Teacher Attitudes Toward Dyslexia:
Effects on Teacher Expectations
and the Academic Achievement
of Students With Dyslexia

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Abstract
The present study examined teacher attitudes toward dyslexia and the effects of these attitudes on teacher expectations and the academic achievement of students with dyslexia compared to students without learning disabilities. The attitudes of 30 regular education teachers toward dyslexia were determined using both an implicit measure and an explicit, self-report measure. Achievement scores for 307 students were also obtained. Implicit teacher attitudes toward dyslexia related to teacher ratings of student achievement on a writing task and also to student achievement on standardized tests of spelling but not math for those students with dyslexia. Self-reported attitudes of the teachers toward dyslexia did not relate to any of the outcome measures. Neither the implicit nor the explicit measures of teacher attitudes related to teacher expectations. The results show implicit attitude measures to be a more valuable predictor of the achievement of students with dyslexia than explicit, self-report attitude measures.

Keywords
dyslexia, teacher–child interaction, methodological issues

Inclusive Education
Educational policy is increasingly aimed at teaching students with special educational needs in inclusive classrooms. Underlying reasons are concerns about these students being segregated from their nondisabled peers, as well as beliefs that students with special educational needs would benefit educationally. However, educational success of inclusion may depend on many factors, not only the disability of the student but also the expertise and the willingness of the teacher to attend to the needs of these at-risk students (Lindsay, 2007). Teachers have been shown to vary in their attitudes toward inclusive education (Avramidis & Norwich, 2002) and in their beliefs regarding students with disabilities.

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stereotyped judgments about teachers. Stigmatization means that a negative but also the result of group stigmatization and stereotyping by teacher expectations for certain groups of students may be children with dyslexia in reading and spelling. However, lower relatively lower levels of performance displayed by children with dyslexia versus children without learning disabilities can certainly be explained by accurate perception of the students with dyslexia. Low teacher expectations of students with dyslexia can affect just how teachers interact with their students and also can influence the curricular and instructional opportunities offered to students, which may then—in turn—affect the academic achievement of students (Alvidrez & Weinstein, 1999, Paterson, 2007). This may also hold for students diagnosed as having dyslexia; that is, teachers may hold lower expectancies for such students than for students without any learning disabilities, and these expectations may—in turn—impact student achievement.

Differences in the expectations of teachers for children with dyslexia versus children without learning disabilities can certainly be explained by accurate perception of the relatively lower levels of performance displayed by children with dyslexia in reading and spelling. However, lower teacher expectations for certain groups of students may be not only the result of accurate judgments of individual students but also the result of group stigmatization and stereotyping by teachers. Stigmatization means that a negative attitude is adopted with regard to a group in general as opposed to basing one’s judgments on the specific characteristics of individuals (Dovidio, Major, & Crocker, 2000). Whereas expectations reflect perceptions of individual students, attitudes reflect stereotyped judgments about groups and can be considered a characteristic of the person holding that attitude. Negative group evaluations or stigmatization can bias teacher perceptions of individual students (Jussim & Harber, 2005). The effects of teacher expectations, moreover, have been found to be significantly stronger for stigmatized groups of students, including ethnic minority and low achieving children, than for children from the general school population (Jussim & Harber, 2005; Madon et al., 1997). Students with dyslexia may also be susceptible to group stigmatization as a result of the label “dyslexia”; that is, the label “dyslexia” may lead to overly or mistakenly low teacher expectations for such students.

According to Jussim, Nelson, Manis, & Soffin (1995), low expectations can indeed arise as a result of labeling effects or group stereotyping. That is, the application of a group label to a specific individual can influence how the perceiver judges the person in question (i.e., expectations). Many different sources of group labeling exist (Jussim, Palumbo, Chatman, Madon, & Smith, 2000). Possibly, children with dyslexia could also be stigmatized as a group, which can lead to lower teacher expectations for individual students with dyslexia and possibly lower student achievement as a result.

Within the context of the present study, teacher attitudes toward dyslexia in general may influence their expectations regarding individual students with dyslexia. Of course, not all teachers are alike, and presumably, teachers will differ in the extent to which they may stigmatize their students with dyslexia. Unknown at this point is to what extent differences between teachers in their attitudes toward dyslexia may result in differences in the expectations they hold for their students with dyslexia. In other words, to what extent can low teacher expectations of students with dyslexia be attributed to the attitudes on the part of their teachers? The extent to which the label “dyslexia” affects teacher expectations of their students is unknown at this point. On one hand, some possibly negative effects of the label “dyslexia” can be expected to occur for the specific domain(s) in which the student is experiencing difficulties (i.e., reading, spelling). This could also possibly occur in other academic domains as well (e.g., math). On the other hand, students with dyslexia by definition show unexpectedly low achievement in certain academic areas but not others (Lyon, 1996), which means that teachers may be forced to perceive such students in a more differentiated manner than students from other stigmatized groups. The result could thus be relatively accurate expectations with regard to those students with dyslexia rather than inaccurate expectations based on group stereotyping.

Possible Effects on Student Achievement

As already mentioned, it is possible that teacher expectations can affect the achievement of students with dyslexia. That is, teacher attitudes toward dyslexia may underlie teacher expectations for such students and thus produce an indirect association between teacher attitudes and student achievement mediated by teacher expectations. Teacher attitudes may thus have an indirect effect on student achievement through
expectations teachers hold. In other words, teacher expectations may thus mediate the relation between teacher attitudes and student achievement. In addition, teacher attitudes may also be directly associated with student achievement. A distinction between teacher-dependent measures of achievement and teacher-independent measures of achievement should, however, be made. Teacher-dependent measures are the grades or achievement ratings provided by teachers on a task. In several experimental studies, group stereotyping has indeed been shown to influence the grading of student essays and other scholastic tasks (e.g., Babad, 1985; Fazio & Olson, 2003). For example, when teachers were led to believe that an essay was written by an ethnic minority student, the essay was unjustly graded more negatively (Fazio & Olson, 2003). A confirmation bias, which refers to the tendency to interpret information in a manner consistent with existing beliefs or expectations (Nickerson, 1998), may explain these findings. Negative teacher attitudes can therefore possibly lead to unjustly low achievement ratings for students with dyslexia, as a result of the operation of a confirmation bias.

