Motivation of Lower and Higher-Performing Primary School Students: The Role of Perceived Autonomy-Supportive and Controlling Teaching

Michiel. S. Duffels (8454183)

Faculty of Social and Behavioural Sciences, Utrecht University

Educational Sciences

Master's thesis (201500002)

Supervisors: Jonne Bloem, MSc. & Dr. Lisette Hornstra

Second assessor : Dr. Jeroen Janssen

June 12, 2023

Wordcount: 7991

Abstract

According to self-determination theory (SDT), teachers can support students' motivation by providing autonomy support or thwart their motivation by adopting a controlling teaching style. There are indications that teachers differentiate their autonomy-supportive and controlling teaching toward lower and higher-performing students within the same class. Previous research has shown that the perception of students' autonomy-supportive and controlling teaching relates to the quality of their motivation. However, research using student performance to examine these relationships is scarce. Therefore, this study examined the mediating role of students' perceived autonomy-supportive and controlling teaching between student performance and students' (a)motivation. Questionnaires with scales on motivation, amotivation, and perceived autonomy-supportive and controlling teaching were administered to 203 upper primary school students. The results indicated that student performance was modest but positively associated with autonomy-supportive teaching. Autonomy-supportive teaching was positively related to autonomous forms of motivation and negatively to controlled forms of motivation. Significant indirect effects indicated the mediating role of perceived autonomy-supportive teaching. No significant associations were found with perceived controlling teaching. The findings suggested that teachers differentiate in autonomy-support based on students' performance. Implications for practice and future research are discussed.

Keywords: student performance, perceived autonomy-supportive and controlling teaching, (a)motivation

Motivation of Lower and Higher-Performing Primary School Students: The Role of Perceived Autonomy-Supportive and Controlling Teaching

The motivation of Dutch students to learn at school lack behind compared to other countries (OECD, 2016). However, strikingly, a considerable amount of research shows the impact of motivation on achievement (e.g., Burnette et al., 2013; Leon et al., 2015). As Dutch student achievement decreases (OECD, 2016) and educational inequality increases (Inspectorate of Education, 2019), it seems important to gain insight into how to support the motivation of Dutch primary school students. This may especially be important for low-performing students because research indicates that these students have to put more effort into learning than others (Logan et al., 2011).

SDT states that teachers can foster students' motivation by supporting their psychological need for autonomy (Deci & Ryan, 2000). Studies confirm that students' perceived autonomy-supportive teaching relates to high-quality motivation (autonomous motivation) (Vansteenkiste et al., 2020). However, teachers can also thwart the need for autonomy by adopting a controlling teaching style (De Meyer, 2014). When students perceive controlling teaching, they are far more likely to exhibit low-quality motivation, such as controlled motivation or amotivation (absence of motivation) (Bartholomew et al., 2018). However, there are indications that teachers differ in their need-supportive behavior toward different students within the same class (Domen et al., 2020). Past research (Bennet & Offord, 2001) indicates that low motivation of low-performing students is often developed and reinforced in school. The question arises whether this can be explained by the extent to which low-performing students perceive less autonomy-supportive and more controlling teaching from their teachers compared to higher-performing students. Teachers could provide different levels of need-supportive behavior based on their expectations of their students (Hornstra et al., 2018) or their personal beliefs about how to shape differentiation (e.g., control and support) to adapt to their student's educational needs (van Vijfeijken et al., 2023). However, if low-performing students perceive less autonomy-supportive or more controlling teaching, this may hinder their motivation,

and in turn, low-performing students might be put behind even more. Currently, SDT research has mostly focused on autonomy-supportive teaching behaviors and their positive effects on student outcomes (e.g., Cheon et al., 2023; Vansteenkiste et al., 2012). With the present study, we aim to add to the literature by incorporating perceived controlling teaching and student performance levels to understand differences in student motivation.

Accordingly, the present study aims to gain more insight into the differences in levels of perceived autonomy-supportive and controlling teaching between lower- and higher-performing primary school students and how differences in teaching practices affect students' (a)motivation. The results could provide educators with more insight into how to fulfill the motivational needs of low-performing students, which is needed to boost their learning ultimately.

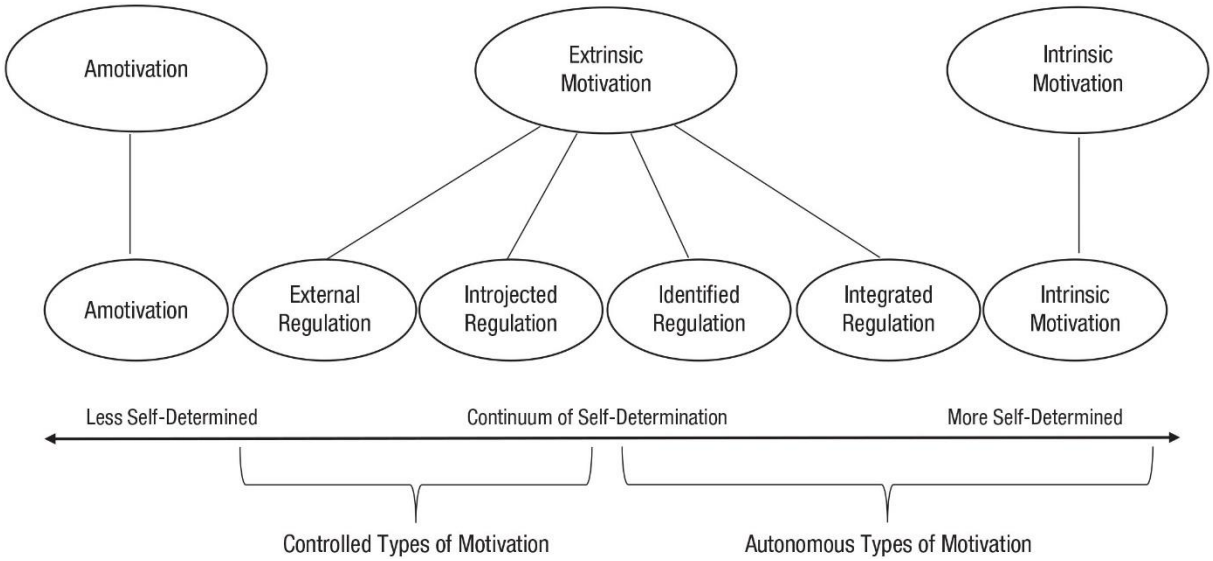
Motivation

According to SDT, the quality of student motivation refers to the reasons behind students' behavior (Ryan & Deci, 2000). Different types of motivation reflecting different levels of self-determination are ordered on a continuum (see Figure 1). That is, motivation moves to the less self-determined side of the continuum when students engage in an activity more out of internal or external pressure. Conversely, motivation moves to the more self-determined side when students' behavior is more useful-value- or interest-driven. A substantial body of research has proven the importance of student self-determination for learning, such as higher achievement and academic engagement (Jang et al., 2016; Howard et al., 2021; Taylor, 2014).

As shown on the left side of the continuum in Figure 1, amotivation relates to students who are neither intrinsically nor extrinsically driven and avoid participating in academic activities because they perceive no relationship between their acts and outcomes (Banerjee & Halder, 2021). More specifically, amotivation is the absence of motivation and may result from a lack of value, interest, or competence (Cheon & Reeve, 2015). Studies indicate that amotivation relates to adverse student outcomes, such as lower engagement, learning, boredom, and well-being (Ryan & Deci, 2020).

Figure 1

Motivation in Self-Determination Theory



Note. Adapted from "Student motivation and associated outcomes: A meta-analysis from self-determination theory," (Howard et al., 2021).

Secondly, extrinsically motivated students do not learn because of task satisfaction but due to external reasons independent of the activity itself (Ryan & Deci, 2020). SDT distinguishes different types of extrinsic motivation that vary in their level of self-determination, namely external regulation, introjected regulation, identified regulation, and integrated regulation (Howard et al., 2021). First, external regulation to complete a task originates from the students' desire to obtain an external reward or avoid punishment (Guay, 2021). Second, introjected regulation refers to internal pressure that drives students' motivation, such as pressure to avoid guilt (Domen et al., 2020). Next, external and introjected regulation both involve a sense of pressure or control. Therefore, these two forms of extrinsic motivation are considered controlled motivation (Howard et al., 2020). Studies have indicated that controlled motivation relates to adverse student outcomes, such as lower academic achievement (Wijsman et al., 2018), procrastination (Mouratides et al., 2017), and even school dropout (Jeno et al., 2021).

Furthermore, extrinsic motivation also includes more self-determined types of motivation. That is, identified regulation refers to behaviors performed by choice because students consider them important. Identified motivated students are in a state that drives students to act based on perceived personal value and meaning, although they might not inherently enjoy the task (Howard et al., 2021). Besides, integrated regulation corresponds to the most internalized form of extrinsic motivation. In integrated regulation, student behavior to engage in an activity is also out of choice. This type of regulation occurs when students internalize the reasons for engaging in the activity, and these reasons are congruent with students' own needs and values (Ntoumanis et al., 2020). Nevertheless, for identified and integrated regulation, students achieve an outcome independent of the learning task itself, whereas intrinsically motivated students learn from reasons inherent to the learning task, such as pleasure and satisfaction (Ryan & Deci, 2020). Therefore, at the far-right end of the continuum (see Figure 1), intrinsic motivation refers to students entirely motivated by intrinsic sources.

Identified regulation, integrated regulation, and intrinsic motivation are considered autonomous forms of motivation due to their volitional nature (Van den Broeck et al., 2021). Recent meta-analyses have demonstrated autonomous motivation to significantly predict students' engagement, positive affect, goals, self-esteem, and achievement (Bureau et al., 2021). Therefore, to support student learning and development, teachers should support autonomous forms of motivation by displaying a style that provides autonomy-supportive teaching and avoids controlling teaching.

Perceived Autonomy-Supportive and Controlling Teaching Practices

Teachers' motivating style refers to the interpersonal tone teachers have toward their students when trying to engage students in learning activities (Reeve, 2016). A teacher’s style can affect students’ perception of autonomy-supportive or controlling teaching (Amoura et al., 2015). An autonomy-supportive teaching style encompasses behaviors where teachers consider students’

perspectives, provide choices, and offer meaningful rationales to explain why they must do less interesting activities (Guay, 2021). Likewise, autonomy-supportive teachers seek activities relevant to students' interests, use inviting language, offer choices, and incorporate students' input in instruction and activities (Reeve & Cheon, 2021). Various studies have proven the relationship between students' perception of autonomy-supportive teaching and several beneficial student outcomes, including students' engagement, performance, and autonomous motivation (e.g., Matos et al., 2018; Vasconcellos et al., 2020). Moreover, social psychological research shows that the influence of any (learning) situation depends on the individual's personal and subjective meaning attached to the experience (Ross & Nisbett, 2011). As a result, the insider's view, or students' perception of a learning situation, is more indicative of the influence on student motivation than looking at teaching behavior (Wallace & Sung, 2017). Therefore, we will look at students' perceptions of teachers' need support teaching practices rather than their actual behavior.

In contrast, controlling teaching refers to delivering instruction through an interpersonal tone of pressure that drives students to behave in teacher-prescribed ways (Reeve, 2009). Likewise, controlling teachers ignore students' perspectives and behave in authoritarian and pressuring ways (Bartholomew et al., 2018). When students perceive controlling teaching, they experience pressure which thwarts their autonomous motivation and associates with controlled motivation and amotivation (Bartholomew et al., 2018; Jang et al., 2016). Controlling teaching is mainly incompatible with autonomy-supportive teaching. However, some studies indicate that students may perceive autonomy-supportive and controlling teaching simultaneously (Amoura et al., 2015; Balaguer et al., 2012). This indicates that teachers may provide autonomy support and, at the same time, show controlling behavior.

