



Ex.i.a.

Experience in action

Search and implementation of procedures
for dyslexia in VET

RESEARCH REPORT



UNIMORE
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA

Introduction

Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge.

Dyslexia is a specific learning disability: this opening sentence identifies dyslexia as a specific learning disability in contrast to the more general term learning disabilities (LD). While the general LD category encompasses a wide range of disorders in listening, speaking, reading, writing, and mathematics (USOE, 1977), we continue to recommend (Fletcher et al., 2002; Lyon, 1995) that the field should discontinue the use of the broad term learning disabilities when discussing reading disabilities, and should instead discuss specific disabilities defined in terms of coherent and operational domains. From an epidemiologic perspective, reading disabilities affect at least 80 percent of the LD population and thus constitute the most prevalent type of LD (Lerner, 1989; Lyon, 1995). As noted previously (Lyon, 1995), it is also important to recognize that many individuals with dyslexia evidence cooccurring or comorbid deficits in other cognitive and academic areas such as attention (Shankweiler, et al., 1995; B.A. Shaywitz, Fletcher, & S.E. Shaywitz, 1994), mathematics (Fletcher & Loveland, 1986), and/or spelling and written expression (Lindamood, 1994; Moats, 1994). These observations of comorbidity do not detract from the specificity of the proposed working definition of dyslexia since the cognitive characteristics of deficits in attention and mathematics are quite different from the cognitive characteristics associated with deficits in basic reading skills (for further discussion see Lyon, 1995; Lyon, Fletcher, & Barnes, 2003).

In addition to these characteristics, the British Dyslexia Association (BDA) acknowledges that some individuals with dyslexia can also experience visual and auditory processing difficulties pointing out that, these individuals often have a combination of abilities and difficulties that can affect their ability to acquire literacy (and numeracy) skills. (However, research has shown that when the delivery of learning is “dyslexia friendly” every child should be able to learn to read and write*.) It is also widely accepted that many of these individuals also have

strengths in other areas, such as design, problem solving, creative skills, “big picture” thinking, interactive skills, entrepreneurial flair and good communication skills.

Dyslexia is thought to affect between 5% - 15% the population and is a disorder that persists throughout a lifetime (Kemp, Parrila, & Kirby, 2009). Studying adult dyslexia is therefore important both for understanding which aspects remain critical when reading should be highly automatized and for developing adequate procedures for identifying the needs of individuals with dyslexia, so helping to avoid adverse consequences in their lives that might result from the disorder. In this respect, an important longitudinal study following a group of 26 adults with dyslexia who received a late diagnosis highlighted the secondary effects of dyslexia on self-esteem and on life choices (Michelsson, Byring, & Bjorkgren, 1985). The authors found that most of the group completed only the minimum (legally required) number of years at school, a high percentage were early school leavers, whereas just one went to university. The authors stressed the need for full consideration of the risk of negative consequences of dyslexia in adulthood (Michelsson et al., 1985). Until now, studies mainly concerned Anglophone subjects. From one of the first longitudinal studies (Shaywitz et al., 1999), where subjects were identified at an early age and followed until adolescence, we know that individuals with dyslexia continue to be slower than peers, whereas accuracy improves with schooling and that phonological awareness continues to be one of the major difficulties. There is also extensive evidence that in adulthood, individuals with dyslexia still exhibit limitations in tasks involving phonological processing, lexical access and working memory (Singleton, Horne, & Simmons, 2009). From the literature, we know that poor phonological awareness is one of the primary deficits in dyslexia and that this problem seems to persist through adulthood (Pennington et al., 1990). It has also been observed that slowness in decoding is one of the principal characteristics of dyslexia at every phase of life (Hatcher, Snowling, & Griffiths, 2002). A problem of dyslexia may cause severe difficulties in everyday life to all adults who are involved in processing written material including people who want to continue their studies. In fact, university students with dyslexia—who presumably were able to compensate for their difficulties in reaching higher education—still exhibit problems in specific tasks.

In Adulthood Dyslexia and Specific Learning Disabilities may affect different functional areas such as work, family, social and emotional context, everyday life and leisure activities. In the

workplace context, available literature, report a number of difficulties and obstacles that go far beyond reading or writing and may have an impact already in the choice of the most appropriate professional role up to influence career growth and advancement. Implementing interventions in a workplace in a systematic and widespread manner, however, does not seem easy due to the total lack of knowledge of learning disabilities in the world of work.

Aims

In the European Union there is the need to have standardized tests to evaluate the performance of reading to allow an equivalence between the different languages, for both the clinical and research (Trauzettel - Klosinski et al., 2012). Our aim is the implementation of a similar tool for different countries to identify people with learning disabilities in adulthood.

Secondary, to reduce the probability of errors in data collection we decided to Implementation of a computerized assessment tool with automatic procedure on the diagnostic profile of the subjects. This first step it's necessary to identify people with learning disabilities and provide useful tools for school placement and provide tools for employment.

Method

Participants

This study involved in total 543 adults: students, people with academic failure and unemployed in a different countries, aged from 16 to 30.

The sample is so composed:

- Portugueseparticipants: 152
- Italianparticipants: 106
- French participants: 135
- Turkishparticipants:150

Procedure

Participants were tested individually in a quiet area, and the battery of test required about 90-120 minutes. The examiner has a computerized scoring system

(see:<http://sos.volsrl.com/login.php>). The platform was specially designed for the E.X.I.A. project.

Before the administering the tests examiner need to report the following informations:

- Participant : name and surname
- Age
- Total number of school years
- The most recent academic grade attained

In addition, clinical history was reported for each participant.

Materials

The assessment battery includes standardized tests, given in the following order; some tools are the same among different countries, others are country-specific.

The assessment battery proposed in all four countries is:

- Adult Dyslexia checklist (ADCL)
- Nonverbal intelligence (Standard Progressive Matrices)
- Literacy (reading, spelling and math abilities)
- Rapid Automatized Naming (RAN)
- WAIS IV (memory, symbol coding, symbol search, arithmetic)

Spelling and math abilities have been evaluated with different tests according to different language.

Adult Dyslexia checklist ADCL (Vinegrad, 1994)

The checklist contains questions about verbal memory, difficulty with directions, spelling, reading and language, familial history of dyslexia, and other symptoms.

The questionnaire consists of 20 questions. A checklist for dyslexic adults will not provide enough information for a diagnostic assessment, but it can be very useful in promoting a better self-understanding and a pointer towards future assessment needs. The Adult Dyslexia Checklist contains questions that are predictive of dyslexia (as measured by prior diagnosis). In order to provide the most informative checklist, scores for each answer indicate the relative importance of that question. Alongside each line you can keep a tally of your score and at the end find a total.

Nonverbal intelligence test: Standard Progressive Matrices

The Standard Progressive Matrices (SPM) was designed to measure a person's ability to form perceptual relations and to reason by analogy independent of language and formal schooling, and may be used with persons ranging in age from 6 years to adult. The SPM consists of 60 items arranged in five sets (A, B, C, D, & E) of 12 items each. Each item contains a figure with a missing piece. Below the figure are either six (sets A & B) or eight (sets C through E) alternative pieces to complete the figure, only one of which is correct. Each set involves a different principle or "theme" for obtaining the missing piece, and within a set the items are roughly arranged in increasing order of difficulty. The raw score is typically converted to a percentile rank by using the appropriate norms. The SPM is considered an "average"-level test for the general population and the test is untimed but generally takes 25-45 minutes.

Reading: International Reading Speed Texts (IReST)

The battery International Reading Speed Test (Trauzettel - Klosinski et al., 2012) is a tool that has the same characteristics of linguistic complexity in different languages. It is composed of 10 tracks, linguistically adapted into 17 languages with the aim of assessing reading skills in adults with visual impairments. The texts are equivalent in length, difficulty and linguistic complexity in the following languages : German, Arabic, Chinese, English, Finnish, French, Hebrew, Italian, Japanese, Dutch, Polish, Portuguese, Swedish, Slovenian, Spanish, Russian and Turkish.

