



## Teachers' knowledge about and perception towards learning disabilities in reading

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### KEYWORDS

Learning disabilities  
Reading  
Teachers  
Knowledge  
Attributions

### ABSTRACT

Teachers play an essential role in the early detection and treatment of students with specific learning disabilities, hence the interest in assessing their knowledge and attitude towards this group of students. The aims of the current study were: to analyze differences in knowledge about specific learning disabilities of teachers from different educational profiles (Elementary Schools and Middle School teachers) and of teachers with different levels of experience with students with specific learning disabilities; and to examine teacher's causal attributions of students with and without specific learning disabilities. Participants were 237 teachers, of whom 78.1% were women. Of the total 118 were elementary school teachers and 119 middle school teachers. All of them filled out the scale of knowledge about specific learning disabilities in Reading (38 items) which includes three dimensions (General Information, Symptoms/Diagnosis, Treatment) and the questionnaire of teachers' casual attributions for students' achievement (four items). Middle school teachers and teachers with lack experience with specific learning disabilities students displayed lower levels of knowledge of specific learning disabilities. Teachers substantially attribute students' (with and without specific learning disabilities) achievement to intrinsic factors. In the case of failure, teacher's causal attributions to external factors increased with specific learning disabilities students.

## Conocimiento y percepción del profesorado sobre las dificultades de aprendizaje de la lectura

### PALABRAS CLAVE

Dificultades de aprendizaje  
Lectura  
Profesorado  
Conocimiento  
Atribuciones

### RESUMEN

El profesorado es determinante en la detección e intervención en los casos de alumnado con dificultades específicas del aprendizaje de la lectura, de ahí el interés en valorar su conocimiento y actitud hacia este grupo de estudiantes. Los objetivos del presente estudio fueron: analizar las diferencias en el conocimiento sobre las dificultades específicas del aprendizaje de la lectura en base al nivel educativo del profesorado (Educación Primaria y Educación Secundaria Obligatoria) y su experiencia con alumnado con dificultades específicas del aprendizaje de la lectura; y analizar las atribuciones causales del profesorado sobre el rendimiento del alumnado con y sin dificultades específicas del aprendizaje de la lectura. Participaron 237 docentes, de los cuales el 78.1% eran mujeres. Del total, 118 eran maestros/as de Educación Primaria y 119 profesores/as de Educación Secundaria Obligatoria. Los docentes respondieron a la Escala de Conocimientos sobre las dificultades específicas del aprendizaje de la lectura (38 ítems) que cuenta con tres dimensiones (Información General, Síntomas/Diagnóstico e Intervención) y a un cuestionario de atribuciones causales del profesorado (cuatro ítems). Los resultados reflejaron que el profesorado de Educación Secundaria Obligatoria y aquellos/as con poca experiencia con alumnado con dificultades específicas del aprendizaje de la lectura mostraban un menor conocimiento sobre las dificultades específicas del aprendizaje de la lectura. El profesorado atribuía el éxito de los/las estudiantes con y sin dificultades específicas del aprendizaje de la lectura mayoritariamente a factores intrínsecos. En el caso del fracaso la atribución extrínseca aumentaba ante el alumnado con dificultades específicas del aprendizaje de la lectura.

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Learning to read is one of the most important tasks children face at school, especially in the first few years of compulsory education (Cuetos et al., 2015). Nonetheless, between 5 and 10% of Spanish school children have problems with reading (Balado-Alves et al., 2017). If these difficulties persist, despite the child having what they need to be an effective reader (educational opportunities, intelligence, motivation), that would mean dealing with a specific learning disabilities in reading (SLD-R; Deutsch & Davis, 2019).

Specific learning disabilities were included in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association [APA], 2013) within neurodevelopmental disorders, and are defined as difficulties in learning and use of academic skills, despite appropriate treatment aimed at easing those difficulties. For SLD-R the problems tend to be with reading words slowly or with effort, inaccurately, or having difficulty understanding what is being read (APA, 2013).

Between 5% and 15% of the school population in Spain have some sort of specific learning disabilities (Del Río, 2018), and they make up one of the most common groups of students who need specific educational support (Suárez-Rodríguez et al., 2022). Dyslexia is the most common learning disability (Soriano-Ferrer & Piedra-Martínez, 2020), with a prevalence in Spanish students between 3.2% and 5.9% in primary education (Jiménez et al., 2009) and between 3.2% and 5.1% in secondary education (González et al., 2010). Dyslexia falls within SLD-R and refers to difficulties in the accurate, fluent recognition of words and decoding problems resulting from a deficit in the phonological component (International Dyslexia Association, 2002).