Overall, students who perceive higher levels of autonomy-supportive and lower levels of controlling teaching show more autonomous motivation, which is related to positive student outcomes, including student engagement and achievement (Haerens et al., 2015). On the contrary,

students who perceive lower levels of autonomy-supportive and higher levels of controlling teaching show more controlled motivation and amotivation, which has been found to relate to negative student outcomes, including procrastination and lower school results (Amoura, 2015). Hence, it might be that lower and higher-performing students receive different levels of need support from their teachers, which in turn might result in differences in motivation of lower- and higher-performing students.

Lower and Higher-Performing Students

Research suggests that differences in students' performance are partly caused by differences in motivation (Arens et al., 2017; Seaton et al., 2014). Accordingly, motivation may differ between lower and higher-performing students. In line with this idea, Xuejun (2021) investigated motivational differences among Chinse Junior secondary school students and found that lower-performing students reported higher levels of amotivation and lower levels of intrinsic motivation than higher-performing students. Recently, the Program for international student assessment (PISA) reported that students with high levels of motivation also performed better on the PISA assessment (Mo, 2019). Moreover, Brandenberger et al. (2018) showed a statistically significant negative trend in self-determined academic motivation for lower-performing students across childhood through adolescence. Therefore, primary school teachers must support student motivation to avoid students ending up in a negative circle of low performance and (a)motivation.

Vansteenkiste et al. (2004) indicate that to obtain high-quality motivation, teachers must present learning material in an autonomy-supportive way. However, teachers may unintentionally provide lower-performing students with less autonomy-supportive and more controlling teaching due to differentiated instruction. Differentiated instruction is a popular educational approach in which goals, instruction, and practice are adapted to students' educational needs based on students' performance levels (Prast et al., 2018). For example, low-performing students might experience less

choice because they must receive additional instruction, and perceived choice relates to autonomy (Patall et al., 2008).

Furthermore, research suggests that teachers provide different levels of autonomy support toward distinct students (Hornstra et al., 2015; Lee & Chatzisarantis et al., 2017). For instance, Hornstra et al. (2018) showed that teachers might provide different levels of need support because of the expectations they have from different students. That is, teachers may provide lower levels of autonomy support towards low-expectation students. Besides, some other studies indicate that teachers' expectations affect their behavior toward lower- and higher-performing students (Bohlmann & Weinstein, 2013; McKown & Weinstein, 2008). Specifically, Heyder et al. (2020) showed that teachers' ability beliefs about low-performing students might affect the feelings of low-performing students that they have the chance to succeed in the future. Teacher expectations and subsequent teaching behavior toward students could be based on students' prior performance (Timmermans et al., 2015). These findings suggest that teacher expectations lead to providing lower levels of autonomy support and more controlling teaching to lower-performing students. For example, when teachers believe that low-performing students cannot fulfill a task, they could provide a prescriptive tone related to controlling teaching.

In addition, schools' visions and teachers' beliefs about adapting their instruction to their student's educational needs differ (van Vijfeijken et al., 2023). Accordingly, teachers can use performance grouping (small instruction group) with differentiated learning experiences. When these learning experiences for low-performing students thwart their need for autonomy, teachers might undermine students' motivation and consequently negatively affect their learning. This aligns with studies that suggested teachers differ in their provision of need-supportive teaching (Domen et al., 2020; Reeve, 2009) and could be more controlling and less autonomy-supportive towards low-expectation students (Urhahne, 2015). However, studies investigating to which students teachers are differentiating their practices often look into the link with teachers' expectations (e.g., Hornstra

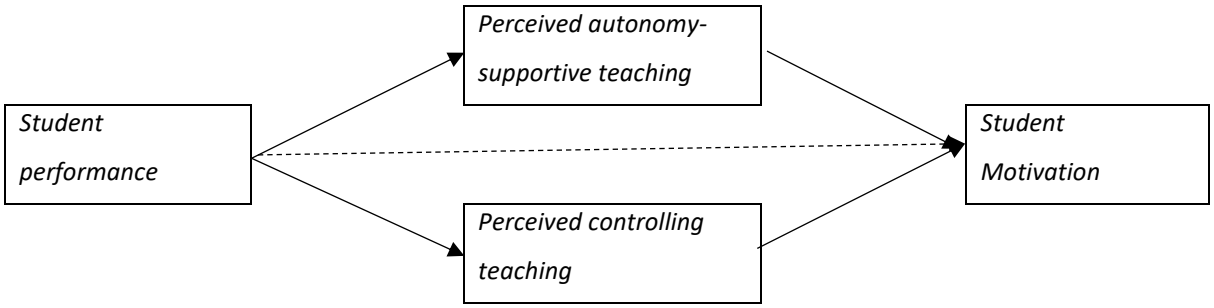
et al., 2018). The present study is unique by using student performances, which is important because this provides a better understanding of the link between actual performance, perceived need supportive teaching, and (a)motivation.

The Present Study

With the present study, we aim to gain insight into what extent lower and higher-performing primary school students differ in their perceived autonomy supportive and controlling teaching and how this relates to amotivation, controlled motivation, and autonomous motivation (see Figure 2).

Figure 2

Research Model of the Relationship Between Performance Level and Students' Motivation Mediated by Perceived Autonomy-Supportive and Controlling Teaching



Note. Student performance will be assessed from math and reading comprehension. For students' motivation, we look at amotivation, extrinsic regulation, introjected regulation, identified regulation, and intrinsic motivation. Covariates: gender and age (not depicted in the model).

Hornstra et al. (2018) showed that when teachers had higher expectations of students, students experienced more need-supportive teaching. In line with this finding, we expect that higher-performing students compared to lower-performing students perceive higher levels of autonomy support and lower levels of control and that these differences exist because of students' performance level (Hypothesis 1).

Furthermore, in line with findings from the study of Haerens et al. (2018) and the study by Vansteenkiste et al. (2020) in which perceived autonomy-support primarily related to autonomous motivation, with need satisfaction mediating this relation, and perceived controlling teaching

primarily to controlled motivation and amotivation, trough need frustration, we expect that the differences in perceived autonomy-supportive and controlling teaching based on performance levels relate to differences in student motivation. Hence, we expect that perceived autonomy-supportive teaching and controlling teaching mediate the relationship between student performance and their motivational outcomes. (Hypothesis 2).

Past research has indicated that motivation can differ between boys and girls (Opdenakker et al., 2021) and between different ages (Gillet et al., 2011). Therefore, we included gender and age as covariates. Thereby, we can examine the hypotheses beyond these background features.

Method

Design and Participants

To test the hypotheses, this study conducted quantitative survey research in upper classes (grades 4 – 6) of primary schools in an urban area in the Netherlands. A power analysis was conducted with G*Power 3.1 (Faul et al., 2007) to determine the sample size needed for this study with a statistical power of .80. Meta-analyses on the effectiveness of perceived autonomy support on motivation showed different effect sizes, such as small effects (Bureau et al.,2021) and medium to large effects (Okada, 2021). In line with the study of Haerens et al. (2015), examining perceived autonomy-supportive and controlling teaching, psychological needs, and motivational outcomes, an small to medium effect size of *f2* = 0. 10 and an alpha level of .05 was used. The power analysis showed that a sample size of at least 100 participants was needed. However, due to the participants' nestedness within classes, the present study consisted of 203 upper-primary school students from 10 classes out of four primary schools to have sufficient variation. The students' mean age was 10.40 years (SD = 1.09; age range 8 – 13 years). 48.8% boys. Students were in grade 4(36.4%), grade 5 (18.2%), or grade 6 (45.5%). Class sizes ranged from 15 to 30 students per class.

Instrumentation

Motivational Outcomes (Dependent Variables)

Motivational outcomes have been measured with existing validated questionnaires. All subscales contained four items and were answered using a five-point Likert scale ranging from totally not applicable to me (1) to totally applicable to me (5). The short version of the Academic Self-Regulation Questionnaire (SRQ-A) (Ryan & Connel, 1989; Dutch translation by Sierens et al., 2009) assessed students' autonomous and controlled motivation. This scale consists of four subscales, intrinsic motivation (e.g., "I like to learn new things"), identified regulation(e.g., "I learn useful things at school"), introjected (e.g., "I want to show I can get good grades") and external regulation (e.g., "I do my schoolwork mainly because I have to"). Integrated regulation was not included due to a lack of discriminant validity (Gagné et al., 2014; Howard et al., 2020). Based on Howard et al. (2020), the subscales for intrinsic motivation and identified regulation were used to asses autonomous motivation, and introjected and external regulation for controlled motivation. Furthermore, the Academic Motivation Scale (Vallerand et al., 1992) was used to assess amotivation. This scale consisted of four items (e.g., "school does not interest me") and was answered using the same 5-point Likert scale.

Confirmative factor analysis (CFAs) were conducted to check the proposed model. Contrary to previous studies(e.g., Domen et al., 2020), the factors autonomous motivation, controlled motivation, and amotivation could not be distinguished well. A CFAs supported a five factor-model representing the subscales intrinsic motivation, identified, introjected, external regulation, and amotivation, $\chi^2(142) = 243.343$, $p < .001$, RMSEA = .059, CFI = .936, TLI = .923, SRMR = .063. One item ("I want my teacher to be satisfied") was removed from the subscale external regulation because a factor analysis revealed it had a low factor loading (.27) and cross-loaded rather strongly (.40) with the subscale identified regulation, and cross-loaded on the subscales intrinsic (.23) and introjected (.24). Because this item is theoretically related to controlled motivation and not to identified, which relates to an autonomous form of motivation, it was decided to remove this item. After checking internal consistency with Cronbach's alphas, another item ("I do my best because I do not want my

teacher to get mad at me") was removed from the subscale external regulation because this significantly improved the reliability (from $\alpha = .64$ to $\alpha = .72$). CFAs without the removed item resulted in a better fit, $\chi^2(125) = 216.726$, $p < .001$, RMSEA = .060, CFI = .941, TLI = .928, SRMR = .058. With a cutoff value of $\alpha = 0.70$ (Streiner, 2003), the internal consistency of the scales was satisfactory to good. For the subscale intrinsic ($\alpha = .86$), identified ($\alpha = .80$), introjected ($\alpha = .69$), extrinsic ($\alpha = .72$), and amotivation ($\alpha = .84$).

Perceived Autonomy-Support and Controlled Teaching (Mediating Variables)

Students perceived autonomy-supportive and controlling teaching were both measured with four items derived from existing questionnaires, the Teacher Social Context Questionnaire (TASCQ; Belmont et al., 1988) and the Teacher Interpersonal Style Questionnaire (TISQ; Leo et al., 2021). Adaptations have been made to update the questionnaire with recent insights about the constructs (see Ahmadi et al., 2022) and align the questionnaire with the target population of the present study (see Appendix A for changes). Perceived autonomy-supportive teaching was assessed with four items adapted from the subscale autonomy-support (e.g., the teacher listens to my ideas") and perceived controlling teaching from the subscale autonomy-thwart (e.g., the teacher always tells me exactly what to do"). To illustrate an adaptation, the item from the TASCQ and TISQ "The teacher takes into account our opinions when designing the lesson" was changed to "The teacher listens to my opinion." All items were answered using a five-point Likert scale ranging from completely not applicable to me (1) to completely applicable to me (5).

