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Link to publication

The gender gap in student engagement: The role of teachers' autonomy support, structure, and involvement

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Background. The gender gap in education in favour of girls is a widely known phenomenon. Boys generally have higher dropout rates, obtain lower grades, and show lower engagement. Insight into factors related to these academic outcomes could help to address the gender gap.

Aims. This study investigated, for Dutch language classes, (1) how boys and girls differ in behavioural engagement, (2) which teacher support dimensions (autonomy support, structure, involvement) may explain gender differences in engagement (mediation hypothesis), and (3) whether and which of these teacher support dimensions matter more for boys' as opposed to girls' engagement (moderation or differential effects hypothesis).

Sample. A total of 385 Grade 7 students and their 15 language teachers participated in this study.

Methods. Teacher support was assessed through student reports. Student engagement was measured using student, teacher, and observer reports. By means of structural equation modelling, the mediating role of the teacher support dimensions for gender differences in behavioural engagement was tested. The potential differential role of the teacher support dimensions for boys' and girls' engagement was investigated through multigroup analysis.

Results. Boys were less engaged than girls and reported lower support from their teacher. Autonomy support and involvement partially mediated the relationship between gender and behavioural engagement. Autonomy support was demonstrated to be a protective factor for boys' engagement but not for girls'. Structure and involvement contributed equally to engagement for both sexes.

Conclusions. Although involvement and autonomy support partly explained the gender gap in engagement (mediation hypothesis), more support was found for differential effects of autonomy support on boys' versus girls' engagement (differential effects hypothesis).

One of the most robust findings in educational research is the fact that boys, in general, show lower engagement and achievement at school and have higher dropout rates than girls (Lamote, Speybroeck, Van Den Noortgate, & Van Damme, 2013; Van de gaer,

Pustjens, Van Damme, & De Munter, 2006; Wang & Eccles, 2012). For example, in Grades 7–9, girls reported higher engagement than boys in a data set of 3,400 students in 12 countries (United States, European, and Asian countries; Lam *et al.*, 2012). Cooper (2014) found the same results for 1,132 Grades 9–12 students in the United States. Moreover, in secondary education, student engagement appeared to decline for both genders (Van de gaer *et al.*, 2009; Wang & Eccles, 2012), with some studies indicating a larger decline for boys than for girls thus widening the gender gap (Chouinard & Roy, 2008; Dotterer, McHale, & Crouter, 2009; Watt, 2000). For instance, Lamote *et al.* (2013) followed a sample of 4,063 students from Flanders (Belgium) throughout secondary education and found that boys, more than girls, were likely to be part of the low engagement group or the high and decreasing engagement group. This underlines boys' more negative engagement trajectories throughout secondary education. Consequently, it seems important to pay attention to the gender differences in secondary school students' engagement. The present study further investigates the gender gap in students' engagement and the role of teacher support herein.

Student engagement has been considered to be malleable through various contextual factors, such as teacher and peer support (Fredricks, Blumenfeld, & Paris, 2004; Hafen *et al.*, 2012). Among these factors, teacher support has been considered to be one of the most important (Allen *et al.*, 2013; Lam *et al.*, 2012; Roorda, Koomen, Spilt, & Oort, 2011). In this perspective, this study examines whether gender differences in teacher support can explain the gender gap in secondary school students' engagement (i.e., mediation hypothesis). Three different teacher support dimensions (i.e., autonomy support, structure, and involvement), distinguished in self-determination theory (SDT; Ryan & Deci, 2000), are investigated. Moreover, evidence has been found for teacher support possibly being more important for the school adjustment of certain groups of students (e.g., for boys) (Hamre & Pianta, 2001; Roorda *et al.*, 2011). Therefore, as a parallel hypothesis, we examine whether and which of these teacher support dimensions matter more for boys' as opposed to girls' engagement (i.e., moderation or differential effects hypothesis).

To sum up, these theoretical arguments provide us with two subjects of investigation that are considered relevant with regard to gender differences in engagement: (1) whether teacher support acts as an explaining mechanism in the gender gap in students' engagement and (2) whether there are differential effects of teacher support for boys' as opposed to girls' engagement.

Behavioural engagement

In general, student engagement is considered to be a multidimensional construct (Fredricks *et al.*, 2004). Most commonly, three dimensions are distinguished: The cognitive (i.e., psychological investment in learning: self-regulated learning and goal orientation), behavioural (i.e., participation in school activities, conduct, and participation and initiative in class) and emotional dimension (i.e., feelings towards school and learning, interest, and identification with school) (Fredricks *et al.*, 2004). Research indicated that girls scored higher on most of these constructs, especially for behavioural engagement (Martin, 2007; Skinner, Kinderman, & Furrer, 2009; Wang & Eccles, 2012). This implies that girls generally exert more effort, participate more actively in class, and show higher attention and persistence than boys. Previous literature has provided some explanations for these gender differences in favour of girls, that is (1) girls also scored higher for the antecedents of engagement such as motivation (Sierens, Vansteenkiste,

Goossens, Soenens, & Dochy, 2009; Skinner & Pitzer, 2012; Watt, 2000), (2) the activities at school and the content of the school curriculum might be too feminine for boys due to the focus on language and verbal learning (Brozo, 2002; Geist & King, 2008). Because gender differences are more prominently present in behavioural engagement, this study specifically focuses on this student engagement dimension.

Teacher support as an explaining factor for gender differences in engagement

In the literature, student engagement has been considered to be malleable by several factors, such as teacher support (e.g., Allen *et al.*, 2013; Lam *et al.*, 2012). It has also been found that boys tend to report lower levels of teacher support (Oelsner, Lippold, & Greenberg, 2011; Soenens, Sierens, Vansteenkiste, Dochy, & Goossens, 2012; Van de gaer, Pustjens, Van Damme, & De Munter, 2007; Vansteenkiste *et al.*, 2012). A reason can be found in the arguments of Younger, Warrington, and Williams (1999), who suggested that teachers are less tolerant towards the negative behaviour of boys, whereas they see the ideal student as 'female'. They associated this female behaviour with, for example, more compliance, willingness to please and better organizing skills.