Because of the high prevalence of SLD-R and the importance of reading in order to follow curricular content, teachers must be able to detect and treat possible SLD-R in their students (González-Benito, 2018). The teacher is the educational agent who knows the student best and has the most contact with them (Guzmán et al., 2015), meaning that their role, and their training, is key to detecting and preventing neurodevelopmental disorders (Cueli et al., 2022; Fuchs & Fuchs, 2006). Furthermore, the knowledge teachers exhibit about specific learning disabilities also helps them develop positive, inclusive attitudes towards students in the classroom (Thomas & Uthaman, 2019). In this context, the present study aims to examine what teachers know about SLD-R and their causal attributions related to the success or failure of students with SLD-R in reading tasks.

### *Knowledge of SLD-R*

Washburn et al. (2017) carried out a study in the USA about knowledge of SLD-R in general, and dyslexia in particular, in 271 teachers with between 0 and 5 years of experience. Their results indicated that 54% of the teachers had incorrect ideas about dyslexia, and the percentage was higher in secondary school teachers.

In England and Wales, Knight (2018) examined knowledge about dyslexia in 2,570 primary, secondary, further educa-

tion, and special education teachers. The results showed that the participating teachers' knowledge of dyslexia was based on behavioural aspects, and they lacked information about associated cognitive and biological aspects. In addition, teachers who reported having had specific additional training about the disorder used significantly more cognitive descriptors associated with dyslexia.

Guzmán et al. (2015) performed a study in Spain about teachers' knowledge of SLD-R. They used the Knowledge of SLD-R Scale, which has three dimensions: General information, Symptoms/Diagnosis, and Intervention. The scale collects information about real knowledge, incorrect ideas, and gaps in knowledge about SLD-R. The results of the study (in which 149 infant and primary school teachers took part) showed that most correct answers were given for items in the Intervention dimension. Most incorrect ideas were in the items in the Symptoms/Diagnosis dimension, and most gaps in knowledge were in the General Information dimension (Guzmán et al., 2015). Both Guzmán et al. (2015) and Washburn et al. (2017) found no significant relationship between teaching experience and knowledge about SLD-R, or between experience working with students with SLD-R and knowledge about it.

In addition to the importance of what teachers know about SLD-R, their attitudes and perceptions about their students are also significant (Jager et al., 2021). In this context, studying the factors teachers associated with their students' performance becomes important, which is linked to the theory of attribution (Weiner, 1985).

### *Teachers' Causal Attributions About the Performance of Students With and Without SLD-R*

Weiner's (1985) theory of attribution defines causal attribution as a person's perceptions about the cause or reason for success or failure in a task. The type of attribution or cause that a person establishes about their success or failure has a series of specific effects on emotions, decision-making, and subsequent performance. Based on this theory, Wang and Hall (2018) suggested that students' motivation and success in tasks may be influenced by the causal attributions made not only by the students, but also by teachers.

In reading-related tasks, Natale et al. (2009) found that when teachers attributed their students' success to effort and ability (internal factors or causes), students' task motivation was greater. In contrast, when teachers attributed students' success to tasks being easy or the students getting help (external causes or factors), the lower the levels of motivation and performance in the reading tasks (Natale et al., 2009).

With regard to failure, Frijters et al. (2018) noted an association between poor reading competency and repeated failure. However, if teachers attribute students' poor performance to external factors (or when the teacher shares responsibility for that poor performance), then they may be able to provide a more positive, encouraging educational response, regardless of students' levels of effort or ability, or whether they have an SLD or not (Woodcock et al., 2019). Nonetheless, teachers' causal

attributions and educational responses to the performance of students with SLD have been shown to be different from those for students without (Woodcock & Hitches, 2017).

In a study with 19 Spanish primary school teachers, Navarro and Rueda (2012) examined the relationship between the teachers' causal attributions and student's performance (with and without SLD-R) in reading tasks. Their results indicated that there was greater attribution of internal factors (such as ability) for failure in reading tasks when students had SLD-R. In addition, attribution of those students' success in reading tasks to external factors (such as the support students receive) was related to poorer performance.