CFAs were performed to test whether the questionnaire comprised a two-factor model. However, fit values were not satisfactory, $\chi^2(19) = 107.201$, $p < .001$, RMSEA = .151, CFI = .794, TLI = .697, SRMR = .137. Two items of the latent construct perceived controlling teaching showed problematic loadings. Item "the lesson should always go exactly as the teacher wants" showed a low correlation with the items of the same construct (between .31 and .44), and removing this item raised the reliability from the subscale perceived controlling teaching with Cronbach's alpha from $\alpha =$

.65 to .66. Factor loadings (.47 and .51) of item "The teacher often tells me to do my work differently" did not discriminate between the two latent constructs. As similar items in the study of Haerens et al. (2015) showed problematic loadings on perceived controlling teaching, it was decided to remove these two items. This resulted in a significantly improved model fit, with four items as indicators of the latent variable perceived autonomy-supportive teaching and two items of perceived controlling teaching, $\chi^2(8) = 14.143$, $p < .001$, RMSEA = .062, CFI = .980, TLI = .963, SRMR = .044. Cronbach's alpha for the perceived autonomy-supportive teaching scale was $\alpha = .77$.

Performance Level (Independent Variable)

In the Dutch system, students' math and reading comprehension scores based on the Dutch National Institute of Educational Measurement (CITO) tests are teachers' most significant information for future track recommendations, as these subjects are strong predictors of school success (Korpershoek et al., 2015; Van Aarsen et al., 2013). COTAN, the review system for test quality, showed these tests to be highly reliable ($\alpha > 0.80$; Egberink & Vermeulen, 2015). Therefore, students' most recent CITO math and reading comprehension scores are used. The test results of the CITO are reported as level scores (I = 20% highest scoring students, II = 20% students above the national average, III = 20% average scoring students, IV = 20% under the national average, V = 20% lowest scoring students). The items were reversed so that a high value indicated the same type of response as all items used in the present study (e.g., I = 5, II = 4). All results were obtained from the latest CITO 3.0 version.

Procedure

Schools were recruited from the network of the researcher. Data collection took place in the spring of 2023. The teachers of the participating classes received an introduction explaining the study's purpose, the survey content, how to fill in the questionnaires, and information about how the anonymity of the participants would be guaranteed. Before data collection, a consent procedure was administered to ensure voluntary participation. For each student, passive consent was obtained

from their parents to participate in the present study. One student did not give consent and did not take part in the data collection. After the consent procedure, the data collection took place anonymously. To create an anonymous label for each participant's data, each school received a letter, and each class and participant received a number (e.g., participant A.6.11. = school A, class 6, student number 11). The participating students had to fill in their anonymous labels at the start of the questionnaire. The questionnaire was administered digitally (Chromebook or laptop) using Qualtrics survey software during regular class hours. Teachers were asked to fill in the most recent math and reading comprehension CITO achievement scores. In addition, the students filled in demographic information (age and gender). After that, the students filled in the questionnaire with scales on motivational outcomes (intrinsic, identified, introjected, external, and motivation) and perceived autonomy-supportive and controlling teaching. Some additional questions were asked to the students, for instance, about their self-esteem, as this study was part of a bigger project. The data was stored on the secure Yoda server, and the Ethical Committee of Utrecht University approved the study protocol.

Data Analyses

To examine the hypotheses, we conducted mediation analyses with the Process macro tool version 3.5.3 in SPSS 28 (Hayes, 2017). Before testing the hypothesized model, the data were visually inspected using scatterplots of standardized residuals. Homogeneity of variance and linearity was established, as the scores were randomly scattered and closely resembled a straight line (Field, 2018; Tabachnic & Fidell, 2007). With cutoff values for Tolerance > .20 and variation inflation factor < 10 (Field, 2018), collinearity statistics indicated that multicollinearity was not a concern (Tolerance, >.60; VIF < 2.0). A bell-shaped histogram of standardized residuals indicated that the data contained approximately normally distributed errors (Das, 2016). Probability-Plots of standardized residuals showed points not entirely on the line but close, indicating normally distributed data (Healy et al., 1984).

Using a bootstrapping resampling procedure, we tested the hypotheses by conducting mediation analyses with each outcome variable (amotivation, external, introjected, identified, intrinsic) in their relationship with students' math and reading comprehension performance. Age and gender were included in the models as covariates. Bootstrapping entails repeatedly sampling from the data set and estimating the indirect effect (effect of student performance on the motivational outcomes through the mediators) in each resampled dataset. As Preacher & Hayes (2004) recommended, we used 5000 bootstrapped samples, which provided estimates with a confidence interval of sampling distributions of the indirect effects. If the 95% confidence interval does not contain zero, we determined that the indirect effect is statistically significantly different from zero at $p < .05$ and that mediation occurs. In addition, the hypotheses were evaluated by examining the significance and direction of the various paths and inspection of model fit. Model fit was tested using RStudio (RCore Team, 2022) by using the Chi-square test, the RMSEA, the comparative fit index (CFI), and the standardized root mean square residual (SRMR). RMSEA < .05 indicates a good fit, scores between .05 and .08 reasonable fit, and scores above .10 poor fit. A CFI > .90 indicates an acceptable fit, and above .95 indicates a good fit of a model. SRMR value < .08 indicates a good fit (Kline, 2010). Finally, the standardized coefficients of the relations were examined to assess the strength of the effects. Standardized estimates of .10 are considered a small effect, .30 medium, and .50 large effect (Cohen, 1990).

Results

Descriptive Statistics and Correlations

Table 1 shows the descriptive statistics of the study variables. A high score represents a high level of the construct on a 1 to 5 scale. The correlations among the study variables are presented in Table 2. The correlation table indicates a positive correlation between math and reading comprehension test scores and no significant correlations with motivational outcomes, except for a negative correlation between reading comprehension test scores and students' external regulation.

Table 1

Descriptive Statistics of Study Variables

	N	*M*	SD	Min	Max
Perceived autonomy support	203	3.55	0.78	1.00	5.00
Perceived controlling teaching	203	3.32	0.94	1.00	5.00
Amotivation	203	1.97	0.95	1.00	5.00
External regulation	203	2.39	1.03	1.00	5.00
Introjected regulation	203	3.92	0.72	1.75	5.00
Identified regulation	203	4.34	0.68	1.00	5.00
Intrinsic motivation	203	4.00	0.80	1.00	5.00
Math performance	201	3.59	1.35	1.00	5.00
Reading comprehension	203	3.32	1.35	1.00	5.00

As expected, perceived autonomy supportive teaching positively correlated with students' performance (test scores) and autonomous forms of motivation and negatively with controlled forms of motivation, except for a positive correlation with introjected regulation. Contrary to expectations, perceived controlling teaching was not correlated with students' performance and positively correlated with identified regulation and perceived autonomy support. As shown in Table 2, the direction of the correlations between the various aspects of motivation was mostly in line with SDT.

Mediation Analyses

The results are presented per outcome variable. First, a figure will be displayed with the unstandardized coefficients of the various paths. Secondly, the significance of the various paths will be described. Following, a conclusion will be drawn about the hypotheses. Lastly, the bootstrap point estimates and confidence intervals with their unstandardized coefficients of the total, direct, and indirect effects will be summarized in a table.

Table 2

Correlations of the Study Variables

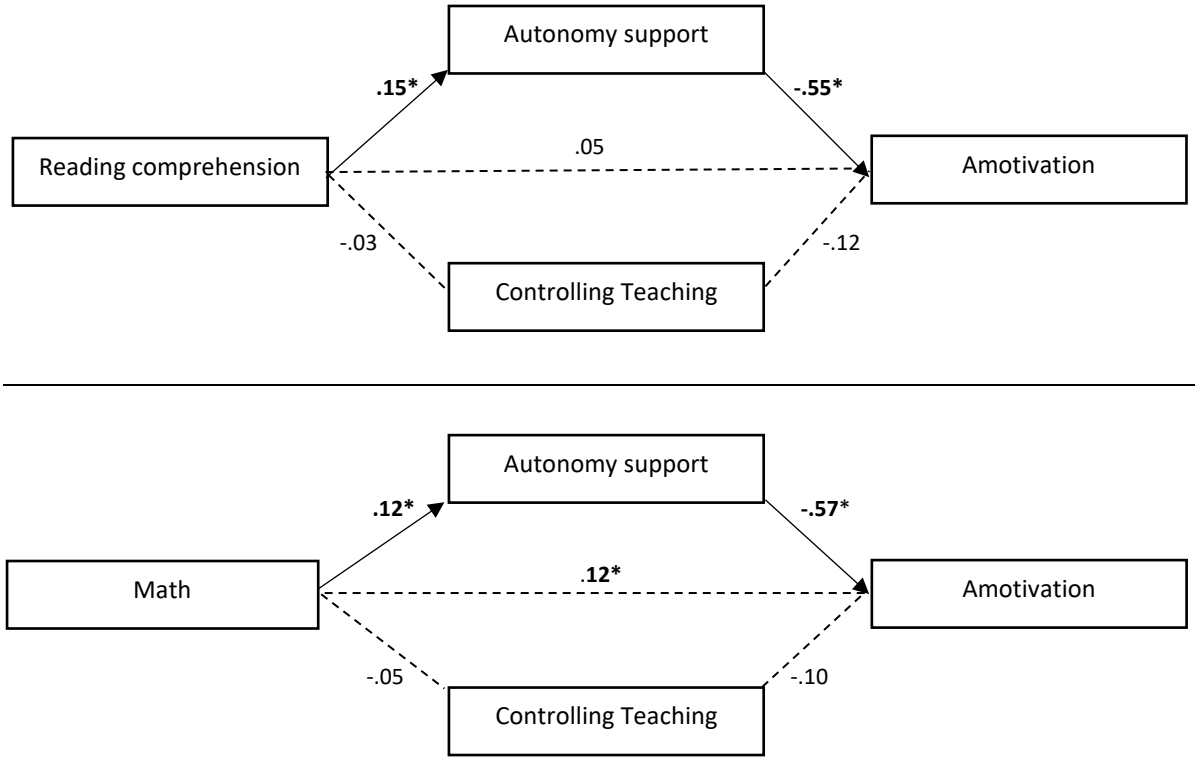
	1	2	3	4	5	6	7	8	9
1. Age									
2 Reading comprehension	.01								
3 Math	-.11	.58**							
4 Intrinsic motivation	-.09	.00	.08						
5 Identified regulation	-.06	.02	-.03	.45**					
6 Introjected regulation	-.21**	-.09	.06	.27**	.25**				
7 External regulation	.22**	-.19**	-.06	-.25**	-.45**	-.19**			
8 Amotivation	.05	-.03	.09	-.40	-.61**	-.22**	.53**		
9 Autonomy support	-.05	.25**	.21**	.24**	.38**	.15*	-.32**	-.43**	
10 Controlling teaching	.00	-.05	-.04	.03	.16*	.12	-.12	-.17*	.18*

Note. *p < .05 level (2-tailed). ** p < 0.01 (2-tailed).

Amotivation

Figure 3

Unstandardized Estimates of the Path Model in the Relationship with Amotivation



Note. Covariates are not depicted. The dotted lines represent non-significant relations. * $p < .01$.

The total effect of reading comprehension and math test scores on amotivation was non-significant. When controlling for the mediators, the direct effect was non-significant in the relationship with reading comprehension and significant (positively) with math. Significant direct positive relations were found between students' test scores and students' perceived autonomy-supportive teaching and direct negative relations between perceived autonomy-supportive teaching and amotivation. No significant direct relations were found between students' test scores and perceived controlling teaching and amotivation. However, the results revealed that an indirect negative effect through perceived autonomy support was significant. Given that the direct path from math test scores was significant, this indicates that the association between math test scores and amotivation was partly mediated by students' perceived autonomy-supportive teaching. The non-

significant direct path between reading comprehension test scores and amotivation suggested that students' perceived autonomy-supportive teaching fully mediated this association. The standardized indirect effects were - .07 (reading comprehension) and -. 09 (math). Both effects can be considered small effects. No significant indirect effects were found through perceived controlling teaching. Thereby, the findings supported Hypothesis 1 and partly Hypothesis 2 for perceived autonomy-supportive teaching and not for controlling teaching.