Rapid automatized naming

RAN tests generally show four types of items: objects, colors, letters and numbers. Small sets of items in the same category (for example, five small squares of several different colors) are presented in rows on a page. But the order in which they appear changes from row to row. The examiner typically starts by going over the names of the set of items with the subject. Then, for the test itself, the subject has to name all of the items aloud as quickly as possible, from first to last, row by row. Both the time the subject needs to name the items and her accuracy are recorded. But the time is what's of interest. RAN tests don't measure vocabulary knowledge. Nor are they about recognizing letters and numbers. They're really tests of fluency.

Wechsler Adult Intelligence Scale WAIS- IV

Used as a general test of intelligence, the Wechsler Adult Intelligence Scale –Fourth Edition (WAIS-IV) was developed to assess cognitive ability for adults. This instrument aids in examining the relationship between intellectual function and memory. A common purpose for the WAIS is for educational planning and placement with older adolescents and adults. The test includes 11 subtests with various types of format. Approximately 60 to 90 minutes is required for completion. The WAIS-IV is composed of 10 primary subtests (Vocabulary, Information, Similarities, Digit Span, Arithmetic, Block Design, Matrix Reasoning, Visual Puzzles, Coding, and Symbol Search) and five optional subtests (Comprehension, Letter-Number Sequencing, Figure Weights, and Cancellation). The primary subtests yield four Index scores (Verbal Comprehension, Perceptual Reasoning, Working Memory, and Processing Speed) and an overall Full-Scale IQ score (WAIS-IV FSIQ). The WMS-IV (Wechsler, 2009) is a battery of tests designed to evaluate working memory, learning, immediate and delayed recall, and recognition of information presented in verbal and visual modalities. The WMS-IV was developed for people aged 16 to 90 years and was normed using a stratified. Furthermore, specific tests were administered for each country.

France

Spelling: DAT 5

It is a tool to investigate spelling abilities. It consists of two subtests “Ortographe” and “Grammaire”.

Portugal

Spelling: PALPA

PALPA has been designed as a comprehensive psycholinguistic assessment of language processing in adult acquired aphasia. Intended both as a clinical instrument and research tool, *PALPA* is a set of resource materials enabling the user to select language tasks that can be tailored to the investigation of an individual patient's impaired and intact abilities. The detailed profile that results can be interpreted within current cognitive models of language. The materials consist of sixty rigorously controlled tests of components of language structure such as orthography and phonology, word and picture semantics and morphology

and syntax. The tests make use of simple procedures such as lexical decision, repetition and picture naming and have been designed to assess spoken and written input and output modalities. Particular attention has been paid to practical use of the tests in the clinic and comprehensive guides have been included that help to suggest which selection of test may be appropriate for each aphasic person. Each test is also accompanied by detailed instructions of how and why it was constructed, how to use it, and by presenter's forms and marking sheets.

Turkey

Math: Counting in reverse100-1

The examiner asks the subject to count from 100 to 1 quickly.

Italy

Spelling

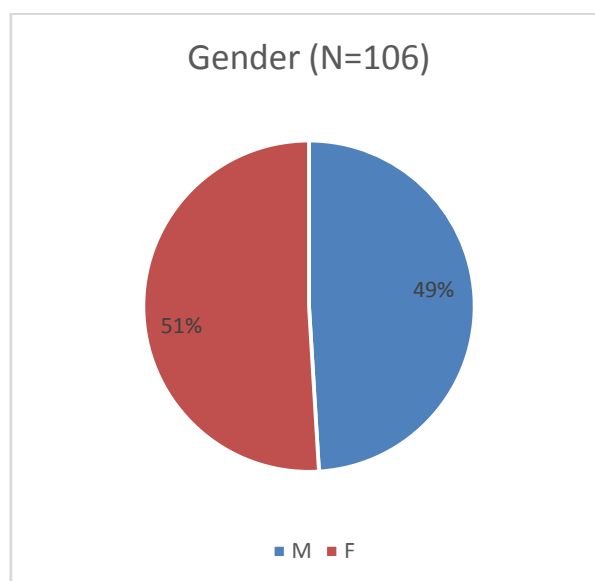
It is a tool to investigate spelling abilities. It consists of two subtests : “writing sentences” and “writing text”.

Results

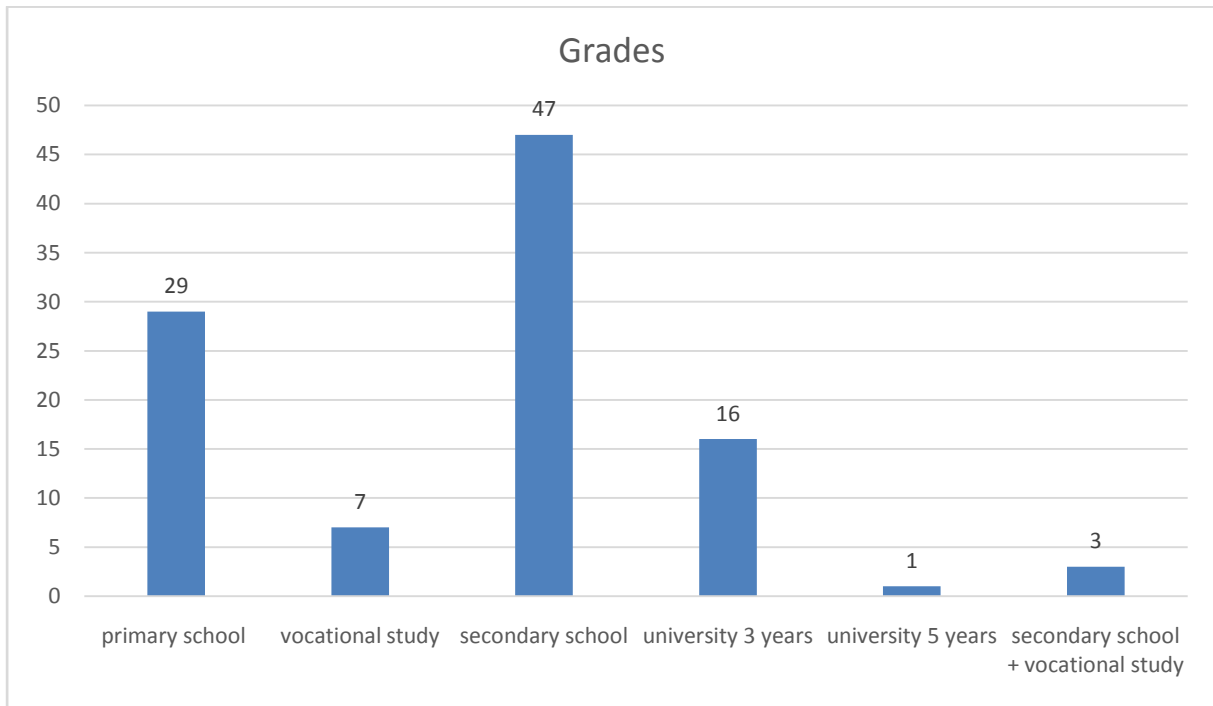
1. Results for each country

Italy

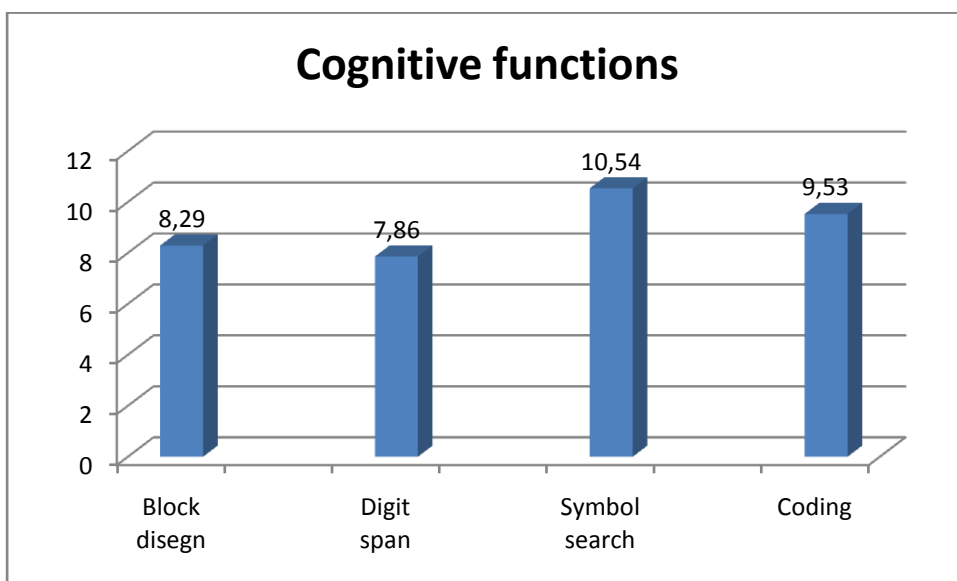
This study involved a total of 106 monolingual Italian adults. The mean age of the group was 24 years old and 7 months (range 18 – 31), and the group was equally distributed by (F=51%, M=49%).