Because of that, it would be interesting to study the type of causal attributions made by teachers about the performance of their students with and without SLD-R in reading competency tasks – in addition to studying what primary and secondary school teachers know about the disorder – in order to determine what attributions are most common in the classroom. Although studies have examined what infant and primary school teachers know about SLD-R (Guzmán et al., 2015), to our knowledge, no studies have looked at compulsory secondary education teachers, or looked at causal attributions along with knowledge.

Against this background, the present study had the following objectives: (1) Analyse the differences in knowledge about SLD-R between primary and secondary school teachers, considering the dimensions of General Information, Symptoms/Diagnosis, and Intervention; (2) Analyse the differences in knowledge about SLD-R (General Information, Symptoms/Diagnosis, and Intervention) according to teachers' experience with students with SLD-R; (3) Analyse the teachers' causal attributions for performance from students with and without SLD-R.

Considering the objectives, we noted three hypotheses. Firstly, based on the literature (e. g., Washburn et al., 2017), we expected to find that primary-school teachers know more about SLD-R than secondary-school teachers. Secondly, again based on the literature, (e. g., Guzmán et al., 2015), we expected similar levels of knowledge between groups based on their levels of experience of students with SLD-R. Lastly, we expected teachers to make more causal attributions about student performance to intrinsic factors for students both with and without SLD-R.

## Method

### Participants

A total of 237 teachers participated in the study who were selected through intentional, non-probabilistic sampling. The teachers mainly taught in the north of Spain, specifically Asturias and Cantabria. Just over three-quarters (185; 78.1%) were women. The mean age was 39.22 years old ( $SD = 10.59$ ).

Half of the teachers (119, 50.2%) taught in secondary-school (ages 11-16), while 118 (49.8%) taught primary education. A fifth of the primary-school teachers (23; 19.4%) had little or no experience of students with SLD-R, 37 (31.3%) had moderate experience, and 58 (49.1%) had a lot of experience of these students.

Just over a third of the secondary-school teachers (43; 36.1%) had little to no experience with SLD-R students, 43 (36.1%) reported moderate levels of experience, and 33 (27.7%) reported a lot of experience. The differences in distribution of experience levels were statistically significant in primary-school teachers ( $\chi^2(2) = 15.780, p < .001$ ; but not in secondary-school teachers ( $\chi^2(2) = 1.681, p = .432$ ).

### Measuring instruments

The survey was split into three sections. The first covered personal data, including sex, age, educational stage taught (primary or secondary), educational specialties, type of school (state-funded, private, or *concertado* [partly state funded, but educationally independent schools]), and experience with SLD-R students. This experience was recorded on a scale from 1 to 5 (1 = *no experience*; 2 = *little experience*; 3 = *moderate experience*; 4 = *quite a lot of experience*; 5 = *a lot of experience*). To make subsequent analysis simpler, we grouped the experience with SLD-R students variable into three: none-little experience ( $n = 66$ ), moderate experience ( $n = 80$ ), and quite a lot-a lot of experience ( $n = 91$ ).

The second section included the Knowledge of SLDs Scale (Guzmán et al., 2015), made up of 38 items in three dimensions (Appendix 1): General Information (11 items), Symptoms/Diagnosis (14 items), and Intervention (12 items). One of those original items was not included (meaning there were 37 in total) as it dealt with learning difficulties with writing, which the present study did not address. The scale was used to produce results in terms of teachers' real knowledge, incorrect ideas, and gaps in knowledge related to SLD-R for each of the three dimensions (General Information, Symptoms/Diagnosis, and Intervention) and overall. Each item has three possible answers: true, false, or don't know. Analysis of the psychometric properties of the scale gave a Cronbach  $\alpha$  of .88 and McDonald's  $\omega$  of .88 (McDonald, 1999).

