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Artículos científicos

Rasgos Residuales de Dislexia en Estudiantes Preuniversitarios

Dyslexia persistent symptoms in pre-university students

Traços residuais da dislexia em estudantes universitários

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Resumen

Los rasgos de dislexia tienden a persistir hasta la edad adulta, desafortunadamente muchos jóvenes nunca son diagnosticados y continúan lidiando con sus dificultades en etapas preuniversitarias. En el presente estudio se buscó identificar las dificultades en la vida cotidiana que reportan jóvenes preuniversitarios en un cuestionario de dislexia para adultos, para lo cual se compararon las respuestas de 52 estudiantes del último grado de bachillerato, entre 17 y 18 años de edad, 26 jóvenes clasificados como disléxicos por su baja velocidad lectora y pobre conocimiento ortográfico y 26 sin dificultades lectoras, se analizó cada pregunta y su relación con el rendimiento lector. Los resultados mostraron que los jóvenes con dislexia no reportan problemas con la rotación de números, pero sí con el llenado de formas, la ortografía y la lectura en voz alta, en cambio los jóvenes sin dificultades lectoras señalaron con mayor frecuencia tener problemas para discriminar derecha-izquierda, leer un mapa o recordar lo que acaban de leer, aspectos que muchas veces se han relacionado con dislexia. Estos resultados confirman que muchas creencias populares sobre la dislexia no tienen un fundamento científico que las sustente y que los puntajes totales de los cuestionarios de dislexia podría señalar erróneamente a personas sin dificultades lectoras. Proponemos un cuestionario breve enfocado a explorar sólo siete aspectos específicos de la lectura que ayudarían a indentificar rasgos residuales de dislexia en jóvenes, con el fin de brindarles apoyo para continuar sus estudios académicos.

Palabras clave: cuestionario de dislexia, problemas lectores, jóvenes, lecto-escritura, ortografía.

Abstract

The symptoms of dyslexia tend to persist into adulthood. Unfortunately, many young people with reading difficulties are never diagnosed and continue dealing with their reading disabilities in postsecondary stages. The objective of this study was to identify residual problems in pre-university students through the application of a dyslexia questionnaire. Fifty-two students of the last year of high school participated, between 17 and 18 years, 26 young people classified as dyslexic because of poor reading performance and poor spelling, and 26 young people without reading difficulties. Dyslexic teenagers do not have number rotation problems, but they reported problems filling out forms, spelling correctly, and reading aloud. On the other hand, teenagers without dyslexia more often pointed out having problems with

left-right discrimination, reading maps, or remembering what they had read, aspects that have often been related to dyslexia. Results corroborate that many popular beliefs about dyslexia are not based on scientific evidence and that most questionnaires could erroneously signalize people without reading difficulties. We propose a short questionnaire focused on exploring only seven specific aspects of reading that would help identify dyslexia persistent symptoms in young adults to support them to continue their academic studies.

Keywords: dyslexia checklist, reading disabilities, teenagers, orthographic knowledge, spelling.

Resumo

Os traços da dislexia tendem a persistir na idade adulta, infelizmente muitos jovens nunca são diagnosticados e continuam a lidar com suas dificuldades na fase pré-universitária. No presente estudo, buscou-se identificar as dificuldades no cotidiano relatadas por jovens pré-universitários em um questionário de dislexia para adultos, para o qual foram respondidas 52 estudantes do último ano do ensino médio, entre 17 e 18 anos de idade. , foram comparados 26 jovens classificados como disléxicos devido à baixa velocidade de leitura e baixo conhecimento ortográfico e 26 sem dificuldades de leitura, foram analisadas cada questão e sua relação com o desempenho na leitura. Os resultados mostraram que os jovens com dislexia não relatam problemas com rotação de números, mas com preenchimento de formulários, ortografia e leitura em voz alta, enquanto jovens sem dificuldades de leitura relataram com maior frequência ter problemas para discriminar direita-esquerda, ler mapa ou lembrar o que faziam. acabei de ler, aspectos que muitas vezes têm sido relacionados à dislexia. Esses resultados confirmam que muitas crenças populares sobre a dislexia não têm base científica para apoiá-las e que os escores totais dos questionários de dislexia podem apontar erroneamente para pessoas sem dificuldades de leitura. Propomos um pequeno questionário focado em explorar apenas sete aspectos específicos da leitura que ajudariam a identificar traços residuais de dislexia em jovens, a fim de fornecer-lhes suporte para continuar seus estudos acadêmicos.