The average of school is 13.87 years, with a minimum of 8 years at a maximum of 21. The most frequent degree is the secondary school (46%), followed by the junior high school (28%) and the degree three-year (16%). One person is in possession of a specialist university degree.



WAIS-IV: Cognitive functions

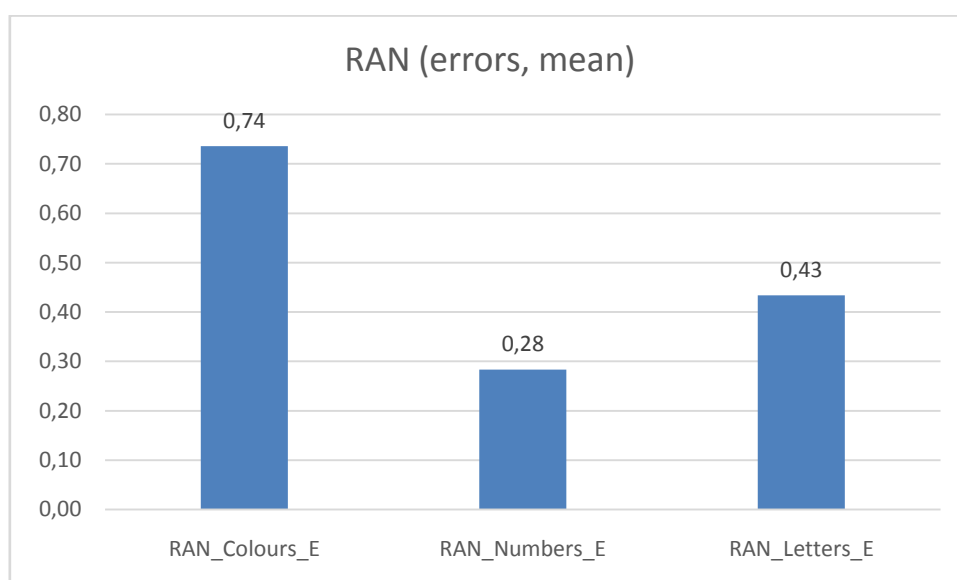
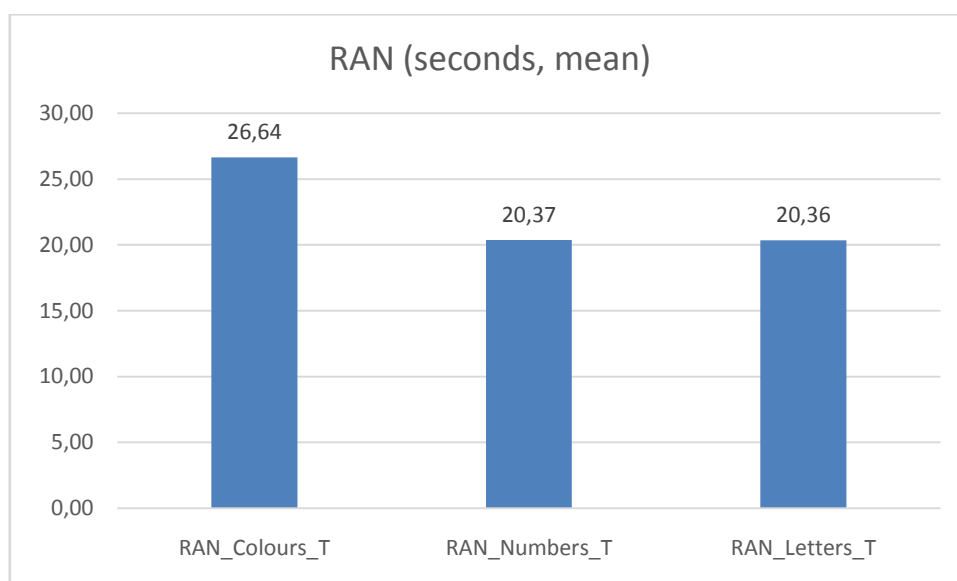


The results show good performance in the subtest symbol search and coding. The performance is lower in the subtest digit span and block design.

Rapid automatized naming

The sample performance (n = 106) to the RAN test is described in the table:

	RAN_COLORI seconds	RAN_COLORI errors	RAN_NUMERI seconds	RAN_NUMERI errors	RAN_LETTERE seconds	RAN_LETTERE errors
Media	26,64	0,74	20,37	0,28	20,36	0,43
Min	19,00	0,00	14,00	0,00	13,00	0,00
Max	41,00	7,00	36,00	3,00	34,00	5,00
<i>ds</i>	4,24	1,19	3,65	0,64	3,73	0,92

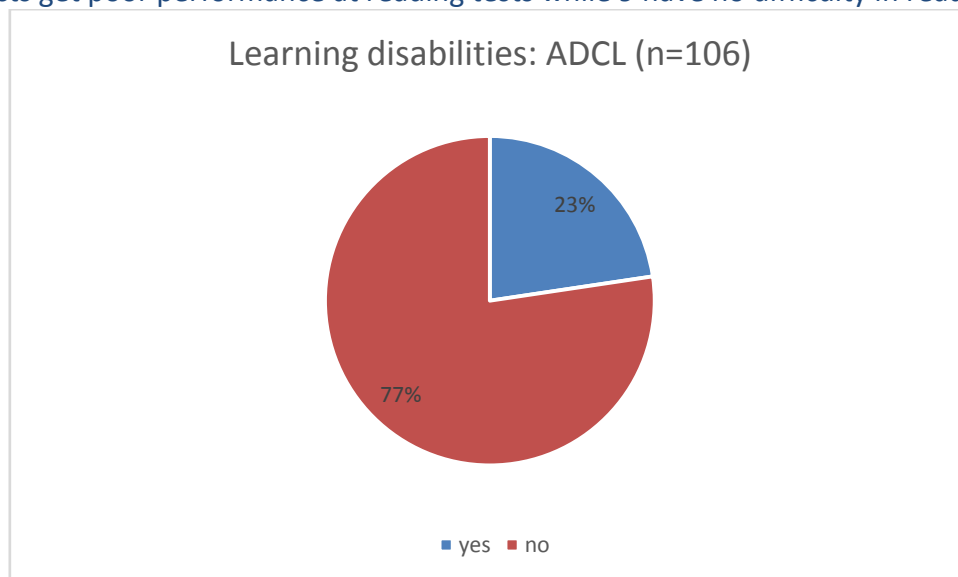


The results show that the most significant parameter is time, as evidenced by the literature. There are no statistically significant differences between the times in the test of RAN letters and RAN numbers. The Italian sample takes more time in color naming.