The third and final section included the teachers' causal attributions questionnaire from Navarro and Rueda (2011). This questionnaire aims to examine the causal attributions exhibited by the teachers for the success or failure of their students with and without SLD-R in reading tasks (Appendix 2). It has four items. Two of the items ask teachers' about the key factors they attribute success or failure to in reading tasks for their students with SLD-R. The other two items ask about students without SLD-R. Each item has six possible responses and the option to provide an open, individual answer. Some of the alternatives are associated with attributions linked to internal factors (ability, interest, motivation), while others are associated with attributions linked to external factors (teacher or family support or the difficulty of the tasks). Participants can only choose one answer, which they feel most strongly identified with. This produces four attribution variables: success of students without SLD-R, failure of students without SLD-R, success of students with SLD-R, and failure of students with SLD-R. The variables were scored as 1 if the teachers' causal attributions dealt with internal factors, 2 if they were external

factors, and 3 if the responses indicated a combination of the two. Analysis of the questionnaire's psychometric properties gave a Cronbach  $\alpha$  of .85 and McDonald's  $\omega$  of .85 (McDonald, 1999).

### Procedure

Data was collected online. The data-collection process began on the 16th of October 2020 and ran until the 30th of November the same year. We contacted 321 schools in Asturias and 173 in Cantabria by email to distribute the survey to the teaching staff. Email addresses were obtained from the websites of the respective regional government education departments. The survey was also spread through social networks, using non-probabilistic snowball sampling (Elfil & Negida, 2017).

Before completing the survey, participants were informed that their responses would be anonymous and asked for their agreement to use the results in the study, ensuring informed consent from each participant.

### Design and data analysis

The study followed a survey strategy, described above. This meant that the study was a transversal, comparative study, analysing a set of variables, which in this case related to teachers' knowledge of SLD-R and the type of causal attributions made by the teachers about their students with SLD-R.

Data analysis was done using SPSS 27.0, with statistical significance set at  $\alpha = 0.05$ . First, a correlation matrix was calculated and the distribution of the variables was examined. In pursuit of the first objective and to analyse the differences in knowledge about SLD-R based on educational level (primary or secondary; independent variable), various univariate analyses of variance (ANOVA) were performed with overall knowledge of SLD-R and knowledge in each of the three dimensions (General Information, Symptoms/Diagnosis, and Intervention) taken as dependent variables.

For the second objective, ANOVA were again carried out to determine the differences in knowledge about SLD-R both generally and in each of the three dimensions (dependent variables) according to teachers' experience with SLD-R students (none-little, moderate, a lot; independent variable). Post hoc analyses (using Bonferroni correction) were performed for the dimensions where statistically significant differences were found.

Effect sizes were estimated using partial Eta squared ( $\eta_p^2$ ), with Cohen's (1988) classic criteria, by which there is a small effect when  $\eta_p^2 < 0.01$ , a moderate effect when  $\eta_p^2 \geq 0.059$  and a large effect when  $\eta_p^2 \geq 0.138$ .

We also performed a descriptive analysis of the different causal attributions exhibited by teachers' about the success and failure of their students with and without SLD-R based on educational level. Multidimensional contingency tables were produced in order to produce the total frequencies of attributions of success or failure to internal or external factors or a combination of the two for students with and without SLD-R.

## Results

### Preliminary Analysis

Table 1 shows the descriptive statistics for the variables, along with the Spearman correlation matrix. The values for asymmetry and kurtosis indicate that the study variables complied with the criteria for normality (values below three for asymmetry and below ten for kurtosis; Kline, 2011). The results of the correlation analysis indicate that real knowledge of the General Information, Symptoms/Diagnosis, and Intervention dimensions, and experience of students with SLD-R, were positively and significantly correlated, with greater experience being associated with greater knowledge.

### Teachers' knowledge of SLD-R according to educational profile

Teachers' knowledge about SLD-R considered real knowledge, incorrect ideas, and gaps in knowledge via the Knowledge of SLD Scale.

There were statistically significant differences between primary- and secondary-school teachers in real knowledge about SLD-R,  $F(1, 235) = 37.07, p < .001, \eta_p^2 = 0.136$ , with a large effect size. Primary-school teachers exhibited greater real knowledge ( $M = 25.18, SD = 4.99$ ) than secondary-school teachers ( $M = 20.98, SD = 5.6$ ). The differences between primary- and secondary-school teachers' scores in the three dimensions were also statistically significant, with a small effect size for General Information, moderate for Intervention, and large for Symptoms/Diagnosis (see Table 2), primary-school teachers scoring higher.