In a similar manner, teacher-independent measures of academic achievement might also be affected by negative teacher attitudes. Negative attitudes on the part of teachers can conceivably lead to the differential treatment of students with increased differences in academic achievement as a result. Teachers may interact both qualitatively and quantitatively differently with students from stigmatized groups compared to nonstigmatized groups of students (Brophy, 1985; Rosenthal, 1994). To determine if differences in the achievement of students with dyslexia versus students without learning disabilities can be ascribed—at least in part—to group stereotyping (i.e., teacher attitudes), will be examined. Thereafter, the question of whether these effects may possibly be mediated by teacher expectations will also be considered.

The Measurement of Teacher Attitudes

To our knowledge, educational studies have always employed self-report measures when examining teacher attitudes regarding stigmatized groups. These self-report measures can also be referred to as "explicit measures." However, these measures do not always produce valid outcomes. Self-report measures require respondents to understand the questions, determine which information is asked for, retrieve this information from memory, decide on the accuracy of this information, and finally to formulate an answer in a way that corresponds with what is asked (Jobe, 2000; Schwarz, 2008). Mistakes can occur during any of these steps. Strategic answering is one of the problems that may occur (Jobe, 2000). This may especially occur when the questions concern controversial topics, which can evoke a tendency to report social desirable attitudes or behavior (Gawronski, LeBel, & Peters, 2007; Schwarz & Oyserman, 2001). Besides social desirability, the use of explicit measures requires respondents to be fully aware of their attitudes, which is not always the case (Schwarz, 2008). Both social desirability and unawareness of one’s own attitudes may affect the validity of explicit measures, especially when topics are socially controversial, as stigmatization of students with dyslexia could be for teachers.

Because of the aforementioned concerns of explicit measures, there is a need for other ways to collect data (Schaeffer, 2000). In social psychology, “implicit attitude measures” have been developed to gain insight into stigmatization processes. These implicit measures have gained enormous popularity in almost every field of psychology during the past couple of years (Hofmann, Gawronski, Gschwendner, Le, & Semtit, 2005). Implicit measures commonly rely on response time measurement, which has been shown to be a valid method for assessment of implicit attitudes (Wittenbrink & Schwarz, 2007). These measures assess the more or less automatic evaluative responses of the individual to an attitude object and can therefore circumvent many concerns about the operation of social desirability and/or strategic responding (Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Wittenbrink & Schwarz, 2007).

Among teachers, it might be controversial to express a distinctly negative attitude toward children with learning disabilities, and an implicit measure of teacher attitudes may therefore constitute a more suitable measure than an explicit self-report measure of teacher attitudes. To our knowledge, implicit attitude measures have not yet been applied within the field of educational science, although such measures can contribute to our knowledge of teacher attitudes and the effects of such on not only teacher expectations for different groups of students but also student achievement.

Low correlations have repeatedly been found between explicit and implicit measures, especially when they concerned controversial topics. One possible explanation for the low correspondence between implicit and explicit measures is offered by the model of Motivation and Opportunity as DEterminants of attitude-behavior relations (MODE model) put forth by Fazio and Towles-Schwen (1999) to explain how attitudes relate to behavior. In this model, it is suggested that the strength of the correlation between implicit and explicit attitude measures may depend on the motivation and the opportunity of individuals to engage in effortful reflection. When a person is both motivated to deliberate and has the opportunity to do so, this might result in strategic responding on a questionnaire. When a domain is more sensitive or more controversial, it is more likely that motivational factors will be evoked—provided there is an opportunity to do so—and thus influence the expression of one’s attitudes.
The weak relationship between explicit and implicit measures of attitudes thus appears to support the claim that explicit measures regarding socially controversial topics may evoke socially desirable answering behavior, which implicit measures are believed to avoid. Many studies on the link between explicit and implicit attitude measures have focused on racial prejudice and stigmatization of ethnic minorities. It was found that self-reported attitudes toward ethnic minorities often did not correspond to implicitly measured attitudes. Because implicit measures were better able to predict subsequent behavior toward people from ethnic minority groups (e.g., Fazio & Olson, 2003; Von Hippel, Sekaquaptewa, & Vargas, 1997), these seem to be more suitable instruments to use in research on stigmatization.

Teachers with negative attitudes toward dyslexia may find it socially unacceptable to report such attitudes on a self-report measure. However, when in front of the class on a daily basis, these same teachers may not be particularly motivated to hide their opinions or have the opportunity to mask their attitudes. That is, an implicit measure of teacher attitudes toward dyslexia may indeed constitute a better predictor of not only teacher expectations but also the achievement outcomes of students with dyslexia.

**Evaluative Priming**

Different types of implicit attitude measures are available today. Most of these measures involve the recording of response times using a computer. One such measure is evaluative priming, and the assumption underlying evaluative priming is that many or most of the associations between concepts are actually stored in human memory. When a respondent is thus presented with a word or picture (i.e., a so-called attitude object or prime), this can activate an evaluative (i.e., positive or negative) attitude in memory. In other words, the priming task measures whether exposure to an attitude object (i.e., prime) facilitates the response to negative target words or, alternatively, positive target words. When a person has a negative attitude toward a particular prime of an attitude object, presentation of the prime will then facilitate responding with regard to the evaluative connotations of negative target words and thereby result in a shorter reaction time on average relative to neutral primes (Fazio & Olson, 2003; Wittenbrink, 2007). Many studies in which such a priming measure has been used have found, moreover, the implicit attitudes of the respondents to be predictive of subsequent behavior (e.g., Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997; Fazio & Olson, 2003; Towles-Schwen & Fazio, 2006).

**Possibly Confounding Factors**

In the study of the influence of teacher attitudes toward dyslexia on teacher expectations and student achievement, additional factors may also play a role. Considerable research has shown children with reading disabilities, for example, to also show higher rates of either internalizing or externalizing behavior problems than individuals without reading disabilities (Willcutt & Pennington, 2000). The diagnostic label of “behavioral disorder” can thus have a stigmatizing effect as well (Jussim et al., 2000), and teacher perceptions of their students can be biased to an increased extent. In other words, the label of “behavioral disorder” may also be a source of differential teacher expectancies, which may affect the outcomes of the present study and will therefore be taken into account. Furthermore, teacher expectations and—as a consequence at least in part—the academic achievement levels of children from lower socioeconomic backgrounds have been found to be lower than those for other children on average (Jussim, Eccles, & Madon, 1996; Sirin, 2005). Teacher expectations can also differ for boys versus girls—particularly with regard to mathematics education (Jussim et al., 1996). As for behavioral disorders, potentially biased teacher perceptions based on socioeconomic status (SES) or gender differences were therefore also taken into account in the present study but were by no means of primary concern (see Note 2).