Adult Dyslexia Checklist

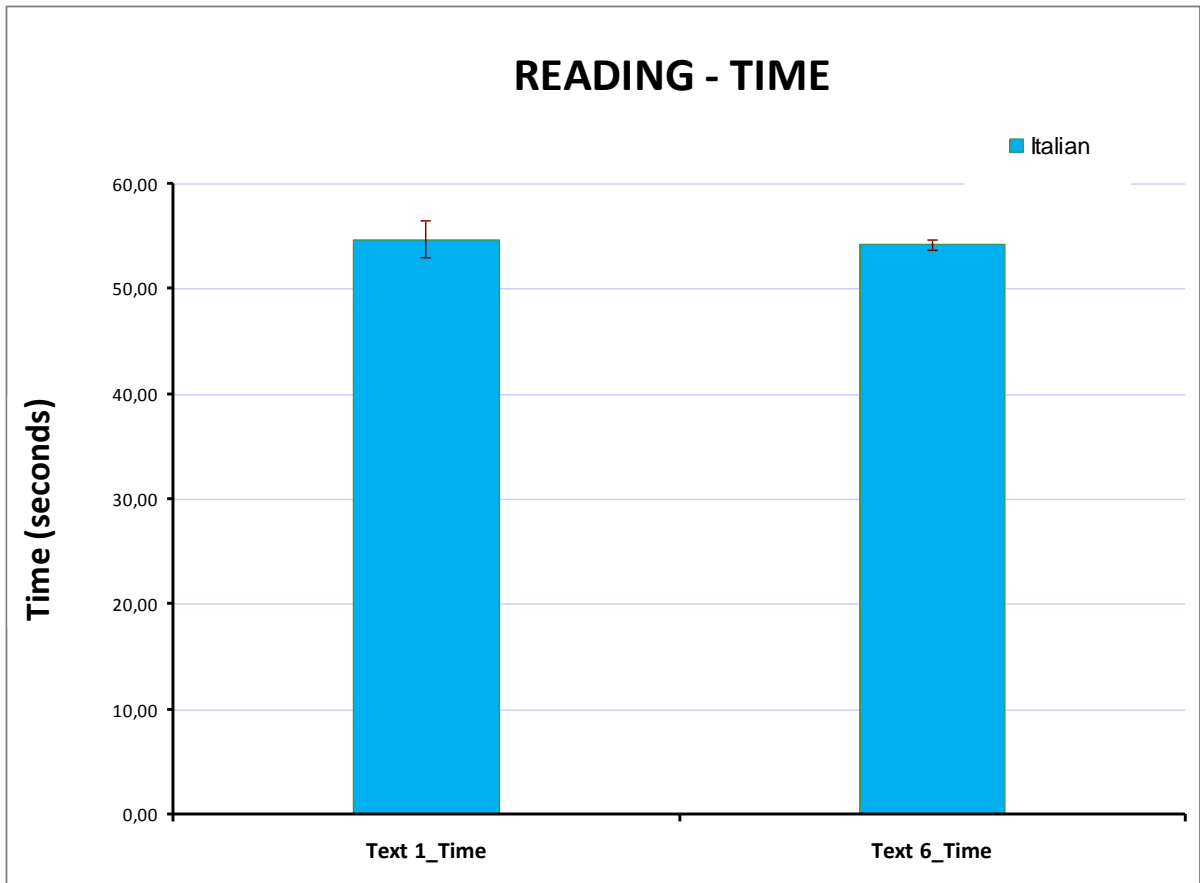
The results of the ADCL questionnaire show that 24 subjects report difficulties about verbal memory, difficulty with directions, spelling, reading and language, familial history of dyslexia, and other symptoms.

15 subjects get poor performance at reading tests while 9 have no difficulty in reading tests.

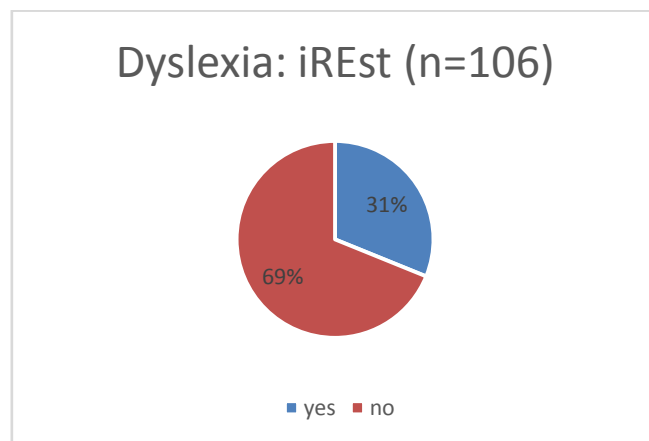


Reading: International Reading Speed Texts (IReST)

Two texts have been proposed: 1 and 6. There are no differences in the reading time of the two texts.

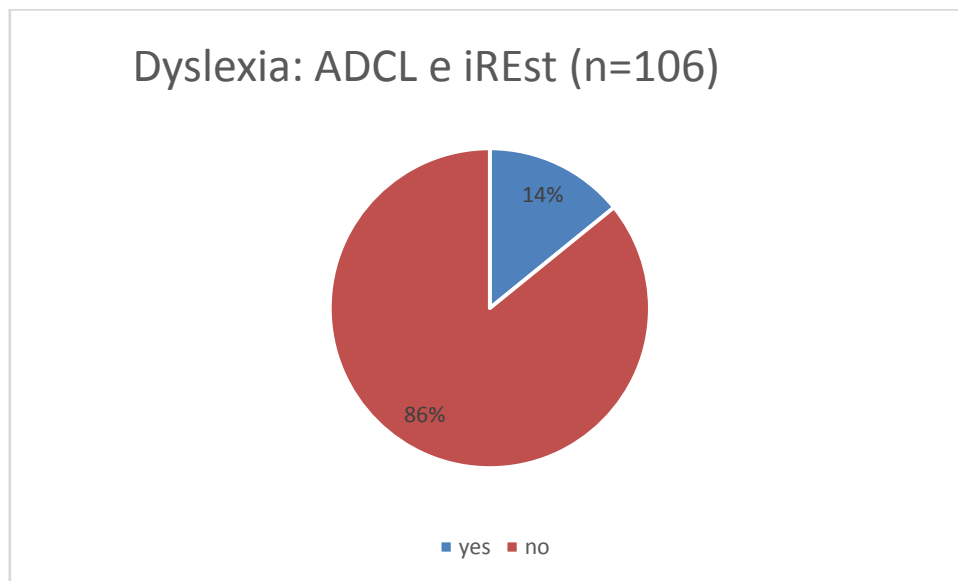


31% of participants show a performance less than or equal to -2.00 ds in reading one of the two texts.

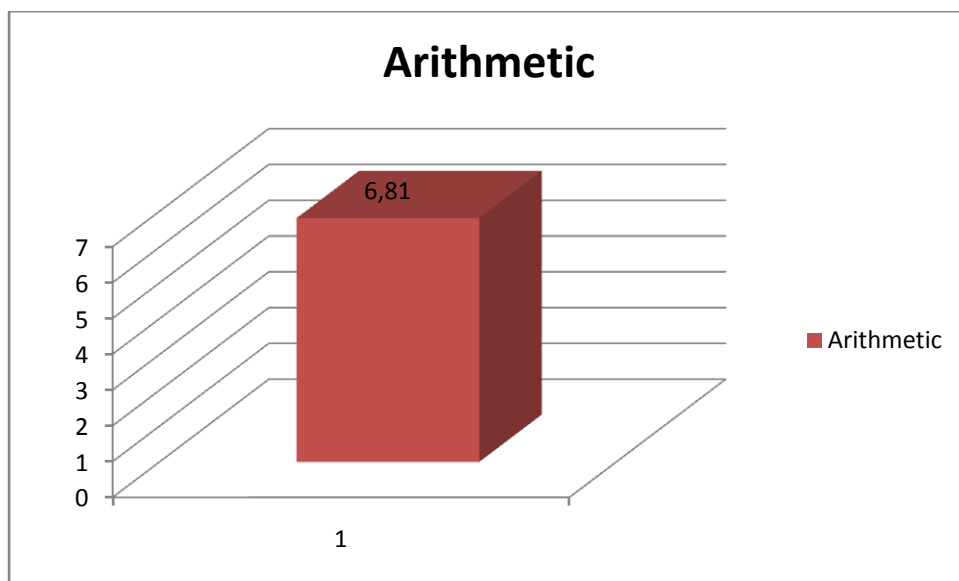


A small part of the sample showed consistency between its perception of dyslexia symptoms and the lack of effective performance at reading tasks: 14% of the sample dropped to both

tests. 6 participants are not perceived as dyslexic but actually show poor performance at reading texts.