We might thus expect that boys' and girls' perceptions of teacher support can explain the gender gap in engagement. SDT (Ryan & Deci, 2000) provides a theoretical framework for linking teacher support and student engagement. According to SDT, students have three basic psychological needs (i.e., the need for autonomy, competence, and relatedness). The fulfilment of these needs enhances students' engagement (e.g., Stroet, Opdenakker, & Minnaert, 2013; Vansteenkiste *et al.*, 2012). Teachers can support students' needs by providing autonomy support (i.e., indicating the relevance of learning materials, providing choices, stimulating initiative), structure (i.e., providing clear guidelines and expectations, thorough assistance, competence-relevant feedback), and involvement (i.e., affective support, warmth, taking the perspective of the students) (Deci & Ryan, 2008; Reeve, 2002; Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009). Several empirical studies have found evidence for the link between (one of) these teacher support dimensions and engagement. For example, Marks (2000) proved that general teacher support was positively associated with student engagement for elementary as well as middle and high school students. Likewise, in their review study, Stroet *et al.* (2013) demonstrated that there was a positive relationship between teacher support and student engagement for young adolescents. More specifically for physical education, some studies confirmed the positive relationship between teacher support and engagement from a SDT perspective (see review study of Van den Berghe, Vansteenkiste, Cardon, Kirk, & Haerens, 2014). Most of these studies, however, only focused on general measures of teacher support. Stroet *et al.* (2013) confirmed that only a few studies investigated the unique contribution of each of the three teacher support dimensions from an SDT perspective for student engagement. Three relevant studies were found in this context. In a sample of Grade 3–5 students (Skinner & Belmont, 1993), students' perception of teacher structure positively influenced their self-reported behavioural engagement. In addition, teacher-reported involvement and autonomy support influenced teachers' perceptions of students' behavioural engagement (Skinner & Belmont, 1993). Likewise, in a sample of Grade 1–12 students (Tucker *et al.*, 2002), student-reported teacher involvement and autonomy support were both significant predictors of student-reported engagement, with involvement being the most important contributor to engagement. In contrast, structure only had an indirect effect on engagement (Tucker *et al.*, 2002). Furthermore, for Grade 9–11 students, Jang, Reeve, and Deci (2010) found

that observed autonomy support as well as structure predicted students' collective behavioural engagement (overall classroom measure). However, only observed autonomy support, and not structure, predicted students' self-reported engagement. Involvement was not inquired into. These findings suggest that autonomy support and involvement relate more directly to student engagement than structure does. Although these studies have investigated the link between teacher support and student engagement, they have not considered whether teacher support explains the gender gap in engagement. In the present study, we examine whether these three dimensions of teacher support can help to gain an insight into gender differences in engagement.

Differential effects of teacher support for boys' versus girls' engagement

In line with SDT, we could argue that teacher support is beneficial for all students' engagement, both boys' and girls' (Ryan & Deci, 2000). Nevertheless, the role of gender within SDT literature on teacher support and engagement has been underemphasized. In the review study of Stroet *et al.* (2013), very few articles investigated gender differences. In other studies, it has been suggested that the association between teacher support and student engagement might be different for boys and for girls. For example, according to the academic risk hypothesis (Hamre & Pianta, 2001), teacher support (i.e., an emotionally warm and caring, low-conflict teacher–student relationship) is considered to be more important for boys' engagement than for girls', because boys are more at risk for academic maladjustment (e.g., lower grades and motivation, deviant classroom behaviour) and consequently have more to gain or to lose from the degree of support that teachers provide. Although some evidence has been found for the differential role of teacher support for boys' and girls' engagement (e.g., Marks, 2000), research focusing on the three separate dimensions of teacher support has been scarce. Below, we give an overview of existing research on the differential effect of the three teacher support dimensions and components thereof for boys' versus girls' engagement.

With regard to the affective dimension of teacher support or *involvement*, a meta-analysis based on 99 studies (Roorda *et al.*, 2011) revealed that affective teacher–student relationships were more important for boys' than girls' school engagement. Likewise, Greene, Miller, Crowson, Duke, and Akey (2004) found that affective support in Grade 4 had more effect for boys' as opposed to girls' engagement in Grade 8. In contrast, Thijs and Verkuyten (2009) found that high teacher involvement was more positive for girls' engagement than for boys'. Other studies found no gender differences in the relationship between teacher involvement and student engagement (Hafen *et al.*, 2012; Lam *et al.*, 2012; Wang & Eccles, 2012).

Providing *structure* has generally been found to matter more for boys' engagement. Marks (2000) demonstrated that social support (i.e., teacher support in the sense of high expectations and helping students, which can be considered as components of structure) had a larger effect on boys' as opposed to girls' engagement. In line with these findings, positive feedback (another component of structure) was also proved to be more important for boys' motivation than for girls' (Katz, Assor, Kanat-Maymon, & Bereby-Meyer, 2006). In contrast, Tucker *et al.* (2002) found no gender differences in the relation between teacher structure and student engagement.

Some studies discovered no gender differences in the relationship between *autonomy support* and engagement (Hafen *et al.*, 2012; Tucker *et al.*, 2002). Other studies that measured only some components of autonomy support did suggest gender differences. For example, interview data indicated that boys considered the arrangement of fun

activities, providing choices, making schoolwork relevant, and respecting students' perspectives as engaging practices (Martin, 2003). In addition, Geist and King (2008) argued that boys were generally more distracted than girls when quietly performing repetitive activities and suggested that boys profited from variation, exploring and hands-on activities. This could imply that offering choices in activities (i.e., component of autonomy support) is of particular importance for boys.