**Specific Research Questions**

In the present study, the following specific research questions were thus examined:

1. To what extent do teacher attitudes toward dyslexia predict teacher expectations for individual students with dyslexia?
2. To what extent do teacher attitudes toward dyslexia predict the achievement of students with dyslexia?
3. Does the association between teacher attitudes toward dyslexia and the achievement of students with dyslexia appear to be significantly mediated by teacher expectations?

An implicit measure of teacher attitudes was judged to be a suitable measure in light of the fewer validity problems associated with such a measure relative to explicit measures. Given that the use of implicit attitude measures is relatively new in the field of education research, we nevertheless decided to compare this measure to a self-report measure of attitudes toward dyslexia.

**Method**

**Participants**

The present sample consisted of 30 second-grade through sixth-grade regular education teachers (9 male, 21 female) from 16 schools in the south and middle of the Netherlands.
Their mean age was 38 years, and they had an average of 14 years of teaching experience. Each teacher was asked to select ten or more students for inclusion in the present study, as inclusion of all students could be too time-consuming for the teachers. All of the teachers included in the sample had at least one child with a diagnosis of dyslexia or a strong teacher suspicion of dyslexia in their class, as those teachers who had no such students in their classes were excluded from the sample. Given that the present study is about teacher perceptions of students with dyslexia, those students for whom the teacher had a strong suspicion of dyslexia were considered the same as those with an official diagnosis. In the end, the study sample contained 307 students: 46 with dyslexia (27 male, 19 female) and a reference group of 261 students without a learning disability (113 male, 148 female). Eight students from the group of students with dyslexia were also diagnosed as having a behavioral disorder. Twelve students from the reference group were diagnosed as having such.

Of the students with dyslexia, 17 were from a low-SES background, 16 from a middle-SES background, and 8 from a high-SES background. Of the students in the reference group, 76 were from a low-SES background, 82 from a middle-SES background, and 70 from a high-SES background.

Measurements

Implicit teacher attitudes. Implicit teacher attitudes toward dyslexia were measured using a newly developed evaluative priming task that assesses automatic evaluative responses to an object or prime (Wittenbrink, 2007). The task was administered to the teachers using a laptop. To start with, either a neutral string of letters or the prime word “dyslexia,” was presented very briefly (250 ms) to the teacher. After presentation of the neutral prime or dyslexia prime, the participants were next presented a target word that has a general evaluative meaning (e.g., pleasant, horrible). The participants were then asked to indicate the word’s evaluative connotation by pushing one key on the laptop to indicate positive and a different key to indicate negative. Each participant was presented five blocks of 20 randomly ordered trials. The first block was a practice block; the next four blocks were test blocks. All blocks encompassed four different types of trials (i.e., priming combinations): (1) dyslexia prime—positive word; (2) dyslexia prime—negative word; (3) neutral prime—positive word; and (4) neutral prime—negative word. To assess the extent to which “dyslexia” activates a negative attitude, Trials 2 and 4 were used to calculate the implicit negative attitude score.

For the calculation of the attitude score for a participant, all of those trials that involved an incorrect categorization of the target or a reaction time that was 2.5 standard deviations above or below the participant’s average reaction time were omitted. The implicit negative attitude score was then determined for each participant by calculating the average reaction time difference for the negative target word trials following a dyslexia prime versus a neutral prime. When the average reaction time for the trials with the dyslexia prime was greater than the average reaction time for the trials with a neutral prime, the difference score was higher, and this indicated the extent to which the teacher’s categorization of a negative target word was facilitated by the occurrence of a dyslexia prime as opposed to a neutral prime. A higher score thus indicated a more negative attitude toward dyslexia.

Explicit teacher attitudes. The explicit self-report measure of teacher attitudes involved the completion of a questionnaire. Some of the questionnaire items were derived from the Self-Perception of a Learning Disability Scale (SPLD; Heyman, 1990), which measures the attitudes of children with SLDs toward themselves. Of the original 25 items, 7 were considered suitable for the creation of a teacher questionnaire. For example, the item “When I grow up, I could be a good teacher” was adjusted to “Children with dyslexia could become good teachers.” Additional items were developed, which resulted in a teacher questionnaire with a total of 14 items. Examples of these additional items are “I am very understanding when children with dyslexia need extra help” and “I feel that the government should not spend too much money on facilities for children with dyslexia.” The teacher questionnaire was then pilot tested among 125 preservice teachers, and several items that did not show sufficient reliability were omitted. The result was a questionnaire with 9 items to which the teachers were asked to respond using a Likert-type scale that ranged from 1 (totally disagree) to 5 (totally agree). A higher score on the self-report measure of teacher attitudes indicates a less negative attitude toward dyslexia. There were some clear indications of validity for the scale. The formulations of the items appeared to resemble those for other explicit attitude measures such as the Modern Racism Scale (McConahay, 1986), which validly assesses the explicit
attitudes of people toward Black people. In the pilot study, the factorial validity was also found to be good; the scale items represented a single, unidimensional underlying construct. The reliability of the scale was also sufficient with a Cronbach’s alpha of .72.

Teacher expectations. To measure the expectations of the teachers with regard to their students, the teachers completed an evaluation form for each of the students selected for inclusion in the present study. More specifically, the teachers were asked to judge various academic characteristics of the relevant students along a Likert-type scale that ranged from 1 (not applicable) to 5 (totally applicable). There were six items (e.g., “This student will have a successful academic career” or “He/she is a smart student”). The scale was found to be highly reliable; Cronbach’s alpha for this scale was 0.96.

