



Utrecht University

The effect of teacher expectations on the gender gap in reading performance

About the extent to which low teacher expectations lead to boys'
underperformance in reading



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Abstract

Prior research indicates that there exists a gender gap in reading performance among primary school students in which boys underperform compared to girls. Lacking this basic skill has detrimental effects for boys themselves and for society as a whole in which men can achieve less in and for society. The current research has, firstly, focused on the extent to which teacher expectations can explain this gender gap in reading performance. Theories about existing gender stereotypes among teachers and the Pygmalion effect indicating that high teachers expectations should lead to high student reading performance are discussed. Next, it is examined to what extent high teacher expectations can 'buffer' against boys' underperformance in reading in which boys' reading performances are indicated to be more impacted by teacher expectations compared to that of girls due to felt stereotype threat and stigmatization. The 2016 Dutch PIRLS dataset and two different operationalizations of teacher expectations were used to examine the mediating and moderating effect of teacher expectations on the effect of student gender on students' actual reading performance. The conducted multiple OLS regression analyses found that, although the gender gap in reading performance indeed exists, teacher expectations do not significantly explain it. High teacher expectations do not significantly lead to high student reading performance and only teacher expectations perceived by students themselves significantly differ between boys and girls. Lastly, the research does not support the moderation effect: high teacher expectations do not significantly have more impact on boys' compared to girls' reading performances. Limitations of the current research and implications for future research are discussed.

Keywords: gender gap – reading performance – teacher expectations – primary school students – Pygmalion effect – gender stereotypes – PIRLS

Introduction

Multiple studies show that there is a gender gap in reading achievement among primary school students in the Netherlands in which girls outperform boys in reading (Driessen & Langen, 2007; Driessen & Langen, 2013; Onderwijsraad, 2020; Wijnstra, 2001; Ma, 2008; OECD, 2014). Current literature suggests that at the moment, the gender difference in reading is larger than gender differences in other school subjects (Driessen & Langen, 2013; Cappon, 2011; Driessen & Langen, 2007; OECD, 2014). This large gender difference in reading ability is problematic because reading skills of primary school students influence how well they will perform in those other school subjects like math and science (Martin & Mullis, 2013). So a widening gender gap in reading performance may cause boys' math and science performances to also decrease, while boys' high educational achievements are now mostly dependent on high performances in these subjects. This decrease of boys' overall educational achievements due to an increasing gender gap in reading performance, in turn, causes that many boys are at risk to encounter certain obstacles on the long-term in which they can achieve less in education, on the job market, and in their life in general (Martin & Mullis, 2013). This is detrimental for boys themselves, but also for society as a whole. Many boys do not get the chance to fully develop their potential knowledge and capacities and, therefore, will achieve less in and for society (Onderwijsraad, 2020).

Several explanations are offered for this educational disadvantage of boys. One considered factor is the different expectations teachers have about students' reading ability based on students' gender in which boys underperform in reading because teachers expect them to (Onderwijsraad, 2020; Harris, 2013; Robinson & Lubienski, 2011; Gentrup & Rjosk, 2018; Tsiplakides & Keramida, 2010). Primary school teachers have a great influence on the development of their students capacities because their job is to guide them through their school career and to stimulate them to perform the best they can (Onderwijsraad, 2020; Retelsdorf et al., 2015; Fan, 2011; Good, 1987; Martin & Mullis, 2013). Therefore, student-teacher relationships influence students' engagement and success at school (Hughes & Kwok, 2007). In fact, most research investigating the direct effect of teacher expectations on student educational performance shows a significant positive effect: higher teacher expectations lead to higher student educational performance (De Boer et al., 2010; Trouilloud et al., 2002; Jussim & Eccles, 1992; Tsiplakides & Keramida, 2010; Wang et al., 2018; Robinson & Lubienski, 2011). Boys and girls may have different educational expectations of themselves due to different expectations teachers hold about boys versus girls. This, in turn, can cause students making choices in their adult lives to meet those expectations, and disregarding

choices not fitting those expectations (Onderwijsraad, 2020). More specifically, prior research suggests that teacher expectations may have an important influence on students' reading attitudes and abilities (Boerma et al., 2016; Cappon, 2011; Robinson & Lubienski, 2011). Therefore, the current research paper will investigate the influence of differing teacher expectations on educational gender differences in reading achievement between individual boys and girls at primary school. To find out exactly how teacher expectations have an impact on the gender gap in reading, two different kinds of teacher expectations will be taken into account: those perceived by students and those perceived by teachers.

Some prior research investigated whether teacher expectations mediate the effect of students' gender on students' reading achievement outcomes. The Pygmalion effect might explain this mediation effect in which teachers' communication and behavior towards students based on their expectations influences students' own behavior and expectations in such a way that teachers' initial expectations about those students will be confirmed (Jones & Dindia, 2004; Trouilloud et al., 2002; Gentrup & Rjosk, 2018). This phenomenon in which certain teacher expectations become reality because it was expected by them is called a 'self-fulfilling prophecy' (Gentrup & Rjosk, 2018; Tsiplakides & Keramida, 2010). De Boer and colleagues (2010) found a significant mediation effect of teacher expectations. But Gentrup and Rjosk (2018) did not find a significant effect of teacher expectations partly explaining gender gaps in reading. Furthermore, Dusek and Joseph (1983) found that the height of teacher expectations does not significantly differ between boys and girls in the first place. The current research paper will investigate which findings can be supported by answering the following research question about the mediation effect of teacher expectations on the effect of students' gender on students' reading performance:

- 1. To what extent can the gender difference in students' reading performance be explained by teacher expectations?*

Prior research also investigated whether teacher expectations have more impact on boys' or girls' reading performances by looking at whether teacher expectations moderate the effect of students' gender on students' reading achievement outcomes. Prior literature states that boys' reading achievements may be more impacted by and more vulnerable to teacher expectations than girls' reading achievements due to felt stereotype threat and stigmatization about reading abilities among boys (Jussim & Harber, 2005; Hinnant et al., 2009; Pansu et al., 2016; Gentrup & Rjosk, 2018; Robinson & Lubienski, 2011). On the one hand, some research

did not find significant effects of the interaction between teacher expectations and students' gender on students' achievement outcomes in reading (De Boer et al., 2010; Gentrup & Rjosk, 2018). On the other hand, research investigating whether stigmatized groups are more susceptible to negative teacher expectation effects show that teacher expectations about mathematics performances are more powerful among girls than boys (Jussim et al., 1996, as cited in Wang et al., 2018; McKown & Weinstein, 2002). This higher susceptibility to negative teacher effects among girls is in the literature explained by the stigmatization of girls as being bad in mathematics. This raises the question whether boys are more susceptible to negative teacher effects than girls regarding their reading achievements with the reasoning that boys are stigmatized to perform bad in reading. The current paper will investigate whether teacher expectations significantly moderate the effect of students' gender on students' reading performance by answering the following research question:

2. *To what extent do teacher expectations have a differential impact on boys' and girls' reading performance?*

Both the mediation and moderation effect of teacher expectations are important to investigate because they both entail a different influence of teacher expectations on boys' and girls' reading performances. On the one hand, the mediation effect entails whether the existing gender gap in reading performance, in which boys underperform compared to girls, may be partly explained by teacher expectations. When there exists a significant mediation effect, the gender gap in reading performance should become smaller when teacher expectations would not matter anymore (Nilsen & Bergem, 2020). On the other hand, the moderation effect indicates whether this gender gap varies depending on how high teacher expectations are. Teacher expectations have differential effects on boys and girls when there exists a significant moderation effect (Nilsen & Bergem, 2020). For example, if teacher expectations have a stronger positive effect on boys' than on girls' reading achievements, high teacher expectations may work as a 'buffer' against boys' low reading performance.