There were also statistically significant differences in incorrect ideas based on educational level,  $F(1, 235) = 15.41, p < .001, \eta_p^2 = 0.062$ , with a moderate effect size. Primary-school teachers demonstrated more incorrect ideas ( $M = 4.75, SD = 3.15$ ) than secondary-school teachers ( $M = 3.28, SD = 2.58$ ). The differences between the two were also statistically significant for the three dimensions, with a small effect size for General Information and Symptoms/Diagnosis, and a moderate effect size for Intervention (see Table 2), primary-school teachers demonstrating more incorrect ideas.

Lastly, there were also statistically significant differences between primary- and secondary-school teachers in gaps in knowledge,  $F(1, 235) = 53.69, p < .001, \eta_p^2 = 0.186$ , with a large effect size. In this case, secondary-school teachers exhibited greater gaps in knowledge ( $M = 10.73, SD = 6.48$ ) than primary-school teachers ( $M = 5.08, SD = 5.32$ ). The differences between the two in gaps in knowledge in the three dimensions were also significant, with a moderate effect size for General Information and a large effect size for Symptoms/Diagnosis and for Intervention (see Table 2). Secondary-school teachers exhibited more gaps in their knowledge in the three dimensions.

In summary, in the Knowledge of SLD Scale, secondary-school teachers exhibited lower levels of real knowledge

and more gaps in knowledge than the primary-school teachers. Although the primary-school teachers demonstrated greater real knowledge, they also demonstrated more incorrect ideas.

#### *Teachers' real knowledge of SLD-R according to experience with SLD-R students*

The next step was to examine whether experience of students with SLD-R was related to knowledge about it. The results of the ANOVA indicated statistically significant differences in levels of knowledge about SLD-R by the amount of experience teachers had with it (see Table 3), with a moderate effect size. The results showed that the differences between the different levels of experience (little-none, moderate, a lot) were evident in the three dimensions of the scale, with a small effect in the General Information dimension, a large effect in the Sympt-

toms/Diagnosis dimension, and a large effect in the Intervention dimension (see Table 3).

Via multiple comparison tests, it was possible to determine that the differences in the General Information dimension were between the little-none and moderate experience groups ( $p = .014$ ). In the Symptoms/Diagnosis dimension, the differences were between the three groups – in other words, between little-no experience and moderate experience ( $p = .001$ ), between little-no experience and a lot of experience ( $p < .001$ ), and between moderate experience and a lot of experience ( $p = .047$ ). In the Intervention dimension, there were statistically significant differences between the little-no experience and the moderate experience groups ( $p = .024$ ) and between the little-no experience and the a lot of experience groups ( $p < .001$ ). Teachers who reported having a lot of experience with these types of students scored higher in real knowledge both overall and in the three scale dimensions.

**Table 1**

#### *Descriptive statistics and Spearman Correlation Matrix*

	1	2	3	4
1. General Information	—			
2. Symptoms/Diagnosis	.59*	—		
3. Intervention	.45*	.54*	—	
4. Experience with SLD-R	.18*	.37*	.3*	—
<i>Mean</i>	7.46	8.25	7.36	2.1
<i>SD</i>	2.06	2.83	1.87	0.8
<i>Asymmetry</i>	-0.46	-0.48	-0.81	-0.2
<i>Kurtosis</i>	-0.12	-0.3	0.41	-1.45
<i>Minimum</i>	1	0	0	1
<i>Maximum</i>	11	14	10	3

\* $p < .01$ .

**Table 2**

#### *Differences in knowledge about SLD-R by educational profile*

	<i>M (SD)</i> Primary	Percentage	<i>M (SD)</i> Secondary	Percentage	<i>F</i> (1, 235)	<i>p</i>	$\eta_p^2$
<b>Real knowledge</b>							
General Information	7.86 (1.9)	71.49	7.06 (2.14)	64.16	9.389	.002	0.038
Symptoms/Diagnosis	9.47 (2.32)	67.67	7.04 (2.77)	50.3	53.702	< .001	0.186
Intervention	7.84 (1.77)	65.33	6.88 (1.85)	57.35	16.585	< .001	0.066
<b>Incorrect ideas</b>							
General Information	1.34 (1.3)	12.17	0.98 (1.16)	8.93	4.945	.027	0.021
Symptoms/Diagnosis	2.48 (1.53)	17.73	1.87 (1.43)	13.37	10	.002	0.041
Intervention	0.92 (1.15)	7.69	0.42 (0.79)	3.5	15.533	< .001	0.062
<b>Gaps in knowledge</b>							
General Information	1.81 (1.87)	16.4	2.95 (2.24)	26.8	18.234	< .001	0.072
Symptoms/Diagnosis	2.04 (2.38)	14.58	5.08 (3.18)	36.31	69.332	< .001	0.228
Intervention	1.24 (1.69)	10.3	2.7 (1.94)	22.47	38.135	< .001	0.140

*Nota.* The maximum score for General Information is 11, for Symptoms/Diagnosis it is 14, and for Intervention it is 12.