Teacher-dependent measure of student achievement. To measure how teachers rated the achievement of their students with dyslexia in comparison to the reference group of students without learning disabilities, the teachers had the children in their classes complete a one-page short story starting with the sentence: “If I were the boss of the Netherlands . . . .” A free writing assignment was chosen to examine the teachers’ subjective grading of students with dyslexia versus students without dyslexia or any other learning disability. It is virtually impossible to objectively grade such a free writing assignment, which means that the grading of such an assignment can reflect possible biases on the part of the teacher (Norton, 1990). The teachers were told not to give the children any further instruction with regard to the content or length of the story. Once the students completed their stories, the teachers were asked to rate the general quality of the stories along a 10-point scale.

Teacher-independent measure of academic achievement. The students’ most recent national standard spelling and mathematics test scores were obtained from teacher records as a teacher-independent measure of achievement. These tests from the Dutch National Institute for Educational Measurement (CITO) are administered to students in the Netherlands each year to monitor student progress. Although different versions of the tests are administered in each grade, the scores were standardized for each grade, which allowed the academic achievement of the students to be analyzed across grades.

Control variables. The teachers were asked to indicate the gender of each child and those students who were diagnosed with a behavioral disorder. To determine the SES for each child, the teachers were asked to indicate the highest educational level of the parents; this information was then recoded as low (i.e., elementary school or junior vocational education), middle (i.e., high school or senior vocational education), or high (i.e., college education or higher). These variables then served as control variables in the analyses for this study.

Procedure

A random sample of second-grade through sixth-grade elementary school teachers in the middle and south of the Netherlands were sent a letter of invitation to participate in the study. The letter stated that participation was voluntary and not all teachers within the same school had to participate. Those teachers who agreed to participate were then sent a package that contained the questionnaire, the writing task, and an evaluation form for each student. On the evaluation form, the teachers indicated their expectations with regard to the student in question, the student’s grade on the writing task, the SES and gender of the student, and whether the student was diagnosed with a behavioral disorder. In addition, the teachers were asked to indicate those students who were strongly suspected to have a learning disability or officially diagnosed with a learning disability and to indicate which learning disability that was.

The student sample originally consisted of 323 students, 16 of whom had a GLD or SLD other than dyslexia (e.g., dyscalculia) and were therefore excluded from the sample. This group of students was too small to examine separately, and the effects of teacher attitudes and expectations for such students may differ from those for a group of students with dyslexia. Given that a label of “behavioral disorder” co-occurred in some instances with a label of “dyslexia,” these students were not excluded from the sample but were accounted for by controlling for the presence of behavioral disorders in the analyses.

After the teachers had completed all of the relevant forms and returned the package, an appointment was made to visit each teacher at his or her school after-school hours to administer the priming task measure of implicit attitude on a laptop. Thereafter, the teachers were informed about the purpose of the study, and each of the participating teachers was given a €10 gift certificate.

Data Analyses

Because of the hierarchical structure of the data, the data were analyzed with multilevel modeling techniques (Lee, 2000), using the computer program MLwiN 2.0 (Rabash et al., 2000). Two-level analyses were performed with students clustered within classrooms (see Note 3). Multilevel regression analyses resemble multiple regression analyses but do not suffer from the same conceptual and statistical problems that occur when nested data are analyzed using multiple regression techniques (Hox, 2002). The models were estimated using the iterative generalized least squares method. The significance of the coefficients for the different independent variables was tested using Wald tests (z tests). The set level of significance was 5%. The independent variables were grand mean centered prior to their entrance into the multilevel models. For inclusion in the multilevel regression analyses, the dyslexia, behavioral disorder, and SES
variables were entered as dummy variables. For both dyslexia and behavioral disorder, one dummy variable was created; two dummy variables were created to represent the SES categories (middle SES and high SES, with low SES functioning as a reference group).

Results

In this study, the associations between implicit and explicit measures of teacher attitudes toward dyslexia, teacher expectations for individual students, and teacher-dependent and teacher-independent measures of the academic achievement of students were compared for a group of students with dyslexia and a reference group of students without any learning disabilities. In the following, the descriptive statistics and intercorrelations for a number of the variables will first be considered. Thereafter, the results of the multilevel regression models for the achievement measures and the teacher expectancies are presented.

Descriptive Statistics

The means and standard deviations for teacher expectations, their ratings of student achievement on the writing task, and standardized tests of student academic achievement are presented separately for the two groups of students in Table 1. The inequality of numbers of participants approximately reflects the prevalence of dyslexia. As can be seen, average differences were found, but virtually no differences in the standard deviations for the groups. The results of multilevel comparisons showed consistent and statistically significant differences for those students with dyslexia versus those students from the reference group on all four of the aforementioned student-level variables in favor of the reference group (teacher expectations: \( z = -2.92, p = .00 \); achievement ratings: \( z = -2.92, p = .00 \); spelling achievement: \( z = -6.74, p = .00 \); math achievement: \( z = -1.99, p = .01 \)).

The descriptive statistics for the teacher-level variables, namely their implicit and explicit attitudes toward dyslexia, are presented in Table 2. Given that a score of 0 ms on the implicit attitude measure indicates a neutral attitude, the teachers can be seen to have slightly negative implicit attitudes toward dyslexia on average. In contrast, the mean score of the teachers on the explicit self-report measure was relatively high, which shows the teachers report highly positive attitudes toward dyslexia on average. The two measures thus produce very different results. This is confirmed by the nonsignificant correlation between the two teacher attitude measures (\( r = .05, p = .80 \)). To improve the interpretability of the results, the implicit attitude measure was standardized.