The 'Progress in International Reading Literacy Study' (PIRLS) will be used as dataset to answer both research questions. The dataset includes primary school students' reading achievement scores as well as some of their background characteristics, like their gender. Furthermore, teachers have answered some general questions about their school classes and students have answered questions about how they perceive their teacher (PIRLS 2016 International Database, 2018). Because surveys are conducted indicating both teachers'

and students' perception about teachers' expectations, the current study can test in what way teacher expectations might could narrow the gender gap in reading. It will be examined to what extent teachers' perceptions about boys being worse in reading than girls have to change, or whether boys' own perceptions indicating low teacher expectations about their reading abilities have to change. Prior literature often only takes into account the operationalization of teacher expectations perceived by teachers themselves and does not consider how students themselves perceive expectations teachers have about them (Åhslund & Boström, 2018; Boerma et al., 2016; De Boer et al., 2010; Gentrup & Rjosk, 2018; Hinant et al., 2009; McKown & Weinstein, 2002; Trouilloud et al., 2002). Therefore, this study contributes to already existing literature about the influence of teacher expectations on the gender gap in reading performance by comparing both operationalizations.

Theory

Prior literature indicates the possibility of teacher expectations mediating the effect of students' gender on students' reading achievements. Furthermore, a moderation effect in which teacher expectations have more impact on boys' than on girls' reading achievements is often discussed. Both effects will be explained in detail below.

The mediation effect of teacher expectations

Prior literature states that teacher expectations might explain the gender gap in student reading performance. In the first paragraph, the possible existence of a gender gap in teacher expectations will be explained in which teachers expect less from boys' compared to girls' reading abilities. Next, factors explaining the positive effect of teacher expectations on student reading performance will be discussed. From this follows the mediation effect in which teacher expectations differ based on students' gender and these teacher expectations, subsequently, influence students' reading performances.

The effect of students' gender on teacher expectations

Several factors might explain why teachers have lower expectations about boys' reading performances in the first place. First of all, differences in behavioral characteristics teachers perceive within boys and girls may influence teachers' expectations of boys' general underperformance in school subjects compared to girls (Gentrup & Rjosk, 2018). Åhslund and Boström (2018) state that teachers seem to have higher expectations of students who they perceive as self-confident, independent, and having positive work habits at school. Prior

research shows that teachers more often perceive that girls have these traits compared to boys. Teachers seem to perceive girls as putting forth more effort, being more independent, having better communication skills, being more organized, and being less disruptive than boys (Buchmann et al., 2008; Jussim & Eccles, 1992; Åhslund & Boström, 2018; Downey & Yuan, 2005). Boys, on the other hand, are often perceived by their teachers as dependent, idle, and unmotivated (Åhslund & Boström, 2018; Downey & Yuan, 2005). Research findings show that, already in primary school, boys find it harder to pay attention and to complete certain tasks on time. Girls, on the other hand, show advantages in orientation to learning and other social skills: they show persistence in finishing tasks and an eagerness to learn (Buchmann et al., 2008). This perceived differential classroom behavior between boys and girls found in prior research might explain why teachers have lower expectations about boys' compared to girls' educational performance in general. Secondly, gender stereotypes that teachers hold are considered to play a large role in explaining differing teacher expectations of boys' and girls' reading performance, specifically. According to expectancy-value theory, teachers hold different stereotypic expectations in which some demographic groups are favored while others are not. In this case, prior research found that there exists a stereotype among teachers that boys, on average, are worse in reading than girls are (Retelsdorf et al., 2015; Ma, 2008; Martin & Mullis, 2013; Wolter et al., 2015; Muntoni & Retelsdorf, 2018). The existence of this stereotype might lead to lower teacher expectations of boys' reading abilities. So teacher expectations about boys' reading performance may be even lower than their expectations about boys' general educational performance due to gender stereotypes teachers hold.

Considering teacher expectations about boys' and girls' behavioral characteristics and about their reading achievements, Åhslund and Boström (2018) found that when boys and girls behave alike, those behavioral characteristics are interpreted differently due to traditional gender stereotypes teachers hold. So, for example, when girls talk very much during class, they may be seen as social, talkative, and having high communication skills. On the other hand, when boys do this, they may be perceived as not paying attention, being unmotivated, and being unconcentrated. This shows that traditional gender stereotypes hold by teachers may not only directly lead to lower teacher expectations about boys' reading abilities. These gender stereotypes might also indirectly lead to these low reading expectations through teachers' stereotypic perception of boys' behavioral characteristics entailing that they are less involved, less hardworking and more dependent compared to girls. Taken together the mentioned effects, the following hypothesis can be formulated:

1. *There exist lower teacher expectations about boys' compared to girls' reading abilities.*

The effect of teacher expectations on students' reading achievements

It is stated in prior literature that teacher expectations influence student achievement through self-fulfilling prophecies. This entails a mechanism in which certain expectations become reality due to the fact that people act according to these expectations because it was expected by others. Applied to teacher expectations, when a teacher has low expectations of students' educational performances, those students will perform in accordance with these low expectations of the teacher (Gentrup & Rjosk, 2018; Tsiplakides & Keramida, 2010). This has been referred to as the Pygmalion effect in which teachers communicate their expectations of students through behavior, which subsequently changes the behavior and expectations of those students in such a way that teachers' initial expectations of them will be confirmed (Jones & Dindia, 2004; Trouilloud et al., 2002; Gentrup & Rjosk, 2018). Following this mechanism, it is expected that boys have lower reading achievements compared to girls because teachers expect this and, in turn, boys will perform in accordance with those low expectations. When taking a deeper look into how this self-fulfilling prophecy works, three distinct processes can be identified which explain how exactly teacher expectations influence students' actual reading achievements. The first process focuses on how teachers' differential learning opportunities they give to students of which they have high versus low expectations influence students' reading performances. The focus of the second process lies on the influence of differential social interactions between teacher and student on students' self-concept and, subsequently, their reading performances. The third process explains how students' self-concepts and ability beliefs get influenced by teacher expectations through attributions students make about themselves in accordance with these perceived teacher expectations and how these ability beliefs, in turn, influence students' reading performances.

Firstly, prior literature indicates that teachers' behavior towards students differs based on their expectations. The difference in learning opportunities teachers give to students of which they have high versus low expectations is often indicated as an important factor explaining the positive effect of teacher expectations on students' reading achievements through teachers' behavior. Students of which teachers have high expectations seem to get more learning opportunities and, therefore, perform higher compared to students of which teachers have low expectations (De Boer et al., 2010; Good, 1987; McKown & Weinstein, 2002; Boerma et al., 2016; Jussim & Harber, 2005; Tsiplakides & Keramida, 2010; Wang et

al., 2018). Teachers also seem to teach a larger amount and more difficult materials to students of which they have high expectations (Good, 1987; Jussim & Harber, 2005). Furthermore, teachers are likely to give their high expectancy students more opportunities to demonstrate mastery by, for example, providing high achievers with opportunities to answer more difficult questions (Jussim & Harber, 2005; Tsiplakides & Keramida, 2010). Teachers also give these students more feedback about their performances (Good, 1987; Jussim & Harber, 2005; Good et al., 1980). Lastly, Boerma and colleagues (2016) show that students who are expected by teachers to achieve low in reading often receive other opportunities to acquire reading skills than other students. For example, students might get physically placed in separate groups with other students who have a low reading performance.