Considering these limited and contradictory findings, we can conclude that additional research is needed (1) to expand this small body of literature and (2) to take into account the three teacher support dimensions in one model. Therefore, the present study investigates the differential effects of the three dimensions of teacher support for boys' versus girls' engagement.

The role of teacher support for boys' and girls' engagement: Mediation versus differential effects

In the present study, we formulated two alternative hypotheses because we aimed to explore two possibilities for investigating the gender gap in the relationship between teacher support and student engagement.

First, we tested the hypothesis that gender differences in teacher support would explain the gender gap in engagement (i.e., mediation effect). As mentioned above, boys and girls seem to have different levels of school engagement (e.g., Marks, 2000) and teacher support has been frequently found to be linked to student engagement (e.g., Stroet *et al.*, 2013). Furthermore, some evidence has been found that teachers provide more autonomy support and more structure and show more involvement towards girls than towards boys (e.g., Vansteenkiste *et al.*, 2012). Hence, existing literature provided evidence for the three elements that are preconditions for investigating possible mediation effects (Baron & Kenny, 1986). However, current literature has not investigated the possibility that gender differences in teacher support might explain the gender differences in student engagement. Based on studies discussed by Stroet *et al.* (2013), we can conclude that up to now, there has been insufficient research on the possible mediating role of teacher support in the relationship between gender and student engagement.

Second, we tested the hypothesis that teacher support has differential effects for boys' as opposed to girls' engagement. As mentioned above, the academic risk hypothesis (Hamre & Pianta, 2001) assumes that teacher support is more important for boys' as opposed to girls' engagement. Thus, although teacher support is important for all individual students' engagement, it might be the case that for boys, teacher support is even more beneficial because boys appear to be more at risk for disengagement than girls are.

Measuring student engagement: Student, teacher, and observer report

The present study combines student, teacher, and observer report to measure students' behavioural engagement. Many researchers have highlighted the benefits of using multiple perspectives to measure student engagement (e.g., student self-report, teacher report, interviews, observations) in order to counter shared method variance and to capture the complexity of certain behaviours and contexts more thoroughly (Cohen, Manion, & Morrison, 2011; Doumen, Koomen, Buyse, Wouters, & Verschueren, 2012). Nevertheless, student, teacher, and observer report have rarely been combined. The strength of combining the three measures counters the disadvantages and highlights the

advantages of each separate measure. First, as far as we know, in secondary education, up to now, *observations* of student engagement have only been conducted by Hafen *et al.* (2012), by Jang *et al.* (2010) and by Reeve, Jang, Carrell, Jeon, and Barch (2004). In all these studies, student engagement was measured at classroom level (overall class engagement), which means that no gender differences could be examined. Only Jang *et al.* (2010) also measured students' individual engagement. *Observational data* have the advantage of giving the most objective view of students' engagement. Moreover, often, observational data are based on smaller samples than student- or teacher-reported data because data collection is more time-consuming (Doumen *et al.*, 2012; Fredricks & McColskey, 2012). Second, *student self-report* questionnaires have been most commonly used in secondary education because students are highly capable of knowing whether they are engaged and their subjective perceptions of the learning environment are of absolute importance (Fredricks & McColskey, 2012; Skinner *et al.*, 2009). An objective measure may consider students as being engaged, but if students do not feel engaged, there is still room for improvement in their level of engagement. However, students' lack of trust in the anonymity, possible socially desirable answers, and not understanding the questions may inhibit accurate results (Fredricks & McColskey, 2012). These possible disadvantages raise the need for more objective measures (e.g., observations) or other perspectives (e.g., teacher report). Third, *teacher reports* for measuring student engagement have been used more often with younger students for whom valid self-reports are more difficult to obtain (Fredricks & McColskey, 2012). Teachers have a good image of how students behave in class because they observe their day-to-day behaviour (Skinner *et al.*, 2009). However, as Skinner *et al.* (2009) mentioned, teachers may not notice students' disengagement because students sometimes tend to only act compliant when they know the teacher looks at them or calls upon them. Moreover, this appears to happen more often with girls than with boys (Williams, Burden, & Lanvers, 2002). This kind of bias could be countered by measuring student report as well. Also, teachers' perceptions of students may colour their judgments (e.g., over-rating the engagement of students with higher grades; Doumen *et al.*, 2012). Moreover, in relation to the gender of the student, teachers may have a more positive attitude towards girls than towards boys because, according to Younger *et al.* (1999), they may see girls as the perfect students. This may result in higher teacher-reported engagement for girls than for boys.

Because student, teacher, and observer report can each be biased in their own specific way and because gender-related biases are of utmost importance to counter in this study, we decided to use all three measures combined in a model testing the relationship between teacher support and engagement for boys and girls.

Aims and research questions

This study aimed to extend previous research by investigating the explaining (i.e., mediating) role of teacher support (autonomy support, structure, and involvement) for differences in the behavioural engagement of boys and girls. Furthermore, we examined whether teacher support is found to relate more to boys' engagement as opposed to girls' (i.e., differential effects). This study focused on behavioural engagement during Dutch language classes because boys are particularly at risk for low behavioural engagement (e.g., Martin, 2007) especially during language classes (Meece, Glienke, & Burg, 2006). Teacher, student, and observer reports were used to measure students' behavioural engagement. Students reported about the degree of teacher support they received.

Three research questions guided this study:

1. How do boys and girls differ regarding their behavioural engagement and regarding their perceived support (autonomy support, structure, and involvement) from their Dutch language teacher?
2. Which teacher support dimensions (autonomy support, structure, and involvement) can explain the relationship between gender and students' behavioural engagement (mediation effects)?
3. Does teacher support matter more for boys' as opposed to girls' behavioural engagement and for which specific teacher support dimensions (autonomy support, structure, involvement) is this the case (differential effects)?