Table 1. Means and Standard Deviations for Teacher Expectations, Teacher Ratings of Writing Achievement, Spelling Achievement and Math Achievement for the Reference Group (N = 261), Dyslexia Group (N = 46), and Total Group (N = 307)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Reference group</th>
<th>Students with dyslexia</th>
<th>Total group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Expectations</td>
<td>3.67</td>
<td>0.97</td>
<td>2.97</td>
</tr>
<tr>
<td>Teacher Ratings of Writing Achievement</td>
<td>6.73</td>
<td>1.26</td>
<td>6.04</td>
</tr>
<tr>
<td>Spelling Achievement</td>
<td>0.21</td>
<td>0.89</td>
<td>-0.90</td>
</tr>
<tr>
<td>Math Achievement</td>
<td>0.11</td>
<td>0.97</td>
<td>-0.25</td>
</tr>
</tbody>
</table>

Table 2. Descriptive Statistics of the Teacher-Level Variables (N = 30 teachers)

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implicit attitude measure (in ms)</td>
<td>8.00</td>
<td>64.01</td>
<td>-122.62</td>
<td>153.53</td>
</tr>
<tr>
<td>Explicit attitude measure</td>
<td>4.22</td>
<td>0.41</td>
<td>3.33</td>
<td>5.00</td>
</tr>
</tbody>
</table>

Table 3. Correlations between Student-Level Achievement Variables

<table>
<thead>
<tr>
<th></th>
<th>Teacher Ratings of Writing Achievement</th>
<th>Spelling Achievement</th>
<th>Math Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students with Dyslexia (n = 46)</td>
<td>.38*</td>
<td>.12</td>
<td></td>
</tr>
<tr>
<td>Teacher Ratings of Writing Achievement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spelling Achievement</td>
<td>.49**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math Achievement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students from the Reference Group (n = 261)</td>
<td>.32***</td>
<td>.24***</td>
<td></td>
</tr>
<tr>
<td>Teacher Ratings of Writing Achievement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spelling Achievement</td>
<td>.38***</td>
<td></td>
<td></td>
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<tr>
<td>Math Achievement</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* \( p < .05 \). ** \( p < .01 \). *** \( p < .001 \).
measures of achievement (i.e., standardized spelling and math scores) for those students with dyslexia and those from the reference group separately.

**Multilevel Regression Models**

Multilevel models were used to investigate the ability of the implicit and explicit measures of teacher attitudes to predict teacher expectations and the academic achievement of the students with dyslexia and the reference group. The multilevel models were constructed in a similar manner for the different dependent variables (i.e., teacher expectations, achievement ratings, spelling achievement, and math achievement). The intercept-only model containing the dependent variable and no predictors whatsoever was first constructed to estimate the variance in the dependent variable at both the teacher and student level. In the second step, the control variables of gender, behavioral disorder, and SES were entered. The third step in each model involved the entrance of the independent variables of dyslexia and either the implicit or explicit measures of teacher attitudes. Finally, in the fourth step, the cross-level interaction between student dyslexia and either the explicit or the implicit measure of teacher attitudes was added. Each of these steps resulted in a model that could be compared to the previous one, to determine the added value of subsequent predictors. To answer the research questions, it had to be determined whether the cross-level interactions proved statistically significant. That is, if differences between the students with dyslexia and the reference group on the dependent variables are associated with differences in the attitudes of the teachers toward dyslexia, a significant interaction effect can be expected. Given that the small teacher sample size could lead to problems with the estimation of the random slope effects of the teacher-level variables, all reported effects are fixed and include just two random parameters: the (residual) variance at the two levels.

**Effects of teacher attitudes on teacher ratings of writing achievements.** The effects of the implicit and explicit measures of teacher attitudes on the achievement ratings provided by the teachers for the students with dyslexia were examined. The intraclass correlation was 0.21, which shows 21% of the variance in the ratings of writing achievements provided by the teachers to occur at the level of the teacher and 79% at the level of the student. The interaction of dyslexia and the explicit self-report measure of teacher attitudes on the achievement ratings was nonsignificant ($b = .26, z = .57, p = .569$). The predictive power of the explicit measure of teacher attitudes on the achievement ratings provided by the teachers was thus the same for students with dyslexia and students from the reference group.

In contrast to the findings for the explicit measure of teacher attitudes, the interaction of dyslexia and the implicit measure of teacher attitudes on the achievement ratings was statistically significant for teacher ratings of student achievement ($b = -.45, z = -2.23, p = .026$). The difference in the achievement ratings provided by the teachers for those students with dyslexia versus those students from the reference group increased when the teacher held a more negative attitude toward dyslexia. Stated differently, students with dyslexia not only attained lower achievement ratings on the writing task than students from the reference group but also were found to be given even lower scores when their teachers held more negative implicit attitudes toward dyslexia. This was not found to be the case for the students in the reference group ($b = -.05, z = -0.26, p = .795$).

The statistics for the multilevel analyses of the teacher ratings of writing achievements are reported in Table 4 (models 1A and 1B). Only the results for models involving the implicit attitude measure are reported. Further inspection of the results shows several control variables also to have statistically significant effects. Girls generally received higher achievement ratings than boys on the writing task. Children from middle- and higher SES backgrounds received higher achievement ratings than children from lower SES backgrounds. The main effect of dyslexia was also statistically significant, which again shows the children with dyslexia to be given lower achievement ratings by their teachers on average. Implicit negative teacher attitude toward dyslexia did not exert a significant main effect on the achievement ratings provided by the teachers, which shows the implicit attitudes of the teachers not to affect the achievement ratings for all students but only those with dyslexia instead.

In Figure 1, the more negative impact of the implicit teacher attitudes toward dyslexia on the achievement ratings provided for the students with dyslexia versus the students from the reference group is depicted. Adding the interaction effect reduced the student-level variance by 2.2%. The size of this cross-level interaction was further evaluated via multiplication of the regression coefficient as estimated in model 1B of Table 4 by the range for the implicit attitude scores. The standardized scores on the implicit attitude measure ranged from −2.05 to 2.28. The outcome of this calculation indicates the maximum differential effect of implicit teacher attitudes on achievement ratings. In such a manner, the teacher observed to hold the most negative attitude toward dyslexia in our data can be compared to the teacher observed to hold the least negative attitude. According to this calculation, the predicted achievement rating for the writing task differed a maximum 1.95 along a scale of from 1 to 10 for the students with dyslexia versus the students from the reference group. More specifically, for the teacher observed to hold the most negative attitude, an achievement rating that was 1.61 points lower for the students with dyslexia than for the students from the reference group was predicted; for the
teacher observed to hold the most positive attitude, an achievement rating that was 0.34 points higher for the students with dyslexia than for the students from the reference group was predicted. The association between the implicit attitudes of teachers toward dyslexia and student achievement can thus be considered quite substantial.

Effects of teacher attitudes on spelling achievement. When the effects of explicit and implicit teacher attitudes toward dyslexia on the spelling achievement of the students were examined, the intraclass correlation was found to be 0.18. There was no statistically significant interaction for the association between the teachers’ explicit attitudes toward dyslexia and the spelling achievement of the students when those students with dyslexia and those from the reference group were compared ($b = .55, z = 1.56, p = .116$). In other words, the influence of the teachers’ explicit attitudes toward dyslexia on spelling achievement was the same for the two groups.