Table 3

Bootstrap Point Estimates and Confidence Intervals (CI) for Perceived Autonomy-Supportive and Controlling Teaching as Mediators in the Relationship Between Student Performance and Amotivation (5000 bootstrap samples; 95% confidence interval; unstandardized coefficients)

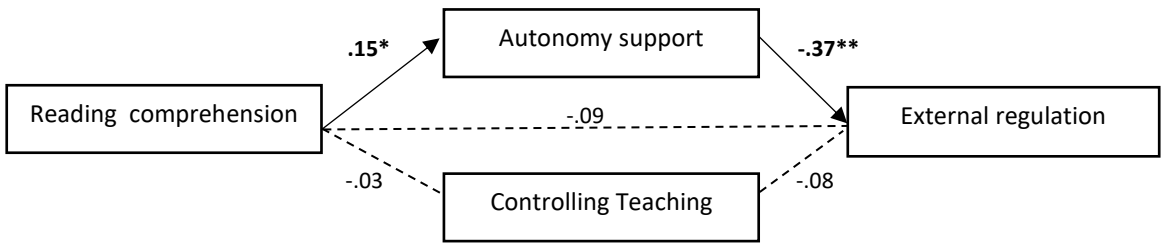
		Effect	Boot SE	LLCI	ULCI
Total effect	RC - A	-.03	.05	-.127	.074
Direct effect	RC - A	.05	.05	-.038	.147
Total effect	M – A	.06	.05	-.040	.163
Direct effect	M -A	.12	.05	.031	.214
Indirect effect	RC – AS - A	-.08	.03	-.143	-.035
Indirect effect	M – AS – A	-.07	.02	-.115	-.023
Indirect effect	R – CT - A	.00	.01	-.009	.021
Indirect effect	M – CT - A	.01	.01	-.005	.025

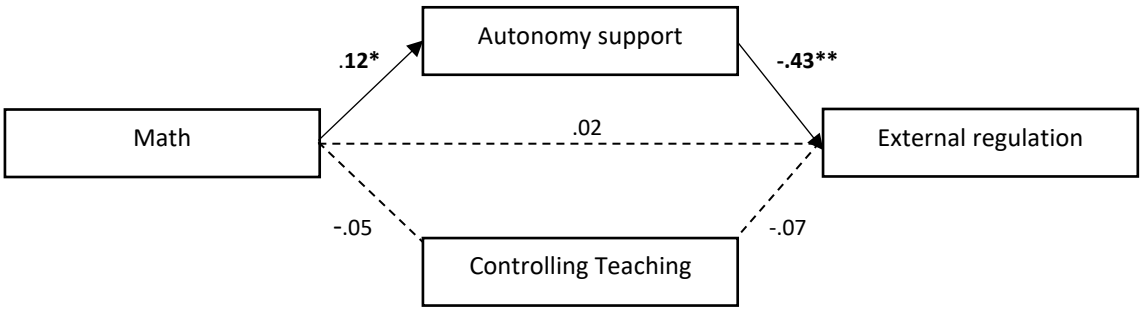
Note. RC = reading comprehension, M = math; PAS = perceived autonomy support, PCT = perceived controlling teaching; A = amotivation.

External Regulation

Figure 4

Unstandardized Estimates of the Path Model in the Relationship with External regulation





Note. Covariates are not depicted. The dotted lines represent nonsignificant relations. * $p < .01$. ** $p < .001$.

The total effect of reading comprehension test scores on students' external regulation showed a significantly negative relationship, and for math test scores, a non-significant relationship. When controlling for the mediators, the direct effect was non-significant in the relationship with students' reading comprehension and math test scores. Significant direct positive relations were found between students' test scores and students' perceived autonomy-supportive teaching and direct negative relations between perceived autonomy-supportive teaching and external regulation. No significant direct relations were found between students' test scores, perceived controlling teaching, and external regulation. However, analyses revealed a significant indirect negative association from students' test scores on external regulation via perceived autonomy-supportive teaching. Given that the direct paths were non-significant, the results suggest that students' perceived autonomy-supportive teaching fully mediated the association between students' test scores and external regulation. The standardized indirect effects were -.07 and - .06, associated with reading comprehension and math test scores, respectively. Both effects can be considered small effects. No significant indirect effects were found through perceived controlling teaching. Hence, the findings supported Hypothesis 1 and 2 for perceived autonomy-supportive teaching and not for controlling teaching.

Table 4

Bootstrap Point Estimates and Confidence Intervals (CI) for Perceived Autonomy-Supportive and Controlling Teaching as Mediators in the Relationship Between Student Performance and External Regulation (5000 bootstrap samples; 95% confidence interval; unstandardized coefficients)

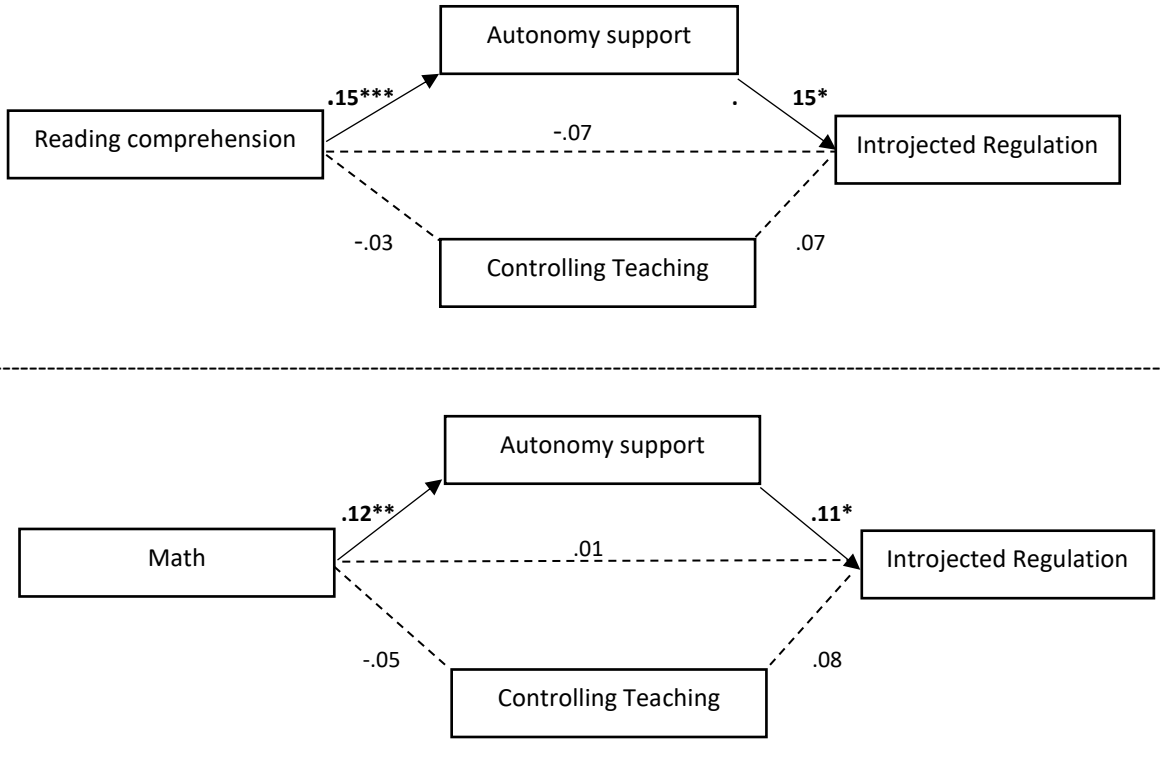
		Effect	Boot SE	LLCI	ULCI
Total effect	RC - E	-.15	.05	-.253	-.046
Direct effect	RC – E	-.09	.05	-.198	.008
Total effect	M – E	-.02	.05	-.132	.083
Direct effect	M -E	.02	.05	-.083	.126
Indirect effect	RC – AS - E	-.06	.02	-.107	-.020
Indirect effect	M – AS - E	-.05	.02	-.094	-.013
Indirect effect	R – CT - E	.00	.01	-.009	.018
Indirect effect	M – CT - E	.00	.01	-.007	.019

Note. RC = reading comprehension, M = math; PAS = perceived autonomy support, PCT = perceived controlling teaching; E = external regulation.

Introjected Regulation

Figure 5

Unstandardized Estimates of the Path Model in the Relationship with Introjected Regulation



Note. Covariates are not depicted. The dotted lines represent nonsignificant relations. * $p < .05$. ** $p < .01$. *** $p < .001$.

The total effect of the test scores on students' introjected regulation showed no significant relationships. The direct effects with the inclusion of the mediators were non-significant. Significant direct positive relations were found between students' test scores, perceived autonomy-supportive teaching, and introjected regulation. No significant direct relations were found between students' test scores, perceived controlling teaching, and external regulation. Moreover, no significant indirect relations existed between students' test scores and introjected regulation. Hence, the results supported the first hypothesis for perceived autonomy-supportive teaching and not for controlling teaching. Hypothesis 2 could not be confirmed regarding introjected regulation.

Table 5

Bootstrap Point Estimates and Confidence Intervals (CI) for Perceived Autonomy-Supportive and Controlling Teaching as Mediators in the Relationship Between Student Performance and Introjected Regulation (5000 bootstrap samples; 95% confidence interval; unstandardized coefficients

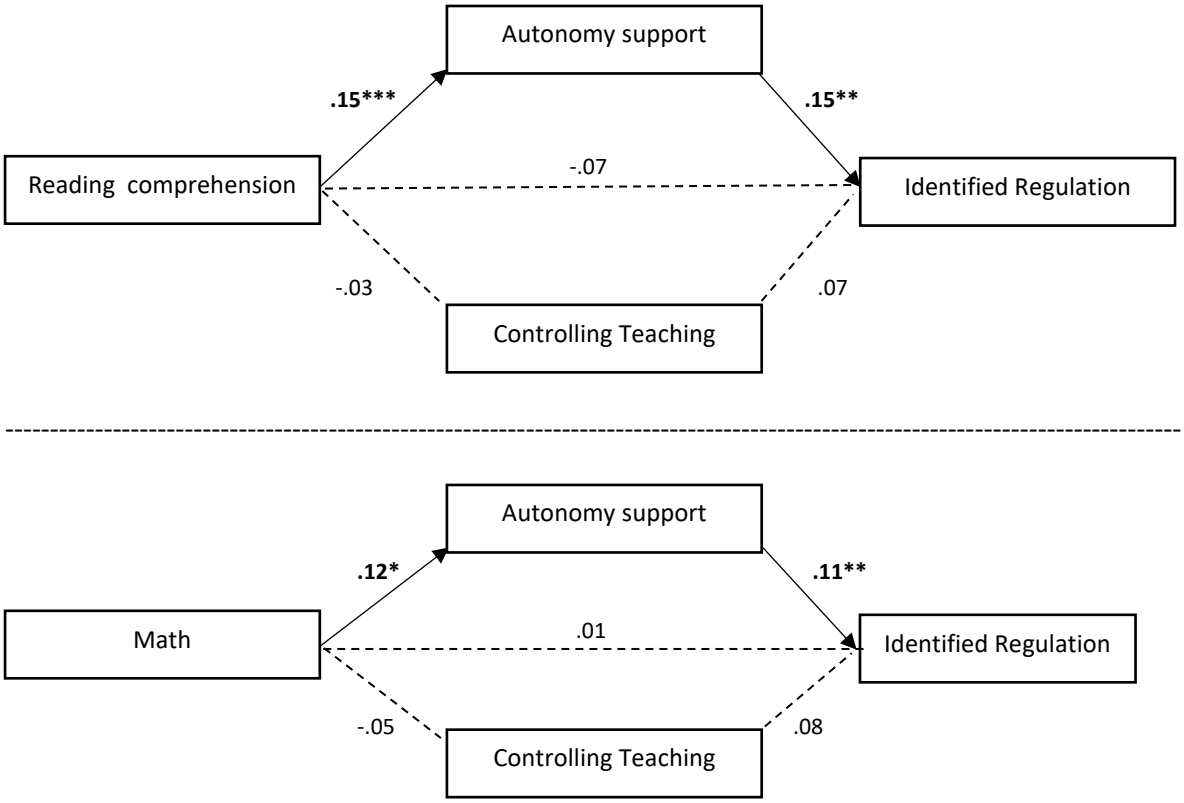
		Effect	Boot SE	LLCI	ULCI
Total effect	RC – IN	-.05	.04	-.121	.026
Direct effect	RC – IN	-.07	.04	-.143	.008
Total effect	M – IN	.02	.04	-.054	.096
Direct effect	M -IN	.01	.04	-.064	.088
Indirect effect	RC – AS - IN	.02	.01	-.001	.050
Indirect effect	M – AS - IN	.01	.01	-.006	.036
Indirect effect	R – CT - IN	-.00	.01	-.015	.007
Indirect effect	M – CT - IN	-.00	.01	-.017	.005

Note. RC = reading comprehension, M = math; PAS = perceived autonomy support, PCT = perceived controlling teaching; IN = introjected regulation

Identified Regulation

Figure 6

Unstandardized Estimates of the Path Model in the Relationship with Identified Regulation



Note. Covariates are not depicted. Dotted lines represent nonsignificant relations. * $p < .01$. ** $p = < .05$.*** $p < .001$.