These different ways in which teachers give more and different kinds of opportunities to high-expectancy students than to low-expectancy students may lead to the development of a negative self-concept among low-expectancy students (Boerma et al., 2016). Students' self-concept involves their own expectations, competence beliefs and achievement-related behavior regarding their reading abilities (Retelsdorf et al., 2015; Fan, 2011; Martin & Mullis, 2013). Because teachers have daily social interactions with their students, expectations of teachers have a great influence on students' own self-concept. Empirical results indicated in prior research show that teachers interact differently with students based on their expectations (Wang et al., 2018). For example, they seem to create more warm social-emotional relationships (Good, 1987; Jussim & Harber, 2005; Tsiplakides & Keramida, 2010) and initiate more favorable interactions more frequently with students of which they have high expectations (Jones & Dindia, 2004; Good et al., 1980). Therefore, students self-concepts can be influenced positively or negatively depending on the height of teacher expectations. This self-concept is positively influenced when teachers show that they have high expectations of students through motivating and stimulating them to put much effort in and to perform as good as possible in reading (Retelsdorf et al., 2015; Fan, 2011; Good, 1987). On the other hand, students' self-concepts are negatively influenced when teachers show that they have low expectations of students by creating a cold and less challenging environment for them (Retelsdorf et al., 2015).

The development and transformation of students' self-concepts and ability beliefs occurs as students themselves make attributions based on teacher expectations they perceive through opportunities and social interactions they receive from their teacher. Attribution theory models suggest that expectations of teachers influence students' attributional thinking about the reasons for their successes and failures (Good, 1987). When a teacher has high

expectations about students' reading abilities, these students will believe that they have the ability to succeed at reading tasks if they apply reasonable effort. Students will believe that they can succeed if they try. This indicates a positive development of students' self-concept. Subsequently, those students will try their best to perform as good as possible and, therefore, perform high in reading. But when a teacher expects little from certain students' reading abilities, those students will become to believe that they have not the ability to succeed in reading. They will fall into a 'failure syndrome' or 'learned helplessness pattern'. This entails that students will discount their successes to luck and will attribute their failures to a lack of ability rather than to insufficient effort or reliance on an ineffective strategy. Consequently, students' self-concepts are negatively influenced. Therefore, they will try less hard to become better in reading and, in turn, perform low in reading tasks (Good, 1987). Applied to the current research, boys may perform low in reading compared to girls because boys think they lack reading abilities due to low teacher expectations and, therefore, will put less effort in reading. Literature highlights empirical evidence that students can sense whether teachers believe they have the ability to succeed or not through verbal and nonverbal interactions and behaviors from teacher to student (Good, 1987; Boerma et al., 2016; Wang et al., 2018). It is believed that teachers indirectly suggest that students have not the ability to succeed when they minimize demands on those students, overreact to their minor successes, and respond to failures with pity instead of trying to identify the cause of the failure (Good, 1987).

Prior research notes that expectations only cause behavior and act as self-fulfilling prophecies on student achievements if expectations are rigid and inflexible (Jones & Dindia, 2004). This is the case when teachers base their expectations on demographic characteristics of students like their gender. So because of gender stereotypes teachers might hold, teachers create lower expectations of boys' reading abilities compared to that of girls. As a consequence, boys develop more negative self-concepts about their reading abilities compared to girls and are, in turn, less motivated to achieve high in reading (Retelsdorf et al., 2015).

In accordance with expectancy-value theory, empirical results found by Retelsdorf and colleagues (2015) provide evidence that not only gender stereotypes of parents and students themselves but also those of teachers play an important role in shaping students' self-concept and, in turn, may explain gender differences in reading achievement. Another empirical result shows that when teachers have traditional gender role attitudes, indicating that girls are better in reading compared to boys, boys tend to have lower reading achievements than when teachers hold more egalitarian gender beliefs (Wolter et al., 2015).

Taken together all these influences, the following hypothesis about the influence of teacher expectations on students' reading achievements can be formulated:

2. *The lower the teacher expectations about students' reading abilities, the lower students' actual reading performance will be.*

The moderation effect of teacher expectations

There may exist an interaction effect of teacher expectations and students' gender on students' reading achievements in which the gender gap in reading achievement depends on how high teacher expectations are for boys and girls. It may be the case that high teacher expectations protect boys from low reading achievements.

Research about stereotype threat gives an explanation of how teacher expectancy effects could narrow the gender gap in reading (Gentrup & Rjosk, 2018; McKown & Weinstein, 2002). It is identified that people their cognitive abilities and motivation decrease when they feel the threat of confirming to a negative stereotype. Therefore, students who are members of a certain stigmatized group due to a stereotype may show poorer performance because of the anxiety of confirming the stereotype (Pansu et al., 2016; McKown & Weinstein, 2002). In this case, boys belong to the stigmatized group because of the gender stereotype that boys are less successful in reading compared to girls. Therefore, boys' reading performance may become closer to that of girls when stereotype threat is reduced. This might be the case because reduced stereotype threat creates higher teacher expectations about boys' reading performance (Gentrup & Rjosk, 2018; Pansu et al., 2016; McKown & Weinstein, 2002; Robinson & Lubienski, 2011; Jussim & Harber, 2005; Hinnant et al., 2009).

Pansu and colleagues (2016) investigated whether and how reduced stereotype threat affects boys' reading performances. They looked at the gender gap in reading between boys and girls who were randomly assigned to the threat condition or the reduced-threat condition. Their results show that boys have significantly lower reading scores compared to girls in the threat condition. But in the reduced-threat condition, boys significantly perform as well as girls in reading. Girls' reading scores do not significantly differ between the threat and reduced-threat condition. Furthermore, boys evaluate their own reading performance more positively than girls within the reduced-threat condition while they evaluate this less positively when stereotype threats are present. This may indicate that reduced stereotype threat leads to more confidence and the development of a positive self-concept about reading abilities among boys which, in turn, leads to higher reading scores among them. When taking

into account that teachers are likely to base their low expectations of boys' reading abilities on traditional gender stereotypes (Retelsdorf et al., 2015; Ma, 2008; Martin & Mullis, 2013; Wolter et al., 2015), these findings suggest that boys will perform higher in reading when teacher expectations are high due to reduced stereotype threat.

