supportive teaching. In practice, this means that a teacher may provide autonomy support by for example incorporating students' interests or preferences in the lesson (providing choice) or to provide a rationale when no choice is provided (fostering relevance). Structure may, among other things, be provided through communication of clear and consistent guidelines (clarity) or through the offering of step-by-step directions to the students (guidance). Lastly, involvement may for instance be achieved by talking in a friendly tone (affection), or by showing to students that you understand what is important to them (attunement) (Stroet, 2014). Additionally, to keep the overall affect towards a subject at a high level, it is

important to stress the relevance and importance of the subject (Hulleman, Godes, Hendricks, & Harackiewicz, 2010; Reeve, 2002; Stroet et al., 2013).

If students do not favour a subject, on the other hand, the teacher may use the same strategy as with students who do favour the subject, namely to provide need-supportive teaching, as was described in the previous paragraph (Stroet et al., 2013). By providing this type of teaching, the teacher may try to stimulate autonomous motivation. The present study suggests that this is more important than to focus on decreasing controlled motivation, as the effect of controlled motivation in a context of favoured subjects is less harmful for performance than in disfavoured subjects.

3.5.2 Limitations and future directions

Students' varying reasons to judge a subject as favoured or not may influence the autonomous and controlled motivation, and the relation between motivation and performance towards the subject differently. The students participating in the present study answered questions about their autonomous and controlled motivation for studying for two subjects they considered as favoured and two subjects they considered as disfavoured. The exact reasons why students favour a particular subject or not may, however, differ between students. In further research, it might be good to include the reasons why students favour some subjects while they do not favour other subjects. For example, a student may judge a subject as favoured because he likes the teacher, because he sits next to his friend during these lessons, or because it is an easy, challenging, fun, or interesting subject.

A more refined measure, asking for the different reasons why one favours a subject could provide more insight into which reasons specifically drive the moderating influence of subject favouritism. For instance, SDT distinguishes between nonself-determined and self-determined extrinsic motivation, where self-determined extrinsic motivation is a positive predictor of high quality learning outcomes (Rigby, Deci, Patrick, & Ryan, 1992). Although autonomous motivation not only includes intrinsic motivation but also the most self-determined type of extrinsic motivation, controlled motivation still consists of different reasons which can be more or less self-determined. These different, more or less self-determined, reasons may relate to performance differently. For example, favouring a subject because you like your teacher may affect motivation and performance differently than favouring a subject because it is easy. It would therefore be interesting to unravel the specific reasons why someone is controlled motivated in future research.

Chapter 4

Student Perceptions of Autonomy Support and Structure in Talent Lessons: Relationship with Subject Motivation and Self-efficacy

This chapter is based on:
Wijsman, L., Saab, N., Schuitema, J. A., van Driel, J. H., & Westenberg, P. M. (2018). *Student perceptions of autonomy support and structure in enrichment classes: Relationship with subject motivation and self-efficacy.* Manuscript submitted for publication.

Abstract

To stimulate motivation and perceived competence, this study employed an enrichment approach for all students, constituted by autonomy-supportive and structured talent lessons. Student perceptions were studied because these determine how an innovation may affect students. The talent lessons were part of GUTS and were implemented at a Dutch secondary school. The first part of this study aimed to describe by means of structured interviews (n = 30) how students perceived autonomy support and structure in the talent lessons. The second part investigated, through regression analyses on questionnaire data, the relationship between perceived autonomy support and structure during the talent lessons, and motivation and self-efficacy for the corresponding school subject (n = 213). Results showed that the talent lessons were generally perceived as autonomy-supportive and structured. Furthermore, a relationship between perceived autonomy support in the talent lessons and autonomous subject motivation was found. Such a relationship was not observed for structured teaching in the model including autonomy support as a predictor too. This study shows that talent lessons using an enrichment approach may be beneficial for enhancing autonomous motivation in all students.

4.1. Introduction

An extensively studied phenomenon is decreasing student motivation during secondary education (Eccles, Lord, & Midgley, 1991; Gottfried, Fleming, & Gottfried, 2001; Lepper, Corpus, & Iyengar, 2005). Intrinsic motivation in specific is found to decline (Pintrich & de Groot, 1990; Wigfield & Wagner, 2005). Additionally, student perceptions of their own competence generally decrease during this time (Chouinard & Roy, 2008; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002). These are imperative findings because of the importance of motivation and perceived competence for students' school careers.

Several types of interventions have been developed for increasing student motivation (for a review see Lazowski & Hulleman, 2016). Self-determination theory (SDT; Ryan & Deci, 2002) postulates that motivation-enhancing teaching should be need-supportive, that is, it should meet three basic student needs: autonomy, competence, and relatedness. Importantly, it has been argued that the effectiveness of an educational intervention or innovation depends in part on how it is perceived by the students (Könings, 2007). Based on a review of the literature, Stroet, Opdenakker, and Minnaert (2013) concluded that student *perceptions* of need-supportive teaching are positively related to motivation. The first goal of the present study was to investigate student perceptions of autonomy-supportive teaching and the provision of structure within an enrichment programme designed for all students instead of a smaller group of gifted students. The second goal was to investigate the relationship between student perceptions of autonomy-supportive teaching and the provision of structure and their motivation and perceived competence in a particular school subject.

4.2 Conceptual Framework

4.2.1 Student perceptions of (new) learning environments

Student perceptions of innovations are important because the success of an innovation depends on how it is perceived and understood by all involved parties. While teacher perceptions of innovations are often studied, students are mainly seen as the ones who should benefit from innovations and student learning outcomes are studied rather than their perceptions of the innovation (Fullan, 2007). However, a learning environment does not directly influence learning outcomes, but influences learning outcomes via perceptions of the learning environment, which makes it an indirect effect (Könings, 2007). It is not others' behaviour that affects one's motivation, but it is the perception of this behaviour (Deci, 1975; Stroet et al., 2013).

Influences on student perceptions are their conception of learning, motivational orientation and goals, regulation of the learning process, use

of cognitive processing strategies, and expectations regarding the learning environment (Könings, 2007). If one perceives an innovation differently from other students, this may cause differing effects of the innovation. For example, it was found that student perceptions of the mathematics classroom environment in terms of teacher structure, teacher expectations, and reform practices mediated the effect on mathematics standardised performance (Gilbert et al., 2014). Additionally, student perceptions of a teacher professional development programme showed a good reflection of the learning environment when compared to objective observations of this learning environment (Soebari & Aldridge, 2015).

Regarding innovations focused on need-supportive teaching to increase motivation, some examples show that perceptions of need support are important and can differ among students who experience the same innovation. Among secondary school students it was found that perceived choice during lessons mediated the effect of autonomy-supportive teaching on motivation (Patall, Cooper, & Wynn, 2010). Furthermore, a site visit based teaching innovation in science teaching, aimed at enhancing motivation towards science through need-supportive teaching, was a reasonably successful way to increase student motivation, although the need support was perceived differently by students who had different motivation profiles to begin with (Loukomies et al., 2013).

4.2.2 An enrichment approach constituted by talent lessons to motivate all students

An enrichment approach has mainly been taken to stimulate and motivate gifted students who are poorly motivated or who underachieve (Kim, 2016; Subotnik, Olszewski-Kubilius, & Worrell, 2011). Enrichment is used to challenge gifted students in new topics which are not part of the regular curriculum (Kim, 2016). However, the enrichment approach appears not only suitable for gifted students, but may be beneficial for all students (Renzulli & Renzulli, 2010; Robinson, Zigler, & Gallagher, 2000). An example of an enrichment approach for all students is the Schoolwide Enrichment Model (SEM; Renzulli & Renzulli, 2010). This model is used to engage all students through enjoyable, challenging and interest-based enrichment. The SEM is composed of three pillars: (1) a total talent portfolio, (2) curriculum modification and differentiation techniques, and (3) enrichment learning and teaching. Also, the SEM emphasizes strengths of students, as happens in the enrichment approach in the present study.

The enrichment approach in this study is aimed at motivating all students and is constituted by talent lessons. Goal of the talent lessons is to positively approach all students. The talent lessons focus on students' strengths, that is, their talents in existing subjects. Talent, in this way, is defined as a combination of competence in a subject and a drive to work on that subject. This definition of talent is similar to Gagné's (1985, 2004) reasoning, which states that the expression of talent through performance depends on a combination of ability,

personal, and context factors. Additionally, an important nuance we make in this definition is that talent development is important for all students (Barab & Plucker, 2002) instead of only for the gifted ones. Talent is not about being exceptional overall, but about the pursuit of one's relative strengths.

The talent lessons in the present study were designed to be need-supportive. Self-determination theory (SDT; Ryan & Deci, 2002) distinguishes three basic needs: autonomy, competence, and relatedness. Fulfilment of basic psychological needs stimulates *autonomous, or self-determined* motivation (Ryan & Deci, 2002; Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009). One then truly enjoys an activity or views it as personally relevant (Ryan & Deci, 2002). In contrast, nonself-determined motivation is *controlled,* or *externally regulated*. Externally regulated behaviour is done purely to receive a reward or to avoid punishment or feelings of guilt (Ryan & Deci, 2002). Autonomous motivation is associated with positive learning outcomes, whereas controlled motivation might be counterproductive (Guay & Vallerand, 1997; Ryan & Deci, 2000; Vansteenkiste et al., 2009). For the talent lessons, we decided to focus on two needs – autonomy and competence, as those needs appear to be most relevant for autonomous motivation (Deci & Ryan, 2000).

The need for autonomy is fulfilled through autonomy-supportive teaching, which can be described as giving students freedom to plan their own learning activities and follow their personal interests (Reeve, 2002), and to take part in decisions and choices, and solving problems independently (Grolnick & Ryan, 1989). An autonomy-supportive teacher adopts the student perspective, is open to thoughts, feelings, and behaviour of students, and stimulates the autonomous self-regulation (Reeve, 2009; Stroet, 2014). Teaching then incorporates students' interests and values through offering choice, fostering relevance and showing respect (Stroet, 2014; Vansteenkiste et al., 2012). If students perceive autonomy support, they experience more motivation and engagement in school (Deci, Schwartz, Sheinman, & Ryan, 1981; Reeve, 2006; Stroet et al., 2013).

The need for competence is fulfilled through structured teaching, which comprises clear expectations and goals, guidelines and rules, and informative feedback (Reeve, 2002). If a teacher provides structure, his teaching fulfils the basic psychological need for competence by providing students with the feeling of control over their school outcomes (Stroet, 2014). Fulfilment of the need for competence is important to stimulate autonomous motivation, as well as to fuel perceptions of competence or self-efficacy. Self-efficacy in academic settings is the extent to which one believes in one's own competence to finish a task well (Pajares, 1996) and is important for academic achievement (Peetsma et al., 2005).

Autonomy support and structure are both positive predictors of engagement in learning activities (Jang, Reeve, & Deci, 2010). Vansteenkiste et al. (2012) found that a combination of autonomy support and provision of clear expectations (used as an essential element of structure by these authors), leads to the most positive student outcomes in terms of autonomous motivation, self-

regulation, and a low level of problem behaviour. With regard to structure, in some cases the positive effects have only been found when autonomy support was also present (Jang et al., 2010), while other authors concluded that structure uniquely contributed to motivation and performance (Farkas & Grolnick, 2010).

The talent lessons in the present study were designed to fulfil the needs for autonomy and competence in various ways. First, students were offered choice to spend time on one of their interests by choosing a subject for the talent lessons. Second, during the talent lessons, as much choice in assignments and ways of working as possible was offered. Higher order thinking tasks and enrichment were also included as principles in the design of the talent lessons to challenge and interest students and make them acquainted with topics that are not included in the regular curriculum. Also, the lessons took place in smaller groups than the usual classroom setting, providing teachers with the opportunity to respond to the student's specific interests. Clear instructions, goals and expectations were provided to students by means of a description of the talent lessons on a website through which students applied for the lessons. We expected that a transfer effect shows between autonomy-supportive and structured teaching in the talent lessons on the one hand and motivation and self-efficacy for this subject in general on the other hand. This expectation is based on the hierarchical model of motivation, investigated in a sports context, which states that need support at a specific level may affect motivation at a more general level (Vallerand, 2007).

4.2.3 This study

The present study employs talent lessons to support all students' motivation and sense of competence for a particular school subject. The first goal of this study was to investigate to what extent students perceived and valued the talent lessons as autonomy-supportive and structured. The second goal of this study was to investigate the relation between the perception of need-supportive teaching during the talent lessons on the one hand and motivation and self-efficacy for the corresponding regular school subject on the other hand. We expected that the perception of autonomy-supportive and structured talent lessons would positively relate to autonomous motivation and sense of competence for a particular school subject.

4.3 Method

4.3.1 Context of the study

The talent lessons in the present study were part of GUTS (in Dutch: Gedifferienteerd Uitdagen van Talent op School; Differentiated Challenging of Talent in School). GUTS is an innovation that aimed to promote lower secondary school students' motivation and performance in the context of the Netherlands.

The project started in school year 2013/2014 and was piloted for three consecutive years. A more detailed description of the innovation was provided in paragraph 1.4 in Chapter 1. The present study investigated the talent lessons during school year 2015/2016.

The talent lessons were provided by means of extra classes in specific subjects. Students chose their own subject for talent lessons: a subject that they liked and for which they received relatively good grades (i.e., a 7 or higher on a 10-point scale). Two cycles of eight 100-minutes lasting classes were provided. Students chose two different subjects for the talent lessons per school year. Seventh and eighth grade students, and students from the two included school types took the talent lessons jointly. The task performed during the talent lessons was graded. At the end of a cycle of talent lessons, presentations for the parents were provided by the students.

4.3.2 Participants

This study consisted of two parts. Part 1 investigated student perceptions of autonomy support and structure in the talent lessons and Part 2 studied the relation between autonomy support and structure in the talent lessons and motivation and self-efficacy for the subject.

For Part 1, a sample of 30 students, two per class, was interviewed. These were 15 girls and 15 boys. Sixteen students were in seventh, and 14 in eighth grade. Sampling was performed purposefully: from every class one boy and one girl were selected, and in total 15 students were good performers (average report card grade higher than 7 on a 10-point scale) and 15 were modest performers (average report card grade below 7). The students took talent lessons in various subjects: 6x Dutch, 5x art & design, 4x Spanish, 4x physical education, 2x history, 2x English, 2x German, 2x biology, 1x mathematics, 1x geography, and 1x French. The interview participants were also included in the sample for Part 2.

For Part 2, questionnaires were administered among all seventh and eighth grade students participating in GUTS. The sample consisted of 245 seventh (n = 136) and eighth grade (n = 109) students who were divided over 15 classes. Of the seventh grade students, 57 were in the combined senior general secondary/ pre-university school type, and 79 were in pre-university. Senior general secondary education prepares for higher professional education, and pre-university education prepares for university. In grade 7, combination classes can be used to give students the opportunity to experience which school type fits best. Of the students in eighth grade, 31 were in senior general secondary education, and 78 in pre-university. Thirty-two students had not fully completed the questionnaire on autonomy support and structure, resulting in no or non-representative scale scores. These students were deleted listwise, resulting in a sample of 213 students (n_{grade7} = 120, n_{grade8} = 93) who were included in the analyses.

4.3.3 Procedure

For Part 1, structured individual interviews were conducted to obtain the students' own view on need-supportive teaching in the talent lessons they took in February 2016. These interviews included questions about the perceived autonomy support and structure during the talent lessons of November/ December 2015. Interviews took approximately 20 minutes, and took place during school times. Interviews were conducted by the first author and by three university students who wrote their master theses on this topic.

For Part 2, students completed two questionnaires about the talent lessons of spring 2016. The first questionnaire included questions about perceived need support during the talent lessons and was conducted in May 2016. The second questionnaire, in June 2016, assessed the students' autonomous and controlled motivation and self-efficacy for the subject in which they had taken talent lessons during spring 2016. The first questionnaire was administered digitally through an emailed link to all students. The second was a paper-and-pencil questionnaire, administered in a classroom setting where a teacher and the first author were present.

Only students of whom the parents provided consent for participation of their child, were included. The procedure was approved by the Leiden University Psychology Research Ethics Committee.

4.3.4 Measures

Both instruments for measuring student perceptions of need-supportive teaching – the structured interview as well as the digital questionnaire – were based on the framework developed by Belmont, Skinner, Wellborn, and Connell (1988). This framework suggests four themes for autonomy support (choice, respect, relevance, and control) and two themes for structure (clarity and guidance).

4.3.4.1 Part 1: Structured interview

The structured interview comprised two sets of questions: (1) questions aimed at specific themes as identified by Belmont at al., 1988), and (b) follow-up questions to probe the student's thinking, such as 'can you give an example', and 'do you know other students who did experience this' (see Table 4.1).

Table 4.1
Interview questions for every sub-theme

Sub-theme	Questions
Choice	Could you do whatever you wanted during the talent lessons? (in terms of topic, or way of working?
Respect	Did the teacher listen to your ideas about the assignment?
Relevance	Did the teacher explain why the assignment was relevant? Do you agree with this relevance?
Control	Did you have to do something the teacher wanted you to do sometimes? Was that good or bad?
Clarity	a. Did you know beforehand what you were going to do during the talent lessons? Can you explain what you thought?
	b. Did the teacher tell you which criteria your assignment had to meet at the end?
	c. If you did not know what to do during the talent lessons, what did you do?
Guidance	How did the teacher respond to your questions?