The total effect of students' test scores on identified regulation was non-significant. When controlling for the mediators, the direct effect was non-significant in the relationship with students' test scores. Significant direct positive relations were found between students' test scores, perceived autonomy-supportive teaching, and identified regulation. No significant direct relations were found between students' test scores, perceived controlling teaching, and external regulation. Furthermore, the findings indicated significant indirect positive relations through perceived autonomy-supportive teaching. Given that the direct paths were non-significant, the results suggested that the association between students' test scores and identified regulation was fully mediated by students' perceived

autonomy-supportive teaching. The standardized indirect effect was .10 (reading comprehension) and .08 (math). These are considered small effects. The indirect effects through students' perceived controlling teaching were non-significant. Hence, the findings supported both hypotheses for perceived autonomy-supportive teaching and not for perceived controlling teaching.

Table 6

Bootstrap Point Estimates and Confidence Intervals (CI) for Perceived Autonomy-Supportive and Controlling Teaching as Mediators in the Relationship Between Student Performance and Identified Regulation (5000 bootstrap samples; 95% confidence interval; unstandardized coefficients

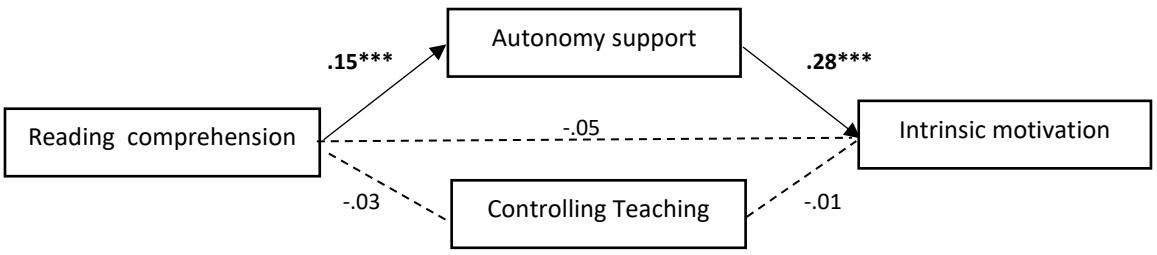
		Effect	Boot SE	LLCI	ULCI
Total effect	RC – ID	.02	.04	-.053	.089
Direct effect	RC – ID	-.03	.03	-.098	.039
Total effect	M – ID	-.02	.04	-.088	.057
Direct effect	M -ID	-.05	.03	-.119	.018
Indirect effect	RC – AS – ID	.05	.02	.020	.087
Indirect effect	M – AS - ID	.04	.02	.011	.071
Indirect effect	RC – CT - ID	-.00	.01	-.016	.007
Indirect effect	M – CT - ID	-.00	.01	-.018	.005

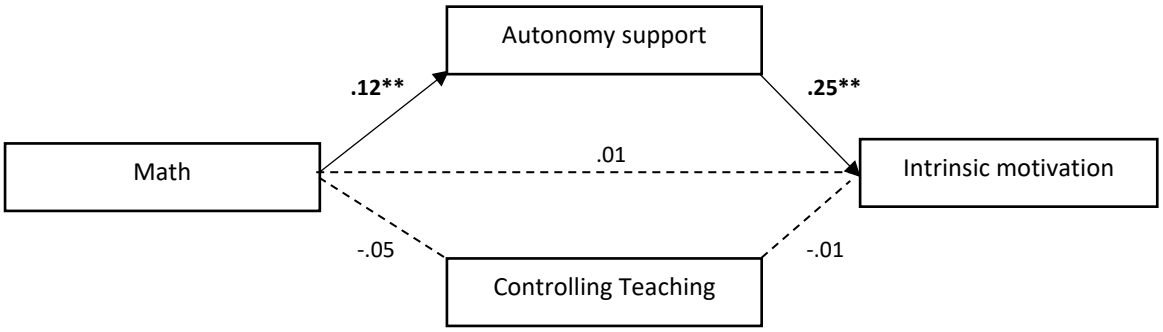
Note. RC = reading comprehension, M = math; PAS = perceived autonomy support, PCT = perceived controlling teaching; ID= identified regulation.

Intrinsic Motivation

Figure 7

Unstandardized Estimates of the Path Model in the Relationship with Intrinsic Motivation





Note. Covariates are not depicted. The dotted lines represent nonsignificant relations. * $p < .01$. ** $p = < .05$.*** $p < .001$.

The total effect of students' test scores on intrinsic motivation was non-significant. When including the mediators, the direct effect also showed non-significant relationships between students' test scores and intrinsic motivation. Significant direct positive relations were found between students' test scores, perceived autonomy-supportive teaching, and intrinsic motivation. No significant direct relations were found between students' test scores, perceived controlling teaching, and intrinsic motivation. However, significant indirect positive relations were found from students' test scores on intrinsic motivation via perceived autonomy-supportive teaching. Because the direct paths were non-significant, the results suggest that students' perceived autonomy-supportive teaching fully mediated the association between students' performance and intrinsic motivation. The standardized indirect effect was .07 for the relationship with reading comprehension and .05 with math test scores. These are considered small effects. The indirect effects through students' perceived controlling teaching were non-significant. Therefore, these findings supported the hypotheses for the relationships with perceived autonomy-supportive teaching and not for perceived controlling teaching.

Table 7

Bootstrap Point Estimates and Confidence Intervals (CI) for Perceived Autonomy-Supportive and Controlling Teaching as Mediators in the Relationship Student Performance and Intrinsic Motivation(5000 bootstrap samples; 95% confidence interval; unstandardized coefficients

		Effect	Boot SE	LLCI	ULCI
Total effect	RC – I	-.00	.04	-.087	.081
Direct effect	RC – I	-.05	.04	-.131	.040
Total effect	M – I	.04	.04	-.047	.124
Direct effect	M -I	.01	.04	-.077	.095
Indirect effect	RC – AS – I	.04	.02	.015	.074
Indirect effect	M – AS – I	.03	.01	.007	.057
Indirect effect	RC – CT - I	.00	.00	-.009	.010
Indirect effect	M – CT - I	.00	.00	-.010	.011

Note. RC = reading comprehension, M = math; PAS = perceived autonomy support, PCT = perceived controlling teaching; I = intrinsic motivation.

Covariates, age, and gender

A significant and negative correlation existed between gender and math performance (r = -.17, p < .05). However, in the path model, there were no significant differences in the results for gender. The analyses revealed a significant negative relationship between age and introjected regulation with (reading comprehension: b = -.12, p = < .01; math: b = -.12, p = < .01) and without the mediators (reading comprehension: b = -.13, p < .01; math: -.13, p < .01), suggesting that students age associated negatively with introjected regulation. Moreover, a significant positive relationship between age and external regulation existed with (reading comprehension: b = .19, p < .01; math: b = .19, p < .01) and without the mediators (reading comprehension: b = .21, p < .01; math: b = .21, p < .01), suggesting that students' age positively relates to external regulation.

Overall, the results suggested that students' performance was positively related to students' levels of perceived autonomy-supportive teaching, which were related to differences in motivational outcomes. Furthermore, students' perceived autonomy-supportive teaching mediated the association between students' performance and intrinsic, identified, external, and amotivation

(math) fully, and amotivation (reading comprehension) partly. Therefore, we conclude that Hypothesis 1 is confirmed for autonomy-supportive teaching, not for controlling teaching. Hypothesis 2 is partly confirmed for the relationship with perceived autonomy-supportive teaching and not for perceived controlling teaching. The effect sizes of the indirect relations indicated small effect sizes.

Discussion

This study examined whether student performance differences were associated with students' perceived autonomy-supportive and controlling teaching and motivation in primary education. The present findings add to SDT research on need support by revealing that students' performance levels may affect the levels of autonomy support that teachers provide to different students. Below, the results are described in further detail.

In line with our expectations, based on the study of Hornstra et al. (2018), which showed that higher teacher expectations were associated with higher levels of perceived autonomy support, the findings of the present study suggested that differences in students' performance were related to the level of students' perceived autonomy-supportive teaching; that is, an increase in performance related to an increase in perceived autonomy-supportive teaching. Moreover, the findings suggested that students' perceived autonomy-supportive teaching mediated the relationship between student performance and several motivational outcomes. These findings are worrisome because the psychological need for autonomy is universal (Ryan & Deci, 2000), and the results suggested that low-performing students' need for autonomy is thwarted.

The differences in perceived autonomy support may come from how teachers shape instruction to adapt to students' educational needs (van Vijfeijken et al., 2023). The results from our study imply that this adaptation is based on the level of students' performance. This could, in fact, suggest that the instructional method that teachers use to adapt to the educational needs of students with differential performances affects students' perceived autonomy support. This aligns

with previous research indicating that the method of instruction relates to differences in motivation between students (Hänze & Berger, 2007). Additional research could provide more insight by examining whether there is a trade-off between the instructional method and students' perceived autonomy-supportive and controlling teaching and how this relates to students' motivation (e.g., direct instruction approaches with ability grouping compared to Montessori educational approaches).

In line with previous studies (Haerens et al., 2018; Vansteenkiste et al., 2020), our findings suggested that students' perceived autonomy-supportive teaching was positively related to students' autonomous forms of motivation (identified regulation, intrinsic motivation) and mostly negatively to controlled forms of motivation (external regulation) and amotivation. These findings imply the importance of teachers providing high and equal autonomy support to students. Yet, our results suggested that higher levels of students' perceived autonomy support increased their introjected regulation in the relationship with reading comprehension. A possible explanation is that we used approach-oriented items and no avoidance-oriented items. SDT posit that introjected regulation contains both approach and avoidance components (Ryan & Deci, 2000). It seems plausible that the students could not report their introjected regulation accurately because the avoidance items were not represented in the measurement.