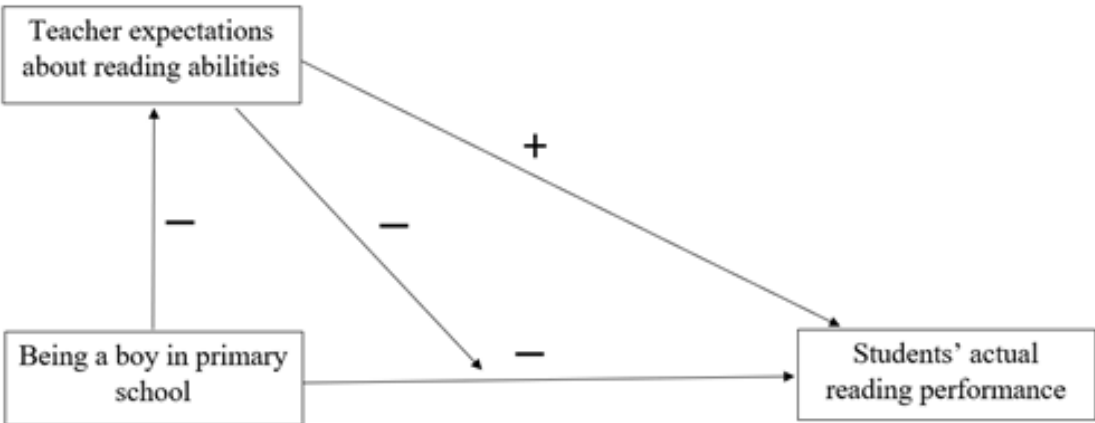
There exists other research showing that high teacher expectations mostly increase the reading abilities of stigmatized groups compared to other groups (Jussim & Harber, 2005; Hinnant et al., 2009). For example, Hinnant and colleagues (2009) found that minority boys show the greatest gains in reading performances when their abilities are overestimated by teachers. Furthermore, some research pointed out that students who are socially dependent on significant others are especially impacted by high teacher expectations (Good and Nichols, 2001). So assuming that boys are more dependent, when it comes to reading, than girls are because girls have high organization skills, an eagerness to learn and more discipline (Buchmann et al., 2008; Jussim & Eccles, 1992; Åhslund & Boström, 2018; Downey & Yuan, 2005), this finding may implicate that high teacher expectations have a stronger positive impact on boys' compared to girls' reading performances in such a way that the gender gap in reading becomes smaller.

Taking together the mentioned stereotype threat and stigmatization effects, high teacher expectations are expected to narrow the gender gap in reading because it increases boys' reading performance in such a way that their reading performances become closer to that of girls. Subsequently, the following hypothesis can be formulated:

- 3. *High teacher expectations have more impact on increasing boys' compared to girls' actual reading performance.*

All hypothesized effects are graphically presented in a path model (see Figure 1).

Figure 1: path model of hypotheses.



Data & Methods

The ‘Progress in International Reading Literacy Study’ (PIRLS) will be used as dataset to answer the mentioned research questions (Martin et al., 2017). The purpose of PIRLS is to construct datasets that can be used to conduct international comparative research on the reading skills of fourth grade primary school students (who are called sixth grade students in the Dutch educational system). To achieve this goal, reading tests are administered during data collection and information about background characteristics of students, their parents, teachers, and school leaders is collected. Since 2001, the PIRLS tests and questionnaires have been administered every five years in many countries around the world. In the current research, the 2016 Dutch PIRLS dataset will be used (Gubbels et al., 2017).

The PIRLS 2016 reading test consists of twelve reading texts. In order to create a reading test of high quality, a trial measurement was first conducted at different schools to test the reliability and validity of the reading test. Based on these analyses, the reading texts for the main measurement were selected. To ensure that schools were not approached for both measurements, the samples for the trial measurement and the main measurement were determined at the same time (Gubbels et al., 2017). Furthermore, two stratification variables were taken into account when drawing the sample. Firstly, the average ‘student weight’ of the school is considered. This indicates the average assumed disadvantage of students at a certain school based on the average educational level of these students' parents (Mulder & Meijnen, 2013). Furthermore, the degree of urbanization has been taken into account when drawing samples. To ensure reliable results, the samples also included two reserve schools per selected school that matched as closely as possible with the originally selected school in terms of the mentioned stratification variables. Lastly, when schools had multiple fourth grade classes, all classes participated (Gubbels et al., 2017).

To ensure that the participating schools are representative for the actual Dutch situation, approximately 4000 students are required to take the reading test in which at least 50% of the schools in the main sample should participate. To accomplish a representative sample with enough students, reserve schools are selected which can participate when originally selected schools refuse to do so. The final response rate after approaching reserve schools should be at least 85% to have a representative sample. During the assessment of PIRLS 2016 in the Netherlands, 67% of the schools in the main sample have participated and, after approaching reserve schools, the final response rate was 88%. At the end, a total of 4206 students divided across 132 schools and 226 classes took the PIRLS 2016 test in which the average age of students is 10,1 years. Of these 4206 students, 4179 also filled in the student

questionnaire. This entails a response rate of 99% (Gubbels et al., 2017). To conclude, the Dutch PIRLS 2016 dataset is representative for all Dutch fourth grade students.

Although the Dutch PIRLS 2016 dataset can be perceived as representative, certain groups of schools and students are systematically excluded from the sample (Martin et al., 2017). For example, some schools may be excluded because of the extremely small number of fourth grade students they got, or because their grade structure or curriculum is radically different from the mainstream educational system. Certain groups of students that are excluded from the sample are those with functional and/or intellectual disabilities, and those who do not read or speak the language of the reading test. To ensure that the sample remains representative for the actual Dutch population, the number of excluded students does not account for more than 5% of the Dutch target population.

The reports written by Gubbels and colleagues (2017) and Martin and colleagues (2017) can be consulted for further details concerning the data collection and the exact way the data collection was executed.

Data selections

The initial number of cases in the Dutch PIRLS 2016 dataset was 4206. Due to the existence of missing values within certain variables that are needed to test the mentioned hypotheses, some cases are lost during the construction of variables. Therefore, these cases will not be included in the analyses. Items measuring teacher expectations perceived by students ($N_{\text{missing}} = 60$; 1.4% of total cases) and by teachers ($N_{\text{missing}} = 283$; 6.7% of total cases) indicated missing values. Missing values also existed within the variables used to control for whether students speak Dutch at home or not ($N_{\text{missing}} = 53$; 1.3% of total cases), and to control for economic ($N_{\text{missing}} = 132$; 3.1% of total cases) and cultural ($N_{\text{missing}} = 58$; 1.4% of total cases) parental socioeconomic status. Respondents who have a missing value on one of these variables are not included in the analyses. Taken together, the final number of cases that will be used in the analyses is 3730.

Operationalizations

Actual reading performance

To measure the dependent variable, the mean of five plausible values measuring students' overall reading performance has been calculated. These plausible values are derived by using item response theory (IRT) scaling. In this way, reliable estimates of student reading performance on the assessment as a whole can be made, although each student only got one

reading test booklet containing only a part of the entire assessment. Working with plausible values ensures the accuracy of estimates of the reading proficiency distributions so that comparisons in reading achievement can be made between different individual students and subpopulations (Martin et al., 2017). This is important for the current research because the differences in reading performance between boys and girls and between students who perceive low versus high teacher expectations will be analyzed. From this scaling, reading performance scales are created with most performance scores ranging from 300 to 700. International benchmarks are provided to indicate whether students score low (400), intermediate (475), high (550), or advanced (625) in reading (Martin et al., 2017). Looking at the descriptive statistics in Table 1, it can be seen that the minimum reading score entails 347.26 and the maximum reading score 737.13. The mean reading score is 548.46 with a standard deviation of 55.70. So the Dutch mean reading score is relatively high according to the international benchmark provided by PIRLS (Martin et al, 2017).