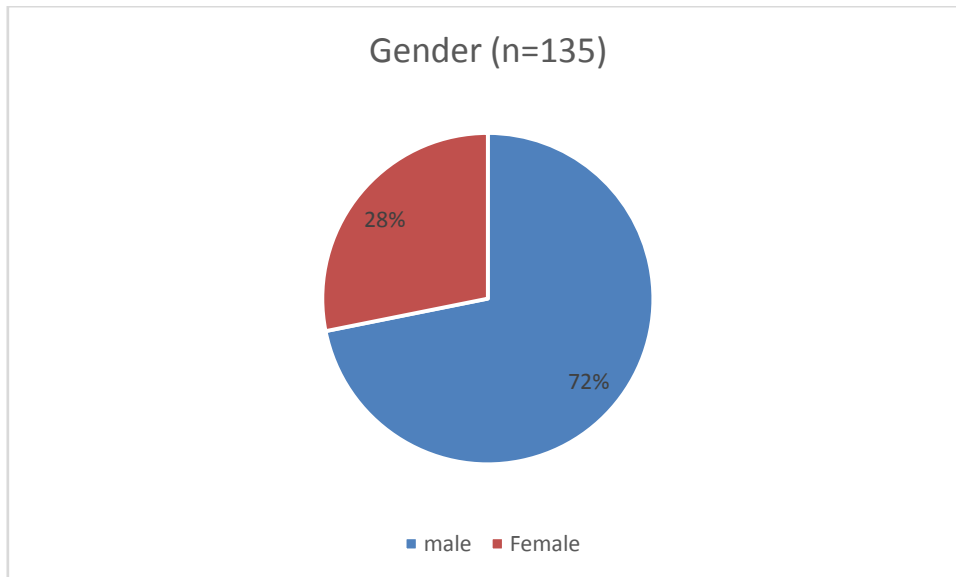
Arithmetic- WAIS-IV



The results show a poor performance.

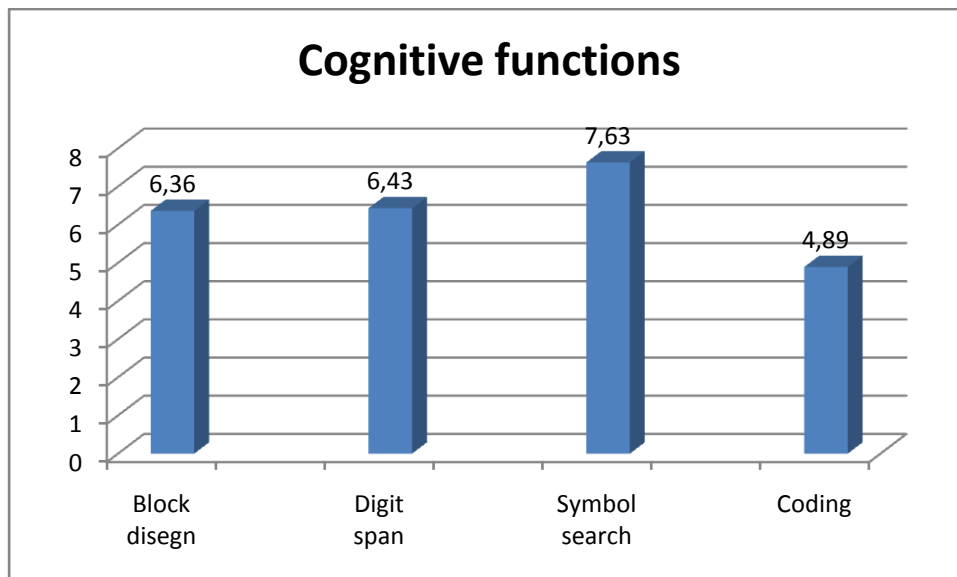
France

This study involved a total of 135 participants, 97 males and 38 females (F=28%, M=72%). The mean age of the group was 24 years old and 7 months (range 16 – 30).



Average of school is 9.59 years, with a minimum of 5 years at a maximum of 14. The most frequent degree is college (31.11%), followed by CAP (29,63%), BEP (13,33%), BAC PRO (12,59 %), dal BREVET (5,93%), dal BAC (5,19%), dal BTS (1,48%) and primary school (0,74%).

WAIS-IV: Cognitive functions

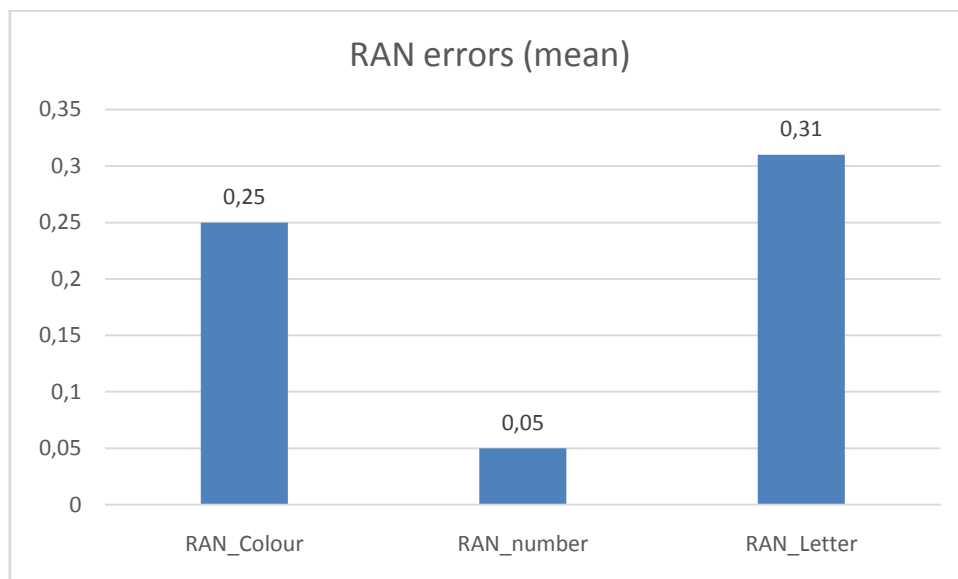
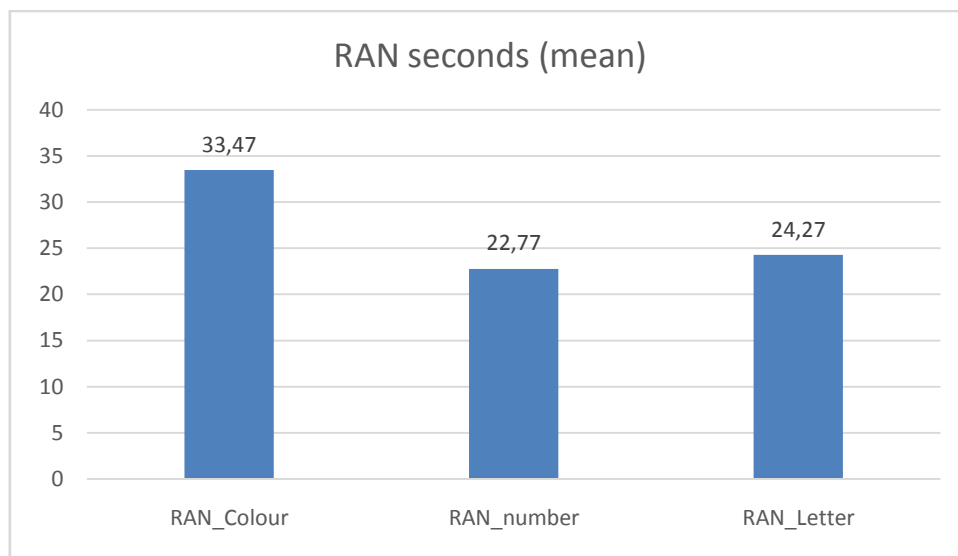


The results show lower performance in the subtest coding, poor performance in block disegn and digit span. The performances improves in the subtest symbol search.