In addition, we expected that perceived controlling teaching would mediate the relationship between students' performance and their motivational outcomes. However, we did not find significant relationships between perceived controlling teaching and students' performance and motivation. Prior research suggested that controlling teaching does not occur automatically when autonomy-supportive behavior is absent (Bartholomew et al., 2018). Our study showed a small but significant positive correlation between perceived autonomy-supportive and controlling teaching (r = .18, p < .05). Perceived controlling teaching should be assessed separately. However, in the present study, only two items, 'the teacher always tells me what to do' and 'the teacher always tells me how

to behave,' were used to measure perceived controlling teaching. These items primarily focus on a teacher-prescribed way of delivering expectations on what to do and how to behave, which can be followed by autonomy-supportive practices. Therefore, future research could examine the associations using items that capture the entire construct of perceived controlling teaching, for example, by adding items measuring power-assertive strategies (i.e., perceived threats of punishment) and guilt-inducing strategies (i.e., perceived expressions of disappointment) (Bartholomew et al., 2018).

Finally, we found an unexpected direct positive relationship between math performance and amotivation. Although prior research suggests that students' performance relates to autonomous forms of motivation (Taylor et al., 2014), SDT may provide an explanation. To obtain autonomous forms of motivation, students ideally have to experience autonomy in combination with competence need satisfaction (Vansteenkiste et al., 2009). High math achievers may not be challenged enough in accordance with their ability level, which thwarts their competence need satisfaction. This aligns with the study of Wang et al. (2022), who suggested that competence satisfaction is more important than the need for autonomy and relatedness in mathematics education. Hence, high levels of autonomy support without competence need support may not be sufficient to fulfill the needs of high math achievers. Therefore, including all need-supportive variables in future research may help to understand how to support lower and higher-performing (math) students' motivation.

Implications for Research and Practice

The findings of this research supported the idea that students' perceived autonomy support plays a mediating role between students' performance and motivation. This suggests that students' performance may help to explain differences in perceived autonomy support and motivation. Therefore an important implication for research that examines the role of autonomy-supportive and controlling teaching and its relation with motivation is to include student performance more often as a study variable.

Second, this study has shown that higher levels of student performance were related to higher levels of perceived autonomy-supportive teaching. These findings suggested, supported by prior studies on teachers' differentiated need support (Domen et al., 2020; Hornstra et al., 2015), that teachers provided more autonomy support to higher-performing students. Although lower-performing students may need more help and guidance during learning, SDT posits that it is important that teachers do this in an autonomy-supportive way (Reeve & Cheon, 2021). These findings also suggested that teachers find it difficult to adapt their teaching practice to the ability level of students and, at the same time, support their need for autonomy. Teachers could be supported in developing the necessary skills to provide high and equal autonomy support and avoid using controlling teaching behaviors. This may involve teacher training programs that combine effective didactical and autonomy-supportive strategies. Prior research has shown that teacher training programs on autonomy support positively affect teaching and student motivation (Su & Reeve, 2011). In addition, building an 'autonomy supportive pedagogical design' incorporating research features on effective didactics and motivation could be extra relevant for teachers in academically diverse classes.

Limitations and Future Research

Several limitations of the present study should be noted. First, the present study's cross-sectional design could not establish causal inferences. Second, we used shortened scales of existing measures, which may cover only some of the range of the constructs. As already noted, this could have affected the introjected and perceived controlling teaching scale. However, shortened scales could be an advantage when administering questions to children, such as in the present study. Third, we did examine the potential influence of students' lesson-specific perceived autonomy-supportive and controlling teaching between math and reading comprehension. Research suggests that teachers can have lesson-specific autonomy support, and motivational results may differ if subject domains are compared (Marsh et al., 2015; Tsai et al., 2008). Therefore, it would be

interesting to examine the role of the subject domain in future research. Fourth, the instructional approach, such as a lecture-based approach or active learning approach, was not included, as the present study focused on the role of students' performance. Active and collaborative approaches may offer higher levels of autonomy support. It would be interesting to extend the research by investigating how an instructional approach may affect the levels of lower and higher-performing students' perceived autonomy-supportive and controlling teaching.

Finally, the measures of the present study were self-report scales, which have potential desirability bias. Future research that includes multiple informants (e.g., teachers, peers) could add to the understanding of the role of students' perceived autonomy-supportive and controlling teaching between lower- and higher-performing students.

Conclusion

The present study extended the body of work which addresses students' performance as a variable in motivational research. The findings indicated a mediating role of students' perceived autonomy-supportive teaching between students' performance and the quality of their motivation. This type of research is important if we want to understand the relationships between need-supportive teaching behavior and student motivation. The results suggested that higher performance relates to higher levels of perceived autonomy-supportive teaching and autonomous forms of motivation. Overall, these findings imply that interventions to support students' motivation should focus on providing high and equal autonomy support and avoiding controlling teaching behaviors. Teaching training programs that combine didactical and motivational knowledge could help teachers to support students' motivation regardless of their performance level.

References

Ahmadi, A., Noetel, M., Parker, P. D., Ryan, R. M., Ntoumanis, N., Reeve, J., Beauchamp, M. R., Dicke, T., Yeung, A. S., Ahmadi, M., Bartholomew, K. J., Chiu, T. K. F., Curran, T., Erturan, G., Flunger, B., Frederick, C. M., Froiland, J. M., González-Cutre, D., Haerens, L., . . . Lonsdale, C. (2023). A classification system for teachers' motivational behaviors recommended in self-determination theory interventions. *Journal of Educational Psychology*. https://doi.org/10.1037/edu0000783

Amoura, C., Berjot, S., Gillet, N., Caruana, S., Cohen, J. E., & Finez, L. (2015). Autonomy-Supportive and Controlling Styles of Teaching. *Swiss Journal of Psychology*, *74*(3), 141–158. https://doi.org/10.1024/1421-0185/a000156

Arens, A. K., Marsh, H. W., Pekrun, R., Lichtenfeld, S., Murayama, K., & vom Hofe, R. (2017). Math selfconcept, grades, and achievement test scores: Long-term reciprocal effects across five waves and three achievement tracks. Journal of Educational Psychology, 109(5), 621–634. https://doi.org/10.1037/ edu0000163

Balaguer, I., González, L., Fabra, P., Castillo, I., Mercé, J., & Duda, J. L. (2012). Coaches' interpersonal style, basic psychological needs and the well- and ill-being of young soccer players: A longitudinal analysis. *Journal of Sports Sciences*, *30*(15), 1619–1629. https://doi.org/10.1080/02640414.2012.731517

Banerjee, R., & Halder, S. (2021). Amotivation and influence of teacher support dimensions: A self-determination theory approach. *Heliyon*, *7*(7), e07410. https://doi.org/10.1016/j.heliyon.2021.e07410

Bartholomew, K. J., Ntoumanis, N., Mouratidis, A., Katartzi, E., Thøgersen-Ntoumani, C., & Vlachopoulos, S. (2018). Beware of your teaching style: A school-year long investigation of controlling teaching and student motivational experiences. *Learning and Instruction*, *53*, 50–63. https://doi.org/10.1016/j.learninstruc.2017.07.006

Belmont, M., Skinner, E., Wellborn, J., & Connell, J. (1988). *Teacher as social context: A measure of student perceptions of teacher provision of involvement, structure, and autonomy support* (technical Report). Rochester, NY: University of Rochester.

Bennett, K., & Offord, D. R. (2001b). Conduct disorder: can it be prevented? *Current Opinion in Psychiatry*, *14*(4), 333–337. https://doi.org/10.1097/00001504-200107000-00016

Bohlmann, N. L., & Weinstein, R. S. (2013). Classroom context, teacher expectations, and cognitive level: Predicting children's math ability judgments. *Journal of Applied Developmental Psychology*, *34*(6), 288–298. https://doi.org/10.1016/j.appdev.2013.06.003

Brandenberger, C., Hagenauer, G., & Hascher, T. (2018). Promoting students' self-determined motivation in maths: results of a 1-year classroom intervention. *European Journal of Psychology of Education*, *33*(2), 295–317. https://doi.org/10.1007/s10212-017-0336-y

Bureau, J. S., Howard, J. L., Chong, J. X. Y., & Guay, F. (2021). Pathways to student motivation: A meta-analysis of antecedents of autonomous and controlled motivations. *Review of Educational Research*, *92*(1), 46–72. https://doi.org/10.3102/00346543211042426

Burnette, J. L., O'Boyle, E. H., VanEpps, E. M., Pollack, J. M., & Finkel, E. J. (2013). Mind-sets matter: A meta-analytic review of implicit theories and self-regulation. *Psychological Bulletin*, *139*(3), 655–701. https://doi.org/10.1037/a0029531

Cheon, S. H., & Reeve, J. (2015b). A classroom-based intervention to help teachers decrease students' amotivation. *Contemporary Educational Psychology*, *40*, 99–111. https://doi.org/10.1016/j.cedpsych.2014.06.004

Cheon, S. H., Reeve, J., & Marsh, H. W. (2023). Autonomy-supportive teaching enhances prosocial and reduces antisocial behavior via classroom climate and psychological needs: A multilevel randomized control intervention. *Journal of Sport & Exercise Psychology*, *45*(1), 26–40. https://doi.org/10.1123/jsep.2021-0337

Cohen, J. (1990). Statistical power analysis for the behavioral sciences. *Computers, Environment and Urban Systems*, *14*(1), 71. https://doi.org/10.1016/0198-9715(90)90050-4

Das, K. R. (2016b). A brief review of tests for normality. *American Journal of Theoretical and Applied Statistics*, *5*(1), 5. https://doi.org/10.11648/j.ajtas.20160501.12

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227–268. https://doi.org/10.1207/s15327965pli1104_01

De Meyer, J., Tallir, I. B., Soenens, B., Vansteenkiste, M., Aelterman, N., Van Den Berghe, L., Speleers, L., & Haerens, L. (2014). Does observed controlling teaching behavior relate to students' motivation in physical education? *Journal of Educational Psychology*, *106*(2), 541–554. https://doi.org/10.1037/a0034399

Domen, J., Hornstra, L., Weijers, D., Veen, I., & Peetsma, T. (2020). Differentiated need support by teachers: Student-specific provision of autonomy and structure and relations with student motivation. *British Journal of Educational Psychology*, *90*(2), 403–423. https://doi.org/10.1111/bjep.12302

Egberink, I. J. L., Janssen, N. A. M., & Vermeulen, C. S. M. (2015). *COTAN Documentatie*. Boom Test Uitgevers.

Faul, F., Erdfelder, E., Lang, A., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175–191. https://doi.org/10.3758/bf03193146

Field, A. (2018). *Discovering statistics using IBM SPSS statistics*. SAGE Publications Limited.

Gagné, M., Forest, J., Vansteenkiste, M., Crevier-Braud, L., Van Den Broeck, A., Aspeli, A. K., Bellerose, J., Benabou, C., Chemolli, E., Güntert, S. T., Halvari, H., Indiyastuti, D. L., Johnson, P. A., Molstad, M. H., Naudin, M., Ndao, A., Olafsen, A. H., Roussel, P., Wang, Z., & Westbye, C. (2014). The multidimensional work motivation scale: Validation evidence in seven

languages and nine countries. *European Journal of Work and Organizational Psychology*, *24*(2), 178–196. https://doi.org/10.1080/1359432x.2013.877892

Gillet, N., Vallerand, R. J., & Lafrenière, M. a. K. (2011). Intrinsic and extrinsic school motivation as a function of age: the mediating role of autonomy support. *Social Psychology of Education*, *15*(1), 77–95. https://doi.org/10.1007/s11218-011-9170-2

Guay, F. (2021). Applying self-determination theory to education: Regulations types, psychological needs, and autonomy supporting behaviors. *Canadian Journal of School Psychology*, *37*(1), 75–92. https://doi.org/10.1177/08295735211055355

Haerens, L., Aelterman, N., Vansteenkiste, M., Soenens, B., & Van Petegem, S. (2015). Do perceived autonomy-supportive and controlling teaching relate to physical education students' motivational experiences through unique pathways? Distinguishing between the bright and dark side of motivation. *Psychology of Sport and Exercise*, *16*, 26–36. https://doi.org/10.1016/j.psychsport.2014.08.013

Haerens, L., Vansteenkiste, M., De Meester, A., Delrue, J., Tallir, I., Broek, G. V., Goris, W., & Aelterman, N. (2018). Different combinations of perceived autonomy support and control: identifying the most optimal motivating style. *Physical Education and Sport Pedagogy*, *23*(1), 16–36. https://doi.org/10.1080/17408989.2017.1346070

Hänze, M., & Berger, R. (2007). Cooperative learning, motivational effects, and student characteristics: An experimental study comparing cooperative learning and direct instruction in 12th grade physics classes. *Learning and Instruction*, *17*(1), 29–41. https://doi.org/10.1016/j.learninstruc.2006.11.004

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis, second edition: A regression-based approach*. Guilford Publications.