Method

Participants

Participants were selected from six secondary schools in Flanders (Belgium). The schools were randomly selected from a disproportionally stratified sample of 59 schools. Equal distribution of the schools according to three criteria was demanded: (1) geographical distribution in the Flemish community, (2) urban versus rural location, and (3) publicly run versus privately run educational network. Data were collected from September to November 2012. Grade 7 students from 23 classes ($N = 385$; 13 general track classes and 10 vocational track classes; 58% boys, 42% girls) completed questionnaires about perceived teacher support and their engagement in Dutch language classes. This took place during school time under the supervision of a researcher who explained the purpose of the questionnaire and the procedure and who answered students' questions.

In three of these six schools (12 classes; six general track classes and six vocational track classes), the engagement of 10 randomly selected students per class ($N = 156$; 62% boys, 38% girls) was observed during six Dutch language classes, with a total of 12 observations per student. The observers were two researchers and two master students. All four observers were trained by means of the manual of the Leuven Involvement Scale (Laevers, 1994), videotaped examples, and observations in real classroom settings. The results were discussed by all observers and were compared to the examples and theory in the manual. Dutch language teachers also rated the engagement of the observed students in a questionnaire. In the other three schools, Dutch language teachers rated the engagement of 10 randomly selected students per class.

Measures

Observer report of behavioural engagement

The Leuven Involvement Scale (Laevers, 1994) was used to observe students' activity-specific engagement during Dutch language classes. Each individual student was observed during a maximum of twelve 2-min intervals and their engagement was rated on a 9-point scale (1 = *not engaged at all*; 9 = *highly engaged, never distracted*). Observations began approximately 10 min after the start of a lesson of 50 min and ended 5 min before the end of the lesson. Scores were averaged across intervals to obtain a general measure for observed behavioural engagement. Excellent inter-rater reliability in previous research ($r = .75–.90$; Doumen *et al.*, 2012; Laevers & Laurijssen, 2001) was replicated here. The intra-class correlation coefficient between four observers who

double-coded 15 students was excellent (ρ_{ICC} = .91). Cross-informant convergence with teacher reports of engagement was found by Doumen *et al.* (2012).

Teacher report of behavioural engagement

To measure teacher reports of students' behavioural engagement, Dutch language teachers filled out the subscale Cooperative Participation (seven items; e.g., 'Listens carefully to the teacher's instructions and directions') of the Teacher Rating Scale of School Adjustment (TRSSA; Birch & Ladd, 1997). Items were rated on a 3-point scale ranging from 1 (*does not apply*) to 3 (*certainly applies*). Reliability and validity of this scale were shown in previous research (e.g., Doumen *et al.*, 2012). Cronbach's α in the present study was .88.

Student report of behavioural engagement

Students filled out the subscale Cooperative Participation (seven items; e.g., 'I listen carefully to the teacher's instructions and directions') of the student report version of the TRSSA (Birch & Ladd, 1997). Items were rated on a 3-point scale ranging from 1 (*does not apply*) to 3 (*certainly applies*). Valiente, Swanson, and Lemery-Chalfant (2012) were the first to use this student report scale of the TRSSA and found acceptable reliability (α = .64). Cronbach's α in the present study was .88.

Teacher support

Students' perceptions of support received from their Dutch language teacher were assessed by means of the short Dutch version of the Teacher As Social Context Questionnaire (TASC-Q, Belmont, Skinner, Wellborn, & Connell, 1988; Sierens *et al.*, 2009) with subscales for Autonomy support (eight items; e.g., 'My Dutch teacher listens to my ideas'), Structure (eight items; e.g., 'My Dutch teacher tells me what he/she expects from me in class'), and Involvement (eight items; e.g., 'My Dutch teacher likes me'). All items were answered using a 5-point scale, ranging from 1 (*completely disagree*) to 5 (*completely agree*). Reliability and validity were proved in previous studies (see Vansteenkiste *et al.*, 2009).

For this study, a confirmatory factor analysis was conducted. Satisfactory model fit was reached, $\chi^2(101)$, $p <$ .001, CFI = .91, TLI = .89, RMSEA = .08, SRMR = .05, when six items for autonomy support (α = .83), five items for structure (α = .78), and five items for involvement (α = .86) were retained.

Data analyses

To detect gender differences for all investigated variables, *t*-tests were performed and Cohen's *d* effect sizes were calculated. Next, to test whether the teacher support dimensions explained the relationship between gender and behavioural engagement, mediation analyses were carried out in Mplus (Muthén & Muthén, 1998–2012). Furthermore, the possible differential role of teacher support for boys' as opposed to girls' behavioural engagement was investigated by means of multigroup analysis in Mplus (Muthén & Muthén, 1998–2012). Behavioural engagement, the dependent variable, was entered as a latent factor with student, teacher, and observer report of behavioural

engagement as observed indicators. The Full Information Maximum Likelihood Estimation option in Mplus was used to account for missing data.

Results

Gender differences in engagement and teacher support

Table 1 presents the descriptive statistics and correlations for all study variables. The *t*-tests indicated that girls reported higher behavioural engagement than boys (see Table 1). In addition, teachers and independent observers also rated girls' engagement higher than boys'. Girls also reported significantly higher teacher support (all three dimensions) than boys. Moreover, the Cohen's *d* values for the gender differences in student-reported, teacher-reported, and observer-reported engagement were .54, .43, and .42, respectively. The Cohen's *d* values for the gender differences in autonomy support, structure, and involvement were .52, .60, and .31, respectively.

Furthermore, as can be seen in Table 1, significant positive correlations were found between students' perceived teacher support and student-rated engagement. Moreover, the teacher support variables were also significantly and positively correlated with teacher and observer reports of engagement (except involvement and observer report of engagement).