Rapid automatized naming

The sample performance (n = 135) to the RAN test is described in the table:

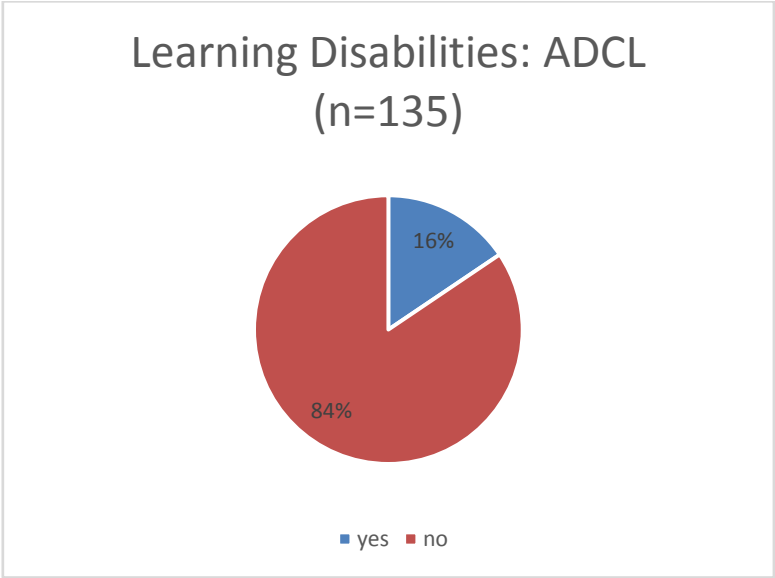
	RAN_Colour seconds	RAN_colour errors	RAN_numberseconds	RAN_number errors	RAN_letter seconds	RAN_letter errors
Mean	33,47	0,25	22,77	0,05	24,27	0,31
Min	0,00	0,00	13,00	0,00	13,00	0,00
Max	96,00	3,00	36,00	1,00	68,00	6,00
<i>ds</i>	11,35	0,58	4,10	0,22	6,33	0,91



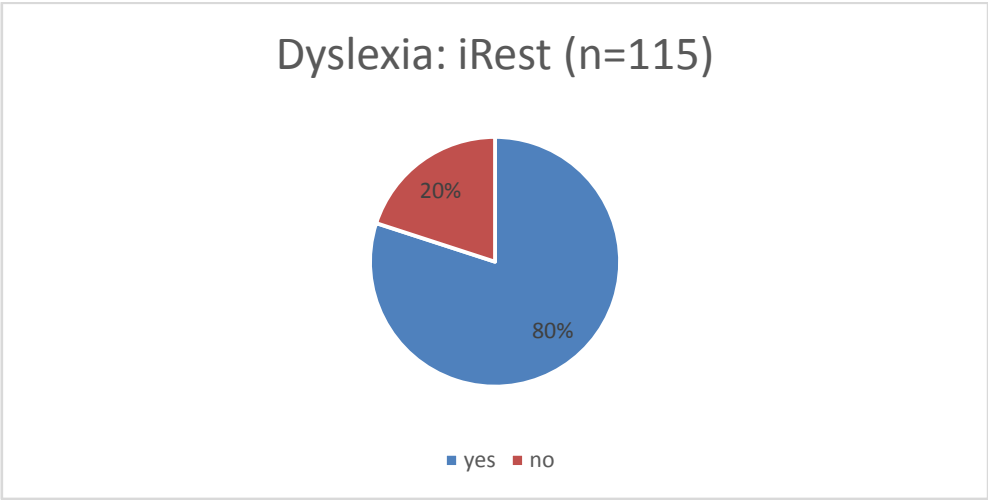
The results show that the most significant parameter is time, as evidenced by the literature. There are no statistically significant differences between the times in the test of RAN letters and RAN numbers. The France sample takes more time in color naming like Italian participants. There aren't mistakes.

Adult Dyslexia Checklist

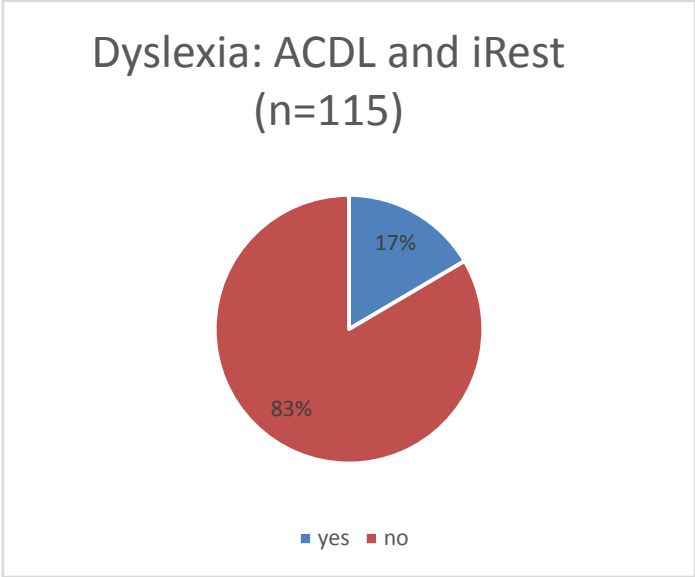
The results of the ADCL questionnaire show that 21 subjects (16%) report difficulties about verbal memory, difficulty with directions, spelling, reading and language, familial history of dyslexia, and other symptoms.



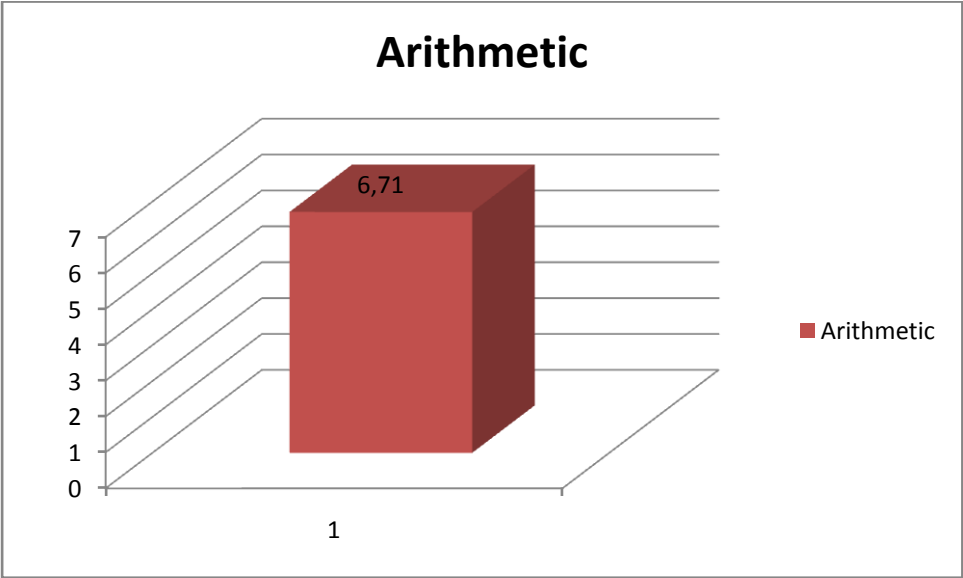
92 subjects get poor performance at reading texts.



A small part of the sample showed consistency between its perception of dyslexia symptoms and the lack of effective performance at reading tasks: 17% of the sample dropped to both tests. 6 participants are not perceived as dyslexic but actually show poor performance at reading texts.



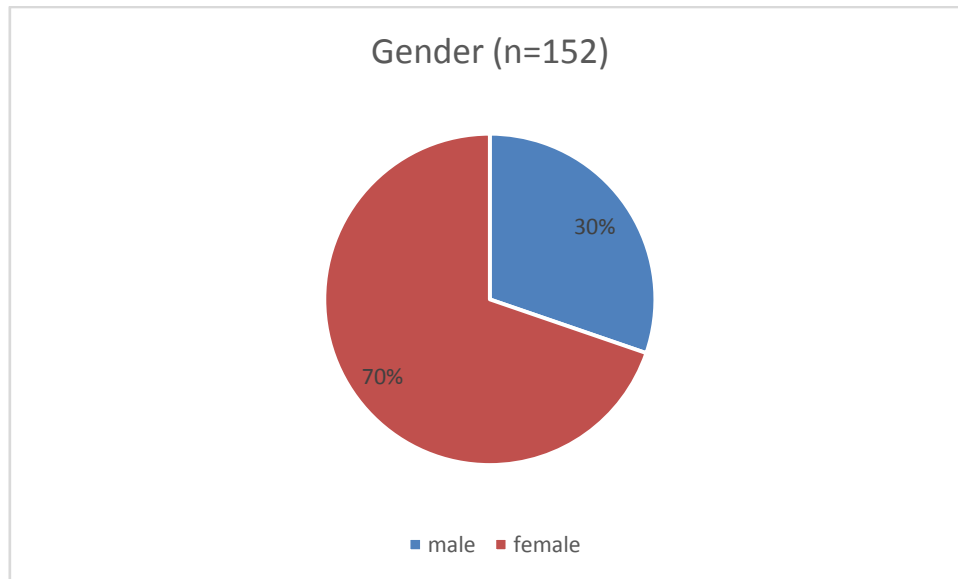
Arithmetic- WAIS-IV



The results show a poor performance like Italian participants.