Palavras-chave: questionário de dislexia, problemas de leitura, jovens, alfabetização, ortografia.

Introduction

Difficulties in learning to read or developmental dyslexia represent a frequent problem at school. These difficulties are derived from a neurodevelopmental disorder that is independent of the individual's cognitive abilities, sociocultural environment or learning opportunities, its manifestations tend to persist into adulthood, despite the fact that the individual has repeatedly exposed to reading and writing activities.

Young people who have had reading difficulties since childhood face increasing reading demands such as: abstracting information from texts more and more quickly in order to make summaries; write essays or reports clearly, creatively and without spelling mistakes; All of which represents a great challenge for their school adaptation. To the academic impact, the emotional and social impact that reading difficulties have on development is added. Many of these young people have low self-esteem and poor interest in academic achievement, all of which can even lead to dropping out of school.

It has been reported, for example, that a greater proportion of young people with poor spelling knowledge and poor reading performance do not continue studying after high school, compared to those young people with normal spelling knowledge and reading (González-Garrido, et al., 2014). Most of them do not have a diagnosis of reading difficulties, mainly due to the lack of consensus in the academic field on the distinctive features of dyslexia in adults and the lack of reliable and quickly applied diagnostic instruments that allow early detection of the problem. trouble. The lack of detection in early stages greatly limits the possibilities that young people receive timely and appropriate care for their difficulties.

In recent years, the study of reading difficulties in adults has increased, motivated by the interest in identifying which are the main difficulties that persist in people with dyslexia (Soriano-Ferrer and Piedra-Martínez, 2016). One of the most used methods to identify these difficulties is the application of questionnaires or self-report scales, which explore aspects as diverse as: visual-perceptual difficulties, attention, orientation in space, language, writing and, of course, reading.

The best known scales for the diagnosis of dyslexia are: Revised Adult Dyslexia Checklist (Vinegrad, 1994), Adult Reading History Questionnaire (Lefly and Pennington, 2000), British Dyslexia Association: Adult Checklist (Smythe and Everatt, 2001), Dyslexia Association of Ireland: Adult Dyslexia Checklist, and Adult Self-report of Dyslexia and

Related Difficulties (Snowling et al., 2012), some of these scales have been translated into Spanish. Several authors agree that self-report scales represent the only inexpensive, fast and relatively reliable measure to obtain information on reading difficulties in adulthood (Decker et al., 1989; Gilger, 1992; Giménez et al., 2015; Wolff & Lundberg, 2003), this is obviously due to the fact that adults can identify better than children what problems they have been dealing with for a good part of their lives.

However, some disadvantages of these scales have been pointed out, such as the tendency to leave many individuals with low reading skills undiagnosed (Snowling et al., 2012), the lack of specificity in many of the items and the lack of certainty of the Self-report in retrospect, especially when it comes to describing the difficulties that people presented during childhood. In general, the reliability of the results reported by adults seems to depend on numerous factors such as age, gender, level of achievement and personal history of reading difficulties (Gilger, 1992).