### Teachers' causal attributions of the success and failure of their students with and without SLD-R in reading tasks

The final step was to perform a descriptive analysis, with multidimensional contingency tables, to determine what the teachers (primary and secondary) attributed the successes and failures of their students (with and without SLD-R) to in reading tasks. As Table 4 shows, both primary- and secondary-school teachers mainly attributed successes and failures of students without SLD-R and successes of students with SLD-R to intrinsic factors. In contrast, teachers attributed failure of students with SLD-R to both intrinsic and extrinsic factors. Primary-school teachers felt that failures of students with SLD-R was mainly due to extrinsic factors, whereas secondary-school teachers attributed it to intrinsic factors.

In summary, the most common teacher attributions were related to intrinsic factors, however, for students with SLD-R, there were more attributions of failure to extrinsic factors than for students without SLD-R (see Table 4).

### Discussion

The objective of this study was to analyse differences in teachers' knowledge of SLD-R according to level they teach (primary or secondary) and according to their experience of students with SLD-R. Another objective was to analyse the teachers' causal attributions related to the performance of students with and without SLD-R in reading tasks.

Given our hypotheses, we expected to find differences in knowledge of SLD-R, which we expected to be greater in primary-school teachers. Our results did indicate differences between primary- and secondary-school teachers, with the

secondary-school teachers demonstrating lower levels of real knowledge and more gaps in their knowledge in the three dimensions we examined: General Information, Symptoms/Diagnosis, and Intervention. The secondary-school teachers exhibited the most gaps and incorrect ideas in the Symptoms/Diagnosis dimension.

This low level of knowledge about SLD-R may be related to secondary-school teachers' education and training. They are usually graduates in specific knowledge areas who subsequently do additional training in teaching (Imbernón, 2019). The most recent Talis report (OECD, 2018) indicates that 52% of secondary teachers currently feel insufficiently trained in the content, pedagogy, and classroom practice in the subjects they teach. This is why it is important to address these needs in secondary-school teachers' training, improving and broadening the educational psychology content they receive in their initial education and continuing professional development.

It is worth noting that the primary-school teachers had significantly more incorrect ideas in all of the dimensions than the secondary-school teachers. The gaps in their knowledge were greater in the General Information dimension, which is consistent with the findings from Guzmán et al. (2015), although that study found greater levels of real knowledge in the Intervention dimension, whereas we found greater levels in the General Information dimension.

Both primary- and secondary-school teachers had higher scores for incorrect ideas in the Symptoms/Diagnosis dimension, followed by General Information, and Intervention. This is also consistent with the results from Guzmán et al. (2015) in infant- and primary-school teachers. This greater number of incorrect ideas in the Symptoms/Diagnosis dimension suggests a need to reinforce both primary- and secondary-school teach-

**Table 3**

*Differences in real knowledge about SLD-R according to experience with SLD-R students*

Experience	None-little	Moderate	Quite a lot-A lot	$F(2, 234)$	$\eta_p^2$
	$M (SD)$	$M (SD)$	$M (SD)$		
General information	6.90 (2.29)	7.48 (1.97)	7.85 (1.88)	4.07**	0.034
Symptoms/ Diagnosis	6.68 (2.9)	8.34 (2.86)	9.32 (2.62)	19.3*	0.142
Intervention	6.58 (1.94)	7.38 (1.74)	7.91 (1.74)	10.6*	0.083
Total knowledge score	20.17 (5.97)	23.19 (5.02)	25.08 (5.18)	16.07*	0.121

\*  $p < .001$ ; \*\*  $p < .05$ .

