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Removing the academic framing in student evaluations improves achievement in children with dyslexia: The mediating role of self-judgement of competence

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Self-judgement is known to play a crucial role in academic achievement, and as such, may be expected to have an impact on students with dyslexia. Their self-judgements may reflect the negative stereotype of low competence that targets people with disabilities. Their repeated academic failures may lead to a negative association between “school” and “failure”. The aim of the present study was to investigate how such factors contribute to academic failure in students with dyslexia. Participants were 183 French middle school students. We assessed students' self-judgement and manipulated the framing of performance tasks so that students completed literacy tasks in both academic and non-academic forms. We expected a detrimental impact of dyslexia on performance in academic but not in non-academic tasks. We also expected self-judgement to account for this difference. Students with dyslexia perceive themselves as less competent than students without dyslexia. Significantly, structural equation modeling revealed that students with dyslexia performed poorly in academic tasks, compared to students without dyslexia. This

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difference no longer appeared in non-academic tasks. Self-judgement of competence is a predictor of the performance of students with and without dyslexia at school and their impact is related to how the academic features of the tasks are emphasized.

KEYWORDS

academic achievement, academic framing, dyslexia, self-judgement of competence

Key messages

- Accounting for the subjective representations of competence can lead to a very different interpretation of academic difficulties in vulnerable children.

1 | INTRODUCTION

Academic achievement is a key factor in social inclusion. University degrees give access to prestigious social positions and statuses. Hence, educational attainment is the leading predictor of professional and social integration in young people (Ebersold, Plaisance, & Zander, 2016). Consequently, facing recurrent academic failure can seriously undermine a child's integration into society. This paper is intended to contribute to our understanding of the barriers to academic achievement with a specific focus on children with dyslexia at school. Indeed, for students with dyslexia, academic achievement is still a challenging prospect today. At an international level, data suggest that only 3.2% of students with dyslexia attend university (Warmington, Stothard, & Snowling, 2013). Moreover, teachers and parents report persistent academic failure in children with dyslexia.

To deal with the challenge of improving academic achievement for all children, in France, policies have been developed and promoted in the last decade to favor inclusive education. Children and adolescents with special education needs spend a significant amount of time alongside typically developing students in regular school settings. However, in France, the implementation of the inclusion principle takes a multiplicity of forms. For instance, the time spent in regular classrooms each week, the type of adjustments made or the teacher training required to optimally include students with a wide range of needs may differ from one school to another (Desombre, Lamotte, & Jury, 2019; Jury, Perrin, Desombre, & Rohmer, 2021; Rattaz, Munir, Michelon, Picot, & Baghdadli, 2020). Even though public funds support inclusion, recent governmental reports deplore that its full implementation still faces serious obstacles (Ebersold et al., 2016; Jumel, 2019). This leads to the conclusion that beyond the public will to enhance inclusion through positive legislation, more subjective barriers that may have been disregarded significantly impact the efficiency of the inclusive policy application. For example, to what extent is the contribution of lay beliefs about factors that make a child successful or not at school taken into account when inclusion fails? The involvement of teachers' attitudes and beliefs in the success of inclusion has recently been analyzed through social psychology lenses (Bastart, Rohmer, & Popa-Roch, 2021; Jury et al., 2021; Rohmer, Palomares, & Popa-Roch, *in press*; Vaz et al., 2015). A few studies revealed that teachers' beliefs predict students' academic outcomes (Hornstra, Dedessen, Bakker, Van den Bergh, & Voeten, 2010; Van den Bergh, Denessen, Hornstra, Voeten, & Holland, 2010). In these rare studies, even less attention was paid to the relationship between students' self-representations of achievement skills and their performance (McArthur, Filardi, Francis, Boyes, & Badcock, 2020). The main goal of this study was thus to shed light on the role that the self-judgement of students with dyslexia plays in their school achievement.

2 | INCLUSION OF STUDENTS WITH DYSLEXIA IN FRANCE

Developmental dyslexia is characterized by an impairment in reading acquisition observed despite normal intelligence and adequate schooling and in the absence of other cognitive, sensorial, psychiatric, and motivational disorders (World Health Organization, 2011). According to the dominant phonological deficit hypothesis, the disorder stems from impaired activation of phonological representations (Boets et al., 2013; Ramus, 2014; Saksida et al., 2016), involving impairment in automatic word recognition. In France, the diagnosis of dyslexia is made by a speech therapist or an educational psychologist, usually after two years of reading delay (Colé & Sprenger-Charolles, 2021). However, the role of teachers is crucial in identifying the predictive signs of dyslexic disorders such as low phonological awareness or letter knowledge. Despite an abundance of scientific literature on the nature of dyslexic disorders, teachers and educators still have misconceptions about the nature and the characteristics of dyslexia (e.g., believe that dyslexia is the result of a visual deficit; Bell, McPhillips, & Doveston, 2011; Knight, 2018; Washburn, Joshi, & Binks-Cantrell, 2011; White, Mather, & Kirkpatrick, 2020) that may lead to inappropriate or non-research-based accommodations. For example, the use of a specific font is often considered effective by teachers, but research shows that it is more the spacing between letters than the font itself that allows individuals with dyslexia to read more accurately and more rapidly (Bellocchi, Massendari, Grainger, & Ducrot, 2019; Kuster, van Weerdenburg, Gompel, & Bosman, 2018; Marinus et al., 2016). Overall, research characterizing the nature of dyslexic disorders and assessing the effectiveness of adaptations remains unknown to the general public and particularly to teachers in France (Dehaene, 2011).