The interaction of student dyslexia and the teachers’ implicit attitudes toward dyslexia on spelling achievement was found to be statistically significant ($b = -.44, z = -2.53, p = .011$). Those students with dyslexia scored not only lower on the spelling achievement tests than students from the reference group but also showed even lower scores when their teachers held more negative implicit attitudes toward dyslexia. This was not found to be the case for those students from the reference group ($b = -.02, z = .18, p = .857$).

The statistics of this multilevel analysis are reported in

![Figure 1](image_url). Regression lines for the effect of implicit negative teacher attitudes toward dyslexia on teacher ratings of writing achievement for students with dyslexia and students from the reference group

### Table 4. Multilevel Models for the Effects of Implicit Negative Teacher Attitudes on Teacher Ratings of Writing Achievement (models 1A and 1B) and Spelling Achievement (models 2A and 2B)

<table>
<thead>
<tr>
<th>Model:</th>
<th>Model 1A</th>
<th>Model 1B</th>
<th>Model 2A</th>
<th>Model 2B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Main effects of Dyslexia and Negative Attitude</td>
<td>Interaction Dyslexia x Negative Attitude</td>
<td>Main effects of Dyslexia and Negative Attitude</td>
<td>Interaction Dyslexia x Negative Attitude</td>
</tr>
<tr>
<td>Fixed Effects</td>
<td>Coeff.</td>
<td>SE</td>
<td>Coeff.</td>
<td>SE</td>
</tr>
<tr>
<td>Intercept</td>
<td>6.17</td>
<td>(0.20)***</td>
<td>6.17</td>
<td>(0.20)***</td>
</tr>
<tr>
<td>Girl</td>
<td>0.41</td>
<td>(0.13)***</td>
<td>0.40</td>
<td>(0.13)***</td>
</tr>
<tr>
<td>Behavioral disorder</td>
<td>-0.23</td>
<td>(0.32)</td>
<td>-0.30</td>
<td>(0.32)</td>
</tr>
<tr>
<td>Middle SES</td>
<td>0.39</td>
<td>(0.17)***</td>
<td>0.42</td>
<td>(0.17)***</td>
</tr>
<tr>
<td>High SES</td>
<td>0.79</td>
<td>(0.18)***</td>
<td>0.82</td>
<td>(0.18)***</td>
</tr>
<tr>
<td>Dyslexia</td>
<td>-0.54</td>
<td>(0.19)***</td>
<td>-0.59</td>
<td>(0.19)***</td>
</tr>
<tr>
<td>Implicit attitude</td>
<td>-0.12</td>
<td>(0.16)</td>
<td>-0.05</td>
<td>(0.19)</td>
</tr>
<tr>
<td>Interaction</td>
<td>-0.45</td>
<td>(0.20)***</td>
<td>-0.45</td>
<td>(0.20)***</td>
</tr>
<tr>
<td>Random Components</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variance at teacher level ($\sigma_u^2$)</td>
<td>0.40</td>
<td>(0.14)***</td>
<td>0.41</td>
<td>(0.15)***</td>
</tr>
<tr>
<td>Variance at student level ($\sigma_e^2$)</td>
<td>1.00</td>
<td>(0.09)***</td>
<td>0.98</td>
<td>(0.09)***</td>
</tr>
<tr>
<td>Explained variance – student level</td>
<td>0.02</td>
<td></td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td>Deviance</td>
<td>744.81</td>
<td></td>
<td>739.86</td>
<td></td>
</tr>
<tr>
<td>Deviance difference</td>
<td>4.95* (df = 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

![Figure 1](image_url). Regression lines for the effect of implicit negative teacher attitudes toward dyslexia on teacher ratings of writing achievement for students with dyslexia and students from the reference group.
Table 4 (models 2A and 2B). The results in Table 3 also show several of the control variables to have a statistically significant effect on the students’ spelling achievement. Those students from higher SES backgrounds showed higher spelling achievement than those from lower SES backgrounds. Those students reported to have a behavioral disorder showed lower spelling achievement than other students. Furthermore, the main effect of dyslexia was found to be statistically significant, which shows those students with dyslexia to generally have lower spelling achievement than those students from the reference group. Implicit negative teacher attitudes did not exert a significant effect in general on the students’ spelling achievement (i.e., no main effect of implicit teacher attitudes was found). Instead, only the spelling achievement of those students with dyslexia was affected by a negative implicit attitude toward dyslexia on the part of the teacher.

In Figure 2, the interaction of student dyslexia and the teachers’ implicit attitudes toward dyslexia on spelling achievement is depicted and can be seen to show implicit negative teacher attitudes toward dyslexia to exert a stronger negative effect on the spelling achievement of those students with dyslexia than those students from the reference group. The interaction effect of dyslexia and the implicit attitude measure reduced the student-level variance by 2.3%. Depending on the implicit attitudes of the teachers toward dyslexia, the students’ spelling achievement differed a maximum 1.90 standard deviations for those with dyslexia versus those from the reference group. More specifically, for the teacher observed to hold the most negative attitude, the spelling achievement of students with dyslexia was predicted to be 1.82 standard deviations lower than the spelling achievement of students from the reference group; for the teacher observed to hold the most positive attitude, the predicted spelling achievement was 0.08 standard deviations higher for the students with dyslexia than for the students from the reference group.

**Effects of teacher attitudes on math achievement.** When the relations between the teacher attitudes toward dyslexia and the math achievement of the students were examined, the intraclass correlation was found to be 0.09. The results did not show a statistically significant interaction for explicit teacher attitudes and dyslexia on the math achievement of the students ($b = -.07, z = -.16, p = .872$). The interaction of the implicit measure of teacher attitudes and dyslexia on the math achievement of the students was also not statistically significant ($b = -.12, z = -.61, p = .271$). In other words, neither the explicit nor the implicit measures of teacher attitudes toward dyslexia differentially affected the math achievement of the students with dyslexia and the students from the reference group.