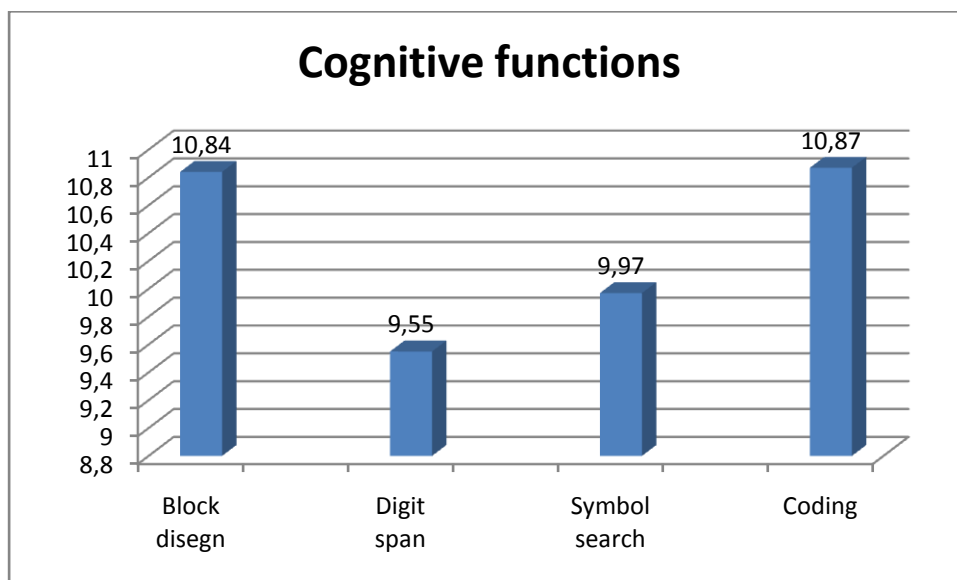
Portugal

This study involved a total of 152 participants, 46 males and 106 females (F=70%, M=30%). The mean age of the group was 23 years old and 4 months (range 1 – 30).



Average of school is 13.06 years, with a minimum of 4 years at a maximum of 19.

WAIS-IV: Cognitive functions



The results show good performance in each subtest.

Rapid automatized naming

The sample performance (n = 151) to the RAN test is described in the table:

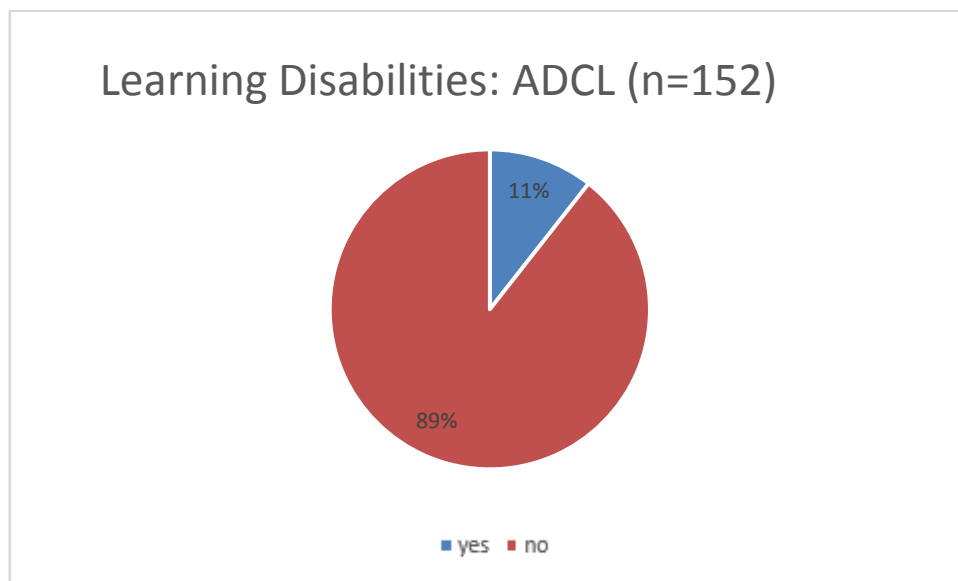
	RAN_Colour seconds	RAN_colour errors	RAN_numberseconds	RAN_number errors	RAN_letter seconds	RAN_letter errors
Mean	18.42	0.28	19.47	0.41	/	3.24
Min	12.10	0,00	13.41	0	/	0
Max	29.97	3,00	31.75	2,00	/	10
ds	3.02	0,57	3.48	0.61	/	2.07

The results show that the participants are very speed and accuracy.

Adult Dyslexia Checklist

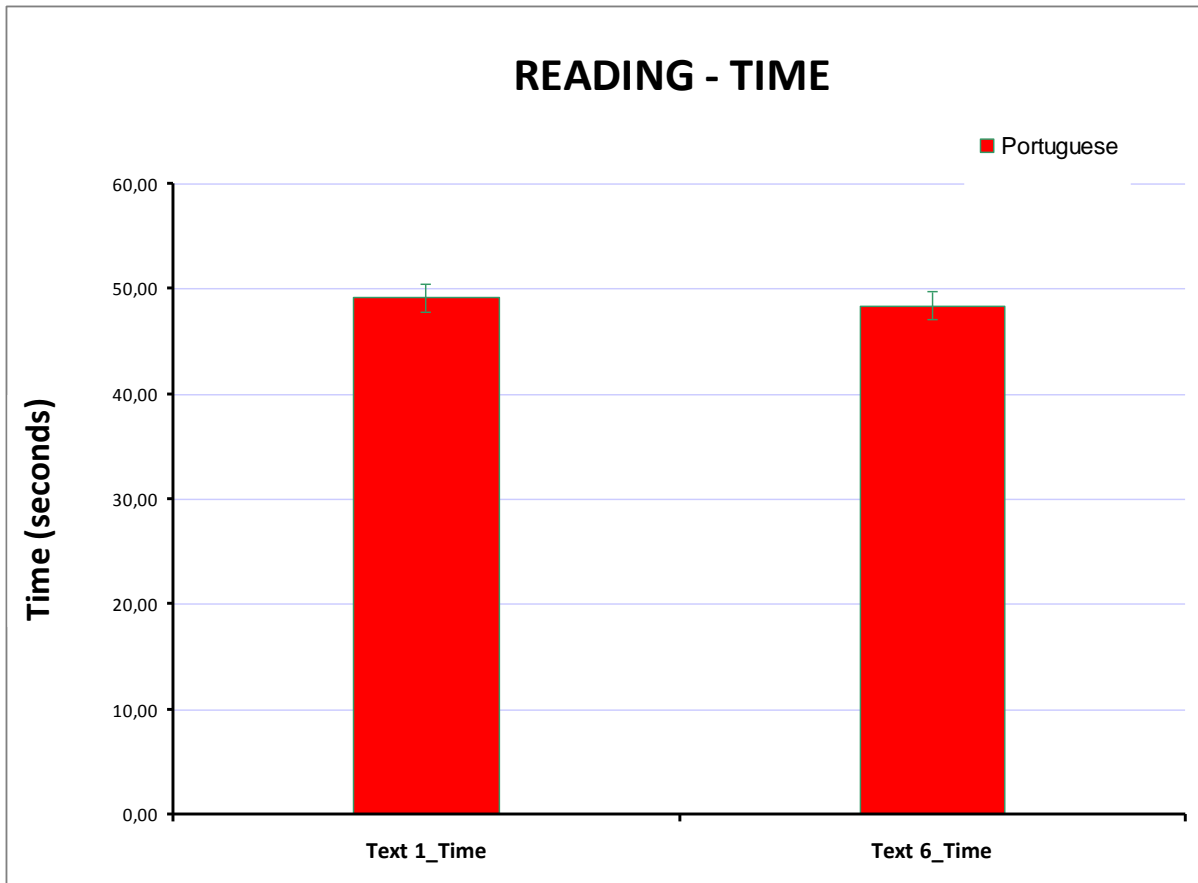
The results of the ADCL questionnaire show that 16 subjects report difficulties about verbal memory, difficulty with directions, spelling, reading and language, familial history of dyslexia, and other symptoms.