Teacher expectations about reading abilities perceived by students

Students' perception about expectations their teachers have about their reading abilities are measured by constructing a scale including items answered by students themselves. In the current research, one discussed factor explaining how teacher expectations influence students' reading achievements entails the attributions students make about their own reading abilities through sensing the expectations teachers have about them (Good, 1987; Boerma et al., 2016; Wang et al., 2018). This factor highlights that students' own experience of teacher expectations may better show the real impact of teacher expectations on students' own reading achievement than that teachers' experience of their expectations about their students will. For example, teachers might indicate that they have high expectations about certain students while these students perceive this differently or not at all and, therefore, still perform low in reading. The used items to measure this are shown in Table A1 in the appendix. Students had to report whether they agreed a lot (1), agreed a little (2), disagreed a little (3), or disagreed a lot (4) with statements about their teacher like 'my teacher tells me how to do better when I make a mistake'. For the current research, all items are first recoded in such a way that a high value on the items indicates high teacher expectations perceived by students. Next, a reliability analysis is conducted to verify whether the different items positively correlate with each other. This analysis shows a Cronbach's alpha of .700, which indicates an acceptable reliability. Then, based on the average item scores, the scale is constructed. Respondents are included in the scale only if they have a valid value on three out of four of

the items. It can be noted in Table 1 that, on average, the perceived teacher expectations are relatively high (mean = 3.40) with a standard deviation of .56.

Teacher expectations about reading abilities perceived by teachers

All analyses including teacher expectations perceived by students themselves will also be conducted with a variable measuring teacher expectations perceived by teachers themselves. This will demonstrate whether teacher expectations perceived by students actually explain the impact of teacher expectations on students' reading performance more accurately than teachers' own perception of their expectations. Another difference between the two operationalizations is that they are measured on two different levels. The items used to measure students' perception are asked on the individual level in which each individual student has answered the items. The used variable to measure teachers' perception, on the other hand, asks whether teachers characterize the expectations about student achievement they and their colleagues have within their school as very high (1), high (2), or medium (3). For the current research, the variable is recoded so that a high value indicates high teacher expectations perceived by teachers. The descriptive statistics are shown in Table 1.

Most prior research testing teacher expectation effects only measure teacher expectations by asking teachers about how they perceive their own expectations (Åhslund & Boström, 2018; Boerma et al., 2016; De Boer et al., 2010; Gentrup & Rjosk, 2018; Hinant et al., 2009; McKown & Weinstein, 2002; Trouilloud et al., 2002). Sometimes, students' self-concepts and perceptions of classroom behavior are also taken into account (Good & Nichols, 2001; Jussim & Eccles, 1992; Wang et al., 2018). However, prior research about teacher expectations lacks consideration of students' specific perception of teacher expectations through measuring directly what students think about their teachers. Therefore, the current research will take into account both perceptions to get some insight on how the influence of teacher expectations manifests itself exactly: through students' individual perceptions or through teachers' school-based perceptions.

A note should be made regarding testing the mediation effect of teacher expectations perceived by teachers, specifically. Because teachers' perception of expectations are measured on a school level, teachers could only indicate the same answer for everyone within a school – both boys and girls. Therefore, expectations perceived by teachers can only explain gender differences in reading performance between schools. This indicates that teacher expectations perceived by teachers are only possible to mediate the direct effect of student gender on students' reading performance when there exists a selection effect whereby schools

which have a larger proportion of boys more often have a teacher with lower expectations. Therefore, this operationalization of teacher expectations can be considered as not useful to explain gender differences in teacher expectations and reading performance between individual students. However, the moderation effect of teacher expectations perceived by teachers is relevant to investigate. Comparing both perceptions of teacher expectations can show whether the gender gap in reading performance depends on how individual students experience teacher expectations or on how teachers behave and interact with boys versus girls during class. In this way, it can be indicated whether the gender gap in reading performance can be narrowed by changing students' and/or teachers' perception of teacher expectations.

Student gender

A dummy variable 'boy' is constructed to indicate whether the student is a girl (0) or boy (1). Table 1 shows that just as many boys as girls are included in the sample (mean = .49).

Control variables

Certain control variables which may entail alternative explanations for the hypothesized effects will be included in the analysis so that these variables do not influence the results.

Student age. Prior research indicates that students' age can influence their reading achievements, the expectations teachers have of them, and the impact teacher expectations have on their reading achievements. Results show that the older children get, the more they seem to link their competence perceptions and self-concepts to their actual educational performances (Boerma et al., 2016; Nicholls, 1979) and the better they can infer teacher expectations existing about them (McKown & Weinstein, 2002; Retelsdorf et al., 2015).

Parental socioeconomic status (SES). Prior literature investigating the influence of teacher expectations on the gender gap in reading often controls for parental SES because it is expected that students with parents of low SES receive lower teacher expectations, perform lower in reading, and are more susceptible for teacher expectations (Good, 1987; Fan, 2011; Good et al., 1980; Hughes & Kwok, 2007; Tsiplakides & Keramida, 2010; Jussim & Harber, 2005; West & Anderson, 1976; Wang et al., 2018; Wolter et al., 2015). In the current research, the economic and cultural dimensions of parental SES will be considered. Economic parental SES is measured by constructing a scale with items asking students about their study-related possessions at home like a computer or own study desk. It is indicated that such home resources are important general indicators that can measure parents' SES and economic capital (Hooper et al., 2016; Sieben & Lechner, 2019). Students could answer yes (1) or no

(2) to seven of the nine questions. For the other two questions, students had to answer whether they had neither (0), either (1), or both (2) an own room and/or internet connection (indicates number of home study supports) and a computer/tablet and/or internet connection (indicates number of home digital supports). Because not all items have the same number of values, standardized items are computed and used to construct the economic parental SES scale. Furthermore, the items are recoded so that a high value indicates high economic parental SES. Then, a reliability analysis is conducted to see whether the different items are positively correlated with each other. All original items included in the reliability analysis are shown in Table A2 in the appendix. After deleting some items, six items remain that will be used to construct an economic parental SES scale (see notes of Table A2). The reliability analysis shows a Cronbach's alpha of .694 which indicates an acceptable reliability. Finally, based on the average item scores, the scale measuring economic parental SES is constructed. Respondents are included in the scale only if they have a valid value on at least three items. The cultural dimension of parental SES is measured with the variable indicating the amount of books students have in their homes. It is indicated that parents' cultural capital can be measured with this variable (Sieben & Lechner, 2019). Students could answer that they had none or few books (1), enough to fill one shelf (2), one bookcase (3), two bookcases (4), or three or more bookcases (5). For the current analysis, it is assumed that the more books students have at their home, the higher parents' cultural SES is likely to be.

Not often speaking Dutch at home. Prior literature indicates that students who belong to an ethnic minority group get lower teacher expectations and are more susceptible for teacher expectations because of stereotyping and stigmatization (De Boer et al, 2010; Good, 1987; Good & Nichols, 2001; Hinnant et al., 2009; Hughes & Kwok, 2007; Tsiplakides & Keramida, 2010; Jussim & Harber, 2005; McKown & Weinstein, 2002; Wang et al., 2018). When controlling for student ethnicity, it could be indicated whether boys and girls also get differential teacher expectations when not taking into account their ethnicity. The question 'How often do you speak Dutch at home?' is used to measure whether students are part of an ethnic minority group because students belonging to an ethnic minority are less likely to (almost) always speak Dutch at home. Students could answer that they always (1), almost always (2), sometimes (3), or never (4) speak Dutch at home. For the current analysis, a dummy variable is constructed in such a way that students who (almost) always speak Dutch at home get the value '0' and students who sometimes or never speak Dutch at home get the value '1'.