3 | FROM THE IMPAIRMENT TO THE SOCIAL CONTEXT

Traditional approaches to dyslexia have focused on the neurodevelopmental aspects of the impairment that largely underestimate the weight of noncognitive and more social variables such as personality, attitudes, values, beliefs and feelings (Stankov, 2013). This mirrors the evolution of how disability is conceived at a macrosocial level (Oliver & Barnes, 2012). Disability was long considered as an individual problem and efforts were focused on reducing the gap between the disability and normality. A more universal view was gradually promoted gradually according to which disability is intrinsically linked with human nature and is more or less salient as a function of the context. Disability emerges at the meeting point between an individual's idiosyncrasies and contextual factors such as unsuitable environments, inadequate training and false beliefs (Bickenbach, Chatterji, Badley, & Üstün, 1999; Bogart & Dunn, 2019). Applied to academic achievements, research has shown that students' ability to solve problems in mathematics, science and literacy is necessary but not sufficient as it also depends on what students think about their level of ability in these domains (Desombre, Anegmar, & Delelis, 2018; Dutrevis & Croizet, 2005; Huguet & Regner, 2007; Stankov, Morony, & Lee, 2014). In this line of thought, it has been shown that many of the difficulties that students experience at school are linked to noncognitive factors, such as the belief that they are not right for school (Pajares & Schunk, 2001; Zeleke, 2004).

4 | SELF-JUDGEMENTS, AN EXPLANATORY MECHANISM FOR SCHOOL ACHIEVEMENT

Among noncognitive constructs with potential importance for education, social psychology literature has stressed the relevance of considering self-judgements (Bakadorova & Raufelder, 2015; Frost & Ottem, 2018; Wouters, Germeijs, Colpin, & Verschueren, 2011). For instance, a longitudinal study with more than 400 children found that, at equivalent learning potential (same IQ), students who had a positive judgement of their own abilities performed better than their peers whose self-judgements were less positive (Bouffard, Vezeau, Roy, & Lengelé, 2011). Self-judgements are particular instances of social judgements referring to how people perceive themselves in terms of personality characteristics (for a review, see Abele, Ellemers, Fiske, Koch, & Yzerbyt, 2021). Research has consistently highlighted two distinct clusters of characteristics that are systematically attributed when making social judgements

about oneself and/or others: a horizontal dimension referring to a desire to align with others (“I consider myself to be friendly, warm, pleasant”) and a vertical dimension referring to a desire to advance personal interests and to succeed (“I consider myself to be competent, efficient, intelligent”).

As far as the academic achievement of children with dyslexia is concerned, cognitive factors have been extensively explored (Saksida et al., 2016; Ziegler, Perry, & Zorzi, 2020). Nevertheless, the potential impact of self-judgement on academic achievement has rarely been taken into consideration so far. Yet, this perspective appears to be particularly relevant, as having a disability such as dyslexia may have a strong impact on individual self-judgement. Studies have shown that people with a disability judge themselves and are judged by others as less competent, less intelligent, and less high-performing than people with no disability (Louvet, Rohmer, & Dubois, 2009; Nario-Redmond, 2010). In fact, being categorized as “dyslexic” can influence children’s self-belief and thus make them interiorize that they are less valuable than their peers (even though being diagnosed with dyslexia is thought to raise self-esteem to a certain extent, see Glazzard, 2010 and Taylor, Hume, & Welsh, 2010). In that case, the consequence would be poorer school performances, as feeling less competent leads to lower academic achievement (Pajares & Schunk, 2001). Empirical evidence of this relationship has been produced in the case of mathematical achievement in girls (Régner, Selimbegović, Pansu, Monteil, & Huguet, 2016) and of the capacity to build abilities in students with an immigration background (Appel & Kronberger, 2012). To the best of our knowledge, no specific attention has been paid to the relationship between self-judgement and school performance in students with dyslexia. Understanding these individuals’ self-representations and their relationship with success could guide professional interventions. An important aim of our research was thus to assess how dyslexia impacts a student’s self-judgement of his/her ability, and to analyze the influence of these non-cognitive constructs on academic achievement.