**Table 4**

*Numbers and percentages of teachers attributing the failure of students with and without SLD-R to intrinsic and extrinsic factors, or a combination of the two*

	Intrinsic factors		Extrinsic factors		Combination	
	$n$	%	$n$	%	$n$	%
Success, SLD-R	143	60.59	68	28.81	25	10.59
Success, without SLD-R	189	80.08	22	9.32	25	10.59
Failure, SLD-R	107	45.34	102	43.22	27	11.44
Failure, without SLD-R	155	65.68	53	22.46	28	11.86

ers' training about the characteristics of the disorder. Although reading-related SLDs begin at school age, they may not become fully apparent until the demands on the affected academic skills overwhelm students' capabilities. Hence the importance of teachers in all educational stages having good training about SLD-R.

With regard to the second hypothesis, we expected knowledge about SLD-R to be similar between the groups of teachers with different levels of experience of those students (none-little, moderate, quite a lot-a lot). The teachers with the highest levels of experience had significantly better knowledge in the three dimensions of the scale and overall. This is in contrast to the study by Guzmán et al. (2015), which found no significant relationship between experience of students with SLD-R and knowledge about it.

It is reasonable that more experience of students with SLD-R would be associated with greater knowledge of the symptoms that characterize these difficulties. Practical experience improves teachers' understanding of the different types of needs and increases their readiness to deal with those needs (Sharma et al., 2008).

Lastly, with regard to teachers' perceptions and attributions of the performance of students with and without SLD-R, we found that the most common attributions in the classroom related to intrinsic factors, as reported by Navarro and Rueda (2012) and in agreement with our hypothesis. We also found that causal attributions related to extrinsic factors were greater for students with SLD-R than students without, particularly in relation to failures in reading tasks. In this case, extrinsic attributions may help teachers to be more positive and encouraging by not focusing on students' skill levels or effort a (Woodcock et al., 2019). Such a response would act as a social support network for the student from the teacher, and may be important in students' intrinsic motivation and engagement (Moreno-Murcia & Corbí, 2021).

### *Practical implications*

The most immediate practical implication of our results concerns the need for education and training programs for teachers of all educational stages, both in their initial training and throughout their careers. This training should emphasize improving teachers' skills for identifying and dealing with students who have specific educational support needs, such as those with SLD-R. Tutorial support is implicit and inherent to teaching, and is the first level of educational guidance (González-Benito, 2018). Good teaching and tutoring practices require broad pedagogical mastery allowing the adoption of the best methods and pathways to encourage the development of students with difficulties (Martín & Villanueva, 2018). Greater awareness and knowledge of neurodevelopmental disorders pays dividends in prevention, detection, and intervention for students that present them (Cueli et al., 2022; Fuchs & Fuchs, 2006), as well as being positively related to teachers' inclusive attitudes in the classroom (Thomas & Uthaman, 2019).

At the same time, new teachers' initial training must consider the importance of establishing an approach to students with SLD-R to provide them with an educational experience guided by professionals who are experts in working with such students.

### Limitations

Lastly, it is important to note some of the limitations of our study. One of the main limitations was the small proportion of respondents compared to the number of schools we contacted and had access to. The teachers who did respond would probably be those who were more motivated or interested in SLD-R. In addition, the geographical reach of the study was limited to the north of Spain. It is also worth noting the possibility of response bias. As noted above, the primary-school teachers exhibited greater knowledge than the secondary-school teachers, but also exhibited more incorrect ideas. These results may be explained by a response pattern with a liberal bent from the primary teachers, which would encourage them to give an answer rather than omit an item, leading to greater levels of knowledge and incorrect ideas.

In any case, and despite those limitations, the study underscores the need to increase teacher training related to SLD-R, given that greater awareness may benefit prevention, detection, and intervention for these students and promote inclusive attitudes in the classroom.

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### Conflict of interest

The authors declare that they have no conflict of interest in the publication of this article.

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### Appendix 1. Items in the Knowledge about SLD Scale