Table 1. Descriptive Statistics (N = 3730)

	Min.	Max.	Mean	SD
Students' actual reading performance	347.26	737.13	548.46	55.70
Teacher expectations perceived by students	1.00	4.00	3.40	.56
Teacher expectations perceived by teachers	1.00	3.00	1.86	.57
Boy	.00	1.00	.49	-
Student age	8.50	12.08	10.03	.45
Economic parental SES	-6.90	.22	.00	.62
Cultural parental SES	1.00	5.00	2.93	1.08
Not often speaking Dutch at home	.00	1.00	.15	-

Analytical methods

An Ordinary Least Squares (OLS) regression analysis will be performed because it can estimate the relationship between multiple independent variables and a dependent variable of interval measurement level while holding other variables constant. But this analytical method is not entirely appropriate because of the nested structure of the data. In the current dataset, individual students are 'nested' within classrooms and schools, which has the consequence that observations representing students who belong to the same classroom or school are dependent from each other. This means that the assumption of OLS regression about the independence of observations, indicating that each observation provides a unique piece of statistical information that is unrelated to the information provided by other observations in the sample, is violated (O'Dwyer & Parker, 2014). This has the implication that the estimates of the standard errors associated with the regression coefficients may be biased negatively. This may lead to incorrect conclusions about the statistical significance of the observed relationships in which the significance of the studied effects is spurious (O'Dwyer & Parker, 2014; Maas & Hox, 2004). So while reading the results, it should be kept in mind that there is a relatively higher probability that effects that turn out to be significant do not actually exist.

Multiple OLS regression analyses will be performed to test the three hypotheses. Firstly, the hypothesized mediation effect will be analyzed by first testing whether there exists a gender gap in students' reading performance. After, a regression analysis will be performed that tests whether lower teacher expectations exist about boys' compared to girls' reading abilities (H1). Next, it will be tested whether teacher expectations perceived by students and teachers have a significant positive effect on students' actual reading performance (H2). These five models will show together which part of the overall effect of gender on students'

reading performance can be directly explained by gender and which part can be indirectly explained by gender via teacher expectations. Secondly, the hypothesized moderation effect will be analyzed by performing a regression analysis including an interaction term involving teacher expectations perceived by students and being a boy, and an interaction term involving teacher expectations perceived by teachers and being a boy (H3).

Results

Mediation effect

The results of analyzing the mediation effect are shown in Table 2. Model 3 shows that there indeed exists a gender gap in reading in which boys significantly perform lower in reading compared to girls ($b = -11.002$; $\text{Beta} = -.099$; $p < .001$). This indicates a small gender gap in reading performance in which boys' reading score is on average 11.002 points lower than that of girls on a scale from 347.26 (min.) to 737.13 (max.). The model explains 14% of the variance in student reading performance ($R^2 = .140$).

In addition to a gender gap in reading performance, Model 1 of Table 2 shows that a significant gender gap in teacher expectations perceived by students themselves also exists ($b = -.089$; $\text{Beta} = -.080$; $p < .001$). This indicates a small gender gap in teacher expectations perceived by students in which being a boy compared to a girl leads to an average decrease in teacher expectations of only .089 on a scale of 1 (min.) to 4 (max.). These results are in accordance with the first hypothesis suggesting that there exist lower perceived teacher expectations about boys' compared to girls' reading abilities when they are perceived by students themselves. However, Model 2 of Table 2 shows that the negative effect of student gender on teacher expectations perceived by teachers is non-significant. This was expected due to the fact that the mediation effect of teacher expectations perceived by teachers cannot actually explain much about gender differences in teacher expectations because it is measured on a school level. Furthermore, it can be noted that both Model 1 and 2 explain little of the variance in teacher expectations; only 1.2% ($R^2 = .012$) and 0.4% ($R^2 = .004$).

To test how much of the overall effect of student gender on student reading performance can be explained by teacher expectations perceived by students or teachers, analyses testing whether lower perceived teacher expectations lead to lower actual reading performances among primary school students (H2) are included in Models 4 and 5. Firstly, it can be seen that the negative direct effect of being a boy on student reading performance is significant in both Model 4 ($b = -10.820$; $\text{Beta} = -.097$; $p < .001$) and Model 5 ($b = -10.938$; $\text{Beta} = -.098$; $p < .001$). When comparing the significantly negative overall effect of student

gender on student reading performance in Model 3 with the significantly negative direct effects of student gender on student reading performance in Models 4 and 5, it can be noted that the strength of the negative direct effect of gender is decreased with 1.7% after including the mediation effect of teacher expectations perceived by students and with 0.6% after including the mediation effect of teacher expectations perceived by teachers. These low percentages suggest that teacher expectations do not explain a large part of the overall effect of student gender on student reading performance. This suggestion is affirmed with the fact that both types of teacher expectations have a non-significant effect on students' reading performance. So the results do not support the second hypothesis indicating that low teacher expectations lead to low reading performances among students. This non-significant effect was expected in Model 5 because the mediation effect of teacher expectations perceived by teachers can only explain student reading performance differences between schools and not between individual students due to the measurement of the variable on a school level. Furthermore, it can be noted that both Model 4 and 5 explain approximately the same amount of variance in student reading performance as Model 3, which is 14% ($R^2 = .140$) and 14.1% ($R^2 = .141$), irrespective of whether teacher expectations are included in the analysis or not. So the results support the existence of a gender gap in reading performance in which boys underperform in reading compared to girls. But the analysis does not support the suggestion that teacher expectations can explain this gender gap.

Moderation effect

To test whether high perceived teacher expectations have more impact on increasing boys' compared to girls' actual reading performance (H3), an interaction term involving teacher expectations perceived by students and being a boy is included in Model 1 and an interaction term involving teacher expectations perceived by teachers and being a boy is included in Model 2 of Table 3. The results show that in both models teacher expectations do not significantly moderate the main effect of student gender on student reading performance. So the third hypothesis indicating that boys' compared to girls' actual reading performances are more impacted by high teacher expectations is not supported. When comparing the explained variance of Models 4 and 5 in Table 2 and Models 1 and 2 in Table 3, it can be noted that the models explain the same amount of variance in student reading performance, irrespective of whether the interaction term is included in the analysis or not (Model 1 and Model 4: $R^2 = .140$) (Model 2 and Model 5: $R^2 = .141$).

Table 2. Regression table testing the mediation effect of teacher expectations on the direct effect of gender on student reading performance (N = 3730).

	DV = teacher expectations				DV = reading performance					
	Model 1 (students)		Model 2 (teachers)		Model 3		Model 4		Model 5	
	b (s.e.)	Beta	b (s.e.)	Beta	b (s.e.)	Beta	b (s.e.)	Beta	b (s.e.)	Beta
Intercept	2.726*** (.206)		2.187*** (.212)		697.810*** (19.296)		692.262*** (19.742)		691.687*** (19.563)	
Boy	-.089*** (.018)	-.080	-.023 (.019)	-.020	-11.002*** (1.695)	-.099	-10.820*** (1.701)	-.097	-10.938*** (1.695)	-.098
Teacher expectations perceived by students							2.035 (1.533)	.020		
Teacher expectations perceived by teachers									2.800 (1.489)	.029
Student age	.076*** (.020)	.062	-.036 (.021)	-.029	-18.071*** (1.880)	-.147	-18.225*** (1.884)	-.149	-17.970*** (1.880)	-.147
Economic parental SES	.040** (.015)	.044	.021 (.015)	.022	6.810*** (1.384)	.075	6.729*** (1.385)	.074	6.752*** (1.384)	.075
Cultural parental SES	-.011 (.009)	-.021	.018* (.009)	.034	13.603*** (.795)	.264	13.625*** (.795)	.264	13.552*** (.796)	.263
Not often speaking Dutch at home	-.055* (.025)	-.036	-.059* (.026)	-.038	-16.034*** (2.364)	-.104	-15.921*** (2.366)	-.103	-15.868*** (2.365)	-.103
Adjusted explained variance (R ²)	.012		.004		.140		.140		.141	
F-statistic (df1, df2)	10.277*** (5, 3724)		3.932** (5, 3724)		122.401*** (5, 3724)		102.315*** (6, 3723)		102.659*** (6, 3723)	

Notes. Multiple OLS regression analyses are performed to analyze whether there exists a significant negative effect of being a boy on student reading performance (Model 3) and on teacher expectations (Models 1 and 2), and a significant positive effect of teacher expectations on student reading performance (Models 4 and 5).