5 | THE SCHOOL CONTEXT, A PARTICULAR ENVIRONMENT IN THE RELATIONSHIP BETWEEN SELF-JUDGEMENT AND PERFORMANCE

Context is at the core of the conception of disability today, implying that a given difficulty may exist in one situation but not in another. One can imagine that reading difficulties are prominent in the classroom but fade away in the schoolyard. In other words, the disability appears when the student walks through the door into the classroom and disappears when he/she leaves the classroom. Because of the persistence of some difficulties, low-achieving students may progressively interiorize the association between “school” and “failure”. From this perspective, the school may be a threat to the Self. The stress caused by this uncomfortable situation in turn reinforces the students’ difficulties (Desombre et al., 2018). Interestingly, the threat weighing on individuals with specific difficulties is not permanent and can disappear in less threatening environments (Burden, 2008; Desombre et al., 2018; Zeleke, 2004) and hence interfere less with achievement. For instance, Huguet, Brunot, and Monteil (2001) compared two groups of students, with respectively low and high past achievements in mathematics. Both groups were asked to memorize and draw a complex geometrical figure. When told they had to do a geometry exercise, low achievers performed worse than high achievers. However, the gap between the two groups closed when the same exercise was presented as a drawing exercise. These results indicate that when the academic frame of the exercise (i.e., geometry) was repeatedly associated with failure, corresponding to a threatening situation, its activation was in itself enough to negatively affect performance. However, when the same exercise was presented in a non-academic frame, a non-threatening situation (i.e., drawing), low achievers performed as well as high achievers. The same phenomena are hypothesized to occur in students with dyslexia at school: Academic assessments proposed by teachers often involve reading instructions and writing the answers, which increase the risk of failure for students with dyslexia. Moreover, insidious associations between Self and poor performance perceptions can occur repeatedly. It is widely acknowledged that students’ past experiences are important predictors of current behavior. The more failure they face, the more their performances are likely to be undermined. However, research has also shown that with appropriate and accessible evaluation methods (instructions read aloud by teachers, simplified grammar and vocabulary, oral answers; Waterfield, 2002; Denis, Lison, & Lépine, 2016) performance might be less undermined as reading is deemphasized. Therefore, loosening the relationship between Self and poor performance by modifying the performance context may benefit

success (Huguet et al., 2001). In line with this reasoning, a complementary objective of this study was to test whether reducing the academic framing of literacy tasks at school could improve the performance of students with dyslexia.

6 | OVERVIEW AND HYPOTHESIS

The aim of the present study was twofold. First, we sought to investigate self-judgements at school in students with dyslexia and to assess whether these self-judgements are a mediating factor in the relationship between dyslexia and school performance. To this end, students filled in the School Social Judgement Scale for children (SSJS; Chauvin, Demont, & Rohmer, 2018), and performed a set of academic tasks. In line with previous research (Louvet et al., 2009), we expected students with dyslexia to judge themselves less positively on the vertical dimension (self-judgement of competence) than students without dyslexia. Additionally, based on the two-components approach of social judgement (Chauvin et al., 2018; Louvet, Cambon, Milhabet, & Rohmer, 2019), we expected the mediating variable accounting for the relationship between dyslexia and students' performance to be self-judgement of competence.

Second, we aimed to establish whether the influence of dyslexia on performance is modulated by being framed in an academic context. More precisely, we aimed to assess the differential impacts of dyslexia on performance in academic and non-academic literacy tasks. We expected this impact to be highly detrimental to performance in academic literacy tasks, but not to performance in non-academic literacy tasks. To test this hypothesis, we chose reading-related tasks with which students with dyslexia may have recurrent difficulties but may also be able to achieve a certain degree of success. Comprehension and vocabulary tasks were used. They were presented as an academic task commonly used in French schools and also in a form not commonly used for students at school (i.e., as a non-academic task). Indeed, because the format of academic tasks recalls situations of recurrent failure at school, they can be experienced as threatening. Conversely, because non-academic tasks are not associated with previous episodes of difficulty, non-academic tasks are potentially not threatening. In addition, were the academic framing hypothesis to be confirmed, we extended our prediction of a detrimental impact on performance in an academic task not related to reading, an academic mathematics task.

To achieve the two aims of the study, we chose a multivariate methodological framework. While a considerable literature explores the relationship between specific learning difficulties and performance (in dyslexia; Duff, Hendricks, Fitton, & Adlof, 2020; Richardson, 2015; Willcutt et al., 2007; Wyschkon et al., 2018), and a few authors have tested the relationship between self-judgement and performance in different social groups of students (in girls; Régner et al., 2016) to our knowledge, none have included students with dyslexia. The bivariate framework between learning difficulties and performance, and between self-judgement and performance may underestimate the complexity of the obstacles faced by students with dyslexia. Indeed, the dyslexia itself not only negatively impacts performance, but the specific self-judgement developed at school may account for this negative relationship. Consequently, the complex multivariate nature that dyslexia engenders, which is widely accepted at the theoretical and practical levels, should be reflected in methodological research choices. We believe that the mediation framework used in the present research is an interesting way to model these complex relations. In other words, mediation consists of testing whether dyslexia impacts students' performance directly (in a simple bivariate way), and/or indirectly through an intermediate mediator variable, self-judgement. To account for the potential threat created by an academic context, we tested whether mediation depends on the academic or non-academic framing of the tasks.