Another difficulty that we consider fundamental in the self-report scales is the fact that they were created, for the most part, for the identification of dyslexia in languages with opaque spelling, in which it has been described that the central feature of this disorder is deficient reading of words and pseudowords, in which many mistakes are made. But in languages with more transparent spelling such as German, Finnish, Italian or Spanish, the central features of dyslexia are marked slowness to read and problems with spelling (DeLuca et al., 1999; Ehri, 2014; Gómez-Velázquez et al., 2010; Landerl and Wimmer, 2008; Re et al., 2011). In Spanish, we are only aware of an instrument that was created to select critical items for the identification of reading difficulties in adults: “Self-report of Reading Disorders for Adults” (ATLAS, Giménez et al., 2015). The authors point out that the results of their self-report coincide with objective test measures for the evaluation of reading, indicating that 7 of the items they included can discriminate between participants with or without a previous diagnosis of difficulties such as: changing the order of the letters and of words when they write, make many spelling mistakes, need to constantly check what is written and difficulty taking notes, although in their sample they only included 8 women and 4 university men with a diagnosis of dyslexia, with a very wide age range, between 20 and 49 years old.

In Spanish-speaking adolescents, it has been found that low spelling knowledge is related to slowness and low reading efficiency, which has also been associated with less modulation and lateralization in the electrophysiological response to the processing of spelling errors, when compared to young people with high spelling skills (González-Garrido

et al., 2014), in addition to being related to the neural recruitment of a greater number of brain areas for word processing, as a possible compensatory strategy for young people with poor spelling knowledge (González-Garrido et al., 2017).

Given the findings from transparent spellings that consider that the most important residual features of dyslexia in adults are slow reading and poor spelling knowledge, we decided to explore, in a group of young people with these characteristics, the responses to a scale of Self-report with the main objective of identifying the aspects that they perceive as deficient in their daily life and determining which items are most sensitive for the identification of young pre-university students who face reading problems at a critical stage for their academic development.

Materials and method

A group of 52 right-handed final year high school students between 17 and 18 years of age, with Spanish as their mother tongue, divided into two groups: Controls and Dyslexics, was studied. The group of Dyslexics included young people who presented the two traits considered as residual deficits of dyslexia in adults, had a reading significantly slower than expected for their age and academic grade, in addition to poor spelling knowledge.

- Dyslexics: 26 young people (15 men and 11 women) with a total of homophone errors \geq 85th percentile, according to the scales of the Battery of Spelling Knowledge (BCO, GómezVelázquez et al., 2014) and a reading speed \leq the 16th percentile according to norms of the Infant Neuropsychological Assessment (ENI, Matute et al., 2007) for 16-year-olds (in Mexico there are no reading speed norms for those over 16 years of age).
- Controls: 26 young people (10 men and 16 women) with a BCO error level \leq at the 70th percentile and a reading speed \geq 35th percentile according to ENI standards for 16-year-olds.

Procedure

To carry out the first stage of the selection of the sample, it was decided to apply the Battery of Spelling Knowledge (BCO), because it is considered to be a sensitive instrument for evaluating the spelling skills of young people and that these skills are closely related to reading performance, in addition to the advantage of being able to be applied in groups, which allowed a large sample to be evaluated. Four BCO tests were applied in a group to 450 young people: choice of homophone spellings, letter dictation, word dictation and detection of errors in a text. These tests are the ones with the highest discriminative power of the 7 tasks of the battery (greater than 0.6) and a high internal consistency with a Cronbach's alpha coefficient of 0.859, as well as a high construct validity with the four tasks contributing to a single factor (factor loadings greater than 0.881), which explains 71.89% of the total variability (Gómez-Velázquez et al., 2014).

In a second stage of the selection of the sample, of the 450 students, 92 young people were selected for their performance in the BCO for a subsequent individual evaluation of reading skills, where the reading aloud of an expository text was recorded, in the that the words read per minute, the number of reading errors (any error not spontaneously corrected) and the score of a reading comprehension questionnaire were quantified. In addition to the reading assessment, an estimate of the intelligence quotient (IQ) was made, using a short version of the WAIS-III (Vocabulary and Design with Cubes).

Finally, based on the results obtained in the evaluation of spelling skills and reading performance, the 52 participants that make up the sample of this study were selected, who were asked to answer the Revised RADC Adult Dyslexia Questionnaire (Revised Adult Dyslexia Checklist, Vinegrad, 1994). The Vinegrad questionnaire contains 20 questions about difficulties that have been associated with dyslexia, the person must answer whether or not it is considered that they currently have this difficulty in their daily life. This questionnaire was chosen because it is considered that it includes the main aspects explored by most of the existing scales, as well as that it contains items related to spelling skills, an aspect that is not covered by other questionnaires.