*p < .05 **p < .01 ***p < .001 (two-tailed tests)

Table 3. Regression table testing the moderation effect of teacher expectations on the main effect of gender on student reading performance (N = 3730).

	Model 1			Model 2		
	b	s.e.	Beta	b	s.e.	Beta
Intercept (student reading performance)	697.747***	20.521		693.948***	19.692	
Boy	-21.010*	10.546	-.189	-16.491**	5.787	-.148
Teacher expectations perceived by students	.487	2.202	.005			
Teacher expectations perceived by students * Boy	2.995	3.060	.093			
Teacher expectations perceived by teachers				1.388	2.049	.014
Teacher expectations perceived by teachers * Boy				2.988	2.978	.054
Student age	-18.248***	1.884	-.149	-17.935***	1.881	-.146
Economic parental SES	6.719***	1.385	.074	6.796***	1.384	.075
Cultural parental SES	13.655***	.796	.265	13.563***	.796	.263
Not often speaking Dutch at home	-15.961***	2.366	-.104	-15.875***	2.365	-.103
Adjusted explained variance (R ²)	.140			.141		
F-statistic (df1, df2)	87.835*** (7, 3722)			88.138*** (7, 3722)		

Notes. Multiple OLS regression analyses are performed. The results show whether teacher expectations perceived by students (Model 1) or teachers (Model 2) moderate the main effect of being a boy on student reading performance.

*p < .05 **p < .01 ***p < .001 (two-tailed tests)

Conclusion & Discussion

A gender gap in reading performance among primary school students in which boys underperform compared to girls is often found in prior literature. This underperformance in reading has negative consequences for boys themselves and for society as a whole in the long run because boys' overall educational performance and future life chances on the job market will suffer because of their poor reading abilities. Therefore, it is important to investigate what might explain this gender gap and what could narrow it. The current research investigated to what extent teacher expectations can explain the gender difference in students' reading performance and to what extent teacher expectations have a differential impact on boys' and girls' reading performance. The current research findings suggest that there indeed exists a gender gap in reading performance in which boys underperform compared to girls.

However, the results also indicate that teacher expectations perceived by students or teachers do not mediate the effect of student gender on student reading performance. Although the results suggest that there exists a gender gap in teacher expectations perceived by students themselves in which boys perceive that teachers have lower expectations about their reading abilities compared to girls, both kinds of teacher expectations are not found to relate to student reading performance. So the current paper suggests that the answer to the first research question '*To what extent can the gender difference in students' reading performance be explained by teacher expectations?*' is that the gender difference in students' reading performance indeed exists, but that teacher expectations might not explain this underperformance of boys in reading. The Pygmalion effect, which is indicated to explain how teacher expectations influence student reading performance through 'self-fulfilling prophecy', does not receive support in the current research. However, findings of the current research are in line with those of Gentrup and Rjosk (2018) who also found that teacher expectations do not partly explain gender gaps in reading. Furthermore, findings are partly in accordance with those of Dusek and Joseph (1983), indicating that student gender does not influence teacher expectations in the first place: teachers' perceptions of expectations they have are indeed not influenced by student gender but students' perceptions are. It was expected that a gender gap in teachers' perception of expectations would not be found in the current research because of the school-level operationalization of teachers' perception in which only their expectations of the whole school they teach were measured and not of each student. Therefore, the operationalization is not appropriate to identify gender differences in teacher expectations perceived by teachers between individual students. The difference between teacher expectations perceived by teachers versus students could also be explained

by the tendency of the whole society to have certain gender expectations about men and women. Boys may perceive and/or receive gender stereotypic expectations from their parents or peers. They assume, in turn, that teachers have the same expectations about them and, therefore, perceive low teacher expectations in reading. Expectations of these other social groups may also serve as alternative explanations of the gender gap in student reading performance. Gender stereotypes about boys being bad in reading are indicated to be reinforced by significant others like parents and peers (Ma, 2008; Robinson & Lubienski, 2011). Prior literature also states that parental (Good & Nichols, 2001; Ma, 2008; Robinson & Lubienski, 2011) and peer (Clark et al., 2008) expectations, in turn, have a great influence on student reading performance. More specifically, Good and Nichols (2001) indicate that teacher and parental expectations may influence each other. Therefore, teacher expectations might only indirectly influence student reading performance through influencing parental expectations.

Furthermore, the results suggest that teacher expectations perceived by students or teachers do not moderate the effect of student gender on student reading performance. Therefore, the answer to the second research question '*To what extent do teacher expectations have a differential impact on boys' and girls' reading performance?*' is that high teacher expectations do not have more impact on boys' compared to girls' reading performance. So, although boys may perceive that teachers have lower expectations about them than that girls perceive this, increasing teacher expectations about boys' reading abilities might not 'buffer' against boys' low reading performance. This indicates that the current research does not find support for stereotype threat and stigmatization effects causing boys' reading performance to be more vulnerable to teacher expectations. So, findings indicating that high teacher expectations have more impact on girls' compared to boys' mathematics performances, due to reduced stereotype threat and stigmatization (Jussim et al., 1996, as cited in Wang et al., 2018; McKown & Weinstein, 2002), cannot be generalized to boys' reading performances. However, the results of the current paper are in line with the findings of De Boer and colleagues (2010) and Gentrup & Rjosk (2018) who also do not find a differential impact of teacher expectations on boys' versus girls' reading performance. It may be the case that teacher expectations only have differential effects on boys and girls who feel their reading performance is very important to them. Pansu and colleagues (2016) argue, for example, that stereotype threat effects are often stronger among individuals who highly identify with an academic subject matter, like reading. The cognitive abilities and motivation may decrease more strongly among boys for whom their reading performances are very important for their

own identity because they feel more anxiety about confirming the stereotype of being bad in reading. So high teacher expectations may only buffer against boys' low reading performance by reducing teachers' stereotype threat when boys' themselves think reading is important.