Healy, M. J. R., Chambers, J. M., Cleveland, W. H., Kleiner, B. M., & Tukey, P. A. (1984). Graphical methods for data analysis. *Journal of the Royal Statistical Society*, *147*(3), 513. https://doi.org/10.2307/2981587

Heyder, A., Weidinger, A. F., Cimpian, A., & Steinmayr, R. (2020). Teachers' belief that math requires innate ability predicts lower intrinsic motivation among low-achieving students. *Learning and Instruction*, *65*, 101220. https://doi.org/10.1016/j.learninstruc.2019.101220

Hornstra, L., Mansfield, C., Van Der Veen, I., Peetsma, T., & Volman, M. (2015). Motivational teacher strategies: the role of beliefs and contextual factors. *Learning Environments Research*, *18*(3), 363–392. https://doi.org/10.1007/s10984-015-9189-y

Hornstra, L., Stroet, K., van Eijden, E., Goudsblom, J., & Roskamp, C. (2018). Teacher expectation effects on need-supportive teaching, student motivation, and engagement: a self-determination perspective. *Educational Research and Evaluation*, *24*(3–5), 324–345. https://doi.org/10.1080/13803611.2018.1550841

Howard, J. L., Bureau, J., Guay, F., Chong, J. X. Y., & Ryan, R. M. (2021). Student motivation and associated outcomes: A meta-Analysis from self-determination theory. *Perspectives on Psychological Science*, *16*(6), 1300–1323. https://doi.org/10.1177/1745691620966789

Howard, J. L., Gagné, M., & Morin, A. J. S. (2020). Putting the pieces together: reviewing the structural conceptualization of motivation within SDT. *Motivation and Emotion*, *44*(6), 846–861. https://doi.org/10.1007/s11031-020-09838-2

Inspectorate of Education. (2019). *De staat van het onderwijs*. https://www.onderwijsinspectie.nl/documenten/rapporten/2019/04/10/rapport-de-staat-van-het-onderwijs-2019

Jang, H., Kim, E. J., & Reeve, J. (2016). Why students become more engaged or more disengaged during the semester: A self-determination theory dual-process model. *Learning and Instruction*, *43*, 27–38. https://doi.org/10.1016/j.learninstruc.2016.01.002

Jeno, L. M., Nylehn, J., Hole, T. N., Raaheim, A., Velle, G., & Vandvik, V. (2021). Motivational determinants of students' academic functioning: The role of autonomy-support, autonomous motivation, and perceived competence. *Scandinavian Journal of Educational Research*, 1–18. https://doi.org/10.1080/00313831.2021.1990125

Kline, R. B. (2010). *Principles and practice of structural equation modeling* (3rd ed.). Guilford Press.

Korpershoek, H., Kuyper, H., & Van Der Werf, G. (2015). The relation between students' math and reading ability and their mathematics, physics, and chemistry examination grades in secondary education. *International Journal of science and mathematics education*. *13*(5), 1013 – 1037. https://doi.org/10.1007/s10763-014-9534-0

Lee, R. R., & Chatzisarantis, N. L. D. (2017). Same but different: Comparative modes of information processing are implicated in the construction of perceptions of autonomy support. *British Journal of Psychology*, *108*(4), 687–700. https://doi.org/10.1111/bjop.12237

Leo FM, Sánchez-Oliva D, Fernández-Rio J, et al. (2021). Validation of the teaching interpersonal style questionnaire in physical education. *Journal of Sport Psychology:* 30

León, J., Núñez, J. L., & Liew, J. (2015). Self-determination and STEM education: Effects of autonomy, motivation, and self-regulated learning on high school math achievement. *Learning and Individual Differences*, *43*, 156–163. https://doi.org/10.1016/j.lindif.2015.08.017

Logan, S., Medford, E., & Hughes, N. (2011). The importance of intrinsic motivation for high and low ability readers' reading comprehension performance. *Learning and Individual Differences*, *21*(1), 124–128. https://doi.org/10.1016/j.lindif.2010.09.011

Marsh, H. W., Lüdtke, O., Nagengast, B., Trautwein, U., Abduljabbar, A. S., Abdelfattah, F., & Jansen, M. F. (2015). Dimensional Comparison Theory: Paradoxical relations between self-beliefs and achievements in multiple domains. *Learning and Instruction*, *35*, 16–32. https://doi.org/10.1016/j.learninstruc.2014.08.005

Matos, L., Reeve, J., Herrera, D., & Claux, M. (2018). Students' agentic engagement predicts longitudinal increases in perceived autonomy-supportive teaching: The squeaky wheel gets the grease. *The Journal of Experimental Education*, *86*(4), 579–596. https://doi.org/10.1080/00220973.2018.1448746

McKown, C., & Weinstein, R. S. (2008). Teacher expectations, classroom context, and the achievement gap. *Journal of School Psychology*, *46*(3), 235–261. https://doi.org/10.1016/j.jsp.2007.05.001

Mo, J. (2019). "How is students' motivation related to their performance and anxiety?", *PISA in Focus*, No. 92. OECD Publishing. https://doi-org.proxy.library.uu.nl/10.1787/d7c28431-en.

Mouratidis, A., Michou, A., Aelterman, N., Haerens, L., & Vansteenkiste, M. (2017). Begin-of-school-year perceived autonomy-support and structure as predictors of end-of-school-year study efforts and procrastination: the mediating role of autonomous and controlled motivation. *Educational Psychology*, *38*(4), 435–450. https://doi.org/10.1080/01443410.2017.1402863

Ntoumanis, N., Ng, J. Y., Prestwich, A., Quested, E., Hancox, J. E., Thøgersen-Ntoumani, C., Deci, E. L., Ryan, R. M., Lonsdale, C., & Williams, G. C. (2020). A meta-analysis of self-determination theory-informed intervention studies in the health domain: effects on motivation, health behavior, physical, and psychological health. *Health Psychology Review*, *15*(2), 214–244. https://doi.org/10.1080/17437199.2020.1718529

OECD (2016). *Netherlands 2016: Foundations for the Future*, *Reviews of national policies for education*. OECD Publishing. https://doi.org/10.1787/9789264257658-en

Okada, R. (2021). Effects of perceived autonomy support on academic achievement and motivation among higher education students: A meta-analysis. *Japanese Psychological Research*, 1-13. https://doi.org/10.1111/jpr.12380

Opdenakker, M. C. (2021). Need-supportive and need-thwarting teacher behavior: Their importance to boys' and girls' academic engagement and procrastination behavior. *Frontiers in Psychology*, 12, Article 628064. https://doi.org/10.3389/fpsyg.2021.628064

Patall, E. A., Cooper, H., & Robinson, J. C. (2008). The effects of choice on intrinsic motivation and related outcomes: A meta-analysis of research findings. *Psychological Bulletin*, *134*(2), 270–300. https://doi.org/10.1037/0033-2909.134.2.270

Prast, E., Van De Weijer-Bergsma, E., Kroesbergen, E. H., & Van Luit, J. E. H. (2018). Differentiated instruction in primary mathematics: Effects of teacher professional development on student achievement. *Learning and Instruction*, *54*, 22–34. https://doi.org/10.1016/j.learninstruc.2018.01.009

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, *36*(4), 717–731. https://doi.org/10.3758/bf03206553

R Core Team (2022). *R: A language and environment for statistical computing*. R Foundation for statistical computing. https://www.R-project.org/

Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist*, *44*(3), 159–175. https://doi.org/10.1080/00461520903028990

Reeve, J. (2016). Autonomy-supportive teaching: What It Is, how to do it. *Building Autonomous Learners*, 129–152. https://doi.org/10.1007/978-981-287-630-0_7

Reeve, J., & Cheon, S. H. (2021). Autonomy-supportive teaching: Its malleability, benefits, and potential to improve educational practice. *Educational Psychologist*, *56*(1), 54–77. https://doi.org/10.1080/00461520.2020.1862657

Ross, L., & Nisbett, R. E. (2011). *The person and the situation: Perspectives of social psychology*. Pinter & Martin Publishers.

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology*, *57*(5), 749–761. https://doi.org/10.1037/0022-3514.57.5.749

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68–78. https://doi.org/10.1037/0003-066x.55.1.68

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, *61*, 101860. https://doi.org/10.1016/j.cedpsych.2020.101860

Seaton, M., Parker, P., Marsh, H. W., Craven, R. G., & Yeung, A. S. (2014). The reciprocal relations between self-concept, motivation and achievement: Juxtaposing academic self-concept and achievement goal orientations for mathematics success. Educational Psychology, 34(1), 49–72. https://doi.org/10.1080/01443410. 2013.825232

Sierens, E., Vansteenkiste, M., Goossens, L., Soenens, B., & Dochy, F. (2009). The synergistic relationship of perceived autonomy support and structure in the prediction of self-regulated learning. *British Journal of Educational Psychology*, *79*(1), 57–68. https://doi.org/10.1348/000709908x304398

Streiner, D. L. (2003b). Starting at the beginning: An introduction to coefficient alpha and internal consistency. *Journal of personality assessment*, *80*(1), 99–103. https://doi.org/10.1207/s15327752jpa8001_18

Su, Y., & Reeve, J. (2011). A Meta-analysis of the effectiveness of intervention programs designed to support autonomy. *Educational Psychology Review*, *23*(1), 159–188. https://doi.org/10.1007/s10648-010-9142-7

Tabachnick, B. G., & Fidell, L. S. (2006b). *Using multivariate statistics* (5th ed., Vol. 6). Pearson.

Taylor, G., Jungert, T., Mageau, G. A., Schattke, K., Dedic, H., Rosenfield, S., & Koestner, R. (2014). A self-determination theory approach to predicting school achievement over time: the unique role of intrinsic motivation. *Contemporary Educational Psychology*, *39*(4), 342–358. https://doi.org/10.1016/j.cedpsych.2014.08.002

Timmermans, A., Kuyper, H., & Van Der Werf, G. (2015). Accurate, inaccurate, or biased teacher expectations: Do Dutch teachers differ in their expectations at the end of primary education? *British Journal of Educational Psychology*, *85*(4), 459–478. https://doi.org/10.1111/bjep.12087

Tsai, Y., Kunter, M., Lüdtke, O., Trautwein, U., & Ryan, R. M. (2008). What makes lessons interesting? The role of situational and individual factors in three school subjects. *Journal of Educational Psychology*, *100*(2), 460–472. https://doi.org/10.1037/0022-0663.100.2.460

Urhahne, D. (2015). Teacher behavior as a mediator of the relationship between teacher judgment and students' motivation and emotion. *Teaching and Teacher Education*, *45*, 73–82. https://doi.org/10.1016/j.tate.2014.09.006

Vallerand, R. J., Pelletier, L. G., Blais, M. R., Briere, N. M., Senecal, C., & Vallieres, E. F. (1992). The academic motivation scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educational and Psychological Measurement*, *52*(4), 1003–1017. https://doi.org/10.1177/0013164492052004025

Van Aarsen, E., Roeleveld, J., & Luyten, J. W. (2013). *Voorspellende waarde van LOVS toetsen voor schoolsucces*. Oberon.