**Effects of teacher attitudes on teacher expectations.** In the next set of analyses, whether explicit teacher attitudes toward dyslexia differentially affected the teacher expectations with regard to individual students was considered. The intraclass correlation of teacher expectations was .05. The interaction of student dyslexia and the explicit measure of teacher attitudes on teacher expectations was not statistically significant ($b = .08, z = .22, p = .826$). This finding shows the effects of the teachers’ explicit attitudes toward dyslexia on their expectations for individual students to be largely the same for the two groups of students. Likewise, the interaction effect of student dyslexia and the implicit measure of teacher attitudes on teacher expectations was not statistically significant ($b = -.22, z = -.131, p = .190$). That is, the effects of the teachers’ implicit attitudes toward dyslexia on their expectations for individual students were largely the same for those students with dyslexia and those students from the reference group.

**Effects of expectations on achievement ratings and academic achievement.** In light of the finding that the implicit attitudes of teachers toward dyslexia did not predict their expectations with regard to individual students with dyslexia, teacher expectations could not mediate the statistically significant effects of implicit teacher attitudes on the performance ratings provided by the teachers and the spelling achievement of the students. Nevertheless, the possibility that teacher expectations might affect the different measures of student
achievement has been examined. These possible associations were examined in multilevel models that were comparable to the previously described models and included the same control variables. Rather than teacher attitudes, however, teacher expectations were now entered as a predictor variable. The main effects of dyslexia and teacher expectations were thus entered in addition to the interaction of these two predictors to determine if student dyslexia moderated the possible effects of teacher expectations on student achievement. A direct and statistically significant association between teacher expectations and the achievement ratings provided by the teachers was detected ($b = .71, z = 10.40, p < .001$). This association was not influenced by student dyslexia ($b = -.05, z = .24, p = .810$). Similarly, a direct and statistically significant association between teacher expectations and spelling achievement was detected ($b = .44, z = 9.06, p < .001$), which was also was not moderated by student dyslexia ($b = .04, z = .26, p = .397$). In addition, a significant association between teacher expectations and math achievement was detected ($b = .68, z = 12.57, p < .001$) and again was found not to be moderated by student dyslexia ($b = .12, z = .77, p = .441$). These results show teacher expectations to be related to the different measures of student achievement and that the associations are just as strong for those students with dyslexia as for those students from the reference group.

**Discussion**

In the present study, the effects of implicit and explicit teacher attitudes toward dyslexia on various measures of student achievement were examined. Whereas the implicit attitude measure predicted the teacher-dependent achievement ratings and the spelling achievement of the students with dyslexia, the explicit measure did not predict any of the outcome measures. Implicit measures of teacher attitudes toward dyslexia thus appear to be better predictors of student achievement of students with dyslexia than explicit measures of teacher attitudes toward dyslexia. Teachers might be unwilling to explicitly report their attitudes because they perceive the expression of a negative attitude toward dyslexia to be socially undesirable. This assumption is supported by the particularly high mean score of the teachers on the implicit attitude measure, which showed highly positive explicit attitudes. The implicit attitude scores were more moderate and even negative, which may suggest that they are more likely than the explicit attitude scores to reflect the actual attitudes of the teachers toward dyslexia.

Students with dyslexia were found to receive lower teacher ratings of writing achievement from their teachers when their teacher held a more negative implicit attitude toward dyslexia. This effect can be assumed to reflect a confirmation bias (Nickerson, 1998). That is, when teachers hold more negative attitudes toward dyslexia, they also tend to rate the achievement of students in keeping with this negative attitude.

The spelling achievement of the students when measured using a national standard test, was also clearly affected by implicit negative teacher attitudes toward dyslexia. The difference in the spelling achievement of those students with dyslexia and those students from the reference group was larger when the teachers held more negative implicit attitudes toward dyslexia. Although the outcomes of the present study show an effect of teacher attitudes toward dyslexia on the achievement of students with dyslexia, the underlying process remains unclear. For the observed effects to occur, teacher attitudes must somehow be communicated to students whose achievement is then affected. Several mediating teacher–student interaction factors might possibly account for this effect. The amount of time and effort that teachers are willing to put into helping students with dyslexia improve their spelling may be one such factor that possibly depends on the attitudes of the teacher. The effects of teacher attitudes on student achievement may also be explained in terms of self-fulfilling prophecy effects (Jussim et al., 1996). As argued by Brophy (1985), teachers may certainly interact in both a qualitatively or quantitatively different manner with groups of students for whom they hold more or less negative attitudes. According to Rosenthal (1994), teachers may give students for whom they hold more negative attitudes fewer opportunities to respond and/or less informative feedback. This may hold for students with dyslexia during reading or spelling instruction in particular. Furthermore, teachers may express less warmth toward students from groups for which they have more negative attitudes. Interpersonal warmth is mostly communicated via nonverbal behavior (Rosenthal, 1994), which—as pointed out by Dovidio, Kawakami, and Gaertner (2002)—is mostly predicted by implicit attitude measures; explicit attitude measures, in contrast, appear to predict mostly verbal behavior. In line with the MODE model, implicit attitudes typically affect fast and intuitive reactions and thus reactions when there is no motivation or opportunity to control one’s reactions (Fazio & Towles-Schwen, 1999). This may also hold for the nonverbal reactions of teachers in daily classroom situations where the teacher must deal with many students at the same time and often has to react fast. Nonverbal teacher behavior could thus play an important mediating role in the effects of teacher attitudes on the achievement of students with dyslexia, and observational studies along these lines might provide greater insight into the verbal and nonverbal interactions between teachers and students with dyslexia by which implicit teacher attitudes affect student achievement.

Contrary to the results for the spelling achievement of the students with dyslexia, implicit teacher attitudes did not differentially affect the math achievement of the students with dyslexia. Perhaps not surprisingly, there appears to be...
a domain-specific effect of implicit teacher attitudes toward dyslexia. In other words, the effects of negative implicit teacher attitudes were restricted to the specific domains in which the child is having problems and thus, in the case of dyslexia, the domain of spelling. This domain-specific effect of teacher attitudes toward dyslexia obviously raises questions about the effects of teacher attitudes on the achievement of students with other SLDs and the effects of teacher attitudes on the achievement of students with, for example, behavioral disorders as well.