Explaining the gender gap in student engagement through teacher support: A structural mediation model

To investigate the explaining role of teacher support with regard to the gender gap in student engagement, we tested a structural model with behavioural engagement as a latent dependent variable, with student, teacher, and observer report of engagement as indicators. To estimate the mediating role (Holmbeck, 1997) of the teacher support variables, three models were tested and compared. Model 1 was the direct effects model including only gender and behavioural engagement. Model 2 was the full mediation model, in which only the indirect relations between gender and engagement were modelled and the direct relationship between gender and engagement was constrained to zero. Model 3 was the partial mediation model including both the direct and indirect relationship between gender and behavioural engagement. For full mediation, Model 2 and Model 3 needed to fit the data equally well. The use of bootstrapping allowed to test for significance of the indirect effects. Models fitted the data equally well when at least two of the following requirements were met: $\Delta\chi^2$ non-significant at $p < .050$, ΔCFI $< .010$, or ΔRMSEA $< .015$ (Cheung & Rensvold, 2002).

The direct effects model (Model 1) indicated a good model fit, $\chi^2(2) = 0.587$, $p = .75$; RMSEA $= .000$; CFI $= 1.00$. Both the full mediation model (Model 2), $\chi^2(9) = 16.304$, $p = .06$; RMSEA $= .044$; CFI $= .990$, and the partial mediation model (Model 3), $\chi^2(8) = 10.662$, $p = .22$; RMSEA $= .028$; CFI $= .996$, yielded a good fit. However, deviance tests indicated that Model 3 fitted the data better than Model 2, $\Delta\chi^2(1) = 5.624$, $p = .02$; ΔRMSEA $= .016$. Thus, the indirect effect via teacher support was significant ($B = .20$; 95% CI [0.14, 0.26]; bootstrap $= 5,000$), whereas the direct effects also remained significant. This implies that the teacher support variables only partially mediated the relationship between gender and student engagement.

In all models, student-, teacher-, and observer-reported behavioural engagement were highly significant indicators of the latent construct behavioural engagement (see

Table 1. Means, *t*-tests, Cohen's *d* effect sizes and correlations between the teacher support variables and the behavioural engagement variables

Variable	Girls			Boys			*t*	*d*	1	2	3	4	5	6
	N	*M*	*SD*	*N*	*M*	*SD*								
1. Autonomy	163	3.95	0.66	227	3.58	0.76	−5.02***	.52	—	.71**	.58**	.54**	.28**	.30**
2. Structure	161	3.84	0.70	227	3.40	0.77	−5.77****	.60		—	.59**	.49**	.27**	.32**
3. Involvement	162	3.44	0.74	227	3.02	0.83	−5.24****	.31			—	.49**	.22**	.16
4. Engagement (student report)	160	2.67	0.30	225	2.46	0.46	−4.99***	.54				—	.39**	.34**
5. Engagement (teacher report)	93	2.68	0.38	146	2.50	0.46	−3.13**	.43					—	.33**
6. Engagement (observer report)	59	2.61	0.53	97	2.40	0.48	−2.59*	.42						—

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

Figure 1 for loadings in Model 3). Furthermore, all paths were significant except for the path between teacher structure and behavioural engagement. The effect sizes of the relationships between gender and the three dimensions of teacher support (β = .25, p < .001; β = .28, p < .001; β = .26, p < .001 for autonomy support, structure, and involvement, respectively) confirmed the substantial gender gap in students' perceptions of teacher support in favour of girls. The specific indirect effect with structure as a mediator was not significant (B = .04; p = .18), whereas autonomy support and involvement as mediators did yield a small, yet significant indirect effect between gender and behavioural engagement (B = .10; p = .001 and B = .06; p = .01, respectively).

Because of the small and partial mediation effects, we also tested an alternative hypothesis. This hypothesis involved switching the dependent variable and the mediators. Thus, we studied whether behavioural engagement is a mediator for gender differences in teacher support. Indeed, it is possible that when students (i.e., boys) show less engagement in class, their teachers become less supportive.

For the mediation model with engagement as a mediator, both the full mediation model (Model 2), $\chi^2(11)$ = 14.775, p = .06; RMSEA = .029; CFI = .995, and the partial mediation model (Model 3), $\chi^2(8)$ = 10.662, p = .22; RMSEA = .028; CFI = .996, yielded a good fit. Here, deviance tests indicated that Model 2 and Model 3 fitted the data equally well, $\Delta\chi^2(3)$ = 4.113, p = .25; ΔRMSEA = .001; ΔCFI = .001. Thus, engagement may be seen as fully mediating gender differences in students' perceptions of teacher support.

When we compared the two alternative mediation models by means of the Akaike information criterion (AIC), the model in which engagement was used as a mediator (AIC = 2956.025) appeared to be slightly better than the model in which teacher support was used as a mediator (AIC = 2957.912).

The role of teacher support to promote girls' versus boys' engagement
To assess the possible differential role of teacher support for boys' engagement as opposed to girls', multigroup analyses were conducted.
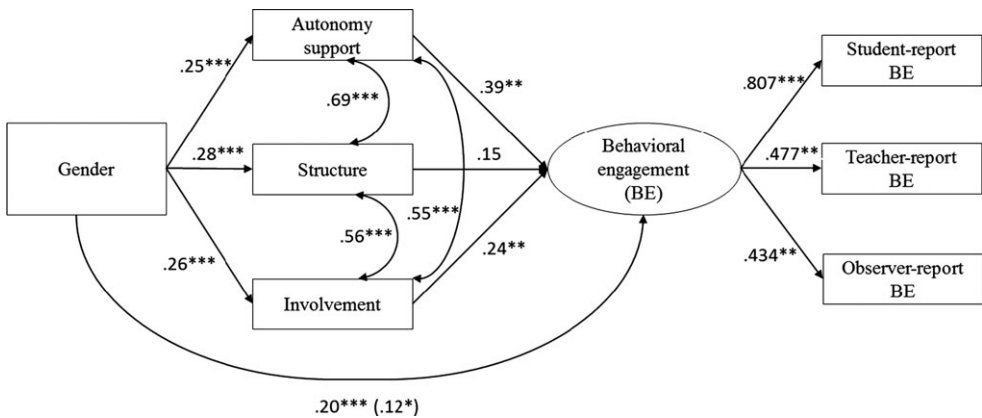

Figure 1. Structural model of the direct and indirect effects (Model 3) of the relationship between student gender and students' behavioural engagement, mediated by teacher support (autonomy support, structure, involvement). Standardized beta coefficients are shown. *Note.* *p < .05, **p < .01, ***p < .001.