7 | METHODS

7.1 | Participants

This study involved 183 French students (71 girls, 112 boys, aged 11 to 15; $M_{age} = 12.8$, $SD = 1.3$) from eight classes in the same middle school. Among them, 31 (7 girls, 24 boys) were diagnosed with dyslexia by a speech therapist.

Students with dyslexia were included in the mainstream classes and there was no age difference between the two groups of students with and without dyslexia ($F [1, 181] < .01, p = .95$). Prior to the study, the students and their parents received a letter informing them that participation was anonymous, and that data would remain confidential. Only students whose parents gave their informed consent for participation were included in the study and only when the students themselves also gave their consent. The protocol was approved by the University of [blinded for review]'s ethics committee (agreement reference: CER/2018-05).

7.2 | Procedure

The experiment was conducted in the real context of each class including students with dyslexia. The information provided in the consent form was recalled. The students were told that they would participate in a study about how people construct their self-image and how this image makes them feel good at school. They were reassured that their results were anonymous and told that neither their teachers nor parents would be informed about their responses. All the students were handed an exercise booklet. Their first task was to invent a personal secret code (e.g., favourite character, hero, symbol, pet). They were asked to fill in the self-report questionnaire before completing the (academic and non-academic) literacy and mathematics tasks. A time limit was set varying from 20 to 10 min depending on the age of the students. At the beginning of each task, the written instructions in the booklet were orally explained to the students. The order of the subjects was counterbalanced between classes: Half the classes completed the literacy tasks first, whereas the other half began with the mathematics tasks. Regarding the literacy tasks, for each of the two competencies evaluated (vocabulary and comprehension), all the students performed the non-academic task before the academic one. We decided to keep the same order of the two types of tasks as non-academic tasks may be less stressful than academic ones, the latter being comparable to common school assessments.

7.3 | Material

7.3.1 | Self-report questionnaire: The school social judgement scale for children

To measure self-judgement at school, participants filled out the School Social Judgement Scale for Children validated on a French population (Chauvin et al., 2018), composed of 15 items assessing the two dimensions of social judgement. Warmth (e.g., be helpful) operationalizes the horizontal dimension, whereas competence (e.g., quick understanding), effort (e.g., motivated to be good) and assertiveness (e.g., motivated to act as a leader) are the three sub-components of the vertical dimension. Participants responded on a four-point Likert scale (1 = *totally disagree*, 4 = *totally agree*).

7.3.2 | Literacy tasks

The literacy tasks were based on standardized tests and were conceived by teachers or speech therapists. Teachers proposed academic versions of the tasks based on similarities with the exercises usually used in the French school system, while speech therapists proposed equivalent versions of the tasks in the appealing forms they usually use in therapy. The two versions of the tasks thus assessed the same literacy skills and were equivalent in difficulty.

Academic task

The academic literacy tasks targeted the evaluation of two skills: Vocabulary and comprehension. The first task was an adaptation of the EVIP (*Echelle de Vocabulaire en Images Peabody*; Dunn, Theriault-Whalen, & Dunn, 1993), a

French version of the Peabody Picture Vocabulary Test Revised (PPVT-R; Dunn & Dunn, 1981). This test is designed to assess the receptive vocabulary of French words in children. The participant had to find the word corresponding to a definition (word-definition association, WDA) through four trials. The second task was adapted from the revised version of the Reading of Words and Comprehension test (LMC-R, *Lecture de Mots et Compréhension*; Khomsi, 1999), which assesses comprehension skills. The instruction was to identify the sentence that best matched a picture among four choices (sentence-picture association, SPA) through seven trials. For both tasks, the response to each item was scored in a binary fashion (0 = incorrect, 1 = correct).

Non-academic task

The same skills (vocabulary and comprehension) were evaluated in the non-academic version of the literacy tasks. While vocabulary and comprehension skills are usually evaluated through all-written material (e.g., comprehension skill is often evaluated by reading a text and answering a few written questions on the text), we preferred illustrated material. We adapted the same two batteries of tests used for the academic format for our participants by modifying the all-written material: The subject is still in written form, but the answers the students could choose from are presented in illustrated form. For the vocabulary task, the purpose was to identify the picture corresponding to a word (picture-word association, PWA) through four trials. For the comprehension task, the instruction was to identify the picture that best matched a situation described in a sentence among four choices (picture-sentence association, PSA) through seven trials. For both tasks, the response to each item was scored in a binary fashion (0 = incorrect, 1 = correct).