The results of age, IQ, spelling knowledge and reading performance were compared between the groups, using a Student's t test for independent groups, as well as in the responses on the Dyslexia scale (using the Levene test to make corrections when the principle of equality of variances). Additionally, Pearson correlations were made to determine the possible relationships between the variables.

This Project was carried out in accordance with the principles of the Declaration of Helsinki and was approved by the ethics committee of the Institute of Neurosciences. All participants (or their parents in the case of minors) signed a letter of informed consent for their participation in the research.

Results

The general characteristics of the study sample are presented in Table 1. No significant differences were found between the groups in age or estimated IQ. As expected, given that the sample was selected in this way, the young people in the Dyslexic group had a significantly lower level of spelling knowledge and lower reading speed compared to the young people in the Control group. The results of the reading evaluation also showed that the young people in the Dyslexic group also presented problems with efficiency when reading, that is, they made more uncorrected errors during their reading aloud, although reading comprehension was preserved.

To analyze the results of the responses of the young people in the Revised Adult Dyslexia Questionnaire (20 questions), first, a general analysis was made by adding the total of affirmative responses of each participant and the group means were compared, not significant differences were found between young people in the control group and young people with dyslexia ($t_{(50)} = -1.134$, $p = 2.62$: Control group mean = 4.85, DS = 2.1; Dyslexic mean = 5.6, DS = 2.7).

Tabla 1. Caracterización de la muestra

	Grupo	Media	Desviación estándar	t (gl)	p
Edad	Controles	17.6	0.58	-1.672 (44.6)	0.102
	Disléxicos	17.8	0.40		
CI Estimado ^a	Controles	104.0	10.4	1.181 (50.0)	0.243
	Disléxicos	101.1	7.1		
Conocimiento Ortográfico ^b	Controles	13.81	6.6	-14.699 (31.6)	0.000
	Disléxicos	34.19	2.4		
Velocidad lectora ^c	Controles	161.1	8.6	13.934 (50.0)	0.000
	Disléxicos	124.5	10.2		
Errores al leer	Controles	3.2	2.9	-4.074 (38.0)	0.000
	Disléxicos	8.1	5.4		
Comprensión lectora	Controles	6.6	2.4	1.373 (50.0)	0.176
	Disléxicos	5.7	2.3		