A model was tested for boys and girls in which student-, teacher-, and observer-reported engagement were considered as indicators of the latent construct behavioural engagement and autonomy support, structure, and involvement were included as predictors.

A stepwise procedure was applied. First, a freely estimated model was tested (Model 1). Second, the indicators of behavioural engagement were constrained to be equal for boys and girls (Model 2) after which the covariances between the predictors were also constrained (Model 3). Third, the paths between each teacher support variable and engagement were one by one constrained to be equal across boys and girls (Models 4, 5, and 6). Paths can be considered equal across groups if the model has a comparable (or better) fit as the previous model (Holmbeck, 1997). Paths were considered invariant across gender when at least two of the following requirements were met: $\Delta\chi^2$ non-significant at $p < .050$, ΔCFI $< .010$, and ΔRMSEA $< .015$ (Cheung & Rensvold, 2002).

Table 2 presents the fit indices of all the tested models, and Table 3 presents the comparisons of the fit indices of these models. Model 6 was found to have the best model fit, $\chi^2 = 10.272$ (22), $p = .566$; CFI $= 1.000$; RMSEA $= .000$. In this model, indicators of student engagement, the covariances between the teacher support variables, and the paths between structure and engagement and between involvement and engagement were constrained across gender. Because Model 3 had a significantly better fit than Model

Table 2. Fit indices of the multigroup models with parameters free and constrained for boys/girls

	χ^2	p	CFI	RMSEA
Model 1	13.747 (14)	.469	1.000	.000
Model 2	18.287 (17)	.371	.993	.019
Model 3	20.016 (20)	.457	1.000	.002
Model 4	24.450 (21)	.272	.981	.028
Model 5	20.218 (21)	.508	1.000	.000
Model 6	20.272 (22)	.566	1.000	.000

Note. Model 1: Freely estimated; Model 2: Indicators for BE constrained; Model 3: Indicators for BE and covariances constrained; Model 4: Indicators for BE, covariances and path autonomy support-engagement constrained; Model 5: Indicators, covariances, and path structure-engagement constrained; Model 6: Indicators, covariances, and paths structure-engagement and involvement-engagement constrained.

Table 3. Differences in fit indices for the free and constrained models

	$\Delta\chi^2$	p	ΔCFI	ΔRMSEA	
Model 2 – Model 1	4.540 (3)	.209	.007	.019	Model 2 = Model 1
Model 3 – Model 2	1.729 (3)	.631	.000	.002	Model 3 = Model 2
Model 4 – Model 3	4.434 (1)	.035	.019	.026	Model 3 > Model 4
Model 5 – Model 3	0.202 (1)	.653	.000	.002	Model 5 = Model 3
Model 6 – Model 5	0.054 (1)	.816	.000	.000	Model 6 = Model 5

Note. Model 1: Freely estimated; Model 2: Indicators for BE constrained; Model 3: Indicators for BE and covariances constrained; Model 4: Indicators for BE, covariances, and path autonomy support-engagement constrained; Model 5: Indicators, covariances, and path structure-engagement constrained; Model 6: Indicators, covariances, and paths structure-engagement and involvement-engagement constrained.

4, $\Delta\chi^2(1) = 4.43$, $p = .035$; ΔCFI $= .019$; ΔRMSEA $= .026$, the path between autonomy support and behavioural engagement was not constrained to be equal for boys and girls. Figure 2 presents the standardized beta coefficients of the final model (Model 6) for boys and for girls. For boys, autonomy support was a significant predictor of behavioural engagement, whereas autonomy support was not significantly related to behavioural engagement for girls. In contrast, structure and involvement were significant predictors of behavioural engagement for both boys and girls.

Discussion

This study investigated the gender gap in student engagement by exploring two paths, that is (1) the explaining role of three teacher support dimensions (i.e., autonomy support, structure, and involvement) for gender differences in student engagement and (2) the differential effects of teacher support for student engagement. Doing so, engagement was measured from a student, teacher, and observer perspective for Dutch language classes.

First, it was demonstrated that boys showed lower behavioural engagement than girls did. This gender difference was found for student, teacher, and observer ratings, showing its robustness across informants. Moreover, boys showed lower perceptions of all teacher support dimensions for Dutch language than girls did. These findings confirm previous literature demonstrating the gender gap in engagement (e.g., Lam *et al.*, 2012; Marks, 2000) as well as in students' perceptions of teacher support (Oelsner *et al.*, 2011; Vansteenkiste *et al.*, 2012). Previous literature provides several explanations for these gender differences. For example, it was found that for antecedents of behavioural
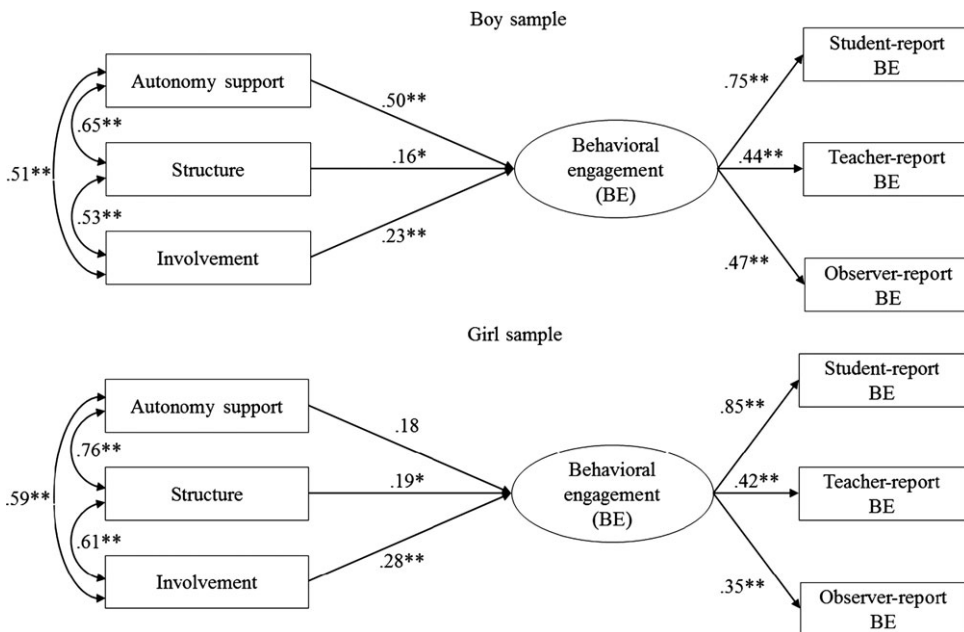