7.3.3 | Mathematics task

The mathematics task (four items) resembled the typical arithmetic exercises done by students in French schools. It was extracted from the *Tedi-Maths grands* (Noël, 2017), which is a diagnostic test of basic mathematical competencies for children. Participants had to perform one addition, one subtraction, one division and one multiplication. The score for each item comprised both the result (1 point) and the correct writing of the answer (1 point). Accordingly, the response to each item had three possible scores (0 for a wrong answer and incorrect writing of the answer, 1 for either the right answer or correct writing of the answer, and 2 for the right answer and the correctly written answer).

7.4 | Statistical data analysis

Our data analysis strategy was structured in two parts. First, self-judgement and performance individual scores were calculated using factor analysis. The following scores were calculated: Dimensions of self-judgement, Academic literacy, Non-academic literacy, and Academic mathematics. Second, we simultaneously investigated the relationship between dyslexia and the above-mentioned scores using mediation analyses. Dyslexia was used as a binary independent variable and the performance variables as continuous dependent variables. A mediator is a third variable that explains how or why two other variables are related (Holland, Shore, & Cortina, 2017; Memon, Cheahb, Ramayah, Ting, & Chuahe, 2018). In our case, self-judgement would mediate the relation between dyslexia and performance.

Mediation model estimation of predicted indirect effects was performed using structural equation modeling (SEM) with maximum likelihood estimation in Mplus software (Muthén & Muthén, 2017). The bias-corrected bootstrap confidence interval procedure incorporated in Mplus allowed us to test the significance of each parameter while providing confidence intervals (CIs) for the parameter values (this procedure for estimating mediation models is widely recommended; see for example MacKinnon, Lockwood, & Williams, 2004; Hayes, 2009). Model fit was considered acceptable if all the following criteria were met: A Chi-square goodness of fit (p -value > .05), the comparative

fit index (CFI) and the Tucker–Lewis index (TLI) > .90, the root-mean-square error of approximation (RMSEA) and standardized root-mean residual (SRMR) < .08 (Kline, 2005).

8 | RESULTS

8.1 | Preliminary analysis

To check if our sample was enough robust to test our hypothesis, we conducted a sensitivity power analysis. Results indicated that 183 participants provide a sufficient statistical power (.08) to detect a significant size effect of $f^2 = .05$ (Perugini et al., 2018). Moreover, one of our goals was to ensure that the academic and non-academic literacy tasks were comparable in terms of difficulty. If that is the case, one should expect comparable scores in performance of students without dyslexia in the two types of tasks. An ANOVA with Dyslexia (with vs. without dyslexia) as between factor and the type of task (academic vs. non-academic) as within factor

TABLE 1 Mean scores (with standard deviation) for each dimension of self-judgement by children with dyslexia and without dyslexia

	Warmth M (SD)	Competence M (SD)	Effort M (SD)	Assertiveness M (SD)
Children with dyslexia	3.26 (.47)	2.38 (.59)	3.54 (.59)	2.21 (.65)
Children without dyslexia	3.33 (.50)	2.78 (.65)	3.43 (.68)	2.22 (.58)

TABLE 2 Mean scores (with standard deviation) for each task performed by children with dyslexia and without dyslexia

	Academic literacy		Non-academic literacy		Academic mathematics M (SD)
	Vocabulary M (SD)	Comprehension M (SD)	Vocabulary M (SD)	Comprehension M (SD)	
Children with dyslexia	4.9 (1.33)	2.65 (.88)	6.55 (.67)	3.06 (.77)	2.83 (1)
Children without dyslexia	5.68 (1.1)	2.86 (.91)	6.55 (.76)	2.91 (1)	3.37 (.78)

TABLE 3 Path coefficients and p -value associated with the linear effect of each dimension of self-judgement on the three performance variables

	Academic literacy		Non-academic literacy		Academic mathematics	
	β	p	β	p	β	p
Warmth	.33	.08	.24	.23	-.11	.52
Competence	.44*	.04	.51**	.01	.58**	.01
Effort	-.08	.50	-.19	.30	.16	.26
Assertiveness	.01	.99	-.01	.93	-.25	.38

Note: * $p < .05$; ** $p < .01$.