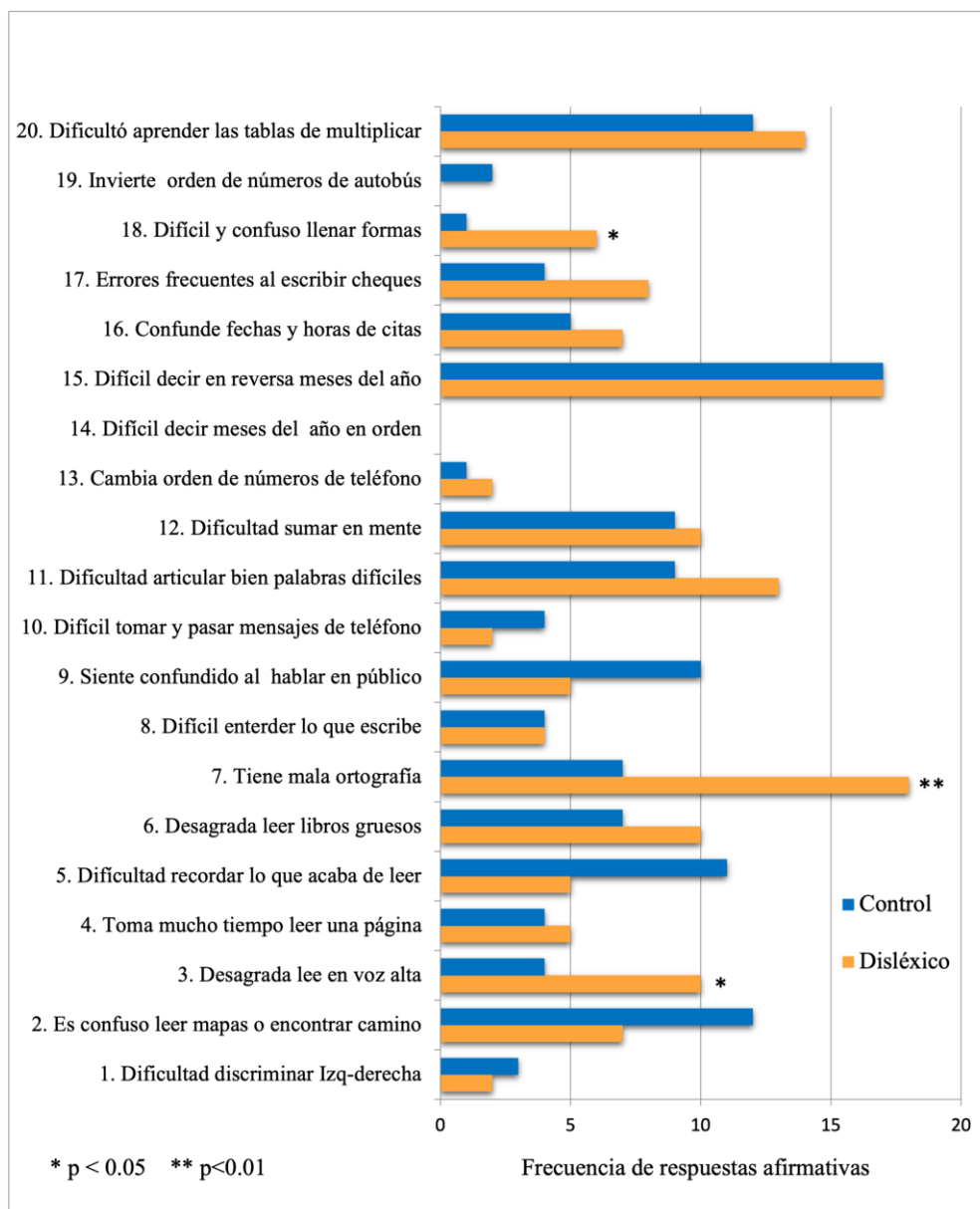
^a IQ estimated from the WAIS-III Vocabulary and Design with Cubes subscales. ^b Average of total homophone errors (substitution of homophone spellings such as B-V, S-C-Z, G-J, Y-LL or omission of H) in 4 tasks of the BCO Spelling Knowledge Battery). ^c Average number of words read aloud per minute in an expository text.

The results were compared between men and women (in the present study an equitable distribution of women and men was not sought due to the already known higher prevalence of dyslexia in men), but given that the distribution by sex in each group was different, the differences were analyzed within the group. In the Control group, no significant differences were found between men and women in the number of affirmative responses to the questionnaire, but in the Dyslexic group it was found that a higher proportion of women reported problems speaking in public ($t_{(10)} = 2.887$, $p < 0.05$) and for mental math ($t_{(24)} = 2.422$, $p < 0.05$), compared with men.

Second, an analysis of the affirmative responses to each question was made, comparing the two groups (Figure 1). Significant differences between the groups were found only in three questions: a higher proportion of young dyslexics reported having difficulties with filling in the forms ($t_{(35)} = -2.076$, $p = 0.043$), with the spelling ($t_{(50)} = -3.305$, $p = 0.002$) y with reading aloud ($t_{(46)} = -2.200$, $p = 0.032$), compared to the youngsters in the Control group.

In contrast, the Control group only observed a tendency to report difficulties in remembering what they just read ($t_{(48)} = 1.826, p = 0.074$).

Figura 1. Frecuencia de respuestas afirmativas a las preguntas del Cuestionario Revisado de Dislexia en el Adulto (RADC, Vinegrad, 1994).



Note: The 20 questions of the questionnaire are presented in abbreviated form in the left column.