Figure 2. Teacher support variables as predictors for behavioural engagement with student report, teacher report, and observer report as indicators. Standardized beta coefficients for Model 6 are shown for the boy and girl sample. Note. *$p < .05$; **$p < .001$.

engagement such as motivation, interest, and self-regulation (Skinner & Pitzer, 2012), girls also score higher than boys (e.g., Sierens *et al.*, 2009; Watt, 2000). A related explanation for these results can be found in Brozo's (2002) argumentation that many activities and materials in the school curriculum, especially in language education, are more matching with girls' than with boys' interests. In particular, the intensive use of language and verbal learning as opposed to more visual and active learning can be seen as indicators for the more feminine characterization of (language) education (Brozo, 2002; Geist & King, 2008). These feminine aspects may explain girls' higher engagement and more positive perceptions of teacher support. Furthermore, the question rises whether teachers truly interact differently with boys than with girls or whether these gender differences are only present in students' perceptions of teacher support. Meece *et al.* (2006) found that boys indeed have more interactions with teachers than girls do because boys are more often called upon for answering questions and because boys receive more positive as well as negative feedback (e.g., acknowledgement, criticism) from their teachers. Moreover, teachers tend to be less tolerant towards boys' misbehaviour than towards girls' (Younger *et al.*, 1999). These differences may stem from different perceptions of teachers about boys as opposed to girls. As Younger *et al.* (1999) argued, teachers see the ideal student as 'female' due to the perception that girls are more compliant, willing to please, better organized, and better communicators than boys.

Second, the current study also provides an explanation for the gender gap in behavioural engagement. Support was found for the first hypothesis, that is, that the gender gap can be explained by teacher support. Autonomy support and involvement partially mediated the relationship between gender and student engagement, suggesting that boys' lower perceptions of autonomy support and involvement help explain the gender gap in student engagement. Both autonomy support and involvement were found to have unique effects in relation to behavioural engagement. In contrast, differences in boys' and girls' perceptions of structure did not explain gender differences in engagement. This is in line with previous research finding structure to be the least important predictor of student engagement, whereas autonomy support and involvement relate more directly to student engagement (e.g., Jang *et al.*, 2010; Skinner & Belmont, 1993; Tucker *et al.*, 2002). In general, however, mediated effects were small. Moreover, an alternative model in which engagement was a mediator between student gender and teacher support yielded a slightly better model. This means that boys' perceptions of their teachers as less supportive are also explained by their lower levels of engagement. Additional research on reciprocal effects between teacher support and engagement could deepen insights into this important classroom dynamic. Skinner and Belmont (1993) found reciprocal effects between teacher support (i.e., autonomy support, structure, and involvement) and student engagement (i.e., behavioural and emotional) for Grade 3–5 students. Hafen *et al.* (2012) and Van Ryzin (2011) found reciprocal effects between student engagement and autonomy support for high school students.

Third, we also found support for the second hypothesis, that is, the differential role of teacher support for gender differences in student engagement. Autonomy support was demonstrated to be significantly related to boys' engagement, but not to girls' engagement, whereas structure and involvement were equally related to boys' and girls' engagement. Moreover, the largest effect size in the model for boys was found for autonomy support, indicating that it is a key predictor of boys' behavioural engagement. In contrast, the effect of autonomy support on engagement was not significant for girls. The results concerning autonomy support confirm hypotheses from the academic risk perspective (Hamre & Pianta, 2001) and are in line with the literature indicating that

providing choice and indicating relevance may be more important for boys' engagement than for girls' (Geist & King, 2008; Martin, 2003). A possible explanation for this differential role of autonomy support could be that girls tend to be more likely to put effort into boring tasks than boys do (Williams *et al.*, 2002). In order for boys to put effort into a task and thus be behaviourally engaged, the task needs to be appealing to them. Then, in fact, the provision of choice and freedom in the task and indicating the relevance of the task, which are core elements of autonomy support, seem highly relevant for boys but not for girls. However, we should keep in mind that we only measured boys' and girls' behavioural engagement, not the underlying reasons for being engaged. Although girls may be more behaviourally engaged and are more likely to put effort into tasks, the reason for their engagement may be controlled (i.e., doing an activity because feeling pressed) rather than autonomous (i.e., doing an activity with a feeling of choice or willingness; Deci & Ryan, 2008). Future research should investigate the quality of girls' and boys' motivation in addition to their engagement and perceptions of teacher support.

For structure and involvement, associations with engagement were the same for boys and girls. Thus, we could not confirm the academic risk hypothesis (Hamre & Pianta, 2001) for involvement and structure, nor could we support previous findings that teacher support is more important for boys' than for girls' engagement (Roorda *et al.*, 2011; Suldo *et al.*, 2009). Instead, our findings are more in line with literature reporting no gender differences in the relationship between these two teacher support dimensions and engagement (Lam *et al.*, 2012; Tucker *et al.*, 2002; Wang & Eccles, 2012). Due to the systematic examination of all three teacher support dimensions together, this study allowed for additional insight into the inconsistent findings in literature. Nevertheless, future research should continue focusing on these differential effects for boys' versus girls' engagement to see whether these results could be replicated in various settings.