Coding of the interviews was performed using the theoretical sub-themes of autonomy support and structure as defined in the framework of Belmont et al. (1988), adding also whether a student perceived much or little of one of the sub-themes during the talent lessons. The description of the codes was based on Stroet's (2014, pp. 202-203) need support rating sheet. This rating sheet was developed to observe need support in the classroom (Stroet, 2014). We selected the parts of this rating sheet which were related to what students perceive in the classroom (see Table 4.2).

To assure reliability of the coding, several steps were taken. In a training phase, ten interviews were coded by the first and second author of this study. Following, the meaning of the codes was discussed and fine-tuned. Finally, five different interviews were coded by the two coders. This resulted in a Cohen's Kappa (κ) of .77, which can be classified as good (Landis & Koch, 1977). Using the coding scheme presented in Table 4.2, 84% of the student utterances could be coded.

Table 4.2

Themes, sub-themes, codes, and descriptions of the codes

Theme	Sub-theme	Code	Description based on rating sheet Stroet (2014, pp 202-203)
Autonomy support	***Choice***	yes: choice	Students' interests, preferences, choices, curiosity, or sense of challenge were incorporated into the lesson and the teacher created opportunities for students to work in their own way
		no: no choice	The teacher kept possession of and monopolised the learning material, did not allow students to realize their action plans, disrupted their natural rhythm, and/or provided solutions before students had time to reflect by themselves
	Respect	yes: respect	The teacher did not only respond to, but also elaborated on the things the student said, listened carefully to students, acknowledged their feelings, thoughts and perspectives, and/or was open to complaints and negative affect
		no: disrespect	The teacher did not allow expression of opinions that differed from those expressed by the teacher and did not allow complaints and negative affect
	Relevance	yes: relevance	The teacher provided a meaningful and realistic rationale when choice was constraint, thereby taking the students' perspectives, and/or provided a specific goal that was realistically and meaningfully connected to a referenced intrinsic goal of the learning activity (via value, meaning, use, benefit, importance)
		no: meaningless activities	The teacher actively attempted to compel students to do things they found boring or meaningless, thereby neglecting students' inner resources, provided a goal that was connected to a referenced extrinsic goal of the learning activity, and/or communicated negative values on schoolwork
	Control*	yes: control	The teacher coerced the students through force or authority to do certain things
		no: no control	The teacher did not coerce students through force or authority to do certain things

Table 4.2 (continued)

Theme	Sub-theme	Code	Description based on rating sheet Stroet (2014, pp 202-203)
Structure	*Clarity*	yes: task is clear	The teacher communicated clear, detailed, and consistent expectations
		no: task is unclear	The teacher communicated unclear, vague, confusing, or contradicting expectations
		yes: goal is clear	The teacher communicated clear, detailed, and consistent guidelines
		no: goal is not clear	The teacher communicated unclear, vague, confusing, or contradicting guidelines
		yes: ask teacher for help	The teacher was available to answer questions when guidelines or expectations were unclear
		no: could not ask teacher for help	The teacher was not available to answer questions when students clearly found guidelines or expectations unclear
	Guidance	yes: teacher helped	The teacher provided step-by-step directions when needed, thereby adjusting to the student, was available to answer questions when students needed help or support, and/or entailed monitoring oand adjusting to students' comprehension
		no: teacher did not help	The teacher was not available to answer questions when students indicated they needed help or support, and did not monitor or adjust to students' level of comprehension

* Stroet (2014) does not distinguish a separate control scale. Therefore, the description of control is based on the framework of Belmont et al. (1988).

4.3.4.2 Part 2: Questionnaires

For the second part, two questionnaires were used (1) a questionnaire on autonomy support and structure in the talent lessons, and (2) a questionnaire on subject specific autonomous and controlled motivation and self-efficacy.

(1) The questionnaire concerning the content of the talent lessons included 8 items about autonomy support, and 8 items about structure, and was based on the Teacher As Social Context questionnaire (TASC; Belmont et al., 1988). Students answered the items on a 5-point Likert scale. Autonomy support consisted of items about perceived choice, respect, relevance, and control. Structure consisted of the subscales clarity and guidance. Initial reliability in the present study was rather low for autonomy support (α = .51) and was good for structure (α = .80). Detailed analyses of the autonomy support scale showed that the two control items reduced the reliability of this scale. These items were: "these teachers always tried to steer me in what I had to do" and "During these talent lessons the teachers always criticised what I did". The item-total correlations were negative (-.255 and -.088, respectively), and removing these items increased the reliability of the scale from α = .51 to α = .75. Furthermore, one structure item belonging to the subscale clarity was not included in the scale because of a low item-total correlation (.07). This item was: "During the talent lessons, the teachers changed the guidelines of the assignment". On this item many students answered the middle category. After removal of this item, the structure scale consisted of seven items and reliability improved to α = .85.

(2) Students completed a questionnaire on autonomous and controlled motivation and self-efficacy for the subject they had taken during the most recent talent lessons. That is, the questions concerned the regular classes for this particular subject. Questions were answered on a 5-point Likert scale, ranging from 'completely untrue' to 'completely true'. Hence, average levels of autonomous and controlled motivation and self-efficacy could vary between 1 and 5. Autonomous and controlled motivation were measured using a shortened 8-item version of the originally 16-item version of the academic self-regulation questionnaire by Vansteenkiste et al. (2009). This questionnaire was based on the Academic Self-Regulation Questionnaire of Ryan and Connell (1989). Autonomous motivation (α = .84) was composed of identified regulation and intrinsic motivation items. Controlled motivation (α = .77) included external regulation and introjected regulation. Self-efficacy (α = .87) was measured using a Dutch translation (Hornstra, van der Veen, & Peetsma, 2016) of the 5-item self-efficacy scale from the Patterns of Adaptive Learning Scale of Midgley et al. (2000).

4.3.5 Analyses

For Part 1, the frequencies of the codes were described and investigated. Accordingly, the answers within codes were clustered based on their content. As for Part 2, to investigate whether perceived autonomy support and structure

in the talent lessons were related to motivation and self-efficacy in a subject, multiple regression analyses were performed. One regression analysis for every dependent variable was conducted. Predictors were perceived autonomy support and perceived structure. In addition, mean level of performance was added as a predictor to study whether all students, as opposed to only the gifted students, benefitted from the talent lessons. All predictors were standardised before inclusion in the regression analyses. For every dependent variable, a model with autonomy support and structure as predictors was performed, after which a second model also included the main effect of performance level, and a third model also contained the interaction between performance level and autonomy support and structure. The data on all scales, except for performance, were rather skewed. Bootstrapping was therefore performed to assure that the skewness did not affect the results.

Multilevel regression analyses were not performed as these analyses failed to show a significant amount of variance at the higher (class) level. Models including the class level were not significantly better model than models without class level for all dependent variables.

4.4 Results

4.4.1 Part 1. Student perceptions of autonomy support and structure in talent lessons

4.4.1.1 Autonomy support

As can be seen in Table 4.3, most student answers in the interviews could be classified as perceiving autonomy support. The answers of 23 students could be classified as perceiving choice and 23 students perceived their teacher to show respect. Fifteen students answered that the relevance of the talent lessons was made clear by the teacher. Regarding control, four students mentioned some form of control, and seven students perceived no control. The answers of 19 students could not be coded on the sub-theme control with the present coding scheme.

Table 4.3
Classification of student answers for the theme autonomy support

Theme	Sub-theme	Code	Frequency
Autonomy support	***Choice***	yes: choice	23
		no: no choice	6
		coding not possible	1
	Respect	yes: respect	23
		no: disrespect	2
		coding not possible	5
	Relevance	yes: relevance	15
		no: meaningless activities	12
		coding not possible	3
	Control	yes: control	4
		no: no control	7
		coding not possible	19

Choice. Clustering the answers of students who perceived choice (n = 23), two types of answers were distinguished. Students either perceived that they could decide themselves what they would do during the talent lessons, or perceived some freedom within the boundaries of the assignment. As for the first group (n = 4), aspects that students who perceived the lessons as open to their choice named were that they could choose the topic of the talent lessons individually or together with peers.

> *"At the beginning of every lesson, the teachers always ask like what do you want to learn. It is then always possible to say what you want to learn and then they allocate that in the lessons" (girl, grade 8, Spanish language talent lessons)*

The second group (n = 19) mentioned that they perceived some choice within the assignment of their talent lessons. Students for example mentioned that they first had to listen to the instruction by the teacher, after which they could work on their assignment themselves. Or, it was mentioned that the assignment or the guidelines were set, for example writing a story, but that students themselves could determine the content of the story. Interpreting these answers, a notion of structure is also apparent here, as students mentioned guidelines, within which they can work by themselves.

> *"We could choose a lot ourselves and we received some big guidelines that we had to do but you were allowed to do it in your own way" (girl, grade 8, geography)*

Some students mentioned another form of choice, namely that that they had to collaborate with other students, and could choose themselves who they wanted to work with. One student mentioned that sometimes he had to do something because his peers wanted to do that, which made it not possible for him to do what he wanted.

As for the students who did not perceive choice during their talent lessons (*n* = 6), these students perceived the content and assignments of the lessons to be predetermined. Students who perceived this mainly mentioned that the topic of the talent lessons or the working method were predetermined. For example, two students who took Physical Education (PE) for their talent lessons mentioned that it was predetermined that they would try tennis, cricket, and badminton and one student who took Dutch talent lessons mentioned that he just had to do what the teacher said.

> *"They said that eh that GUTS was not eh… meant to do something for yourself eh or yes it was not free time. He said that you had to pay attention and had to participate, that is what he said at the beginning" (boy, grade 8, Dutch language)*

Respect. The answers of 23 students were classified as perceiving respect during the talent lessons. The content of these answers of 22 students could be clustered in two directions. The answer of the 23rd student was too short to be assigned to one of the two directions. Therefore, in this section we focus on the more elaborated answers of the 22 other students. Twelve students mentioned that they perceived their ideas to be used as input for the topic of the assignment or way of working.

> *"Yes, quite well, because going to Blijdorp (zoo) was also suggested by someone from the class, so…" (girl, grade 7, French language)*

Ten students who perceived respect told that the teacher listened to their questions and adequately helped them if necessary. These students actually addressed the issue of guidance in their answer, a characteristic of structure. An example of such an answer:

> *"Yes. She just listened and said like yes, well, good idea or sometimes also that it was not a good idea, that it would become ugly or so, then the painting would be too dark, and she said that would be unfortunate" (girl, grade 7, art & design)*

Two students perceived disrespect during the talent lessons. These students said that the teachers did not listen to their ideas during the talent lessons, because the assignments were predefined and there was no room for students' own ideas.

Finally, the answers of five students to the question whether they could express their ideas during the talent lessons could not be coded as these students indicated that they did not have ideas to share during the talent lessons.

Relevance. Fifteen students perceived the relevance of the lessons to be made clear by the teacher. Fourteen of these answers could be classified into three clusters. Firstly, three students stressed that the teacher told them they would acquire skills or knowledge during these talent lessons which they could use for other lessons. Secondly, according to six other students, teachers stressed the relevance of the content of the talent lessons for things outside school, such as later work life, a holiday in a foreign country, or developing an opinion about a topic.

> *"Eh, yes, eh well, they explained, because they were with the two of them, that eh, for example it is convenient to talk German later in life because if you want to work abroad and these kind of things. And it is just very convenient to talk German" (girl, grade 8, German language)*

Finally, five students perceived their teachers to stress the importance of gaining knowledge during the talent lessons to become better at the subject, or to gain higher performance levels.

For 12 students, the relevance was not clear. Four students mentioned that the teacher did not tell them about the relevance of the talent lessons, but that they did see the relevance of the lessons themselves. Two other students said that the teacher told it was fun, and five students only mentioned that the teacher did not tell the relevance.

> *"No, not really, she just said that it was fun. It was, because talent lessons are mainly to do fun projects and so on, and she said that debating and poetry is real fun" (boy, grade 8, Dutch language)*

The answers of three students could not be coded as these students mentioned that they had forgotten whether the teacher told the relevance of the talent lessons.

Control. Four students perceived control during the talent lessons. These students mentioned that they had to do something mandatory and that they did not like this, that it was boring, or took too much time. Seven students perceived no control. The answers of three of these students did not explicate what they meant. Four other students mentioned that they had to do some small things, but that they could mostly choose themselves what they wanted to do. The answers of 19 students could not be classified as control or no control. The answers of most of these students included the notion that they were obliged to do certain tasks or assignments, but also that they liked this, or thought it was good that they had to do this. An example:

> *"You had to do all these things you needed. If you did not do these, then you were not able to determine who the murderer was. So you just had to do it"* Interviewer: "was that good or annoying?" *"yes, that was fun. You just had to do these things to find the murderer. That's why. You just had to do it and if you did not then you did not know" (boy, grade 7, biology)*

4.4.1.2 Structure

Structure is discussed in terms of clarity and guidance. Table 4.4 shows that the majority of the students perceived the task and goal to be clear, that they asked the teacher for help if needed, and that the teacher helped them.

Table 4.4
Classification of student answers for the theme structure

Theme	Sub-theme	Code	Frequency
Structure	***Clarity***	yes: task is clear	18
		no: task is unclear	11
		coding not possible	1
		yes: goal is clear	21
		no: goal is not clear	8
		coding not possible	1
	Guidance	yes: ask teacher for help	25
		no: could not ask teacher for help	0
		coding not possible	5
		yes: teacher helped	27
		no: teacher did not help	0
		coding not possible	3

Clarity. Eighteen students perceived the task as clear before the talent lessons started or during the first of these lessons. As for the students who mentioned the content was clear beforehand (n = 10), seven students mentioned a website on which the content of the talent lessons was explained. One student mentioned that he had done the same talent lessons during the previous school year, and two students did not explain their answer.

For 11 students, the task was not clear before the start of the talent lessons, and they did also not mention that the task became clear at the beginning of the talent lesson. Five students mentioned that they knew the overall theme of the lessons, but not the precise assignment(s). One student told she deliberately did not look on the website which specified the lessons.

One other student mentioned that the classes proceeded differently than from what was explained beforehand, and one student had absolutely no idea of the assignment. Four students did not provide a reason why the task was not clear.

The goal of the assignment was clear to 21 students. Of these, seven students mentioned that they just had to finish the assignment, and eight students stated specific criteria for the assignment which had to be met.

> *"Eh, yes that the project had to be finished. And eh, yes no, the project just had to be finished and we had to present it to the teacher" (boy, grade 8, history)*

> *"It was, you really had to, eh, that it approached the real style, approximately, because otherwise it does not look like the real painting I assume. Then it is, eh, yes, hard to explain… I think that it would then just be, a dot of paint, with a dot of paint on it, with a dot of paint on it, instead of stripes" (boy, grade 7, art & design)*

Three students mentioned that they knew the goal of one assignment, and not for a second assignment of the talent lessons. One student mentioned that the teacher would say what had to be done in a certain lesson, to be able to proceed during the next lesson. One student mentioned that the end goal was clear, but that the teacher could change it somewhat during the series of the lessons, which was not a problem because of the small group of students.

Eight students mentioned that the end goal of their assignment was not clear, either because there was no real end goal (n = 4), because everyone did the same (n = 1), because the teacher told the goal at the end of the series of talent lessons (n = 1), because there was no real end goal but a learning goal to learn to hit and catch (n = 1), or the answer was not further specified (n = 1). An example:

> *"Eh, yes, not really. But it was so that we learned more every lesson. It was not that we had to finish an end assignment or so, not really a goal" (girl, grade 8, Spanish language)*

As for the question what the students did when they did not know what to do during the talent lessons, 25 students mentioned they would ask the teacher for help. Of these, 15 students only said that they asked the teacher for help and 10 students mentioned they would ask the teacher or a peer for help. Of these latter 10, five students rank-ordered these sources for help and said that they first asked a peer for help and if he could not help, went to the teacher.

> *"Eh, I asked it first in my group with whom I worked, and if I then did not understand it, I asked the teacher" (girl, grade 7, English language)*

The answers of five students could not be coded using the coding scheme. Of these, two students said that they asked their peers for help and had no questions for the teacher, and two other students mentioned that they chatted with their friends if they did not know what to do. Finally, one student mentioned that he did something for himself if he did not know what to do.

Guidance. Answering the question how teachers responded to student requests for help or questions, 27 students' answers were coded as perceiving guidance. Ten students mentioned that the teacher helped or answered the question, and ten students said that the teacher explained the topic (again). Eleven students mentioned that the teacher helped or explained in a normal way, or just as always.

> *"Well, just normal, ordinary, she just explained" (boy, grade 8, Dutch language)*

Three students mentioned the emotion or attitude of the teacher; i.e. the teacher was open, friendly, or happy. One student mentioned that the teachers liked it if he asked a question, and one student said that the teachers would start a conversation with the student to come to ideas. One student mentioned that the teacher first asked to solve the problem yourself, and otherwise come back for help.