Van den Broeck, A., Howard, J. L., Van Vaerenbergh, Y., Leroy, H., & Gagné, M. (2021). Beyond intrinsic and extrinsic motivation: A meta-analysis on self-determination theory's multidimensional conceptualization of work motivation. *Organizational Psychology Review*, *11*(3), 240–273. https://doi.org/10.1177/20413866211006173

Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic psychological need theory: Advancements, critical themes, and future directions. *Motivation and Emotion*, *44*(1), 1–31. https://doi.org/10.1007/s11031-019-09818-1

Vansteenkiste, M., Sierens, E., Goossens, L., Soenens, B., Dochy, F., Mouratidis, A., Aelterman, N., Haerens, L., & Beyers, W. (2012). Identifying configurations of perceived teacher autonomy support and structure: Associations with self-regulated learning, motivation and problem behavior. *Learning and Instruction*, *22*(6), 431–439. https://doi.org/10.1016/j.learninstruc.2012.04.002

Vansteenkiste, M., Sierens, E., Soenens, B., Luyckx, K., & Lens, W. (2009b). Motivational profiles from a self-determination perspective: The quality of motivation matters. *Journal of Educational Psychology*, *101*(3), 671–688. https://doi.org/10.1037/a0015083

Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., & Deci, E. L. (2004). Motivating learning, performance, and persistence: The synergistic effects of intrinsic goal contents and autonomy-supportive contexts. *Journal of Personality and Social Psychology*, *87*(2), 246–260. https://doi.org/10.1037/0022-3514.87.2.246

van Vijfeijken, M., van Schilt-Mol, T., van den Bergh, L., Scholte, R. H., & Denessen, E. (2023). How teachers handle differentiation dilemmas in the context of a school's vision: A case study. *Cogent Education*, *10*(1). https://doi.org/10.1080/2331186x.2023.2165006

Vasconcellos, D., Parker, P. D., Hilland, T., Cinelli, R., Owen, K. B., Kapsal, N., Lee, J., Antczak, D., Ntoumanis, N., Ryan, R. M., & Lonsdale, C. (2020). Self-determination theory applied to physical education: A systematic review and meta-analysis. *Journal of Educational Psychology*, *112*(7), 1444–1469. https://doi.org/10.1037/edu0000420

Wallace, T. L., & Sung, H. C. (2017). Student perceptions of autonomy-supportive instructional interactions in the middle grades. *Journal of experimental education*, *85*(3), 425–449. https://doi.org/10.1080/00220973.2016.1182885

Wang, C., Cho, H., Wiles, B. C., Moss, J. L., Bonem, E. M., Li, Q., Lu, Y., & Levesque-Bristol, C. (2022). Competence and autonomous motivation as motivational predictors of college students' mathematics achievement: from the perspective of self-determination theory. *International Journal of STEM Education*, *9*(1). https://doi.org/10.1186/s40594-022-00359-7

Wijsman, L. A., 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. *Educational Research and Evaluation*, *24*(1–2), 51–67. https://doi.org/10.1080/13803611.2018.1512872

Xuejun, Y. (2021). EFL Learning motivation differences of Chinese junior secondary school students: A mixed-methods study. *Education 3-13*. https://doi.org/10.1080/03004279.2019.1711143

Appendix A

Adaptation Items

Autonomieondersteuning: mogelijkheden creëren voor studenten om hun schooltaken en activiteiten op een betekenisvolle manier in te richten (Ahmadi et al., 2022)

Leraar (Ahmadi et al., 2022)

- Deze leerling geef ik veel inspraak in hoe hij/zij de schooltaken wil aanpakken.

Leerling (Leo et al., 2022/ook TASCQ Sierens et al.)

	Engels	**Nederlands**
TISQ/ TASCQ	Often asks us about our preferences regarding activities to be performed	De juf/meester luistert naar mijn ideeën
TISQ/ TASCQ	Tries to give us choice when performing the activities	De juf/meester geeft mij veel keuzes over hoe ik mijn schoolwerk aanpak
TISQ/ TASCQ	Takes into account our opinions when designing the lesson	De juf/meester luistert naar mijn mening
TISQ	Allows us to make decisions during task performance	Ik mag dingen zelf kiezen van de juf/meester als ik dat wil

Peer

- Welke klasgenoten mogen van de juf/meester de meeste keuzes maken over hoe ze het schoolwerk willen aanpakken?

Autonomieondermijning: de leerling geen ruimte geven om het oneens te zijn (Ahmadi et al., 2022; Van den Berghe et al., 2013)

Leraar (aangepast item TASCQ LK en TRS, Aelterman et al., 2019)

- Deze leerling moet ik vaak precies zeggen wat hij/zij moet doen.

Leerling (Leo et al., 2022; TASCQ – Hornstra et al. 2020)

	Engels	**Nederlands**
TISQ	Requires me to do things in a certain way	De juf/meester zegt altijd precies wat ik moet doen
TISQ	Forces me to behave in a certain way	De juf/meester zegt steeds precies zegt hoe ik mij moet gedragen
TISQ	Forces me to accept a way of teaching that I do not agree with	De les moet altijd precies gaan op de manier die de juf/meester wil
TASCQ Hornstra 2020	De juf/meester geeft vaak kritiek op hoe ik mijn werk doe in de klas	De juf/meester zegt vaak dat ik mijn werk anders moet doen

Peer

- Welke klasgenoten moet de juf/meester het meeste precies zeggen wat hij/zij moeten doen?

Structuur/competentieondersteuning begeleiding bieden wanneer nodig op een duidelijke en begrijpbare manier die aansluit bij wat de leerling weet (Stroet et al., 2013). Hierbij kan een onderscheid gemaakt worden tussen (a) het bieden van hulp en ondersteuning door middel van evaluatieve en informatieve feedback en (b) de juiste hoeveelheid uitdaging.

Leraar:

- (a) Bieden van hulp en ondersteuning (TASCQ LK)

  Bij moeilijke opdrachten, geef ik deze leerling veel hulp en ondersteuning.

- (b) De juiste hoeveelheid uitdaging

  Deze leerling daag ik uit om moeilijke opdrachten zelf op te lossen.

Leerling:

- (a) Bieden van hulp en ondersteuning (4 items TASCQ, eerste twee Hornstra, laatste 2 NL versie)

	Nederlands
TASCQ	De juf/meester gaat pas verder met de les als hij/zij merkt dat ik het begrijp
TASCQ	Als ik er bij een opdracht niet uitkom, laat mijn juf/meester andere manieren zien om het te proberen
TASCQ	De juf/meester gaat na of ik klaar ben voordat hij/zij aan iets nieuws begint
TASCQ	De juf/meester laat me zien hoe ik zelf problemen kan oplossen

- (b) De juiste hoeveelheid uitdaging (TISQ Leo et al., 2022).

	Engels	**Nederlands**
TISQ	Encourages us to trust in our abilities to do the tasks well	De juf/meester geeft mij het vertrouwen dat ik de taken voor school goed kan doen

TISQ	Proposes activities adjusted to our skill level	De juf/meester geeft mij moeilijkere taken met meer uitdaging als ik hier aan toe ben
TISQ	Always tries to help us achieve the goals set in the activities	De juf/meester helpt mij de doelen te behalen
TISQ (schaal comp. thwart)	Does *not* give me opportunities to show my potential	De juf/meester daagt mij uit om zelf op antwoorden van moeilijke vragen te komen

Peer

- Welke klasgenoten krijgen de meeste uitleg van de juf/meester?
- Welke klasgenoten krijgen het meeste moeilijke opdrachten van de juf/meester?

Competentie ondermijning: de leerling het gevoel geven dat hij/zij niet goed genoeg is en de dingen niet kan. Door (a) negatieve feedback; de leerling zeggen dat hij/zij niet goed is en daarmee (vaststaande) eigenschappen/kwaliteiten te bekritiseren, en/of (b) chaos; niet duidelijk te zijn in wat er van de leerling verwacht wordt.

Leraar (op basis van Ahmadi et al., 2022).

- (a) Negatieve feedback

  Deze leerling moet ik vaak zeggen dat het schoolwerk niet goed genoeg is.

- (b) Chaos

  Soms heb ik het gevoel dat ik mijn verwachtingen niet duidelijk stel tegenover deze leerling

Leerling:

- (a) Negatieve feedback (drie items TISQ Leo et al., 2022)

	Engels	**Nederlands**
TISQ	Sets up situations that make me feel incapable	De juf/meester geeft me het gevoel dat ik de opdrachten op school minder goed doe dan mijn klasgenoten
		De juf/meester zegt vaak dat ik mijn werk niet goed doe
TISQ	Makes me feel incompetent, sometimes	De juf/meester geeft me het gevoel dat ik niet slim genoeg ben
TISQ	Does not give me opportunities to show my potential	De juf/meester heeft lage verwachtingen van mij

- (b) Chaos (TASCQ en Ahmadi et al., 2022)

TASCQ	De juf/meester maakt me niet duidelijk wat hij/zij van mij in de les verwacht.	Bij de juf/meester snap ik soms niet wat ik moet doen in de les
TASCQ	De juf/meester doet steeds anders tegen mij	De juf/meester doet steeds anders tegen mij
TASCQ	Elke keer als ik iets verkeerd doe bij een opdracht, reageert mijn juf/meester anders	Elke keer als ik iets verkeerd doe bij een opdracht, reageert mijn juf/meester anders
Ahmadi	Do not get any clear feedback or structure on how to pursuit goals - Provides vague critical feedback	De juf/meester zegt vaak dat ik iets verkeerd doe, zonder aan te geven wat ik de volgende keer anders kan doen

Peer

- Welke klasgenoten zegt de juf/meester het meeste dat het werk niet goed is?

Verbondenheidondersteuning: Onvoorwaardelijke positieve affectie door aandacht voor de leerling te hebben en hem/haar te zien, luisteren, en begrip te tonen.

Leraar

- Het lukt me altijd goed om aardig te zijn tegen deze leerling.

Leerling (op basis van Ahmadi et al., 2022)

	Engels	**Nederlands**
Ahmadi		De juf/meester doet altijd aardig tegen mij, ook als ik iets fout doe
SPARTS	When I feel uncomfortable, I go to my teacher for help and comfort	Als ik mij niet fijn voel, ga ik naar de juf/meester toe
Ahmadi		De juf/meester heeft aandacht voor mij en hoe het met mij gaat
TASCQ		De juf/meester begrijpt mij
SPARTS	Ik vind dat ik goed kan opschieten met mijn juf/meester	Ik kan het goed vinden met mijn juf/meester

Peer:

- Tegen welke klasgenoten doet de juf/meester het meeste aardig?

Verbondenheid ondermijning: Het hebben van conflict en continu voeren van een strijd (Ahmadi et al., 2022).

Leraar

- Met deze leerling lijk ik continu een strijd te voeren.

Leerling (op basis van Ahmadi et al., 2022)

	Engels	**Nederlands**
Ahmadi		De juf/meester negeert mij vaak
SPARTS	My teacher particularly tells me what I do wrong and not what I do right	De juf/meester vertelt vooral wat ik verkeerd doe en niet wat ik goed doe
SPARTS	Other children are less punished	De juf/meester is strenger voor mij dan voor mijn klasgenoten
SPARTS	My teacher treats me unfairly	De juf/meester behandelt mij oneerlijk

Peer

- Op welke klasgenoten wordt de juf/meester het meeste boo