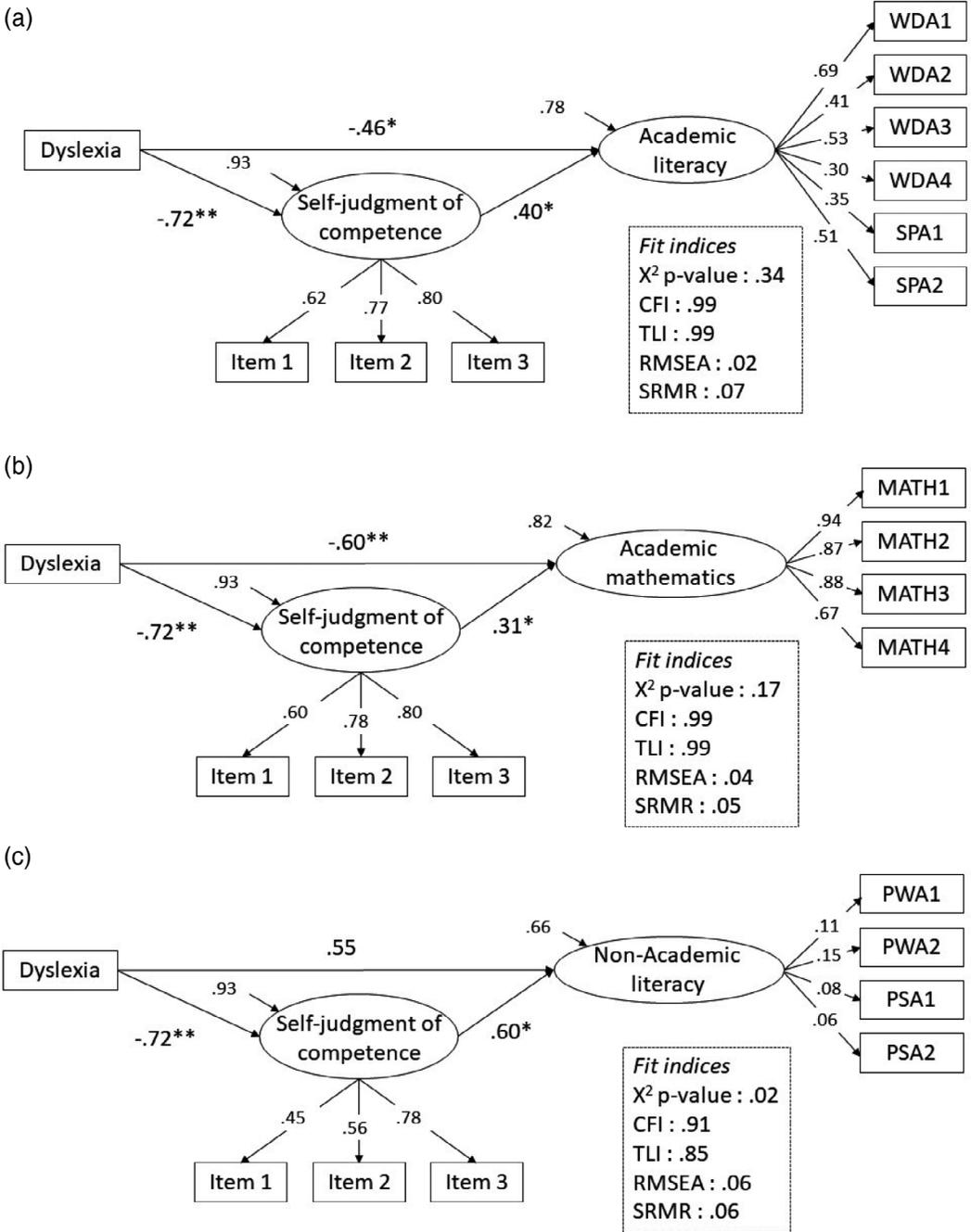


FIGURE 1 Structural equation model representation of the two mediation models obtained for (a) academic literacy, (b) academic mathematics, (c) non-academic literacy. Fit indices are depicted for each model. Factor loadings and path coefficients are standardized ($*p < .05$; $**p < .01$)

revealed a significant interaction ($F [1,181] = 6.39, p = .012$). As expected, while there is a difference in performance between the two tasks in students with dyslexia ($t [30] = 3.71, p < .01$), this is not the case for students without dyslexia ($t [151] = 1.55, p = .12$).

The School Social Judgement Scale for Children had overall acceptable reliability with Cronbach's alpha values of .84 (effort), .57 (assertiveness), .71 (competence), and .53 (warmth). Table 1 lists the means for each dimension of self-judgement as a function of dyslexia. Table 2 lists participants' mean performance for each task as a function of dyslexia.

In order to test whether there is a real difference in the two groups' performance, we checked the effect of dyslexia (with vs. without) on performance. This effect was significantly negative for academic literacy ($\beta = -.46$, $p < .05$) and academic mathematics ($\beta = -.60$, $p < .01$). This means that students with dyslexia performed significantly less well than students without dyslexia in both academic tasks. However, this effect was not significant for non-academic literacy ($\beta = .55$, $p = .19$).

8.2 | Mediation analysis

We tested the effect of dyslexia on self-judgement. To this end, we used SEM to assess the effect of dyslexia on each of the four self-judgement variables.¹ This effect was significantly negative for competence ($\beta = -.71$, $p < .01$), indicating that self-judgement of competence was significantly lower in students with dyslexia than in students without dyslexia, but was not significant for warmth ($\beta = -.28$, $p = .25$), assertiveness ($\beta = -.16$, $p = .52$), and effort ($\beta = .22$, $p = .35$). Then, we tested the effect of the four dimensions of self-judgement on each of the three performance variables. As can be seen in Table 3, this effect was always significantly positive for self-judgement of competence, and never significant for the others.