No students perceived a lack of guidance. Three students did not mention anything about the reaction of the teacher to their questions.

4.4.2 Part 2. Autonomy support and structure in the talent lessons in relation to subject motivation and self-efficacy

Correlations, means and standard deviations of the included constructs are presented in Table 4.5. Significant correlations were observed between autonomy support and structure (r = .67**), autonomy support and autonomous motivation (r = .31**), and structure and autonomous motivation (r = .28**). Furthermore, autonomous motivation was positively related to controlled motivation (r = .25**), self-efficacy (r = .44**), and mean report card grade (r = .16*). Finally, self-efficacy and mean report card grade were positively related (r = .19*).

Table 4.5

Correlations between need support in the talent lessons, motivation and self-efficacy for the subject, and mean report card grade

	1	2	3	4	5	6	*M*	*SD*
1. Autonomy support	-						3.75	0.78
2. Structure	.67***	-					3.90	0.78
3. Autonomous motivation	.31***	.28***	-				3.66	1.03
4. Controlled motivation	.04	-.08	.25***	-			1.99	0.94
5. Self-efficacy	.07	.07	.44***	.03	-		4.09	0.75
6. Mean report card grade	-.11	.01	.16*	-.09	.19**	-	7.27	0.65

* p < .05. ** p < .01. *** p < .001.

Three multiple regression analyses were performed to study the relations between autonomy support and structure in the talent lessons and autonomous motivation, controlled motivation, and self-efficacy for the subject. The final models, including the predictors autonomy support, structure, and performance level, are shown in Tables 4.6 and 4.7. Bootstrapping did not present different results. For autonomous motivation, a model with main effects and a model including interaction effects are presented (Table 4.6). The final model shows that autonomy support was a significant predictor (t = 3.37, p = .001) and structure was not (t = 1.04, p = .298). Performance level was a significant positive predictor of autonomous motivation (t = 3.23, p = .001), meaning that students with higher performance levels generally also perceive higher levels of autonomous motivation. The interaction-effect between autonomy support and performance level was also a significant negative predictor (t = -3.40, p = .001). This means that the relationship between perceived autonomy support and autonomous motivation was stronger for students with lower performance levels than for students with higher levels of performance. The model as a whole was significant, with R^2 = .19.

For controlled motivation and self-efficacy, models including main effects are presented in Table 4.7. Regression models with interaction effects were tested and showed no such effects. These are, therefore, not presented. The

Table 4.6

Regression models with main effects and with interaction effects for autonomous motivation

	Autonomous motivation					
	Model with main effects			Model with main and interaction effects		
Predictor	B	β	95% CI	B	β	95% CI
Constant	3.66**		[3.53 – 3.79]	3.63**		[3.49 – 3.75]
Autonomy support	0.27**	.26	[0.10 – 0.45]	0.30**	.29	[0.13 – 0.47]
Structure	0.10	.10	[-0.06 - 0.27]	0.09	.09	[-0.08 – 0.25]
Performance level	0.19**	.18	[0.07 - 0.30]	0.22**	.21	[0.09 – 0.32]
Autonomy support* performance level				-0.31**	-.25	[-0.48 – -0.15]
Structure* performance level				0.04	.04	[-0.07 – 0.23]
R^2	.14			.19		
F	10.997***			9.75***		

Note. 95% CI = bootstrapped 95% confidence intervals
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4.7

Regression models with main effects for controlled motivation and self-efficacy

	Controlled motivation			Self-efficacy		
Predictor	B	β	95% CI	B	β	95% CI
Constant	1.99**		[1.85 - 2.11]	4.09**		[3.99 - 4.19]
Autonomy support	0.14	.15	[-0.37 - 0.31]	0.06	.08	[-0.08 - 0.19]
Structure	-0.16	-.18	[-0.35 - 0.02]	0.01	.02	[-0.11 - 0.16]
Performance level	-0.06	-.07	[-0.20 - 0.07]	0.15**	.20	[0.05 - 0.24]
R^2	.03			.05		
F	1.75			3.29*		

Note. 95% CI = bootstrapped 95% confidence intervals
* $p < .05$. ** $p < .01$. *** $p < .001$.

regression model for controlled motivation as a whole was non-significant. No effects on controlled motivation were found. The model with self-efficacy showed an effect of performance on self-efficacy ($t = 2.94$, $p = .004$) and no effects of autonomy support and structure.

4.5 Discussion

This study aimed first to describe to what extent students perceived and valued the talent lessons as autonomy-supportive and structured, and second how perceptions of autonomy support and structure in the talent lessons were related to subject motivation and self-efficacy.

The interviews in Part 1 of this study showed that a large majority of students perceived autonomy support and structure during the talent lessons, whereas relatively few students felt unsupported by their teachers. Across the board, students perceived autonomy support in terms of choice, respect and relevance, and perceived structure in terms of clarity and guidance. Students provided different explanations for feeling supported in their needs for autonomy and structure.

The differences in perceptions between students may arise from different sources. First, the perception of autonomy support and structure may be quite individually determined. Individual student characteristics may influence perceptions of need support. Studies have documented teacher behaviour that is need-supportive (see Stroet, 2014), but teacher behaviour may be interpreted variously by different students. For example, in our study some students mentioned that they could shape the talent lessons themselves and therefore perceived choice, while others also perceived choice mentioning that they could work in their own way within the boundaries of the assignment. The low level of variance in motivation and self-efficacy at the class level in Part 2 of the present study is also an indicator for the largely individually determined student perceptions. This namely means that students who were in one class and therefore taught by the same teachers, were not more alike than students in different classes who did not have the same teachers.

Second, the different perceptions may have arisen from the teacher's approach, as a teacher of a talent lesson likely differentiated between the students (Tomlinson et al., 2003). This means that a teacher may have addressed one student more or less autonomy-supportive and with more or less structure than another student. Students then consequently have different experiences, which may have affected their perceptions of the talent lessons. Finally, the differences in student perceptions of autonomy support and structure may indicate that the talent lessons for the various subjects were actually shaped differently. Some teachers may have shaped their classes more autonomy-supportive and structured than others, as some teachers are naturally inclined

to use autonomy-supportive and others more controlling teacher strategies (Hornstra, Mansfield, van der Veen, Peetsma, & Volman, 2015). In any case, the interview study showed that, overall, students appreciated the autonomy-supportive and structured elements of the talent lessons and that they provided their own individual reasons and experiences.

In Part 2 a relation was observed between autonomy support in the talent lessons on the one hand and autonomous motivation for the subject on the other hand. This relationship supports the idea of a transfer effect from autonomy support in the context of the talent lessons to subject autonomous motivation in the regular lessons of the same subject. This finding is consistent with the hierarchical model of motivation of Vallerand (2007). This model discerns a global, contextual and situational level of motivation. At all three levels, people can experience need support, which influences motivation at the same level. Moreover, motivation at the global level affects contextual and situational motivation, and the other way around. If we translate this model to the present study, perceived autonomy support in the talent lessons may be positioned at the situational level, and autonomous motivation for the subject at the contextual level. A similar situation has previously been found with physical education lessons (PE) and physical activities at home. Hagger et al. (2009) studied the links between teacher autonomy support during PE lessons, autonomous motivation for PE and autonomous motivation for physical activity during leisure time. These authors found that autonomy support influenced autonomous motivation for PE, which in turn affected autonomous motivation during leisure time. Hagger et al. concluded that the transfer of autonomous motivation from one context (PE) to another (leisure time) is the mechanism underlying the link between teacher autonomy support and autonomous motivation during leisure time.

Furthermore, low performers were found to benefit more from perceived autonomy support for their autonomous subject motivation than higher performers. This result shows that talent lessons can be positive for all students and not just for gifted students. This may be explained by the positive correlation between performance and autonomous motivation. High performers generally already have relatively high levels of autonomous motivation, and their motivation therefore possibly increases less through the experience of autonomy support. Structure in the talent lessons did not contribute to autonomous motivation for the subject on top of autonomy support. None of the included predictors contributed to controlled motivation and self-efficacy for the subject.

Notably, in both parts of the present study a positive relation between perceived autonomy support and structure was observed. Indeed, student responses to the interview questions about autonomy support often also held a notion of structure. For example, answers to questions about choice or respect often included a notion about the presence of guidelines during the talent lessons. Students then answered that they perceived choice within

the guidelines of the talent lessons. Also in the questionnaire, the correlation between perceived autonomy support and perceived structure is rather strong (r = .67). This is in line with previous research which documented that autonomy support and structure cannot be seen as independent characteristics of teaching (Jang et al., 2010; Sierens, Vansteenkiste, Goossens, Soenens, & Dochy, 2009). When studying student perceptions of need support in the classroom, these findings may provide a reason to study autonomy support and structure jointly.

In conclusion, the findings of the present study show that all students – regardless of their overall academic performance – respond positively to talent lessons with an enrichment approach based on need-supportive teaching, specifically with regard to autonomous motivation. The positive effect of autonomy support on autonomous motivation is particularly pronounced in low performing students. This result is in line with the schoolwide enrichment model (SEM), in which the importance of enrichment for all students is stressed (Renzulli & Renzulli, 2010).

4.5.1 Limitations and recommendations for future research

We have established a connection between autonomy support in the talent lessons and autonomous motivation for the corresponding school subject. However, with the current design we cannot draw causal conclusions. A recommendation for future research would be to extend this design with a pre-measurement of subject motivation, to investigate whether motivation is affected by the talent lessons.

In the present study, the reliability of the scale autonomy support improved drastically after removal of the control items in the questionnaire. This shows that the items did not fit the autonomy support scale, and that control was not perceived as the opposite of autonomy support. The interview data as well suggested that students may have interpreted control differently than how it is defined in terms of the opposite of autonomy support. In a school context, students are used to teachers telling them what to do and how to do it, and do not perceive this as controlling but rather as guiding them in learning. As long as the reason for having to do something (i.e. the relevance) is clear to students, control can be perceived as positive and rather autonomy-supportive. A recommendation for future research is to investigate how students in secondary education perceive control, and how this construct is related to autonomy support and structure in this specific context. Possibly, this may reveal a need for adjustment of research instruments regarding perceived control.

A strength of the present study was the focus on student perceptions, not only as an outcome variable but also as a description of the innovation. Although it is very important to document student perceptions of innovations to interpret the effect of innovations, a recommendation for future research is that it would be good to include perceptions of all persons involved such as students, teachers and school leaders, and also include observations of what happened in the classroom.

4.5.2 Implications

Much research is directed at teacher perceptions of innovations, as their perceptions are important for the execution of the innovation. In contrast, students are often included in research mainly as the receivers of an innovation, in which case it is mainly important to study learning outcomes such as student performance or motivation. However, student perceptions of an innovation were shown important in the present study to provide information about the execution of the innovation through the eyes of the student. Indeed, student perceptions may also be used as learning outcomes, and may therefore be important to include as outcome variables in studies on innovations. It is possible that an innovation mainly affects the perceptions at first, leading to other changes only in time. An implication for education and research is therefore to include student perceptions of the learning environment more systematically in developing and implementing innovations.

Furthermore, an implication of this study is that it may be worthwhile to implement enrichment with all students when aiming to motivate them. Often, enrichment is used mainly to motivate gifted students, but this study shows that other students may benefit from this approach too. It may be worthwhile to explore possibilities to embed an enrichment approach in the regular curriculum for all students because it might increase their perception of need support and thereby strengthen their motivation for various subjects.

Chapter 5

Promoting Performance and Motivation through a Combination of Intrinsic Motivation Stimulation and an Extrinsic Incentive

This chapter is based on:
Wijsman, L., Saab, N., Schuitema, J. A., van Driel, J. H., & Westenberg, P. M. (in press). Promoting Performance and Motivation through a Combination of Intrinsic Motivation Stimulation and an Extrinsic Incentive. *Learning Environments Research.*

Abstract

During the early stages of secondary education students' motivation and performance levels decline. This study employed a case study approach to evaluate a learning environment called GUTS; Differentiated Challenging of Talent in School. GUTS was specifically designed to raise performance *and* motivation through a combination of (a) talent lessons as an intrinsic motivator and (b) a higher promotion standard as an extrinsic incentive. Participants were 156 students who started secondary education in grade 7 in school year 2013/2014, and participated in GUTS for three successive school years. Performance and motivation measures were longitudinally collected between grades 7 and 9 and were analysed in comparison to previous cohorts of students at the same school and students at other schools. Additionally, measures of well-being and self-esteem were included to explore possible collateral effects of the intervention. The GUTS cohort generally displayed higher levels of performance and motivation than the comparison groups. However, the GUTS cohort still showed the decline of performance and motivation between grades 7 and 9 that was also observed in the comparison groups. This study showed that performance and motivation levels were increased without collateral damage to the students' overall sense of well-being and self-esteem, while GUTS was not a strong enough intervention to counter the motivation and performance decline. Possible reasons for the persistent decline of student performance and motivation are discussed in terms of various factors at the level of GUTS, the educational context and the needs of the developing adolescent.

5.1 Introduction

During the early stages of secondary education students' motivation and performance levels decline (Eccles, Lord, & Midgley, 1991; Peetsma, Hascher, van der Veen, & Roede, 2005; Wijsman, Warrens, Saab, van Driel, & Westenberg, 2016). This appears to occur in several countries, hence it is not restricted to a particular education system. Declining motivation and performance are problematic as both factors are important determinants of students' school success. We used a case study approach to evaluate the effect of GUTS, a learning environment specifically designed to raise motivation *and* performance.

5.2 Conceptual Framework

5.2.1 Decreasing motivation and performance in lower secondary education

The literature mentions three factors that contribute to decreasing motivation and performance in early secondary education. Firstly, a student factor explaining low motivation in secondary school is that it is not cool to show to peers that you are putting effort into your schoolwork (Mijs & Paulle, 2016; Warrington, Younger, & Williams, 2000). The willingness of students to portray themselves as diligent, especially towards peers, decreases as students come of age (Juvonen & Murdock, 1995).

Secondly, the lack of motivation in school has been assigned to a mismatch between adolescents' needs and what schools offer (Eccles, Wigfield, Harold, & Blumenfeld, 1993) and to shifting relevance of life domains for adolescents (Peetsma, 1997; as cited in Peetsma & van der Veen, 2011). The mismatch between what students expect from school and what they experience appears to be connected to their affective state. Könings, Brand-Gruwel, and van Merriënboer (2011) showed that motivational and concentration problems are related to a mismatch between students' preferences and perceptions of classroom characteristics. In these explanations, the underlying mechanism is the failure to meet students' needs.

Thirdly, education professionals in several countries have recognised that the education system does not encourage students to meet up to their academic potential. Students in this context do what is required instead of meeting their own full potential. This tendency has been referred to as a culture of C's. In several countries the education system and school policy have been under investigation and object of innovations to tackle this culture of C's and stimulate a more ambitious learning culture (Danish Ministry of Education, 2014; De Boer, Minnaert, & Kamphof, 2013; Dutch Ministry of Education Culture and Science, 2011; Ministry of Education and Culture of Finland, 2014).

5.2.2 Dutch context

In the Netherlands, the culture of C's might be even more prominent than in other countries. While Dutch students generally perform well in international comparisons, the amount of top performers is not as high as in Asian countries (OECD, 2016). The OECD (2016, p. 79) wrote that "some of the most promising students in the Netherlands are not reaching their full potential". In addition, student motivation is generally low in comparison to other countries (OECD, 2016).

A specific reason for this culture of C's in The Netherlands is the way in which students progress through secondary education. To progress from one grade to the next, students need to meet a set of specific criteria. Schools have some freedom to determine the specific criteria, but in each school the bottom line is defined by the lowest allowable grade, and that is a 6 on a scale of 1(extremely poor) to 10 (perfect). Overall, students need to obtain at least a 6 for their subjects to march on to the next grade. At the same time, performances higher than this minimum standard do not have consequences for students' progress in school. This might create a focus on the lowest possible grade rather than aiming for higher grades, which allows students to lower their efforts and create more free time for their hobbies and friends. Indeed, the study in Chapter 2 of this dissertation (Wijsman et al., 2016) shows that average report card grades (GPA) gradually decrease during lower secondary education. This was the first longitudinal study to investigate GPA of a large group of students between grades 7 and 9, and showed that students in seventh grade achieve a GPA above a 7 and that in the following two grades these GPA levels linearly decline in the direction of an average 6.

5.2.3 Combining intrinsic and extrinsic motivators to stimulate performance and motivation

To improve student performance and motivation in the Dutch context, we designed an innovation based on a combination of extrinsic and intrinsic motivators. A meta-analysis of Cerasoli, Nicklin, and Ford (2014) showed that a combination of intrinsic motivation and extrinsic incentives is important for performance. Intrinsic motivation predicts quality of performance best, whereas extrinsic incentives are the best predictors of quantity of performance. It was also found that the presence of extrinsic incentives boosted the link between intrinsic motivation and performance (Cerasoli et al., 2014).