Source: self made

Subsequently, the correlation of the total sum of responses to the dyslexia questionnaire (RADC) with the rest of the variables evaluated was analyzed; the 52 participants were included in the analysis. It was found that the higher the total score (more

affirmative responses) in the questionnaire, the young people presented a greater number of errors when reading ($r = 0.388$, $p < 0.01$), but without relation to other reading processes such as speed and comprehension or with the estimated IQ.

Given this low relationship of the total score of the RADC with the reading process, we proceeded to analyze the relationship of each item with the total score. It was observed that a high number of affirmative responses to the questionnaire does not necessarily indicate the presence of difficulties with reading and writing but could indicate problems in other domains, since high correlations ($p < 0.01$) were found between the total score and the frequency of affirmative responses to problems as diverse as: bad spelling ($r = 0.396$); take and pass phone messages ($r = 0.489$); do sums in the mind ($r = 0.415$); change the order of phone numbers ($r = 0.442$); confuse citations ($r = 0.464$); fill out forms or applications ($r = 0.452$); and learn the multiplication tables ($r = 0.425$). A lower but significant correlation ($p < 0.05$) was also found between the total of the RADC with the incidence of difficulties such as: saying the sounds of long words in exact order ($r = 0.276$) and saying the months of the year in reverse order ($r = 0.330$).

Vinegrad (1994), proposed that a total of 9 or more affirmative responses to the questionnaire is a powerful indicator of reading difficulties. In our results, only 4 young people had 9 or more affirmative answers, three dyslexic and one control. It was not possible to group the rest of the young people according to the total number of responses to the questionnaire.

On the other hand, the relationship between the estimated IQ with the reading process and the responses to the questionnaire was analyzed. The results showed that young people with higher IQ had higher reading comprehension scores ($r = 0.368$, $p < 0.01$), but no significant correlations of IQ were found with other reading variables or with the responses to the dyslexia questionnaire.

Additionally, the relationship between the reading variables was analyzed with each questionnaire question, finding that: a greater number of spelling errors in the BCO significantly correlated with a higher proportion of young people who reported that they dislike reading aloud ($r = 0.342$, $p < 0.01$) and who reported having bad spelling ($r = 0.493$, $p < 0.01$); Similarly, lower reading speed was related to young people who indicated that they dislike reading aloud ($r = -0.276$, $p < 0.05$), have poor spelling ($r = -0.375$, $p < 0.01$) and also have difficulties to fill out forms ($r = -0.311$, $p < 0.05$); On the other hand, a higher number of reading errors was related to a higher proportion of people who accepted that they dislike

reading aloud ($r = 0.406$, $p < 0.01$), it took them longer to read a page ($r = 0.351$, $p < 0.05$), they dislike reading thick books ($r = 0.299$, $p < 0.05$) and have bad spelling ($r = 0.443$, $p < 0.01$); finally, a low reading comprehension was only related to a higher proportion of young people who indicated that they dislike reading thick books ($r = -0.394$, $p < 0.01$).

Discussion

The main interest of the present investigation was to determine if the responses to a self-applied scale designed to detect dyslexia in adults (RADC, Vinegrad, 1994), are indeed related to residual reading difficulties in young pre-university students.

The young people in the present investigation did not have a previous diagnosis of dyslexia, however, at the time of selection they exhibited significant difficulties with two aspects that are considered in the literature as residual traits of dyslexia in adults: poor spelling knowledge and slow speed reader. Young people in the dyslexic group showed difficulties with spelling knowledge, despite the fact that they were in the last level of upper secondary education (baccalaureate or twelfth grade), reaching a total of spelling errors in a standardized instrument for their population that ranked them higher 85th percentile. Additionally, all of them had a reading speed significantly lower than expected for their age and academic grade; had an average reading speed of 124 words per minute, which according to the national standards of reading ability in Mexico (SEP, 2010), is equivalent to fifth grade of primary education. Low spelling knowledge, coupled with slow reading speed, clearly indicated the existence of residual difficulties in learning to read and therefore were classified as dyslexic, even though many of them were not aware that their difficulties are part of a disorder of neurobiological origin.