Strengths, limitations, & recommendations for future research

The present study has brought some new insights to the existing literature regarding the effects of teacher expectations on the gender gap in reading performance among primary school students. Existing literature has often examined either the mediation or moderation effect of teacher expectations, although both effects implicate a different influence on the gender gap in reading performance. The mediation effect indicates the extent to which teacher expectations can explain the gender gap in reading performance while the moderation effect shows the extent to which high teacher expectations about boys' reading abilities can narrow the gender gap in reading performance. Therefore, a strength of the current study is that the mediation and moderation effect of teacher expectations were both tested. This has the advantage that the same operationalizations of teacher expectations and reading performance could be used to test both effects which makes it easier and more accurate to compare the different effects. Another strength of the current research is that two different operationalizations of teacher expectations are taken into account when doing the analyses. Prior literature investigating the effects of teacher expectations on the gender gap in reading often does not take into consideration students' perceptions about what teachers expect of them (Åhslund & Boström, 2018; Boerma et al., 2016; De Boer et al., 2010; Gentrup & Rjosk, 2018; Hinant et al., 2009; McKown & Weinstein, 2002; Trouilloud et al., 2002) while attribution theory models argue that students' own perceptions of teacher expectations can have a great influence on their reading performances (Good, 1987; Boerma et al., 2016; Wang et al., 2018). Therefore, adding this operationalization and comparing the effects of teacher expectations perceived by students versus teachers contributes to the existing literature. Comparing the effects of the two operationalizations brings especially useful insights when testing the moderation effect. It will provide insights into how the gender gap in reading performance can be narrowed. Do the perceptions that boys themselves have about what teachers expect from their reading abilities or the expectations that teachers themselves have about boys they teach need to be changed? Therefore, for follow-up research, it is recommended to include the perceptions students have about what significant others – like teachers, parents, and peers – expect of them when testing a moderation effect in addition to only include the perceptions these significant others themselves have about their expectations.

However, comparing the two operationalizations may not be as useful in the current study when testing the mediation effect of teacher expectations. This is the case because the operationalization of teacher expectations perceived by teachers is measured at the school level. This implies that teachers could provide only one answer for their whole school and could not provide answers indicating their expectations per individual student. Therefore, gender differences in teacher expectations and in student reading performance due to teacher expectations can only be examined between different schools and not between individual boys and girls. As a result, this operationalization is less suitable for testing the mediating effect of teacher expectations on the gender gap in reading performance of individual students. This, in turn, has the implication that comparing the two operationalizations when testing the mediation effect does not yield useful insights in the current research. Furthermore, teacher expectations perceived by teachers may exert another influence than indicated in the current research when teachers could identify their expectations about each student individually. Discussed theories about teacher expectations influencing students' reading performances often entail that the existence of differentiating expectations within a school and/or class influences students' reading performances because they develop negative self-concepts when they perceive that fellow students receive higher expectations about their reading abilities than that they receive (Boerma et al., 2016). It may be the case that because of these limitations regarding the operationalization of teacher expectations perceived by teachers, the hypothesized effects of teacher expectations on the gender gap in reading performance are not found. So, an important task for future research is to develop an operationalization of teacher expectations perceived by teachers by asking teachers to indicate their expectations about each individual student they teach. In this way, it can be investigated to what extent within-class teacher expectations might explain the gender gap in student reading performance.

Some methodological limitations also exist with the operationalization of teacher expectations perceived by students. It could be questioned whether the used items to create a scale really measure teacher expectations. When taking a closer look at the four items shown in Table A1 in the appendix, the items may more accurately measure aspects that are indicated in the literature as behavioral responses teachers practice towards students of whom they have high expectations, like giving feedback, opportunities, and help to achieve better at school (Jones & Dindia, 2004; Good et al., 1980; Good, 1987; Jussim & Harber, 2005; Tsiplakides & Keramida, 2010). But the items might not directly measure students' perception of teacher expectations. The hypothesized positive effect of teacher expectations perceived by students on student reading performance may would have been found in the

current research when this operationalization was more oriented toward measuring expectations. To investigate this, future data collection initiatives could ask students more directly about what they think teachers expect of them instead of asking them about teachers' behavior towards them. For example, statements like: 'My teacher expects a lot of my reading performances' or 'My teacher believes that I can score high on my reading tests' could be asked in future questionnaires.

Lastly, a lot of the existing significant effects are found to be relatively small. These small significant effects may be also spurious due to the use of an inappropriate analytical method because of the nested structure of the data. Therefore, effects which seem significant in the current analyses may be not significant at all when using the appropriate analysis techniques. These small effects suggest that it is likely that there exist a lot of other factors that might explain the gender gap in student reading performance which have not been included in the analyses of the current research. Therefore, the focus on future research should be on investigating whether some of the above mentioned alternative explanations can explain and/or narrow the existing gender gap in reading performance. The influence of parental and peer expectations can be used in several ways in future research. First of all, both kinds of expectations can be analyzed in the same way as teacher expectations are analyzed in the current research by examining whether they mediate and/or moderate the effect of student gender on student reading performance. However, it may also be interesting to investigate to what extent low teacher expectations about boys' reading abilities only indirectly lead to low reading performances among boys through influencing parental and/or peer expectations negatively. Furthermore, in addition to examining the influences of expectations of different significant others separately, it could be investigated whether the accumulation of all these societal gender expectations about boys being bad in reading may explain and/or narrow the gender gap in reading performance. Boys' reading performance may only suffer from low expectations and may only be impacted by high expectations when these expectations are universal across the whole society in which they are living. Lastly, it could be investigated to what extent high expectations of significant others may only 'buffer' against boys' poor reading performance when boys identify highly with reading. When future research generates evidence supporting this, schools could consider to place focus on educating boys about the fun and necessity of reading while increasing expectations regarding boys' reading abilities. In this way, boys themselves may feel more encouraged to perform well in reading and their reading performances might be more impacted by high expectations when they consider reading as important.

The current research again shows that there exists a gender gap in reading performance in which boys underperform compared to girls. However, the present study suggests that teacher expectations exert little influence on this gender gap. It is up to future research to investigate what might explain this gender gap and what factors might contribute to narrowing it. This is important for all individual boys for whom their low reading performances have negative consequences for the rest of their lives. But improving boys' reading performances is also a necessity for the society as a whole because a lot of men will lack a basic skill that is needed to get and pursue most jobs if this gender gap in reading performance keeps existing. If nothing will be done to narrow the gender gap in reading, boys who achieve low in reading today, are likely to become men who achieve less in and for society in the future.

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Appendix

Table A1. Used items to construct teacher expectations perceived by students scale

	Mean	SD	Cronbach's Alpha if Item Deleted
My teacher encourages me to say what I think about what I have read	2.84	.97	.684
My teacher lets me show what I have learned	3.43	.78	.592
My teacher does a variety of things to help us learn	3.71	.59	.640
My teacher tells me how to do better when I make a mistake	3.63	.66	.634
Overall Cronbach's Alpha			.700

Notes. Range (min; max) of the items is (1; 4).

Table A2. Original items used in the reliability analysis conducted to construct an economic parental SES scale

	Min; Max	Cronbach's Alpha if Item Deleted
Do you have a computer or tablet at your home? ^a	-11.42; .09	.584
Do you have a study desk/table for your use at your home? ^a	-4.21; .24	.604
Do you have your own room at your home? ^a	-3.34; .30	.548
Do you have internet connection at your home? ^a	-6.15; .16	.517
Do you have your own mobile phone?	-1.19; .84	.622
Do you have a gaming computer at your home?	-2.26; .44	.610
Do you have newspaper every day at your home?	-1.01; .99	.623
Number of home study supports ^a	-5.81; .33	.462
Number of home digital supports ^a	-10.48; .18	.477

Notes. All variables are standardized before creating a scale ($M = .00$; $SD = 1.00$).

^a After stepwise deletion of multiple items, this item will be included in the final economic parental SES scale.