At the same time, extrinsic incentives closely related to performance may fuel a feeling of being controlled and pressured, which may cause collateral damage effects to one's individual sense of well-being (Cerasoli et al., 2014). Cognitive Evaluation Theory (CET) as part of self-determination theory (Ryan & Deci, 2002) postulates that incentives negatively influence self-determination through pressure from outside the individual to perform an activity if they diminish one's basic psychological need for autonomy. At the same time,

incentives are theorised to provide information about one's competence, and this too is one of the basic psychological needs which need to be fulfilled to stimulate intrinsic motivation. Whether incentives then negatively or positively relate to intrinsic motivation depends on the strength of the detrimental effect on autonomy as compared to the advantageous effect on competence.

For the present study we made an attempt to capitalize on the combined effects of intrinsic and extrinsic factors, while avoiding potentially aversive effects of an extrinsic incentive. We created a learning environment in which positive expectations for the students' overall performance level were coupled with a specific focus on the students' strengths and personal interests.

5.2.4 Learning environment

The learning environment evaluated in the present study is called GUTS (in Dutch: Gedifferentieerd Uitdagen van Talent op School; *Differentiated Challenging of Talent in School*). The overall goal is to increase performance level *and* motivation for school. GUTS combines two elements to stimulate performance and motivation: (1) talent lessons as an intrinsic motivator and (2) higher standards for promotion as an extrinsic incentive.

Talent lessons were provided by means of extra lessons in specific subjects. Students chose subjects they liked and were good at. Goal of the talent lessons was to stimulate and continue students' intrinsic motivation for that subject, and performance and motivation for school in general, through positively approaching students in a subject they liked. The talent lessons in the present study focus on students' strengths and aim to fulfil students' needs for autonomy and competence. When feeling autonomous, one's behaviour is perceived in accordance with one's interests and values, and activities are experienced as volitional (Ryan & Deci, 2002). In a school setting, the need for autonomy can be fulfilled through autonomy-supportive teaching, which means that teachers incorporate students' interests and values through offering choice, fostering relevance and showing respect (Stroet, Opdenakker, & Minnaert, 2013; Vansteenkiste et al., 2012). If students perceive autonomy support, they experience more motivation and engagement in school (Reeve, 2006; Stroet et al., 2013).

A higher promotion standard was implemented as an extrinsic incentive. In GUTS, a report card grade of a 6 for a single subject was still sufficient, but students needed to achieve a 7 *on average* at the end of the school year. Report card grades are measures of performance at various tests during a school year. The higher promotion standard was thought to change the behaviour of students is different ways. Firstly, by asking more from students, it becomes worthwhile to perform at a higher level. Most students only put effort into an activity when they think this effort is valuable (Wigfield & Eccles, 2000). As Warrington et al. (2000) illustrated, students deliberately choose which subjects they want to excel at, and for which subjects a pass is enough. Secondly, students respond

differently to low and high grades. Whereas low grades strengthen the decline of involvement with school, high grades reduce this decline in involvement (Poorthuis, 2012). Thirdly, the promotion standard may affect the culture of C's among peers in schools. If everyone excels in some subjects and not in others, then it becomes normal for everyone to excel on occasion and this may lessen the 'uncool' stigma.

5.2.5 This study

To examine student motivation and performance in the context of GUTS, this study employed a case study approach. A case study is suitable when investigating a phenomenon that cannot be separated from its context (Yin, 2011). GUTS was implemented at a Dutch secondary school and was piloted for three subsequent years. Students were followed from seventh to ninth grade. To take the possibility of collateral damage triggered by GUTS into account, we also assessed the students' sense of well-being and self-esteem. Two research questions were addressed.

> ***Question 1***. What is the effect of GUTS on student performance? This was evaluated by comparing the GUTS group with: (a) a cohort of other schools, and (b) previous cohorts of the same school. We expected that a combination of higher performance expectations (extrinsic incentive) with talent lessons (intrinsic motivation stimulation) would lead to better performance in the GUTS cohort
>
> ***Question 2.*** What is the effect of GUTS on student motivation, well-being, and self-esteem? This was evaluated by comparing the GUTS cohort with national norm data. We expected that a combination of higher performance expectations with explicit attention to students' basic psychological need-fulfilment in the talent lessons would improve motivation and not undermine the students' sense of well-being and self-esteem.

5.3 Method

5.3.1 Participants

GUTS was implemented at a bilingual secondary school in the western part of the Netherlands. This school offered senior general secondary education and pre-university tracks. A tracking system is used in Dutch secondary schools, placing students in a track before entering grade 7. The two highest tracks were included in the present study. One part of the participants was in the senior general secondary (havo) track. This school type prepares for higher professional education. The majority of students was in the pre-university (vwo) track. This school type prepares for university. In seventh grade, no separate general secondary track exists in the participating school. Instead, a combined senior general secondary/pre-university track is offered.

Participants were 184 students divided over eight grade 7 classes, who started their secondary education in school year 2013/2014. Twenty-eight students could not be included in the data analyses for the present study because 7 students had left the school between grade 7 and 9 for personal reasons (e.g., family moved away), 13 students left the school because of insufficient grades, and eight students had to repeat a grade. Relevant for the present analyses: a total of 21 out of 184 students (11.4%) dropped out from data analyses due to poor grades. This percentage does not differ significantly from grade-related drop out in previous cohorts at the same school before the implementation of GUTS (cohort -1: 7.4%; χ^2= 1.60, df = 1, p =.206, and cohort 0: 9.7%; χ^2= 0.27, df = 1, p =.601). The final sample consisted of 156 participants who were in school from seventh to ninth grade (see Table 5.1).

Informed consent was provided by the parents or caretakers of the involved students. In total, for 18 out of 202 students no consent was provided for participation in the studies. This procedure was validated by the Leiden University Psychology Research Ethics Committee.

Table 5.1
GUTS cohort: Number of students in both school types and all school years

	2013/2014 Grade 7	**2014/2015 Grade 8**	**2015/2016 Grade 9**
General secondary(/pre-university)	70	44	34
Pre-university	114	126	122
Total	184	170	156

5.3.2 Materials

5.3.2.1 Learning environment

GUTS combined talent lessons and a higher standard for promotion.

Talent lessons. The talent lessons were designed to fulfil students' needs for autonomy and competence in multiple ways. First, choosing a subject for the talent lessons offered some choice to the students to spend extra time on one of their interests. For example, if physics was a student's preferred subject, he or she was allowed to follow talent lessons on this subject. Second, during the talent lessons, as much freedom as possible was offered to choose and structure one's own activities. Moreover, the teacher differentiated between the students, which means that the teacher took differences between students into account (Tomlinson et al., 2003). This provides students with positive affect and motivation towards learning (Tomlinson et al., 2003). Finally, higher order thinking tasks and enrichment were also included as principles in the talent lessons as aspects that challenge and interest students and make them acquainted with topics that are not included in the standard curriculum.

In grade 7 and 8, two cycles of eight 100-minutes lessons were provided. Each school year students could choose two different subjects for the talent

lessons. Additionally, in eighth grade presentations for the parents at the end of a talent lessons cycle were initiated. In ninth grade students completed a personal project. Goal of the personal project was to stimulate the student's intrinsic motivation for the subject. Students individually worked on a topic they deemed interesting and they had to deliver a tangible product. The personal project was based on the same principles as the talent lessons. Students could choose their own topic for the project and during the process had much freedom within the boundaries of the project. Students worked together in groups of 'critical friends' to make a plan for the project, which had to be approved by the supervising teacher.

Performance standard. The higher standard for performance included that students needed to achieve an average report card grade of at least a 7 at the end of every school year. This means that if they achieved lower-than-a-7 report card grades in some subjects, this had to be compensated by obtaining higher-than-a-7 report card grades for other subjects. In this way, students could differentiate their achievement between subjects, giving everyone the opportunity to excel in some subjects and compensate for other subjects that were of less interest to them.

5.3.2.2 Instruments

Student performance was conceptualised as report card grades for all subjects in seventh, eighth, and ninth grade. Grades theoretically range between 1 (extremely poor) and 10 (perfect). Students receive a grade report at the end of every school year, which contains the report card grades for all subjects the student took in that particular year. For this study, an average of all subjects was calculated for every student. We have analysed average report card grades in previous research on performance patterns because of the importance of grades for student school careers (Wijsman et al., 2016, see Chapter 2).

Student motivation for school, sense of well-being, and self-esteem were assessed with the School Attitude Questionnaire (SAQ; in Dutch SchoolVragenLijst: SVL, Vorst, Smits, Oort, Stouthard, & David, 2010). Reliability of the three scales in previous research on the structure of the questionnaire ranged between α = .84 and α = .90 (Vorst et al., 2010). The SAQ is a broadly accepted diagnostic tool in the Netherlands, and has been used in research (Könings, Wiers, van de Wiel, & Schmidt, 2005; Lee et al., 2012). The coring manual includes extensive norm data, which allows for a comparison with the data from our GUTS cohort. The questionnaire consists of two equivalent 80-item versions which can be administered separately with reliable and comparable results. For the present study, one version was used at every measurement to save time and to prevent a test effect to occur because students answered the exact same questions in all three grades. Each scale consists of three subscales with eight items. *Motivation for school* consisted of the subscales learning task orientation, concentration in the class, and homework attitude. *Well-being at*

school consisted of fun at school, feeling socially accepted, and relation with teachers. Finally, *self-esteem* consisted of expression skills, confidence at tests, and social skills. The social desirability scale was not included in the present study. Students answered the items on a three-point scale: agree, don't know, don't agree. Potentially, scores on the scales range between a minimum of 24 and a maximum of 72.

5.3.3 Procedure

5.3.3.1 Procedure of GUTS

To design GUTS in accordance with school policy and procedures, researchers from Leiden University regularly met with the school management team to discuss the development and implementation of GUTS. In addition, the researchers provided several presentations for teachers and parents of students to increase their understanding and appreciation of this innovation at the school. Feedback from teachers and students in the initial phase of the project were also used to fine-tune GUTS.

The higher performance norm was initiated from the start of the project in grade 7. Discussed explicitly with the school was that grading of exams and other assignments would be provided based on the same standards as in previous years. The specific design of the talent lessons developed as the project proceeded, although the idea of positive attention for a subject one liked and was good at was embedded from the beginning.

5.3.3.2 Data collection

Data collection was spread over three years, and was done every year in October and in June. The SAQ was administered in October of each year by the first author of the present study, in a regular classroom setting. The teachers were present in the classroom and completion of the questionnaire took approximately 30 minutes. In July of every school year, students' report card grades were collected from the school's student tracking system.

5.3.4 Analyses

The effect of GUTS on student performance, motivation, well-being, and self-esteem was studied by comparing the GUTS cohort with non-GUTS cohorts. For each measure, the most appropriate available comparison group was chosen.

Research question 1. The effect of GUTS on student performance was studied by comparing the GUTS cohort with two non-GUTS comparison groups. The first comparison group consisted of a large sample of students (n = 667) from five secondary schools including two school types – senior general secondary and pre-university education – that also participated in Chapter 2 of this dissertation. The second comparison group consisted of students in the same school in two preceding cohorts: school year 2011/2012 (cohort -1; n = 132) and school year 2012/2013 (cohort 0; n = 153).

The effect of GUTS on performance was studied using hierarchical regression analyses. Two levels were distinguished in all analyses, time point within student (level 1) and student (level 2). Time point within student refers to the multiple measurements that were included for each student. Students who are in the same class are taught by the same teacher, which may make them more alike than students across classes. To consider this nesting of students in classes a third level was added in the models comparing the GUTS cohort to previous cohorts. Because some classrooms were rearranged during the three years we made clusters of students who were in the same class between grades 7 and 9. In the comparison with other schools, no clusters were made, as not for all students classes were known. Several piecewise linear models were fitted. Model 1 in both comparisons served as the variance component model, and included two time predictors: the difference between grade 7 and 8 (t2), and the difference between grade 8 and 9 (t3). The factor time was included in the first model to prevent an overestimation of the variance at the student level (Hox, 2010). Model 2 either included as a predictor the group of comparison schools (No GUTS) or the previous cohorts of the case school (cohorts -1 and 0), and the interactions with time. In the following model, various control variables were included, dependent on the available measures. These were school type (senior general secondary or pre-university), sex, and the so-called Cito-score. The latter is the score on a standardised national test, measuring academic aptitude, which is administered at the end of grade 6 (primary school), to help determine the best fitting school type for students. We also controlled for students who changed school types between grades 7 and 9. Changes in school type affect report card grades, as the level of difficulty differs between school types. We therefore included two dummy variables, for students who moved up (from senior general secondary to pre-university) and for students who moved down, respectively. Additionally, separate analyses were performed to investigate the difference in performance level between each comparison group and GUTS students in grades 7 to 9 separately. In the comparison with other schools, ANOVA's were used, and in the comparison with previous cohorts at the same school, multilevel regression analyses were used because of the variance located at the cluster level.

***Research question* 2.** To study the effect of GUTS on motivation, self-esteem, and well-being, students at the GUTS school were compared to a national norm group included in the SAQ manual (Vorst et al., 2010). For this cross-sectional norm group, mean scores, standard deviations and sample sizes were available. For each grade, independent samples t-tests were used to compare these cross-sectional data in the SAQ manual with the longitudinal data from our GUTS cohort. Repeated measures analyses were not possible because we did not have access to scale or item ratings for each student in the SAQ norm group. At first, sex was included in the analyses, but no interaction effects were observed, hence sex was excluded in the final analyses presented below. For students in

the GUTS school, some missing data was present. The three SAQ-scales were constructed by taking the total sum scores of the items and consequently, a missing score on only one scale item would result in a missing scale score. Therefore, missing values on the items of the three scales were imputed using Expectation Maximization (Tabachnick & Fidell, 2007). In grade 7, maximally 1.1% of the data missed per item, in grade 8, maximally 0.6% of the data missed per item, and in grade 9, maximally 5% missed per item.

5.4 Results

5.4.1 Research question 1. The effect of GUTS on performance

Mean report card grades for the GUTS and non-GUTS comparison cohorts are presented in Table 5.2 and are plotted in Figures 5.1 and 5.2. The data show a consistent pattern across both comparisons: (a) the GUTS cohort performed better than all comparison cohorts in all three grades, and (b) the level of performance decreased between grade 7 and 9 for all student cohorts, including the GUTS cohort. In other words, GUTS appeared to have had a main effect on performance level, but GUTS did not change the degree of the performance decline in early secondary education.

Table 5.2

Average report card grades of the various groups in grades 7 to 9 of comparison and GUTS groups

			Grade 7		Grade 8		Grade 9	
		N	*M*	*SD*	*M*	*SD*	*M*	*SD*
Comparison group (no GUTS)		667	7.24	0.52	6.92	0.53	6.64	0.59
	Cohort -1 (no GUTS)	132	7.22	0.56	7.02	0.66	6.74	0.74
Case school	Cohort 0 (no GUTS)	153	7.10	0.55	6.94	0.56	6.61	0.69
	Cohort 1 (GUTS)	156	7.48	0.51	7.23	0.47	6.82	0.66

* $p < .05$, two-tailed. ** $p < .01$, two-tailed. *** $p < .001$, two-tailed.

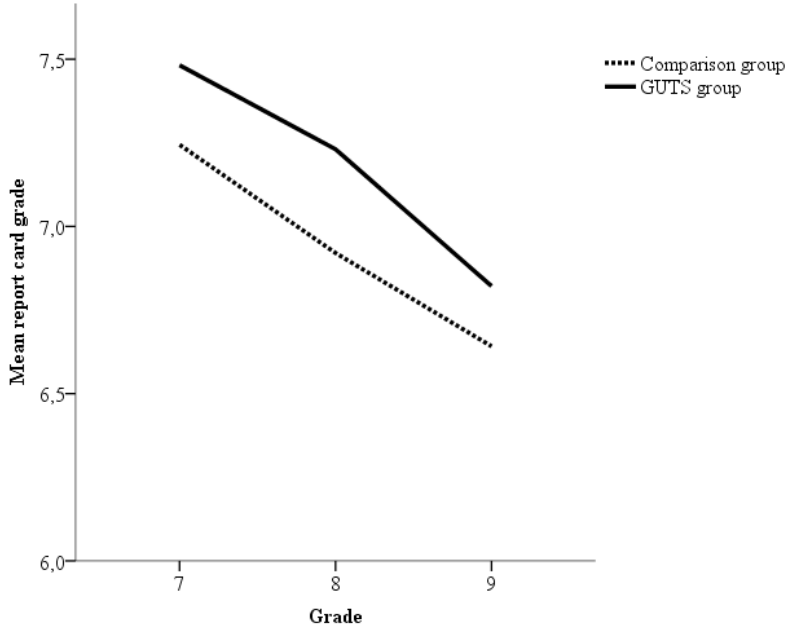

Figure 5.1. Performance means of the GUTS group and the comparison group.