1. Students with SLD-R have low performance in all subjects, including maths.
2. When a student presents problems recognizing and identifying letters and reading or writing words, it is important to have specific early intervention programs.
3. Students who have good reading fluency or speed WILL NOT present problems of reading comprehension.
4. Decoding errors (associating letters with their corresponding sounds) are a symptom of reading related SLD risk.
5. Social and family factors are the main causes of SLD.
6. Phonological awareness is the capacity to think about the sounds of speech.
7. Students with SLD-R need specific intervention inside and outside the classroom.
8. Intervention in the classroom for a student with poor performance must be the same as for a student with SLD-R.
9. When a student does not present SLD-R, it is because they had a good teacher.
10. A student in second-year primary who presents with slow reading of familiar words may be presenting SLD-R.
11. A student with irregular attendance may be identified as a student with SLD-R.
12. All students with SLD-R have the same symptoms.
13. When a student is at risk of presenting SLD-R, the phonetic method is the most appropriate for interventions.
14. Students who are diagnosed with SLD-R in the first few years of primary school, even with specific interventions, will find it difficult to reach university.
15. When a student presents two years of delay in reading without apparent cause (e. g., absenteeism), they should be referred to a school counsellor for educational psychology evaluation.
16. Positive reinforcement by form tutors can prevent the appearance of SLD-R.
17. Students with SLD-R have poor performance in activities related to phonological awareness (isolating, omitting, segmenting, etc.).
18. In the normal classroom, it suits students who present SLD-R to not sit close to the teacher.
19. Students with SLD-R need work on phonetic awareness together with learning letters.
20. Students with SLD-R need to be given visual guides and support that help them understand written instructions.
21. Dyslexia is an SLD-R.
22. When students begin to have unexplained difficulties with reading and writing, the best thing to do is wait for them to mature.
23. When a student presents SLD-R, it is essential to offer them new alternatives so that they are encouraged to read.
24. Difficulties in reading and writing can appear from the first years of schooling, but an educational psychology evaluation is done when there is a lag of at least two school years.
25. Students with SLD have low IQs.
26. It is essential to work on self-esteem and motivation with students who have SLD-R.
27. Intervention with phonological awareness contributes to preventing SLD-R.
28. A student with SLD-R is one who has problems of perception and handedness.
29. The influence of the student's environment is among the main causes of SLD-R.
30. Infant and first- and second-year primary teachers can best identify students at risk of presenting SLD-R.
31. Preventing SLD-R requires prioritization of soundly-based strategies for early detection and intervention from five years of age.
32. Although SLDs may present at the same time as other disabilities (intellectual, sensory, or motor disabilities), sociocultural problems, or issues with school adjustment, they are NOT the result of those conditions or influences.
33. A student with SLD-R lags behind the language curriculum by at least two years.
34. Specific intervention for students with SLD-R must focus on programs that stimulate phonological awareness.
35. The origin of SLD-R is genetic or neurological.
36. When a student makes errors of omission, substitution, or inversion of sounds, etc. they present symptoms of being at risk of presenting SLD-R.
37. One of the main causes of SLD-R is a phonological deficit (the ability to think about and manipulate elements of speech).

*Source.* Taken and adapted from the Knowledge of SLDs Scale by Guzmán et al. (2015).

### Appendix 2. Items and response options in the EIDAL questionnaire

If a student who presents no learning problems, does a reading comprehension test and gets very poor results, what key factors in your opinion would have had the most influence?

- Lack of support during the course from parents and teachers.
- The student being unmotivated by or uninterested in these tasks.
- The difficulty of the tasks they have to do.
- A lack of effort or dedication to overcome the challenges they find.
- A lack of help from teachers or classmates during the activity.
- A lack of ability or skill related to the task.

If a student with reading comprehension difficulties gets excellent results in a reading comprehension evaluation, what

key factors, in your opinion, would have had the most influence?

- Support from parents or teachers during the course.
- The student's efforts to overcome challenges.
- The easiness of the adapted tasks they had to do.
- Help offered by teachers or classmates during the task.
- The student's abilities and skills related to the task.
- The student's motivation and interest in the task.

If a student with difficulties in reading comprehension gets very poor results in a reading comprehension test, what key factors, in your opinion, would have most influenced this?

- The student being unmotivated by or uninterested in the task.
- Low levels of help from teachers or classmates during the activity.
- A lack of skill or ability related to the task.
- A lack of support from parents or teachers during the course.
- A lack of effort or dedication to overcome challenges they find.
- The difficulty of the tasks they had to do.

What key aspects, in your opinion, would have affected a case where a student without any learning difficulties achieved excellent results in a reading comprehension test?

- The student's motivation and interest in the tasks.
- The student's efforts to overcome difficulties.
- The student's skills and abilities related to the task.
- The task being relatively simple to do.
- Help offered by the teacher or classmates during the task.
- Support received from teachers or parents.

*Source.* Internal document from UADLE, University of Salamanca.  
Provided by Juan José Navarro.