The following mediation analyses thus only considered the self-judgement of competence as a mediator. The two mediation models on performance in academic literacy and academic mathematics were consistent. First, the model fit can be considered as good for the two models (see Figure 1). Second, they both showed a significant indirect effect of dyslexia on performance through self-judgement of competence (CIs for the associated parameter do not include 0) for academic literacy ($\beta = -.49$, 95% CI = $[-1.93; -.06]$) and academic mathematics ($\beta = -1.05$, 95% CI = $[-3.00; -.27]$). As predicted, this effect can be broken down into (i) a negative high effect of dyslexia on self-judgement of competence ($-.72$), and (ii) a positive medium effect of self-judgement of competence on performance (.40 for academic literacy and .31 for academic mathematics). However, the indirect effect for non-academic literacy was not significant ($\beta = -.53$, 95% CI = $[-1.11; .04]$).

9 | DISCUSSION

The overall aim of the present study was to test whether students with dyslexia face subjective barriers at school, which would amplify the impact of difficulties stemming from the objective characteristics of their learning impairment. To this end, middle school students with and without dyslexia rated their self-judgement and performed both, academic tasks (i.e., tasks widely used in French schools for students in the academic context) and non-academic tasks (i.e., less common in French schools and unusual for students in the same context). Our first hypothesis was that dyslexia impacts self-judgement, and that the effect of dyslexia on performance is specifically mediated by self-judgement. Our second hypothesis was that dyslexia has a negative impact on academic tasks, but not on non-academic tasks. Our results showed that dyslexia has a negative impact on self-judgement of competence, as well as performance, specifically on academic tasks, in both literacy and mathematics.

Our first hypothesis was that students with dyslexia judge themselves less positively on the competence dimension than students without dyslexia. As predicted, results confirmed that only the competence dimension of the self-judgement differentiates students with and without dyslexia. To our knowledge, this is the first study to show that the tendency observed in adults with disabilities is already manifest in youth (Clément-Guillotin et al., 2018). Insidious automatic association between disability and incompetence may appear in children who are repeatedly exposed to lay beliefs about the abilities of individuals with disabilities. It is likely that school is a favorable environment to

activate these negative associations, considering the importance of academic performance there. Also, whereas most previous studies focused on visible disabilities (people in wheelchairs; for a review see, Rohmer & Louvet, 2012), similar associations apparently also exist for invisible disabilities. In sum, the inclusion policy might lead to unintended early categorization of children at school, automatically activating a pernicious stereotypical association between incompetence and disability.

Additionally, we hypothesized that the impact of dyslexia on performance is mediated by self-judgement of competence. Our results were consistent with this prediction and showed that the relationship between dyslexia and performance is explained by the mediating role of self-judgement on competence (and not by the other dimensions of self-judgement). These findings nicely complement those of Hornstra et al. (2010) who showed that teachers' perceptions predict the performance of students with dyslexia in spelling and mathematics. While these authors highlight the impact of the external judgement on achievement, we show that self-judgements are also a strong predictor of performance. This is in line with the results of previous studies indicating that self-judgement of competence is an important predictor of school achievement (Bouffard, Boisvert, & Vezeau, 2003; Bouffard & Couture, 2003). Results obtained in students without a disability are therefore corroborated in our population, including students with and without dyslexia.

Beyond the mediating influence of self-judgement of competence on performance, our results show that the impact of dyslexia on performance strongly depends on whether academic or non-academic features of the assessment are highlighted. Logically, in tasks related to literacy, students with dyslexia subjectively judged themselves less competent and performed objectively less well in vocabulary and comprehension. Interestingly, when the framing of the task was altered to remove any association with the school environment, dyslexia was no longer negatively related to performance. On the contrary, in a mathematics task that did not involve much reading, but was framed in an academic manner, dyslexia was again negatively related to performance. This suggests that school may be perceived as a threatening environment, negatively affecting performances in domains that are not related to dyslexia-specific impairments. In contrast, once the threat has been minimized by altering the context of the evaluation, it appears that, beyond the mediating role of the self-judgement of competence (still detrimental for students with dyslexia), dyslexia in itself no longer has a negative impact on performance. In other words, subjective beliefs may be more powerful than objective abilities in predicting the performance of children with vulnerability. The objective side of reading difficulty is obviously an important predictor of performance. Nevertheless, the way the student is subjectively experiencing this difficulty was long neglected despite seeming to play an important role in success at school (Pajares & Schunk, 2001; Wei & Marder, 2012).