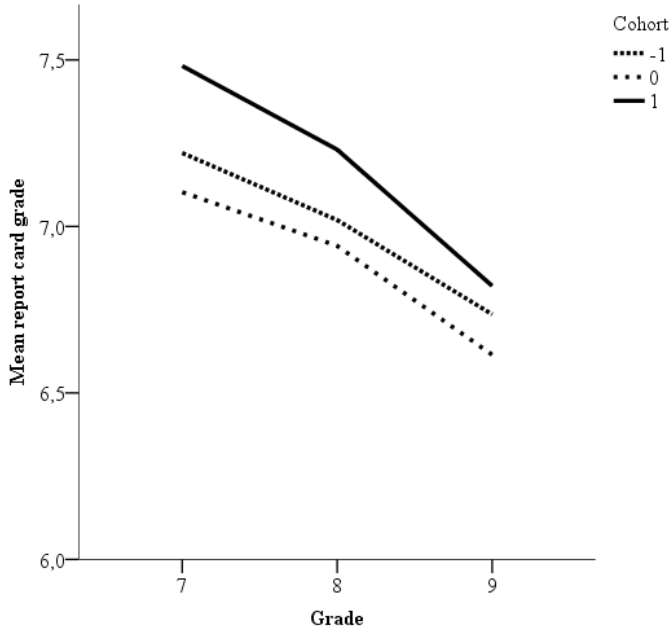

Figure 5.2. Performance means of the GUTS cohort (1) and two previous cohorts without GUTS (cohort -1, and 0).

Hierarchical linear regression analyses were performed to test the comparison between the GUTS and the non-GUTS schools between grade 7 and 9 (see Table 5.3). The final model (Model 3 in Table 5.3) showed that overall performance levels for the groups together significantly decreased in time (b = -0.28 between grade 7 and grade 8, and b = -0.36 between grade 8 and grade 9). Also, performance of students in the comparison group was significantly lower (b = -0.15) than that of students in the GUTS group in grade 7. Between grade 7 and 8, the non-GUTS students' performance decreased significantly more than that of students in the GUTS group (difference in grade 8 = -0.26 (b = -0.15 + b = -0.09)), and between grade 8 and 9, unexpectedly, performance of students in the GUTS group decreased significantly more (difference in grade 9 = -0.11(b = -0.15 + b = -0.09 + b = 0.17)) (see Figure 5.1). Even with this decline in performance of the GUTS-students, the difference in report card grades between the group of students without GUTS and with GUTS was significant in all three years (grade 7: $F(1,822) = 26.04$, $p < .001$; grade 8: $F(1,822) = 46.35$, $p < .001$; grade 9: $F(1,822) = 11.99$, $p = .001$). To control for the possibility that this GUTS versus non-GUTS difference was due in part to students who switched between school type we studied potential interaction effects for students who 'moved up' from secondary to pre-university and for student who 'moved down' from pre-university to general. A significant interaction was found between time and 'moving up'. This means that performance of students who changed to a higher school type decreased less between grade 7 and 8 and more between grade 8 and 9 in comparison to students who stayed in the same school type.

Hierarchical linear regression analyses were performed to test the comparison between the GUTS cohort and the two pre-GUTS cohorts at the same school (see Table 5.4). In total, 69 clusters of students who were in the same class in all three grades were distinguished and included in the analyses. The final model shows that overall, performance levels decreased for all students. Model 3 in Table 5.4 shows that in grade 7, the differences between GUTS and the two non-GUTS groups were significant (cohort -1: b = -0.26, p<.001; cohort 0: b = -0.31, p<.001). Furthermore, the development of performance between grade 7 and 9 of students in cohort -1 and cohort 0 was not significantly different than the development of the performance from the GUTS cohort.

Table 5.3

Performance growth model of performance GUTS students and comparison group at other schools

	Model 1		**Model 2**		**Model 3**	
	B	*SE*	*B*	*SE*	*B*	*SE*
	Fixed effects					
Intercept	7.29***	*0.02*	7.48***	*0.04*	7.50***	*0.04*
Level 1(time)						
Time2	-0.31***	*0.01*	-0.25***	*0.03*	-0.28***	*0.03*
Time3	-0.30***	*0.01*	-0.41***	*0.03*	-0.36***	*0.04*
Level 2(participant)						
No GUTS			-0.24***	*0.05*	-0.15***	*0.04*
T2*No GUTS			-0.07*	*0.03*	-0.09**	*0.03*
T3*No GUTS			0.13***	*0.04*	0.17***	*0.04*
Gen.secondary					-0.78***	*0.14*
T2*Gen.secondary					0.17	*0.11*
T3*Gen.secondary					0.05	*0.13*
Girls					0.21***	*0.03*
T2*Girls					0.03	*0.02*
T3*Girls					-0.00	*0.03*
Up					-0.03	*0.04*
Down					0.25	*0.14*
T2*Up					0.10**	*0.03*
T3*Up					-0.27***	*0.04*
T2*Down					-0.15	*0.11*
T3*Down					-0.08	*0.13*
	Random effects					
Variance time 1	0.28	*0.01*	0.27	*0.01*	0.19	*0.01*
Variance time 2	0.29	*0.01*	0.27	*0.01*	0.19	*0.01*
Variance time 3	0.37	*0.02*	0.37	*0.02*	0.30	*0.02*
Covariance 2,1	0.22	*0.01*	0.21	*0.01*	0.13	*0.01*
Covariance 3,1	0.20	*0.01*	0.20	*0.01*	0.13	*0.01*
Covariance 3,2	0.24	*0.01*	0.24	*0.01*	0.17	*0.01*
-2LogLikelihood	2625.08		2575.63		2193.19	

* $p < .05$, two-tailed. ** $p < .01$, two-tailed. *** $p < .001$, two-tailed.

Table 5.4

Performance growth model of performance GUTS students and students in two previous cohorts at the same school

	Model 1 ***n* = 441**		**Model 2** ***n* = 441**		**Model 3** ***n* = 372**	
	B	*SE*	*B*	*SE*	*B*	*SE*
			Fixed effects			
Intercept	7.22***	*0.05*	7.45***	*0.07*	6.95***	*0.07*
Level 1(time)						
Time2	-0.21***	*0.02*	-0.25***	*0.03*	-0.17**	*0.05*
Time3	-0.34***	*0.02*	-0.41***	*0.04*	-0.24***	*0.06*
Level 2(participant)						
Cohort -1			-0.39**	*0.12*	-0.26***	*0.07*
Cohort 0			-0.40**	*0.11*	-0.31***	*0.06*
T2*cohort -1			0.05	*0.04*	0.05	*0.05*
T3*cohort -1			0.13**	*0.05*	0.11	*0.06*
T2*cohort 0			0.09*	*0.04*	0.09	*0.05*
T3*cohort 0			0.08	*0.05*	0.06	*0.06*
Citoscore					0.05	*0.03*
T2*citoscore					0.04	*0.02*
T3*citoscore					0.06	*0.03*
Pre-univ.					0.49***	*0.07*
T2* Pre-univ.					-0.12*	*0.05*
T3* Pre-univ.					-0.15*	*0.06*
Girl					0.29***	*0.05*
T2*Girl					-0.00	*0.04*
T3*Girl					-0.11*	*0.05*
			Random effects			
Variance time 1	0.22	*0.02*	0.22	*0.02*	0.19	*0.01*
Variance time 2	0.26	*0.02*	0.25	*0.02*	0.23	*0.02*
Variance time 3	0.44	*0.03*	0.43	*0.03*	0.40	*0.03*
Covariance 2,1	0.17	*0.02*	0.17	*0.02*	0.14	*0.01*
Covariance 3,1	0.17	*0.02*	0.18	*0.02*	0.15	*0.02*
Covariance 3,2	0.24	*0.02*	0.24	*0.02*	0.22	*0.02*
Variance cluster	0.11	0.03	0.08	0.03	0.01	0.01
-2LogLikelihood	1548.50		1522.96		1170.45	

* $p < .05$, two-tailed. ** $p < .01$, two-tailed. *** $p < .001$, two-tailed.

For the differences between GUTS and no GUTS in grades 8 and 9, two separate multilevel linear regression analyses were performed at these two time points, including all predictors. Significant differences were also found in grade 8 (cohort -1: b = -0.24, p = .004; cohort 0: b = -0.26, p = .001). In grade 9, no variance was located at the cluster level after adding all predictors to this model. Therefore, the cluster level was removed from the analysis. No significant differences between GUTS and cohort -1 was found (b = -0.09, p = .30) and a slight difference with cohort 0 was found (b = -0.16, p = .047).

5.4.2 Research question 2. Level and development of students' motivation for school, well-being and self-esteem

To investigate students' motivation for school, well-being and self-esteem during grades 7 to 9, a comparison was made with a national norm group as described in Vorst et al. (2010). Table 5.5 provides results on the differences between GUTS and the norm group. A consistent pattern was observed for motivation: students at the GUTS school reported significantly higher motivation than the students in the norm group and this occurred across all three grades. In addition, a decline of motivation levels was observed between grade 7 and grade 9 for the students of the GUTS school as well as for the students in the national norm group.

Students at the GUTS school reported higher levels of well-being in grade 7 compared to students in the norm group. In contrast, well-being did not distinguish both groups in grades 8 and 9. A decline in well-being between grade 7 and grade 9 is visible for the GUTS cohort as well as for the national norm group.

Table 5.5

Independent t-test results for motivation, well-being, and self-esteem in grades 7 to 9

Variable	Grade	GUTS		Norm group				
		M(SD)	*n*	*M*(SD)	*n*	t	df	p-value
Motivation	7	63.45(7.48)	175	57.21(10.10)	1404	7.91	1577	<.001
	8	58.55(8.23)	151	55.53(9.93)	1329	3.60	1478	.0003
	9	55.89(9.99)	146	51.30(11.31)	904	4.62	1048	<.001
Well-being	7	66.29(4.81)	175	62.53(6.54)	1404	7.35	1577	<.001
	8	60.65(7.01)	151	61.02(7.75)	1329	0.55	1478	.5806
	9	60.49(7.42)	146	59.86(7.50)	904	0.96	1048	.3388
Self-esteem	7	60.48(7.84)	175	60.15(7.98)	1404	0.53	1577	.5992
	8	57.99(8.46)	151	61.38(9.29)	1329	4.29	1478	<.001
	9	59.08(9.02)	146	60.93(8.26)	904	2.48	1048	.0133

For self-esteem a different pattern was detected: no differences between GUTS and the norm group were observed in grade 7, whereas the GUTS students reported somewhat lower self-esteem than the norm group in grades 8 and 9.

Looking at the subscales of self-esteem more closely it appeared that GUTS and the norm group did not differ on the two subscales 'expression skills' and 'social skills', but that the GUTS group scored lower than the norm group on the subscale 'confidence at tests' in grade 8 ($t(1478) = 6.84$, $p < .001$; and in grade 9 ($t(1048) = 4.61$, $p < .001$).

5.5 Discussion

This case study evaluated the effects of a learning environment (GUTS) on student performance and motivation in lower secondary education (grade 7 to 9). This learning environment specifically comprised a combination of intrinsic motivation stimulation and an extrinsic incentive. The findings were remarkably consistent across the various comparisons and analyses. Overall, the GUTS cohort obtained higher report card grades than the comparison groups, either from the same school or from other schools. However, the performance decline observed at other schools and in previous cohorts of the same school was also observed in the GUTS cohort. The same combination of results was observed for student motivation: the GUTS cohort displayed higher motivation levels than the national norm group in all three grades. However, student motivation in the GUTS cohort declined between grade 7 and 9, and this decline is also visible in the data from the norm group. Collateral damage effects on the students' sense of well-being and self-esteem were not observed, except for a specific effect on confidence at tests in eighth and ninth grade. These findings are discussed in more detail below.

5.5.1 Student performance

The higher overall level of performance in the GUTS cohort shows that students generally are able to achieve at a higher level when we ask more of them, combined with special attention and support for the student's own preferences for particular school subjects. This finding supports the idea that the culture of C's is partially due to the fact that the school system does not require students to raise their performance. At the same time, performance levels declined between grades 7 and 9, as has been observed in Chapter 2 of this dissertation. In the present chapter, the performance decline was particularly strong between grades 8 and 9. The report card grades were most positively affected in grades 7 and 8, whereas they dropped sharply between grade 8 and 9. The decline in this final year was stronger for GUTS students compared to students at other schools.

This particular pattern in the findings may be related to the following factors. First, it is possible that the curriculum in ninth grade becomes more demanding compared to previous grades. By ninth grade, students have learned the basics of school subjects and are expected to go on to higher order learning tasks (see

Krathwohl, 2002). These higher order learning tasks require more complex skills from students, which may negatively affect results if students are unable to keep up. A second reason for declining performance in ninth grade, within Dutch education, is that students choose a certain combination of subjects (the so called 'profile choice') by the end of ninth grade for the remainder of their secondary school career. This means that every student can opt out of certain subjects after ninth grade if these subjects are not part of their profile choice. However, in ninth grade all subjects still have to be taken. It is conceivable that student performance (and motivation) automatically declines in the ninth grade for discarded subjects. Third, in ninth grade students are around the age of fifteen, which means that puberty is at its peak. Pubertal status appears to have an indirect negative effect on achievement through academic motivation (Martin & Steinbeck, 2017).

5.5.2 Student motivation

GUTS students showed higher motivation levels throughout lower secondary education than the students in the national norm group. This pattern mimics the result found for student performance and shows that it is possible to raise performance and motivation level at the same time. However, the decline of student motivation that has been found in previous studies (Eccles et al., 1991; Peetsma et al., 2005), was also observed in the GUTS cohort in the present study. Apparently, GUTS was not a strong enough intervention to counter the motivation decline. The autonomy-supportive elements included in GUTS might not have been sufficient to neutralize the mismatch between student needs and the school curriculum at large. The talent lessons were restricted to a few specific school subjects. In Chapter 4 we showed transfer of need support in the talent lessons to the motivation in the corresponding school subject. However, this effect might not have generalised to motivation for school. In addition to autonomy support, which was provided in the talent lessons, fulfilment of the need for competence through guidance and feedback is also needed to stimulate motivation (Stroet et al., 2013).

5.5.3 Well-being and self-esteem

The findings of this study show that no collateral damage to student well-being and self-esteem was done while trying to raise performance and motivation levels. Compared with a national norm group, GUTS students showed higher well-being levels at the start of their secondary education, whereas no difference was observed in grades 8 and 9. For self-esteem it was observed that GUTS students were not different from the norm group on two of the subscales – expression and social skills, but in grade 8 and 9 they scored lower on confidence at tests. This particular effect may be explained by the higher performance standard, which increases the expectations regarding students' performance. Asking more of students may on the one hand lead to increased

perceived competence when one reaches this higher expectation, and on the other hand, may lead to low self-esteem or fear of failure when expectations are not within one's reach. In eighth and ninth grade, students may have felt less confident in reaching the higher performance expectation.

Regarding the underlying idea for GUTS, an explicit choice was made for an extrinsic incentive in terms of a higher performance norm. Taking the decreasing pattern of motivation and confidence at tests into account, it is possible that a different type of incentive could have led to other results, as the contingency of incentives is very important for its effects (Cerasoli et al., 2014; Deci, Koestner, & Ryan, 1999). A type of incentive that is generally found to positively relate to intrinsic motivation is positive feedback (Deci et al., 1999; Hattie & Timperley, 2007). A future iteration of GUTS may include more explicit attention to positive feedback when students show improving achievement on the way to meeting the higher performance standard.

5.5.4 Limitations

GUTS was implemented to decrease the effect of a culture of C's and to raise student performance and motivation through a combination of intrinsic and extrinsic motivators. A drawback of this approach is that we cannot ascertain the independent effects of both components on performance, motivation, or both. The present study was a case-study within a particular context. Future research could experimentally vary both components to ascertain their relative contribution with respect to the various outcome measures.

Between grade 7 and 9, 21 students (11.4%) dropped out from the sample because of insufficient grades. This percentage is not significantly higher than in previous, non-GUTS cohorts at the same school. However, the drop out rate might have contributed to an overall positive effect of GUTS on performance levels.

Regarding the instruments used, validation research of the SAQ as was reported in the SAQ manual (Vorst et al., 2010), showed that both internal and criterion validity of the SAQ was an attention point. In the manual, it was suggested to study the validity using confirmatory factor analyses and research at the classroom level to assure the internal and criterion validity.

The school was requested not to change the grading procedures and the performance decline has shown that teachers have not inflated their grades to such an extent that the students' grades would not drop below a 7. Yet, we cannot be absolutely sure that individual teachers might have altered the norms used for grading tests, because we have not studied the grading procedures in how they were executed before and after the implementation of GUTS. Hence it cannot be excluded that unintended changes in grading procedures have affected the results of this study.

5.5.5 Implications and conclusions

Despite its limitations, the results of this case study provide a basis for teachers and school leaders to critically reflect on what motivates students in school to achieve. It appeared possible to increase achievement levels, which means that (some) students may currently perform below their abilities. At the same time performance and motivation declined, despite the school's great efforts to create a stimulating learning environment. GUTS may not have been the best way to achieve the intended results. On the other hand, we might also consider that this decline might be inevitable due to the hormonal effects of puberty, to the changing needs in early adolescence, and the greater focus on peer relations. Further research is needed to disentangle developmental effects from the effects of a novel learning environment.