When comparing evidence for the mediation hypothesis versus the differential effects or moderation hypothesis, we can conclude that there is more support for the differential effects hypothesis. Teacher support mediated gender differences in engagement, but only partially. Moreover, an alternative model in which engagement acts as a mediator fitted at least as good. In the differential effects model, all relationships between the teacher support variables and engagement were significant, except the one between autonomy support and engagement for girls. In other words, whereas teacher structure and involvement contributed to the engagement of both girls and boys, autonomy support proved to be specifically relevant for the engagement of boys.

Implications for educational practice

These findings yield important implications for educational practice. First, the gender gap in student engagement and in students' perceptions of teacher support was confirmed. It is important that teachers are aware of the fact that boys are more at risk to show lower behavioural engagement than girls and that they perceive teacher support to be lower. Second, it is interesting for teachers to know that boys' lower behavioural engagement is related to their lower perceptions of teacher autonomy support and involvement. It has been proved that awareness of a certain problem or situation can stimulate change in teachers' behaviours (Spilt, Koomen, Thijs, & van der Leij, 2012). Training programmes for teachers could thus challenge teachers to reflect upon this phenomenon for their own practice: Is this gender gap present in my classes and which boys are actually less engaged and perceive me to be less supportive? Do I often mention the relevance of the learning material? (i.e., autonomy support) and Do I show interest in my students? (i.e.,

involvement). Because it has been argued that education might align more with the interests and preferences of girls (e.g., verbalization, intensive use of language; e.g., Brozo, 2002), one possibility in trying to address the gender gap in educational practice could be to challenge schools' perceptions of what constitutes an optimal learning environment (for both genders). For example, schools might be stimulated to apply more visual and active approaches in addition to the common verbal learning (see Brozo, 2002). Linking this with autonomy support, for instance, teachers could provide students with both a visual and verbal approach to the subject matter. Then students could choose which approach they find more suitable.

Second, if teachers really interact differently with both genders (see Meece *et al.*, 2006; Younger *et al.*, 1999), education faces the challenge of countering possible stereotypical images of boys as being misbehaved and of girls as being compliant. In conclusion, critical reflection on gender differences in educational practice and raising teachers' awareness concerning gender stereotypes could enhance boys' (and girls') engagement in class and at school.

Third, our results indicated that for both boys and girls, structure and involvement are related to their engagement. For boys, an additional focus on autonomy support is desirable because the present study indicated that autonomy support appeared to be a protective factor specifically for boys' engagement. Thus, by focusing more on autonomy support, the gender gap in engagement may be reduced. Teachers could be made aware of the importance of teacher support for daily class practice and of the difference in importance of autonomy support for boys versus girls. Encouragement to focus on autonomy support to enhance boys' engagement could be advisable. In this respect, adequate guidance in what exactly constitutes this autonomy support is necessary. It has been demonstrated that teachers are very well able to learn this practice of being autonomy-supportive, for which SDT is a practical, theoretically well founded framework (e.g., Reeve, 2006). However, caution is needed not to confirm gender stereotypical thinking of teachers, which could widen the gender gap (Heemskerk, van Eck, Kuiper, & Volman, 2012; Martino, Lingard, & Mills, 2004). Moreover, due to increased attention to autonomy support for boys, girls might experience feelings of unfairness if they noticed that teachers were more autonomy supportive towards boys. It is thus advisable, when establishing interventions for teachers to bridge the gender gap in engagement, to guide teachers thoroughly in applying elements of autonomy support, structure, and involvement in their classrooms.

Limitations and suggestions for future research

Some limitations should be taken into account when interpreting the findings in this study. First, we investigated a modest sample size, especially for the observational measure. This study should be replicated with a larger sample to confirm the robustness of the results. Also, because of the limited number of classes, combined with the use of multigroup analyses, we were not able to take into account the multilevel structure of our data. Still, exploratory analyses in Mplus with the type=complex command, which controlled for the multilevel structure in the data, yielded very similar results. Further research on larger samples and involving more classes is recommended to test whether conclusions hold if nesting of students in classes is accounted for.

Second, the current cross-sectional study does not allow to examine reciprocal effects. Reciprocal effects between teacher support and student engagement seem plausible, given previous research (see Hafen *et al.*, 2012; Skinner & Belmont, 1993; Van Ryzin,

2011) and the current study's finding that alternative models in which the mediator and the outcomes were reversed showed similar model fit. Therefore, the results call for further longitudinal research to clarify the directionality of the effects.

Third, the analyses for Dutch language in this study should be replicated for other school subjects. This will allow a comparison between these results and, for example, the results for mathematics, for which Meece *et al.* (2006) found that boys are more engaged.

Fourth, these results should be replicated not only for behavioural engagement, but also for cognitive and emotional engagement in order to draw additional conclusions about the various student engagement dimensions.

Finally, we only used student report for measuring teacher support. Future research using observations of teacher support in addition to (teachers' and) students' perceptions of teacher support will contribute to more profound conclusions on whether teachers truly interact differently with boys as opposed to girls.

Conclusions

We have found strong evidence for the gender gap in student engagement using students' self-report, teacher report, and observer report and in students' perceptions of teacher support in favour of girls. Moreover, autonomy support and involvement partially explained gender differences in behavioural engagement. Stronger evidence was found for differential effects of teacher support: Autonomy support appeared to be only relevant for boys' engagement but not for girls', whereas structure and involvement have been demonstrated to be equally important predictors of boys' and girls' engagement.

Although caution is needed not to widen the gender gap by proposing interventions specifically directed to one gender, schools, and teachers should be made aware of this gender gap and of the importance of different teacher support dimensions in explaining and bridging gender differences in engagement.

Acknowledgements

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