The lack of diagnosis in childhood, as well as the absence of detection and care of young university students, is currently a concern in the area of education (Ibáñez et al., 2019; López-Escribano et al., 2018; Stampolitzis et al., 2017), not only in young Hispanics, but also in the English population, Hanley (1997) reported that a group of young university students, most of whom had no previous diagnosis, presented significant alterations in reading and spelling compared to a control group.

Attempts to detect these young people with reading difficulties, who were not diagnosed in childhood, have led to the creation of multiple self-report scales or questionnaires, most of them available in English. The scale chosen for the present investigation does not include statements about letter rotation, unlike most scales, although it does contain questions about

number rotation. This choice was based on repeated reports in the literature from the 1970s and 1980s that oculomotor and visuoperceptual difficulties are not the cause of reading difficulties (Vellutino & Fletcher, 2007).

This popular and widespread belief that dyslexics rotate letters or numbers is one of the biggest myths about dyslexia. Letter rotation is part of the literacy acquisition process and most children do it early in the learning process, but only a few cases with more severe reading difficulties continue to rotate letters for a long time, so currently it is not considered a hallmark of dyslexia. Instead, the Vinegrad questionnaire includes a question about difficulties with spelling, which is the trait most reported as deficient in adults with dyslexia (McLoughlin y Leather, 2013; Miles, 1983; Riddick et al., 1997).

The results of the application of the questionnaire confirmed that rotation is not present in the dyslexics of this sample, since none of them reported problems to change the order of the numbers on the bus and very few indicated difficulties with the rotation of numbers when dialing the number. telephone. On the contrary, it was more frequent to find young people from the Control group who agreed to have difficulties to discriminate right-left, to read and orient themselves on a map, or to remember what they have just read, aspects that are usually indicated as dyslexia traits. This confirms that many of the popular beliefs about dyslexia traits do not have a scientific foundation to support them.

The aspects that Dyslexics did report more frequently than the young people in the Control group were: difficulty and confusion to fill out forms, having bad spelling and dislike of reading aloud. These three difficulties can only be the expression of the challenges that these young people constantly face, for whom the simple filling of forms, applications or job applications can generate anxiety and frustration. They are aware that when writing they can make many mistakes and openly point out that they dislike reading aloud, which is most likely related to their slowness to read. These residual features of reading difficulties are consistent with reports of the main problems faced by adults with dyslexia (Logan, 2009; Maughan et al., 2009; McLoughlin and Leather, 2013).

It has been reported that the total score of the questionnaires can distinguish dyslexics from those who are not, but unlike what the author of the applied questionnaire himself reports (Vinegrad (1994), and the results of a study with Greek students In which significant differences were found in the total score of a dyslexia questionnaire (Stampolitzis et al., 2017), in the present study no significant differences were found between the groups in the total score, probably derived from the high incidence of difficulties reported by young people

in the control group to discriminate right-left, to read and orient themselves on a map and to remember what they just read.

We consider that there are other difficulties associated with dyslexia, which are not considered in the scales and which are related to more specific aspects of reading that deserve to be explored, such as difficulty reading new material; to answer written tests; to express ideas clearly in writing when writing letters, reports and even messages; in addition to difficulties with the use of punctuation marks. The exploration of aspects more strictly related to the reading process could help to identify these young people and clarify the magnitude of their disorder, which can put their educational aspirations at risk, restrict their vocational choice, lead them to abandon their education after graduation. high school (González-Garrido et al., 2014) and even lead them to develop low levels of self-efficacy and anxiety at work, derived from the negative emotions emanating from living with dyslexia (Nalavany et al., 2017).

Dyslexia has obvious repercussions on people's academic and work life, but little is said about the impact on social and emotional life resulting from the constant shock with the ignorance and misunderstanding of parents, teachers and educational authorities, who often judge them harshly for his slowness to read, for his incoherent writing, plagued with spelling errors or for his marked slowness to answer exams and carry out any school writing, downplaying the rest of his abilities and his potential in various areas. The adverse experiences of a childhood with dyslexia can negatively affect adulthood, determining that many young people and adults have low self-esteem, anxiety, depression and stress (Nalavany et al., 2010).