Chapter 6

General Discussion

6.1 Introduction

This dissertation intended to contribute to our understanding of possible ways to enhance performance and motivation of students in lower secondary education. It was based on three assumptions: (1) that motivation declines during lower secondary school, (2) that motivation and student performance are interrelated, and (3) that combining intrinsic motivation stimulation and extrinsic incentives is important in lower secondary education. An innovation was initiated, based on these three assumptions. This innovation, called GUTS, aimed to increase both performance and motivation among students in lower secondary education through a combination of intrinsic motivation stimulation and an external incentive (see Westenberg, 2012). The general aim of this dissertation was twofold. First, it aimed to understand development of and relations between performance and motivation of students in lower secondary education. Second, it aimed to describe and evaluate GUTS in relation to students' performance and motivation development between grade 7 and grade 9.

This final chapter first describes the main findings of this dissertation, followed by a discussion of these findings in light of the practice of GUTS and theoretical considerations, limitations and suggestions for future research, and implications of this study for innovations aimed at enhancing performance and motivation.

6.2 Main Findings

Chapter 2 was concerned with two research questions: (a) Does student performance decline during lower secondary education?; and (b) Is this trend moderated by (1) gender, (2) school type or (3) initial level? These questions were important to investigate because much is known about motivation development in secondary education, but the development of performance in terms of report card grades was underexposed. Report card grades were expected to decline between grade 7 and 9, based on previous research showing (1) a motivation decline, and (2) a relation between motivation and performance. A performance decline was indeed found, both for overall student performance as well as for the core subjects Dutch, English and mathematics. Studying the overall report card grades of students between seventh and ninth grade, these grades linearly declined, regardless of the moderators distinguished: gender, school type, and initial level. These moderators, however, did sometimes affect the performance level itself or the strength of the performance decline. Regarding gender, boys started at a lower performance level than girls after the transition into secondary education, and their performance subsequently decreased in a pattern similar to that found for girls. The performance differences between boys and girls therefore remained the same throughout lower secondary education. As for school

type, the second moderator, pre-university students started with the highest performance level in grade 7 and showed the steepest decline. Nonetheless, by the end of grade 9, students in pre-university education still had the highest performance level compared to senior general secondary and pre-vocational education. While students in senior general secondary education had higher performance levels than pre-vocational students in grade 7, by the end of grade 9 both groups had equal performance levels. Finally, initial performance level in grade 7 moderated the performance decline such that performance of students with a high initial level generally declined at a faster rate than performance of students who started at a lower level. Summarising, Chapter 2 showed that performance levels, similarly to previous findings on motivation levels, decline in lower secondary education.

In *Chapter 3*, three questions were investigated: (a) To what extent does autonomous motivation positively predict performance, and to what extent and in what direction does controlled motivation predict performance?; (b) What are the levels of autonomous and controlled motivation and performance in students' favoured and disfavoured subjects?; and (c) What are the roles of autonomous and controlled motivation in predicting performance in students' favoured and disfavoured subjects?

The positive relation between *autonomous motivation* and performance is well known, and was also expected in this study. However, the relation between *controlled motivation* and performance, especially in secondary education is less well documented. Therefore, this relation was explored. Furthermore, a distinction between subjects based on students' affect towards these subjects can provide meaningful information as to how to best stimulate student performance and motivation in various subjects. Autonomous motivation and performance were expected to be higher for favoured than for disfavoured subjects, and the level of controlled motivation in favoured and disfavoured subjects was explored. The study first showed a general positive contribution of autonomous motivation to performance, and a negative contribution of controlled motivation to performance. Secondly, as was expected, autonomous motivation was considerably higher for favoured than for disfavoured subjects and controlled motivation was higher for disfavoured than for favoured subjects. For both types of subjects, some autonomous and controlled motivation was apparent. Third, the relation between autonomous motivation and performance did not differ between favoured and disfavoured subjects, which means that for both types of subjects, the more autonomously motivated a student was, the better his/her performance. Controlled motivation, however, was a stronger negative predictor of performance in disfavoured than in favoured subjects, which means that having a high level of controlled motivation was even more detrimental for performance in disfavoured than in favoured subjects. This suggests that the relatively large presence of autonomous motivation in favoured subjects may buffer the negative effect of controlled motivation on performance

in these subjects. Chapter 3 proposes that it is important to distinguish between subjects when studying the relationship between motivation and performance because the relationships may differ. Also, this study suggests that in trying to increase performance, it is more important to focus on stimulating autonomous motivation than on decreasing the amount of controlled motivation.

The talent lessons, as part of GUTS, were central in *Chapter 4*. These talent lessons were initiated to stimulate autonomous motivation of all students for their favourite subjects. It is important to describe how students perceived and valued autonomy support and structure of the talent lessons, and to investigate whether the perception of need support in the talent lessons contributed to motivation and self-efficacy for the subject, because the effectiveness of an innovation is partly determined by how it is perceived. To investigate student perceptions of the motivating aspects of the lessons, this study posed two questions: (a) How do students experience and value the talent lessons?; and (b) How does need support during talent lessons relate to subject motivation and self-efficacy?

The study reported in Chapter 4 consisted of two parts. Part 1 employed interviews for an investigation of student perceptions of the talent lessons in terms of autonomy support and structure. Part 2 included questionnaires to investigate the transfer between autonomy support and structure in the context of the talent lessons and motivation and self-efficacy in the context of the subject. In Part 1, it was found that students perceived the talent lessons as autonomy-supportive and structured to a large extent. Most students experienced choice, relevance, respect, guidance and clarity during the talent lessons. Students provided various explanations for the support of their needs for autonomy and competence. Furthermore, in Part 2 it was found that autonomy support in the talent lessons related to autonomous motivation for the subject. Students who performed at a lower level benefitted more from perceived autonomy support for their autonomous motivation than students performing at higher levels. This transfer effect was not found between structure in the talent lessons and motivation and self-efficacy for the subject in the model also including autonomy support as a predictor.

Students may have perceived differences in need support based on individually determined perceptions of autonomy support and structure, because teachers addressed students within talent lessons differently, or because the talent lessons were actually shaped differently for different subjects. Autonomy support and structure were found to relate, both in the interviews and in the questionnaire. This means that these concepts may have to be interpreted together, instead of as two independent aspects of need-supportive teaching when trying to stimulate autonomous motivation.

Chapter 5 was concerned with the question how performance and positive affect of students in GUTS developed between grades 7 and 9. Two research questions guided this study: (a) To what extent is GUTS related to a higher

performance level?; and (b) How is GUTS related to motivation for school, well-being and self-esteem? It was hypothesised that performance and motivation of students in GUTS was higher than in comparison groups, and that the declining trends in lower secondary education were prevented. Well-being and self-esteem were also investigated to ensure that there was no collateral damage to these factors. The patterns of GUTS students were compared to various groups of similar students in different learning environments. This study showed mixed effects of GUTS. When compared to students in other schools and previous cohorts in the same school, the report card grades of GUTS students were higher between grade 7 and 9, but the general declining trend of report card grades did not change. The decline between grade 8 and 9 was stronger for GUTS students compared to students in other schools, although GUTS-students' performance remained at a higher level also in this last year. In comparison to previous cohorts in the same school, the declining pattern of performance in GUTS was similar. As for motivation, well-being, and self-esteem, a comparison with a national norm group showed that students in GUTS had higher motivation between grades 7 and 9. The motivation did decline in a similar fashion between these years. Furthermore, GUTS students showed higher well-being levels at the start of their secondary education, whereas no difference was observed in grades 8 and 9. Finally, GUTS students' self-esteem did not differ from the norm group in seventh grade. In eighth and ninth grade, self-esteem was observed not to differ between the GUTS group and the norm group on two of the subscales – expression and social skills, but the GUTS group scored lower on confidence at tests. Concluding, the study in Chapter 5 showed mixed results in comparing GUTS students with students in other learning environments.

6.3 GUTS

This dissertation investigated GUTS, an innovation implemented to stimulate student performance and motivation by means of intrinsic motivation stimulation combined with an extrinsic incentive. GUTS consists of two elements: (a) talent lessons and (b) a higher standard for promotion. The combination of strengthening intrinsic motivation with the talent lessons, and providing an extrinsic incentive with the higher standard was hypothesised to increase performance and motivation. See for a detailed description section 1.4 of this dissertation.

Answering the question whether GUTS enhanced performance and motivation, we see mixed results. Students were positive about the motivating aspects of the talent lessons. Perceptions of autonomy support and structure were encouraging. Also, autonomy support during the talent lessons contributed to autonomous motivation for this subject. Furthermore, performance and motivation of students in GUTS were higher than for students

in comparison groups. This is important because higher report card grades and higher motivation may positively contribute to the role of school in student lives. Report card grades have important predictive validity for students' school careers (Bowers, 2011). The higher a report card grade, the more academic knowledge and non-cognitive competences one has gained (Bowers, 2011). Furthermore, a higher level of motivation is not only important because of its relation to a higher performance level (Steinmayr & Spinath, 2009), but also because motivation is related to well-being (Ryan & Deci, 2000).

On the other hand, the declining trend of performance and motivation levels in lower secondary education still appeared among students in GUTS. These trends were not significantly different from the situation without GUTS. Thus, we can say that GUTS showed positive results regarding the *level* of student performance and motivation, especially in grades 7 and 8. However, the mechanisms in GUTS with regard to performance and motivation *trends* did not all turn out as envisioned.

6.3.1 Reflection on the mechanisms at work in GUTS

Several mechanisms can be detected in GUTS that may have influenced the level and trends of motivation and performance. First, *high expectations* for everyone in certain subjects were expressed, not only for the gifted students. All students were challenged according to their talents in the talent lessons. In these lessons, relatively motivated and high ability students were grouped together, which may have increased teacher expectations for this group. It has previously been studied that high teacher expectations positively influence student performance levels (Rubie-Davies, Peterson, Sibley, & Rosenthal, 2015). In addition to high expectations in the talent lessons subjects, GUTS was also based on general high expectations of students by raising the performance standard to proceed to the next grade at the end of the school year. This means that students were stimulated not only to perform at a high level especially in their favoured subjects, but also to reach an average performance level up to the higher standard.

Second, a characteristic of GUTS was to *challenge* students in a favourite subject. Challenges in the learning environment may positively affect performance, as was found by LePine, LePine, and Jackson (2004). Third, within GUTS, students had several opportunities to make their own *choices* as to the subjects they wanted to take talent lessons in, and with regard to how they would achieve the average seven. Choice is a part of need-supportive teaching, and the importance of need-supportive teaching will be discussed in section 6.4.2.

6.4 Enhancing Performance and Motivation

6.4.1 Declining patterns of performance and motivation

The phenomenon of declining motivation in secondary school is well-known and extensively studied (e.g. Eccles, Lord, & Midgley, 1991; Gillet, Vallerand, & Lafranière, 2012; Gnambs & Hangstingl, 2016; Gottfried, Fleming, & Gottfried, 2001; Lepper, Corpus, & Iyengar, 2005). This dissertation contributed to the idea that the declines of motivation and performance in secondary school are both very persistent. In Chapter 2, a declining pattern of performance was found between grades 7 and 9. In Chapter 5, it was found that even though GUTS students performed at a higher level and showed higher levels of motivation than comparison groups, the declining pattern still occurred.

Reasons for the persisting decline in performance and motivation may be various. Firstly, secondary education becomes more difficult between grade 7 and 9. The content of the curriculum and the associated assessments become harder and some students may not be equipped for that. When tasks become more complex, a sense of metacognition is needed, which is not fully developed yet in adolescence (van der Stel & Veenman, 2010). This lack of metacognition may cause students not to be able to keep up with the study skills which are asked from students, instigating declining performance and motivation. Secondly, another reason why the performance and motivation declines are persistent may be found in the physical developmental phase of the students. Puberty is at its peak for most students in lower secondary education. It has been shown that pubertal status, defined as physical maturation, indirectly affects performance levels. If one showed more advanced pubertal status, self-efficacy and valuing of school were lower, which were associated with lower performance (Martin & Steinbeck, 2017). Thirdly, it is known that adolescence is a period in which other things aside school become more appealing such as hobbies, friends, and social media. This may lead to a shifting relevance of life domains for adolescents, and may cause other life domains to become of larger value than school (Peetsma, 1997, as cited in Peetsma & van der Veen, 2011). These factors may contribute to a general misfit between the student and the environment as argued by Eccles et al. (1993). This so-called stage-environment misfit means that the school environment does not fit the needs of students, leading to friction between what a student wants and the opportunities offered by the school. This friction is linked to negative development of motivation and self-perceptions (Eccles et al., 1993).

6.4.2 The importance of need support and autonomous motivation

As was investigated extensively before, autonomous motivation seems to have an important role in school (e.g. Guay & Vallerand, 1997; Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009) and need support is important to stimulate autonomous motivation (e.g. Reeve, 2006; Stroet, Opdenakker, & Minnaert,

2013). In this dissertation, these results were also found in the context of specific subjects and lessons. Chapter 3 showed the positive relation of autonomous motivation with performance for favoured and disfavoured subjects. Additionally, Chapter 4 showed that need support in the specific situation of talent lessons is positively related to autonomous motivation for the subject. This means that need support does not only affect motivation in the same context, but that a transfer effect is also found between contexts. Need support in one situation or context affects autonomous motivation in another context, as was also proposed by Vallerand (2007) in the hierarchical model of motivation. Therefore, need-supportive teaching in a lesson on a specific topic such as the second world war, may lead to autonomous motivation for the subject history.

When studying need support, it seems important to interpret the needs for autonomy and competence together. Chapter 4 showed that students often see autonomy support and structure as related concepts. In the interviews, answers about autonomy support sometimes included a notion of structure, and the other way around. This relationship between both psychological needs has been found to be positive both in educational setting (Sierens, Vansteenkiste, Goossens, Soenens, & Dochy, 2009; Jang, Reeve, & Deci, 2010), as well as in parental setting (Farkas & Grolnick, 2010).

While autonomous motivation is important in school for student performance and well-being, it is almost impossible to be exclusively autonomously motivated for everything in school. We concluded in Chapter 3 that even in favoured subjects, students reported some controlled motivation. This finding generally seemed to align with the conclusion of Ratelle, Guay, Vallerand, Larose, and Senécal (2007) that no students with solely autonomous motivation could be found in secondary school.

6.5 Reflection on the Implementation of GUTS and Suggestions for Improvement

The implementation of GUTS was a pilot, and revealed some strengths and some points for improvement. Strengths of the implementation of GUTS were firstly that the project was shaped and implemented in close collaboration with the school for secondary education: Wolfert Bilingual. For a successful implementation of an innovation it is important that schools have the freedom to become owner of an innovation in the school (Stevens, 2004). Another strength of the implementation of GUTS was the flexibility during the pilot to adjust the innovation where needed, based on feedback from the persons involved.

Teachers are incredibly important actors in shaping a learning environment (Hornstra, Mansfield, van der Veen, Peetsma, & Volman, 2015). It is important to take teacher concerns into account and to provide teachers with feedback regarding their concerns (Van den Berg, Sleegers, Geijsel, & Vandenberghe,

2000). For an innovation to succeed, it is important to pay attention to questions, needs, and opinions of individual teachers (Van den Berg & Ros, 1999). For this reason, evaluations with teachers took place and another PhD study specifically investigated teachers' perspectives on the practice of differentiated instruction in the context of GUTS (Stollman, 2018). Despite attempts to discuss all aspects of GUTS with the teaching staff, some of the changes along the way (see section 1.4.3) were not well communicated. This led to some confusion about what was expected from teachers. Furthermore, teachers were quite free in developing talent lessons and were sometimes rather puzzled about what was actually expected from them in the talent lessons. Even though it is not likely that this issue influenced the results of this dissertation, communicating clear expectations for teachers from the beginning could have eased the implementation of GUTS in the school.

Students selected subjects for the talent lessons, and ideally took talent lessons in these subjects. A practical point of improvement which came to light during the pilot was that sometimes it was hard to divide all students across their preferred choices. Consequently, some students took talent lessons in the subject of their second or third choice, which may have decreased their engagement. A suggestion for improvement could be to embed the idea of the talent lessons in regular lessons. This would make it possible for students to follow an adaptive curriculum for all subjects, providing every student the opportunity to excel in some subjects. Embedding in regular lessons would require teachers to differentiate between students who want to do just enough to pass and students who want to excel.

Additionally, in this dissertation it was found that in both students' favoured and disfavoured subjects some controlled motivation was present. In addition to need-supportive teaching, which was implemented in the talent lessons, it may be important to support students by focusing on the utility value of what they have to do to stimulate more autonomous forms of motivation. Students do not have to like everything that they are doing in school, but they can be taught to appreciate what they are learning. However, it may be hard to help students value the content of what they are learning (Brophy, 2008). Usefulness of a school subject is not always clear for students. Additionally, the immediate value of the curriculum at the particular moment at which students are learning it, may not even be clear to teachers and researchers, especially if the curriculum serves a greater goal which is useful at a later moment (Brophy, 2008). It is therefore important to expand the theorising of the value of the curriculum. Utility value interventions for students may increase awareness of usefulness of what is to be learned. An example of such an intervention showed that a writing intervention that encouraged students to discover how school tasks are connected to their own lives increased utility value perceptions, which in turn predicted increased performance and interest. These effects were strongest for low-scoring students (Hulleman, Godes, Hendricks, & Harackiewicz, 2010). Emphasising the utility

value of the curriculum for one's personal life or for society may help students when they lack a notion of autonomous motivation. Therefore, some attention for the value of what is learned can expand and improve GUTS.