Despite the importance of our findings, some limitations of our study need to be addressed, as well as the implications for further research. First, our academic and non-academic literacy tasks differed slightly in the extent to which language was displayed within the task (i.e., four sentences for one picture in the academic comprehension task, four pictures and one sentence in the non-academic comprehension task). It could thus be argued that our results are due to the smaller amount of written language used in the non-academic literacy tasks rather than their non-academic framing. However, the academic mathematics tasks did not contain much-written language, and their results were equivalent to those of the academic literacy tasks. More importantly, the analysis showed that students without dyslexia had similar performance in academic and non-academic literacy tasks. This suggests that it is the academic framing, not the amount of written language included or the difference in difficulty between the tasks, that had an impact on the present study. The second possible limitation is that there were fewer students with dyslexia in our sample, than students without dyslexia. However, the imbalance in our sample corresponds to the prevalence of dyslexia in the general population and characterizes most studies in this domain (Hornstra et al., 2010). Moreover, the sample corresponds to the purpose of our study, which was to compare students with and without dyslexia exposed to the same schooling conditions in the same classroom context. Instead of intentionally creating experimental conditions, we took the reality of the classrooms that existed prior to our study for granted. Fundamentally, it is important to ensure that both students with and without dyslexia receive the same type of teaching from the same teachers (Smeding, Dompnier, Meier, Darnon, & Butera, 2021). The third limitation is that participants were

not paired one to one, which may have ruled out explanations in terms of potential confounds. It could thus be argued that our results are linked to differences in individual variables in our sample. However, although we did not record their individual socioeconomic characteristics, all the participants were recruited in the same middle school in a “middle class” urban environment where there is little variation in terms of socioeconomic background. In addition, our study included a range of ages corresponding to the first four classes of “secondary school” in France, which is approximately equivalent to middle school in the US. One may consider the possibility of the variability of self-judgements during adolescence. However, in our study, age did not appear to be linked to self-judgement. Finally, differences related to classrooms and teacher effect (Bressoux & Pansu, 2016) can be excluded, as participants with and without dyslexia had the same teachers because they were enrolled in the same classes.

Important future research questions emerge from our results. First, in a broader perspective, at different levels of schooling, one may wonder whether self-judgement of competence is the prevailing factor in predicting academic performance. As the present study focused on a middle school population (students aged 11 to 15), future studies should investigate older students. Indeed, there is evidence suggesting that self-judgement of competence is less effective in predicting performance as students grow older. Previous research has shown that motivation becomes the leading predictor of performance at university (Darnon, Dompnier, Delmas, Pulfrey, & Butera, 2009). Second, further studies should also aim to disentangle cognitive and emotional explanations or define their relative contributions to academic performance. Indeed, our results are consistent with two mechanisms that explain poor school performance in vulnerable social groups, pertaining respectively to the automatic activation of the stereotype and perception of the school environment as a threat (Régner et al., 2016). From a methodological perspective, the best way to investigate the influence of framing on performance would be to manipulate the framing of the task as a between-subject factor, then capture self-judgement of competence directly related to the task, then evaluate performance among students with and without dyslexia (or other disabilities), and finally perform a mediated moderation analysis.

In sum, these results are consistent with the tenets that subjective factors play a crucial role in the success of the inclusion process. There is a great deal of work that can and should be done by schools, districts, and the State to support students with disabilities in general and with dyslexia in particular in building appropriate self-judgement of competence. More precisely, actors' representations of competence can enhance the achievement of students with learning disabilities. Without any doubt, parents, teachers, caregivers, educators, and speech therapists can all play an active role in fostering positive judgements of one's capacities. The present study suggests that in a non-academic context, students with dyslexia can achieve as much as students without dyslexia. Therefore, the heart of the problem is the question of how the self-concept is specifically fostered at school (Wei & Marder, 2012; Zeleke, 2004). For example, difficulty reading is neither definitive nor synonymous with incompetence in all the subjects taught at school. The contrary view could lead the student to cease to invest in the school sphere. Sharing this positive vision with significant adults would certainly benefit students with dyslexia in the same way as it would benefit all the other students. Both the training of professionals and the psychoeducation of parents should both focus on this crucial aspect. By applying the principle of positive psychology, training programs should encourage positive feedback, less threatening evaluations, and a multidimensional view of skills. The main thread of the training program should be how to no longer perceive school as a potential context of failure and unreachable challenges (Boujut, Popa-Roch, Palomarès, Dean, & Cappe, 2017). At a macrosocial level of analysis, our results support the relevance of the social model of disability for understanding the specific difficulties of certain students. While considering disability as an individual problem has led to efficient strategies to remediate the incapacity at a functional level, this model does not entirely overcome the difficulty (Oliver & Barnes, 2012). The actual model of disability takes more subjective factors such as inadequate training, fears and wrong beliefs into consideration. Public policies designed to encourage inclusion should underline the importance of the subjective factors in the training of pre-service teachers and of health staff involved in the school inclusion program.

Ultimately, even though the underlying mechanisms of the difficulties faced by students with dyslexia at school require further in-depth investigation, our study represents a significant advance by showing that accounting for the subjective representations of incompetence can lead to a very different interpretation of academic difficulties in vulnerable children.

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ENDNOTE

¹ Age and self-judgement of competence were not related ($\beta = -.13$, $p = .15$). Consequently, we did not include age in subsequent analyses.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon request.

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