The lack of social understanding of what dyslexia represents, coupled with existing myths about it, makes it difficult for teachers and school authorities to understand the enormous effort that reading aloud, coherent and well-structured writing represents for some young people, but above all, the marked difficulty they have to write without spelling errors. It is known, for example, that young people with a history of reading difficulties require extra time to complete reading comprehension tests, because they are slow to read and to write a response, which highlights the need to create special measures to support these young people. (Hebert et al., 2018). But even more serious is the lack of self-understanding of their condition, since some young people with dyslexia are not aware that their difficulties are manifestations of a disorder, which is not attributable to a lack of cognitive abilities, a little effort or a disability to achieve higher academic standards.

The characteristics that dyslexics present in adulthood can be very varied, but it is important to identify the common features, regardless of the language. The use of questionnaires has generated many contradictory results, probably due to the fact that they include a very diverse range of symptoms, not necessarily related to the disorder, which could lead to the erroneous detection of young people without reading difficulties. However, the questionnaires continue to represent a massive screening tool for primary, non-diagnostic detection of reading difficulties. Logan (2009), for example, used the Vinegrad questionnaire to study the incidence of dyslexia among corporate managers and entrepreneurs, recognizes that although it was not an ideal tool, since it only indicated possible dyslexic traits and could point to non-dyslexic adults. With some of the weaknesses listed in the questionnaire, it is a good way to study large groups.

Having simple, quick and inexpensive group application tools could help education professionals to identify these young dyslexics, help them to recognize their disorder and thus provide them with strategies to compensate for their difficulties, develop skills and study habits, strengthen their motivation and reassess their personal expectations to face the stress of school, family and social demands. Based on the results of the present study, we propose the use of a shorter questionnaire of only 7 questions focused on more specific aspects of reading and writing, which include the aspects most reported by young dyslexics in the present investigation:

- 1) Do you dislike reading aloud?
- 2) Does it take you longer than others to read a page of a book?
- 3) Do you have bad spelling?
- 4) Do you find it difficult and confusing to fill out forms or applications?
- 5) Do you have problems with sentence construction and with the use of punctuation marks?
- 6) Is it more difficult for you than your peers to write a report or an essay?
- 7) Is it difficult for you to detect the mistakes you have made in writing?

The validity of this brief questionnaire to identify reading difficulties should be analyzed in subsequent studies.

Conclusions

The application of the Vinegrad scale to a large number of young pre-university students, with the intention of identifying the main difficulties presented by those classified as dyslexic (due to their low reading speed and poor spelling knowledge), allowed us to confirm that bad spelling, Difficulty filling in forms and dislike of reading aloud are residual traits that these young people report more frequently compared to their peers without reading difficulties. We propose to include these three aspects, together with four other questions on specific reading-writing problems to integrate a short questionnaire for the identification of dyslexia in young people and adolescents, which will need to be validated later.

Self-report scales or questionnaires are not rigorous tests for the diagnosis of dyslexia, however, they can provide an excellent survey of reading difficulties traits, which allows to quickly detect those young people who require a more comprehensive assessment and specialized psycho-educational support.

Teachers, parents and society in general must know the difficulties that dyslexics go through and understand that reading problems are a condition that will accompany them throughout their lives, regardless of the effort that is devoted to their rehabilitation. The educational authorities, for their part, must create policies for the early detection of these cases, for the granting of support and reduction of the barriers that hinder the academic development of these young people. Education professionals, psychologists, and career counselors should receive up-to-date information, based on scientific evidence, on the nature of the disorder and its educational, personal, and social implications, in order to provide more appropriate treatment strategies for both children and adolescents.

Future lines of research

To explore the validity and reliability of the short 7-question questionnaire to explore reading difficulties in young pre-university students, which would allow the early identification of those who face residual problems in learning to read.

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