Finally, in some cases it was difficult for the teachers and management of the school to handle the performance standard strictly. In the norm standards, it was agreed upon that all students who did not achieve an average 7 would be discussed for passing or not and that only the students with a plausible explanation for their lower grades would be promoted. As a consequence, some students with an average lower than a 7 also passed to the next grade. This may have caused the report card grades to be lower than expected in grades 8 and 9, because students may have reasoned that they would be able to proceed to the next grade even if their grade was slightly lower than an average seven. To stimulate students to perform to a higher standard, it is important that the conditions for a pass to the next grade are formulated even more explicitly on beforehand.

6.6 Limitations and Future Research

The research in this dissertation was practice oriented. This is a strength of the study, because of its direct relevance for secondary education. Not only did the idea for the study originate from educational practice, but an innovation was also implemented and evaluated. Also, its longitudinal character is a strength. Another strength was that the school piloted GUTS with complete cohorts, which meant that the sample was large. However, the research performed in this dissertation also knows some limitations, which provide directions for future research.

First, because GUTS is a learning environment explicitly focused on the combination of talent lessons and a higher performance standard to promote performance and motivation, a limitation of this study is that we cannot, and did not intend to, investigate the relative contribution of the separate elements of GUTS. Therefore, a question resulting from this dissertation is how to overcome the declining trend; should we focus particularly on a higher standard or on intrinsic motivation stimulation, should we focus on stimulation of achievement in specific (clusters) of subjects instead of overall achievement, or should teachers receive support in motivating students?

Second, the present dissertation describes that performance and motivation decline, but did not study the specific reasons for these declines. Therefore, this research provides input for more in-depth questions such as what the reasons for the performance and motivation decline are according to students themselves.

Third, at Wolfert Bilingual, three complete cohorts of senior general secondary and pre-university education students participated in GUTS in three consecutive school years in lower secondary education. This was necessary

because of the adaptation made to the passing standard and the ethical need for equal treatment of all students. A consequence of this approach is that no comparison of the effects of GUTS versus no GUTS was possible across students in one school.

Fourth, only students from the senior general secondary and pre-university education school types in a bilingual secondary school were included in the innovation. The statements made about the evaluation of GUTS as reported in Chapters 4 and 5 therefore apply to students at senior general secondary and pre-university education. To generalize the results of GUTS to all students, in future research, students from other school types should also be included.

Fifth, for this dissertation, we have studied students and have not included the teacher perspective. However, teachers were important in GUTS, especially in shaping the talent lessons. For this reason, a parallel study took place into teachers' perspectives of differentiated instruction in practice in the context of GUTS (Stollman, 2018). For a next study, the student and teacher perspectives could be combined into one study. This is important because teacher characteristics such as teacher efficacy and motivating teacher strategies impact both teaching and student motivation (Hornstra et al., 2015; Thoonen, Sleegers, Peetsma, & Oort, 2011).

In this longitudinal study, students in grades 7 to 9 were included in this dissertation. In a future study, if more years would be available to follow students for a longer period of time, it would be interesting to investigate also students in grade 10 to 12 of secondary education, to study how performance and motivation develop in these years. Research in other countries has found that the motivation decline is strongest until the age of 16 (Gillet, Vallerand, & Lafranière, 2012; Gottfried et al., 2001). This means that in higher secondary education, the autonomous motivation would slightly increase relative to the motivation level in grade 9. Specifically, the Dutch context includes a profile choice after grade 9, and central examinations in the final grade (grade 11 or 12), which may positively affect performance and autonomous motivation through choosing certain subjects and a higher relevance of good achievement respectively. It would therefore be interesting to study whether the declining performance and motivation trends are surmounted in higher secondary education.

6.7 Practical Implications

The research in this dissertation provides practical implications at the school and policy level. At the school level, *challenging* students may be worthwile to increase both performance and motivation. This may be done in various ways. In many approaches, gifted students are challenged and participate in enrichment programs to increase their motivation for school. These students

need extra challenge as they are easily bored with the curriculum that is too easy for them. However, it is important to show positive expectations and to challenge and motivate all students. Challenging every student in certain areas may increase performance and motivation, especially in grade 7 and 8. This dissertation demonstrated that it is possible to *ask more* from students by means of a higher promotion standard. Students achieve towards this standard, and this dissertation showed that there is some stretch in the performance level students achieve. By asking more of students and setting higher expectations, students will, as far as they can, try to reach these higher expectations. At the same time, asking more of students may on the one hand lead to increased perceived competence when one reaches the increased standard, and on the other hand, may lead to low self-esteem or fear of failure when the standard is not within one's reach. In this dissertation, it was found that in eighth and ninth grade, students' self-esteem for tests was lower than for the comparison group. This may indicate that students felt less confident in reaching the higher performance expectation. Therefore, when asking more of students, it is important to carefully consider the testing situation, and the question whether students do not develop a lack of self-esteem to reach the standard.

Furthermore, an implication of this research is that stimulating autonomous motivation may be prioritised, especially for disfavoured subjects, where students are low on autonomous motivation. In Chapter 3 we concluded that the role of autonomous motivation for performance is positive regardless of the level of controlled motivation. Additionally, controlled motivation was an even more negative predictor of performance in the absence of a high level of autonomous motivation. As a consequence, stimulating autonomous motivation may also help to reduce the negative effect of controlled motivation. It is known that *need-supportive teaching* is important to stimulate autonomous motivation (Stroet et al., 2013). At the same time, teachers sometimes resort to more controlling teaching strategies when students have little autonomous motivation (Hornstra et al., 2015). Nonetheless, a recommendation of the present dissertation would be to encourage need-supportive teaching to stimulate autonomous motivation primarily, especially in contexts where students experience little autonomous motivation.

On the policy level, an important message of this dissertation is that it is fruitful to try to improve performance and motivation of all students as opposed to only focus on the top 10 or 20% excellent or gifted students. This requires a focus not on 'the excellent individual', in which excellence is only reserved for the top 20% best performing students, but on '*acts of excellence*' of every individual. Through focusing on every individual's strengths, every student receives a chance to excel at some activities. As a consequence, students' performance and motivation may be enhanced. Additionally, it is possible to increase performance and motivation (hence the higher levels of performance and motivation in this dissertation), although the declining patterns during

lower secondary education are not easy to overcome. It is therefore worth the effort to investigate *reasons* for declining motivation and performance and improvement strategies which may lie, for example, in adjustment of the curriculum to students' abilities or to increase the immediate relevance of the curriculum. This may eventually lead to innovations that are able to counteract the declining trends of performance and motivation.

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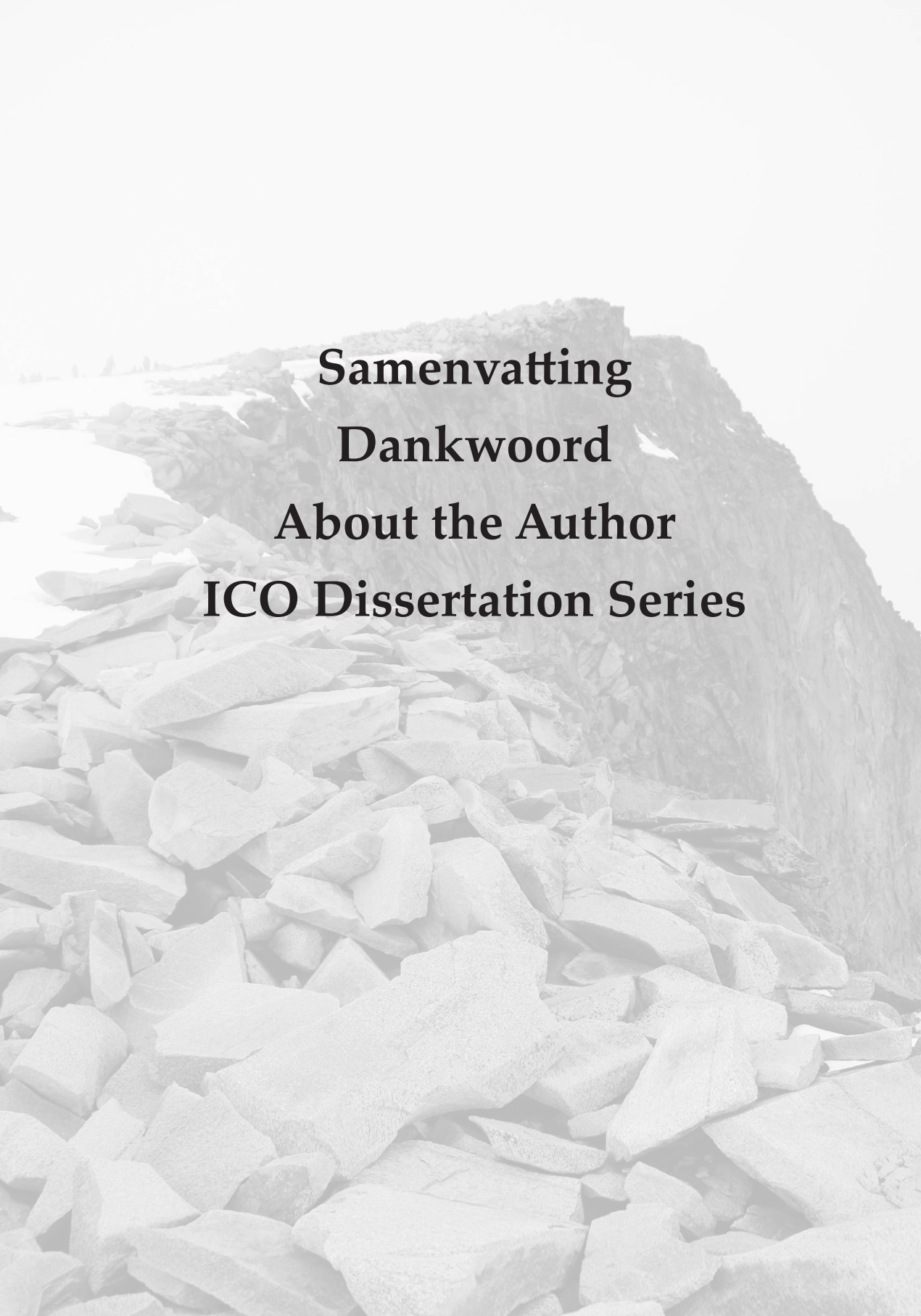

Samenvatting

Dankwoord

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Samenvatting

Een bekend fenomeen onder adolescenten is een dalende motivatie voor school. Leerlingen komen gemotiveerd binnen in de eerste klas van het voortgezet onderwijs, maar deze motivatie daalt in de daaropvolgende jaren. Motivatie is gerelateerd aan prestaties, die weer bepalend zijn voor het succes van de leerling op school. Om deze reden is de waargenomen dalende trend schadelijk voor leerlingen.

Dit proefschrift richt zich op het stimuleren van prestaties en motivatie van leerlingen in de eerste drie klassen van het voortgezet onderwijs. Drie assumpties staan hierbij centraal: (1) dat motivatie afneemt in het voortgezet onderwijs, (2) dat motivatie en prestaties van leerlingen onderling samenhangen, en (3) dat het combineren van stimuleren van intrinsieke motivatie met extrinsieke prikkels belangrijk is voor het bevorderen van motivatie en prestaties in het voortgezet onderwijs. Dit proefschrift beschrijft onderzoek naar een innovatie gebaseerd op deze drie assumpties. Deze innovatie heet Gedifferentieerd Uitdagen van Talent op School, oftewel GUTS. GUTS streeft ernaar om zowel prestaties als motivatie van leerlingen te verhogen.

Het doel van dit proefschrift was tweeledig. Ten eerste was het doel om de *ontwikkeling* van en *relaties* tussen prestaties en motivatie van leerlingen in de specifieke context van de eerste drie klassen van de middelbare school beter te begrijpen. Ten tweede was het doel om GUTS te beschrijven en te evalueren in hoeverre deze innovatie de prestaties en motivatie van leerlingen zou versterken.

Theoretische Onderbouwing van dit Proefschrift

In dit proefschrift staan twee concepten centraal: prestaties en motivatie. Met prestaties worden de rapportcijfers bedoeld die leerlingen op school halen. Om motivatie te definiëren wordt de zelfbeschikkingstheorie (*Self-Determination Theory*) gebruikt. Deze theorie onderscheidt twee typen motivatie die verschillen in de mate van zelfbeschikking, oftewel de mate waarin iemand iets vanuit zichzelf onderneemt. Bij *autonome motivatie* is sprake van een grote mate van zelfbeschikking. *Gecontroleerde motivatie* daarentegen, is een type motivatie waarbij er weinig of geen zelfbeschikking is. Autonome motivatie is positief gerelateerd aan verschillende schooluitkomsten en daarom is het belangrijk om deze motivatie te stimuleren in het onderwijs. Volgens de zelfbeschikkingstheorie is het voor stimulering van autonome motivatie belangrijk dat de docent de psychologische basisbehoeften voor autonomie, competentie en betrokkenheid van de leerling vervult bij het lesgeven. Om dit te doen is het belangrijk dat de docent behoefte-ondersteunend lesgeeft.

Naast het stimuleren van intrinsieke motivatie zijn in de context van het voortgezet onderwijs ook externe factoren van invloed op leerlingen. Zij moeten

nu eenmaal naar school, en het is onwaarschijnlijk dat zij alles op school even leuk vinden. Externe factoren zoals beloningen kunnen enerzijds de behoefte aan autonomie ondermijnen, maar kunnen anderzijds ook informatie bevatten over iemands competenties. Daarom stellen wij dat het belangrijk is om, naast het stimuleren van intrinsieke motivatie, ook een extrinsieke prikkel aan te bieden als sturende kracht wanneer het doel is om zowel prestaties als motivatie te verbeteren.

Interventie: GUTS

Het doel van GUTS is om zowel de prestaties als de motivatie van leerlingen in de eerste drie klassen van het voortgezet onderwijs te verhogen, door het combineren van stimulering van intrinsieke motivatie met een extrinsieke prikkel. GUTS bestaat uit twee elementen: (a) talentlessen als stimulering van intrinsieke motivatie en (b) een verhoogde bevorderingsnorm als extrinsieke prikkel. We hebben een positieve aanpak toegepast door ons te richten op de ontwikkeling van talenten van leerlingen in plaats van het wegwerken van tekorten. Door deze aanpak konden we gebruiken maken van het gecombineerde effect van zowel intrinsieke als extrinsieke factoren en tegelijk een mogelijk negatief effect van de extrinsieke prikkel vermijden. Het basisidee is dat een leerling niet goed hoeft te zijn in elk vak of elk vak leuk hoeft te vinden, maar dat iedere leerling bepaalde vakken selecteert om zijn of haar talent in te ontwikkelen. De verwachting hierbij was dat dit de vakspecifieke en overkoepelende prestaties en motivatie positief zou beïnvloeden.

De implementatie van GUTS was een samenwerking tussen Universiteit Leiden en Wolfert Tweetalig in Rotterdam. De school biedt tweetalig onderwijs op havo- en vwo-niveau. In overleg tussen de school en de universiteit is gedurende de drie jaar van implementatie besloten dat de talentlessen rond de principes van autonomie, differentiatie, hogere orde denken en verrijking vormgegeven werden. De lessen vonden per jaar in twee cycli van acht blokuren plaats. Leerlingen kozen voor deze talentlessen steeds een verschillend vak dat zij leuk vonden en waar ze meer tijd aan wilden besteden. De talentlessen vonden plaats voor leerlingen in de eerste en tweede klas. In de derde klas werkten leerlingen aan een persoonlijk project, gebaseerd op dezelfde principes als de talentlessen. Naast de talentlessen werd besloten dat leerlingen, als extrinsieke prikkel, gemiddeld een 7 moesten halen om over te gaan. Een rapportcijfer van een 6 was voldoende voor een individueel vak, maar om een gemiddelde van een 7 te halen was het in dat geval nodig dat de leerling een 8 haalde in een ander vak. Dit gaf leerlingen de kans om te differentiëren in de cijfers die ze voor verschillende vakken haalden en op deze manier te excelleren in sommige vakken om andere vakken te compenseren.

Belangrijkste Bevindingen

In ***hoofdstuk 2*** wordt de ontwikkeling van het prestatieniveau tussen klas 1 en 3 van het voortgezet onderwijs beschreven. In dit hoofdstuk stonden twee onderzoeksvragen centraal: (a) Neemt het niveau van de prestaties van leerlingen af gedurende de eerste drie jaar van de middelbare school?; en (b) Wordt deze trend gemodereerd door (1) sekse, (2) schooltype, en (3) startniveau? Deze vragen waren belangrijk om te onderzoeken omdat veel bekend is over de ontwikkeling van motivatie in het voortgezet onderwijs, maar de ontwikkeling van prestaties in termen van rapportcijfers tot nu toe onderbelicht is gebleven. Gezien de relatie tussen motivatie en prestaties en op grond van dalende motivatie in de onderbouw van het voortgezet onderwijs verwachtten we dat rapportcijfers ook zouden dalen tussen klas 1 en 3.