The present results showed teacher expectations to not mediate the association between teacher attitudes and student achievement. Nevertheless, a significant association was found between teacher expectations—-independent of teacher attitudes—and student achievement. This association was quite strong for all students, and independent of whether they were students with dyslexia or students from the reference group (i.e., students without any learning disabilities). Many studies of the effects of teacher expectations have shown students from particularly vulnerable groups—such as students from lower socioeconomic backgrounds or students with a history of low school performance—to be more susceptible to the effects of teacher expectations than other students (e.g., Alvidrez & Weinstein, 1999; Jussim et al., 1996). The present study, however, shows a dyslexia label does not lead to greater expectancy effects. The effects of teacher expectations were found to be equally strong for students with dyslexia as for students without learning disabilities. Teacher expectations of students with dyslexia may be based on actual performance levels and therefore be fairly accurate (Jussim & Harber, 2005), whereas attitudes involve group stereotyping. As the results of the present study have shown, research on teacher attitudes examines a different process than research on teacher expectations and therefore has its own added value. That is, research on the effects of teacher attitudes does not fit into our knowledge of the effects of teacher expectations, which means that the process should be examined further.

The present findings highlight the influence of teacher attitudes on student achievement. Not all of the students in our sample were officially diagnosed as having dyslexia; some were labeled as students with dyslexia because their teachers strongly suspected this. As clearly shown in the present study, the label of “dyslexia” may not always be of help for such students. Although a label of SLD can have many benefits in the sense that appropriate treatment and extra support may be attained (Riddick, 2002), such a label may also place these same children at risk of stigmatization by teachers. Caution should thus be exercised with regard to labeling practices and group stigmatization. The present findings clearly point to the possibility of teachers and other practitioners who work with children with dyslexia having implicit negative biases that they may not be aware of toward this group of children. Such biases may not be apparent but nevertheless negatively affect the achievement outcomes of students with dyslexia. Implicit attitude measures could be a helpful tool for teachers to become aware of possible biased attitudes they may hold toward students with learning disabilities. Certainly in inclusive classrooms, there is a need for greater awareness of potentially negative attitudes on the part of teachers toward dyslexia and the risk of unequal treatment of students with dyslexia as a result of such negative attitudes. Also, examination of the interaction between teachers and students is needed to reveal how teachers may communicate negative attitudes to students (Rosenthal, 1994). Teachers could furthermore videotape their lessons to self-examine the way in which they interact with students with dyslexia. This could help teachers to find out if they may unintentionally show differential behavior toward these students in comparison to the other students in their classroom. Implicit attitudes have been argued to be expressed mostly via nonverbal behavior (Dovidio et al., 2002), which means that teachers need to become particularly aware of the way in which they interact with students with dyslexia and the nonverbal signals that they—perhaps unintentionally—communicate to these students.

The way in which a teacher interacts with different students and the teacher’s knowledge, behavior, and underlying values can be referred to as the teacher’s pedagogical identity, which is formed by his or her prior experiences (Beijaard, Verloop, & Vermunt, 2000; Berliner, 2004). Teacher preparation as well as the culture of the school in which a teacher is employed, therefore, forms teacher attitudes (Beijaard et al., 2000). To minimize the stigmatization of certain groups of students, both teacher education programs and schools could offer teachers the possibility of using an implicit attitude measure to examine their own attitudes, and they should inform teachers about the risks of stigmatization. As recently argued by Paterson (2007), moreover, teacher knowledge of the specific needs of students is nevertheless essential for fruitful teacher–student interactions, which means that knowledge of how to teach children with specific learning needs but without stigmatization must be fostered. Future research on how this can best be done is therefore needed.

The present results show that the scores of teachers on the implicit attitude measure clearly vary. Some teachers were more negative than others, which could affect the achievement of students with dyslexia. Future research on teacher characteristics is needed to explain which types of teachers are more likely to have negative attitudes toward dyslexia, what contextual factors appear to be associated with negative teacher attitudes, and what specific interventions may thus be called for.

Several limitations of the present study can be addressed. First, sample selection bias may have occurred as a result of the manner in which the teachers were recruited.
Participation was voluntary, and many of the teachers who were initially approached refused to participate because of time constraints. Furthermore, the implicit and explicit attitude measures were both newly developed for this study, which means that additional research is needed to further document the validity of the measurement instruments. Despite its face validity, the explicit attitude measure was found to have low predictive validity for student achievement outcomes; more research on the construct validity of this scale is therefore recommended.

Also, the focus of the study was solely on teacher attitudes toward dyslexia. The results cannot be generalized to other SLDs (e.g., dyscalculia) or children with a GLD. Also, caution must be exercised with regard to causality in light of the design of the present study. Although the effects of teacher attitudes and expectations on student achievement were examined, it might be possible that past student achievement also affects the expectations and attitudes of teachers. Longitudinal studies are therefore clearly needed in the future to unravel the nature of the causal relations between teacher attitudes and student achievement.

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**Notes**

1. In the Netherlands, a distinction is made between students with specific learning disabilities (SLDs) and general learning disabilities (GLDs). A shared characteristic of all SLDs is an unevenness in the development of abilities (Fletcher, Morris, & Lyon, 2003). Children with SLDs show low achievement in certain academic areas, despite normal intelligence. In contrast, students with GLDs have low academic performance in more than one domain accompanied by a below average intelligence. GLD in the Netherlands is similar to what used to be referred to in the United States as mild mental retardation and in the United Kingdom as mild to moderate learning difficulties. SLD in the Netherlands is similar to what is referred to in the United States as learning disabilities and in the United Kingdom as specific learning disabilities. In the Netherlands, the assignment of a diagnostic label is more or less identical to classification by a disability. Researchers use the generic term SLD, although practitioners speak of a child with, for example, dyslexia or dyscalculia.

2. The ethnic backgrounds of students could also lead to lower teacher expectations (Jussim et al., 1996). However, this could not be taken into account within the present study as there were no ethnic minority students in the sample with dyslexia.

3. A third school level was not defined for the following reasons: First, the purpose of this study was to examine teacher effects on students, which made the school level less relevant. Second, the students remained in the same classroom with the same teacher for the whole day, which clearly calls for comparison across classrooms. The predictors in the present study were thus at the individual student and teacher/class levels. Finally, there were only 16 schools in our sample, which is too few for analyses at the level of the school.

**References**


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