Voor deze studie hebben we de eindrapportcijfers van klas 1 tot en met 3 van 1544 vmbo-, havo- en vwo-leerlingen van verschillende scholen onderzocht. Hiertoe is een hiërarchische regressieanalyse met twee niveaus (tijd en leerling) uitgevoerd. We hebben, zoals verwacht, een lineaire afname in prestaties gevonden, zowel voor gemiddelde rapportcijfers over alle vakken als voor de kernvakken Nederlands, Engels en wiskunde, onafhankelijk van geslacht, schooltype en startniveau. Deze factoren beïnvloedden wel het niveau van de prestaties of de grootte van de afname. Ten eerste, jongens startten met een lager prestatieniveau dan meisjes aan het begin van het voortgezet onderwijs. Hun prestatieniveau daalde daarna op eenzelfde manier als bij meisjes. De verschillen in prestaties tussen jongens en meisjes bleven daardoor even groot tussen klas 1 en 3. Ten tweede, als we naar schooltype kijken, dan zien we dat vwo-leerlingen in klas 1 met het hoogste prestatieniveau begonnen en de sterkste afname in niveau lieten zien. Toch hadden vwo-leerlingen aan het einde van klas 3 nog steeds de hoogste rapportcijfers in vergelijking met havo- en vmbo-leerlingen. Terwijl havoleerlingen in klas 1 een hoger cijfergemiddelde hadden dan vmbo-leerlingen, waren deze prestatieniveaus in klas 3 vergelijkbaar. Ten derde, de cijfers van leerlingen met een hoger startniveau in klas 1 bleken sneller te dalen dan de rapportcijfers van leerlingen met een lager startniveau in klas 1. Concluderend laat hoofdstuk 2 zien dat prestatieniveau, vergelijkbaar met motivatie, daalt tussen klas 1 en 3, ongeacht geslacht, schooltype en startniveau.

Hoofdstuk 3 is gericht op de relatie tussen motivatie en prestaties, in de specifieke context van vakken die favoriet en minder favoriet zijn bij leerlingen. Drie onderzoeksvragen stonden centraal: (a) In welke mate is autonome motivatie een positieve voorspeller van prestaties en in welke mate en richting voorspelt gecontroleerde motivatie prestaties?; (b) Wat zijn de niveaus van autonome en gecontroleerde motivatie en prestaties in favoriete en minder favoriete vakken van leerlingen?; en (c) Wat zijn de rollen van autonome en gecontroleerde motivatie in het voorspellen van prestaties bij favoriete en minder favoriete

vakken van leerlingen? Deze vragen zijn onderzocht onder 918 leerlingen van drie scholen, waaronder Wolfert Tweetalig. De leerlingen vulden een vragenlijst in over hun autonome en gecontroleerde motivatie voor twee favoriete en twee minder favoriete vakken. Zij kozen zelf welke vakken dit waren. Daarnaast zijn de eindrapportcijfers van de leerlingen van de twee favoriete en twee minder favoriete vakken uit de schoolsystemen opgevraagd.

De positieve relatie tussen autonome motivatie en prestaties is bekend uit eerder onderzoek, en verwachtten we ook in deze studie te vinden. Echter, over de relatie tussen gecontroleerde motivatie en prestaties is minder bekend, zeker in het voortgezet onderwijs. Daarom hebben we deze relatie verkend. Bovendien kan een onderscheid tussen vakken waar leerlingen verschillende emoties bij ervaren waardevolle informatie geven over hoe de motivatie en prestaties bij verschillende vakken het beste gestimuleerd kunnen worden.

In hoofdstuk 3 hebben we door hiërarchische regressieanalyse ten eerste een positieve bijdrage van autonome motivatie op prestaties en een negatieve bijdrage van gecontroleerde motivatie op prestaties gevonden. Ten tweede hebben we met behulp van gepaarde t-toetsen, zoals verwacht, gevonden dat autonome motivatie hoger was bij favoriete dan bij minder favoriete vakken en dat gecontroleerde motivatie hoger was voor minder favoriete vakken in vergelijking met favoriete vakken. Ten derde vonden we dat de relatie tussen autonome motivatie en prestaties niet verschilde voor favoriete en minder favoriete vakken. Dit betekent voor beide typen vakken dat hoe meer autonome motivatie een leerling ervaarde, hoe hoger zijn of haar prestaties waren. Gecontroleerde motivatie was daarentegen een sterkere negatieve voorspeller van prestaties in minder favoriete vakken dan in favoriete vakken. Dit betekent dat het hebben van een hoog niveau van gecontroleerde motivatie bij minder favoriete vakken nog schadelijker is voor prestaties dan bij favoriete vakken. Mogelijk beschermt het relatief hoge niveau van autonome motivatie bij favoriete vakken tegen het negatieve effect van gecontroleerde motivatie op prestaties. Dit impliceert dat het vooral belangrijk is om te focussen op het stimuleren van autonome motivatie om prestaties te verhogen, specifiek bij minder favoriete vakken en ook wanneer een leerling gecontroleerde motivatie laat zien.

De GUTS-talentlessen stonden centraal in ***hoofdstuk 4***. Om te onderzoeken hoe effectief de ervaring van deze talentlessen is geweest in het stimuleren van autonome motivatie is het belangrijk om de percepties van leerlingen over de lessen te beschrijven. Om dit te onderzoeken hebben we in deze studie twee vragen gesteld: (a) Hoe ervaren en waarderen leerlingen de talentlessen?; en (b) Hoe is behoefte-ondersteuning tijdens de talentlessen gerelateerd aan motivatie en competentiebeleving voor het vak? Hierbij is behoefte-ondersteuning opgedeeld in autonomie-ondersteuning en structuur, die respectievelijk gerelateerd werden aan motivatie en competentiebeleving.

Om deze vragen te beantwoorden bestaat de studie in hoofdstuk 4 uit twee delen. Voor deel 1 zijn interviews gedaan met 30 leerlingen uit klas 1 en 2 over de mate van behoefte-ondersteuning in de talentlessen. Voor deel 2 is er direct na de talentlessen een digitale vragenlijst over behoefte-ondersteuning afgenomen bij alle leerlingen uit klas 1 en 2, en zijn de motivatie en competentiebeleving bevraagd met een papieren vragenlijst aan het einde van het schooljaar.

In deel 1 hebben we, na codering van de interviews aan de hand van een codeerschema, gevonden dat leerlingen de talentlessen grotendeels als autonomie-ondersteunend en gestructureerd hebben ervaren. De meeste leerlingen ervaarden keuze, relevantie, respect, begeleiding en duidelijkheid tijdens de talentlessen; onderdelen van autonomie-ondersteuning en structuur. Bovendien vonden we met behulp van regressieanalyse in deel 2 dat autonomie-ondersteuning in de talentlessen gerelateerd was aan autonome motivatie voor het vak. Leerlingen die op een lager niveau presteerden profiteerden daarbij meer van autonomie-ondersteuning voor hun autonome motivatie dan leerlingen die op een hoger niveau presteerden. Dit overdrachteffect van autonomie-ondersteuning in de talentlessen naar motivatie voor het vak werd niet gevonden voor de relatie tussen structuur in de talentlessen en competentiebeleving voor het vak. Concluderend laat hoofdstuk 4 zien dat leerlingen talentlessen gebaseerd op autonomie-ondersteuning en structuur zoals aangeboden in GUTS positief ervaren, specifiek in relatie tot de autonome motivatie voor het vak.

In ***hoofdstuk 5*** staat centraal hoe prestaties en motivatie van leerlingen die GUTS volgden zich ontwikkelden tussen klas 1 en 3 van het voortgezet onderwijs. Twee onderzoeksvragen leidden deze studie: (a) In hoeverre is GUTS gerelateerd aan een hoger prestatieniveau?; en (b) Hoe is GUTS gerelateerd aan motivatie voor school, welbevinden en zelfvertrouwen?

We verwachtten dat prestaties en motivatie van leerlingen in GUTS hoger waren dan in vergelijkingsgroepen, en dat de dalende trend in de eerste drie klassen van het voortgezet onderwijs werd verminderd. Welbevinden en zelfvertrouwen werden ook meegenomen in dit hoofdstuk om ons ervan te verzekeren dat er geen nevenschade aan deze concepten toegebracht werd in GUTS.

Om de onderzoeksvragen te beantwoorden zijn 156 leerlingen van het eerste GUTS-cohort drie jaar gevolgd. De prestaties en motivatie van deze leerlingen zijn vergeleken met verschillende groepen, namelijk met twee eerdere cohorten van dezelfde school (prestaties), met leerlingen van verschillende scholen (prestaties), en met een landelijke normgroep (motivatie, welbevinden en zelfvertrouwen).

De studie in hoofdstuk 5 laat gemengde resultaten zien. Bij het vergelijken van de prestaties van de leerlingen in GUTS met leerlingen in de vergelijkingsgroepen door hiërarchische regressieanalyse, was te zien dat de

rapportcijfers van GUTS-leerlingen hoger waren tussen klas 1 en 3, en dat tegelijk de dalende trend bleef bestaan. De afname in prestaties was tussen klas 2 en 3 sterker voor GUTS-leerlingen dan voor leerlingen op andere scholen, alhoewel de prestaties van GUTS-leerlingen ook in het laatste jaar hoger bleven. In vergelijking met twee eerdere cohorten van dezelfde school zag het dalende patroon van de cijfers er bij leerlingen in GUTS vergelijkbaar uit. Bij de vergelijking van motivatie, welbevinden en zelfvertrouwen tussen GUTS-leerlingen en de landelijke normgroep zagen we dat GUTS-leerlingen een hogere motivatie hadden tussen klas 1 en 3. Ook hier zagen we, zoals bij prestaties, dat de afname van motivatie bij GUTS-leerlingen leek op die van de normgroep. Daarnaast lieten leerlingen in GUTS een hoger niveau van welbevinden zien aan het begin van het voortgezet onderwijs, terwijl dit verschil in klas 2 en 3 verdween. Als laatste verschilde het niveau van zelfvertrouwen in de eerste klas niet tussen GUTS-leerlingen en de normgroep, terwijl het zelfvertrouwen van GUTS-leerlingen in klas 2 en 3 lager uitkwam dan bij de normgroep. Bij nadere inspectie was dit effect niet te vinden voor twee van de drie subschalen van zelfvertrouwen, uitdrukkings- en sociale vaardigheden, maar alleen bij vertrouwen bij toetsen.

Interpretatie van de Bevindingen

Qua ontwikkeling van en relaties tussen prestaties en motivatie in de eerste drie klassen van de middelbare school heeft dit proefschrift ten eerste een dalende trend in prestaties laten zien. Ten tweede heeft het een positieve relatie tussen autonome motivatie en prestaties aangetoond en ten derde heeft het een negatieve relatie tussen gecontroleerde motivatie en prestaties bij favoriete en minder favoriete vakken laten zien. Op de vraag of GUTS de prestaties en motivatie van leerlingen heeft verhoogd zien we gemengde resultaten. Hierbij moet onderscheid gemaakt worden tussen *niveau* en *ontwikkeling* van prestaties en motivatie. Terwijl het niveau van prestaties en motivatie bij leerlingen in GUTS hoger was in vergelijking met andere groepen, bleef de dalende trend bestaan. De hoge verwachtingen, uitdaging en mogelijkheid om keuzes te maken, kunnen mechanismes van GUTS zijn die verbonden zijn aan de hogere niveaus van prestaties en motivatie.

Aan de andere kant blijven prestaties en motivatie dalen, wat bewijs levert dat deze dalende trend hardnekkig is. Hier kunnen verschillende redenen voor zijn, zoals de moeilijkheidsgraad van het onderwijs die toeneemt tussen klas 1 en 3, de puberteit waar leerlingen in komen, of veranderende interesses zoals hobby's, vrienden en sociale media die ook tijd vragen die ten koste van schooltijd gaat.

Zowel autonomie-ondersteuning als autonome motivatie is in deze dissertatie belangrijk gebleken voor schoolse resultaten, ook in de context van

vakken met een specifieke emotie (favoriet en minder favoriet). Hierbij kan autonomie-ondersteuning in een specifieke situatie ook de autonome motivatie in een andere context beïnvloeden.

GUTS: Sterke Punten en Verbetersuggesties

De implementatie van GUTS was een pilot en kende sterke en verbeterpunten. Sterke punten waren de nauwe samenwerking van onderzoekers met de school bij de implementatie van GUTS, de grote flexibiliteit om de innovatie aan te passen waar dat nodig bleek, en de combinatie van het huidige onderzoek bij de leerlingen met een ander promotieonderzoek naar de perspectieven van docenten op differentiatie in de context van GUTS (Saskia Stollman). Tegelijk zijn er suggesties voor verbetering. Ten eerste is het belangrijk om richting docenten nog beter te communiceren over de verwachtingen ten aanzien van hun rol in het project. Dit is van belang bij het creëren van eigenaarschap over GUTS. Een tweede verbetersuggestie is om het idee van de talentlessen te integreren in de reguliere lessen. Op die manier kan de benadering waarbij voor elke leerling gekeken wordt waar hij of zij goed in is in alle lessen gehanteerd worden. Tegelijk wordt voorkomen dat leerlingen niet bij hun eerste keuze voor de talentlessen worden ingedeeld, een praktisch probleem waar we nu soms tegenaan liepen. Ten derde kan het van belang zijn om, wanneer autonome motivatie voor een vak laag is, de *waarde* en de *relevantie* van het curriculum nog meer te benadrukken in GUTS, iets dat nu niet in de interventie opgenomen is. Als laatste kan het van belang zijn om ervoor te zorgen dat leerlingen volgens de bevorderingsnorm presteren en de condities voor overgang vooraf aan het schooljaar nog explicieter te formuleren en communiceren.

Tekortkomingen en Aanbevelingen voor Vervolgonderzoek

De oriëntatie op de schoolpraktijk, het longitudinale karakter en de inclusie van hele cohorten waren sterke punten van het onderzoek in deze dissertatie. Omdat GUTS een combinatie was van talentlessen en een hogere bevorderingsnorm zijn de effecten van deze veranderingen niet uit elkaar te halen. Toekomstig onderzoek zou zich kunnen richten op de vraag of een van deze twee pijlers het meest van belang is bij het terugdringen van de prestatie- en motivatie-afname. Ook onderzoek naar de redenen voor deze afname zou een waardevolle toevoeging zijn. Omdat hele cohorten hebben meegedaan aan GUTS, is het niet mogelijk een vergelijking te maken binnen een cohort waarvan de ene helft wel en de andere helft niet mee heeft gedaan. In het huidige onderzoek zijn havo- en vwo-leerlingen onderzocht. Om te kunnen generaliseren naar alle leerlingen zouden ook vmbo-leerlingen meegenomen moeten worden. In vervolgonderzoek zou het leerlingperspectief in één studie

gecombineerd kunnen worden met het docentperspectief. Ten slotte zou het voor vervolgonderzoek interessant zijn om ook leerlingen in klas 4 tot en met 6 van het voortgezet onderwijs te volgen. Dit zouden in de Nederlandse context interessante jaren kunnen zijn voor motivatieonderzoek in verband met de profielkeuze en het eindexamen.

Implicaties

Dit onderzoek heeft verschillende implicaties op het niveau van de school en onderwijsbeleid. Op het niveau van de school kan het *uitdagen* van leerlingen een goede manier zijn om prestaties en motivatie te verhogen. Ook *hoge verwachtingen* in termen van een hogere bevorderingsnorm kunnen hieraan bijdragen; er blijkt namelijk rek in het prestatieniveau van leerlingen te zitten. Daarnaast is het stimuleren van autonome motivatie van belang, specifiek bij vakken die minder favoriet zijn bij leerlingen. Op beleidsniveau is het relevant om te onderzoeken wat redenen zijn voor de dalende motivatie en prestaties, om erachter te komen of en hoe deze dalende trend overwonnen kan worden. Verder is een belangrijke boodschap dat prestaties en motivatie van alle leerlingen verhoogd kunnen worden, en niet alleen van de top 10 of 20% beste leerlingen. Dit vraagt een verandering in focus van 'het excellente individu' naar 'excellente prestaties van ieder individu'.

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About the Author

Curriculum Vitae

Lindy Wijsman was born on 29 December 1989, in Voorburg. She grew up in 's-Hertogenbosch. After finishing her secondary education at Jeroen Boschcollege in 2007, she started studying at Utrecht University. Lindy obtained a bachelor degree in Educational Sciences in 2010. During this bachelor, Lindy studied abroad for one semester at Middlesex University, London, United Kingdom. Following, Lindy completed her research master Educational Sciences: Learning in Interaction at Utrecht University in 2012. The topic of her masters' thesis comprised students' autonomous and controlled motivation in relation to perceptions of teacher control and affiliation. After half a year of traveling and half a year of working as a junior teacher at Utrecht University, Lindy started her phd project at Leiden University in August 2013. This research project focused on performance and motivation of students in lower secondary education. Currently, Lindy is employed as educational consultant and trainer at Educational Consultancy and Professional Development, Utrecht University.

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