12 subject report difficulties but the performance in reading tests is on average.

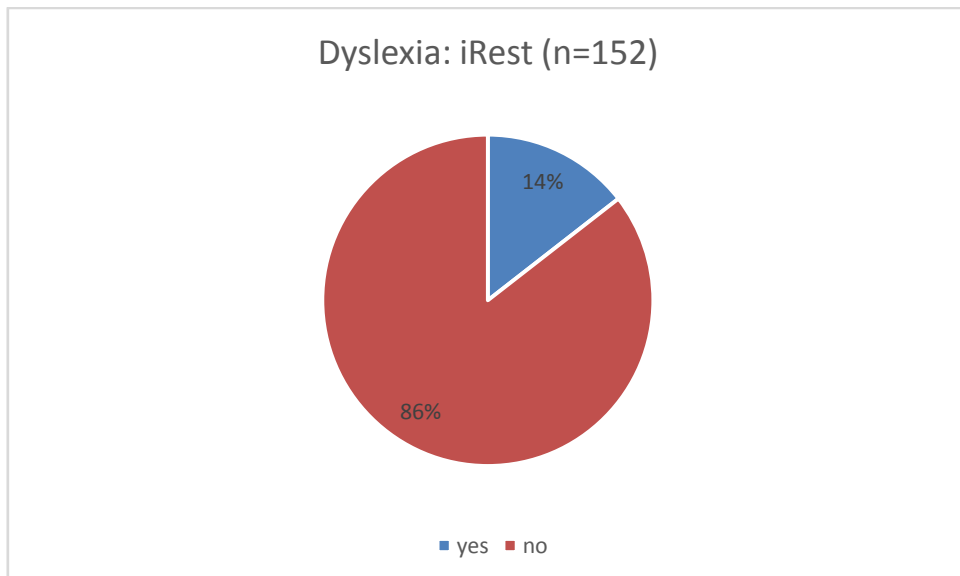


Reading: International Reading Speed Texts (IReST)

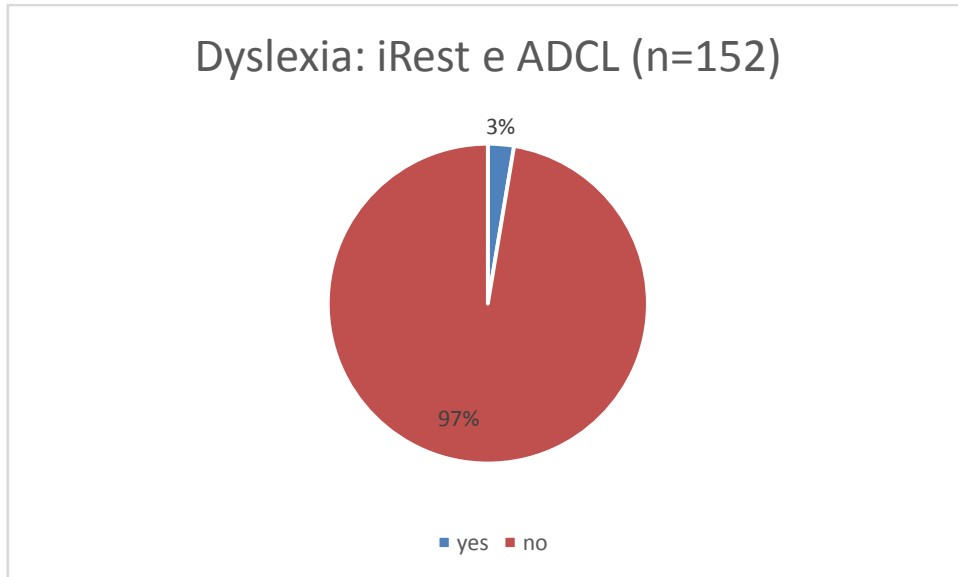
There are no differences in the reading time of the two texts.



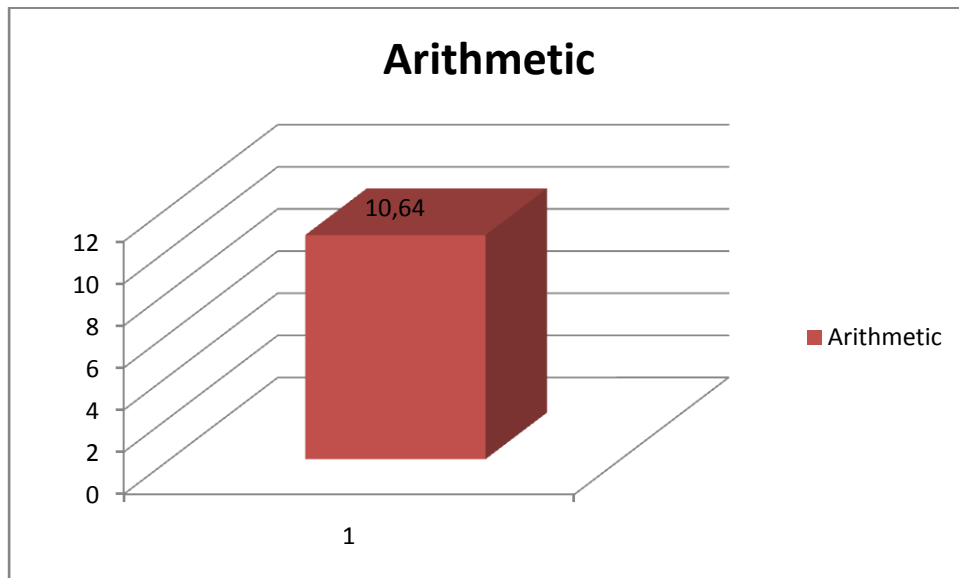
A small part of the sample showed consistency between its perception of dyslexia symptoms and the lack of effective performance at reading tasks: 14% (22 subject) of the sample dropped to both tests. 19 participants are not perceived as dyslexic but actually show poor performance at reading texts.



A small part of the sample showed consistency between its perception of dyslexia symptoms and the lack of effective performance on reading tasks: 3% of the sample dropped to both tests.



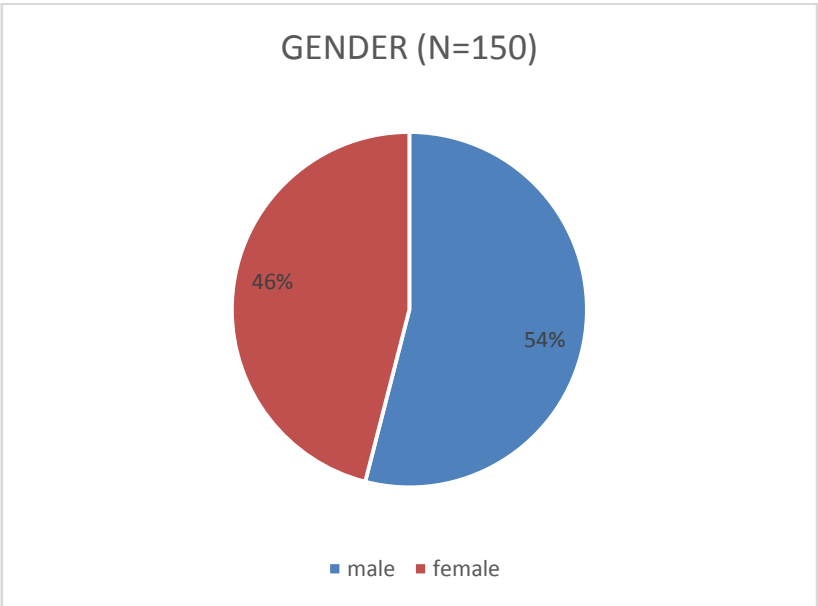
Arithmetic- WAIS-IV



The results show a good performance.

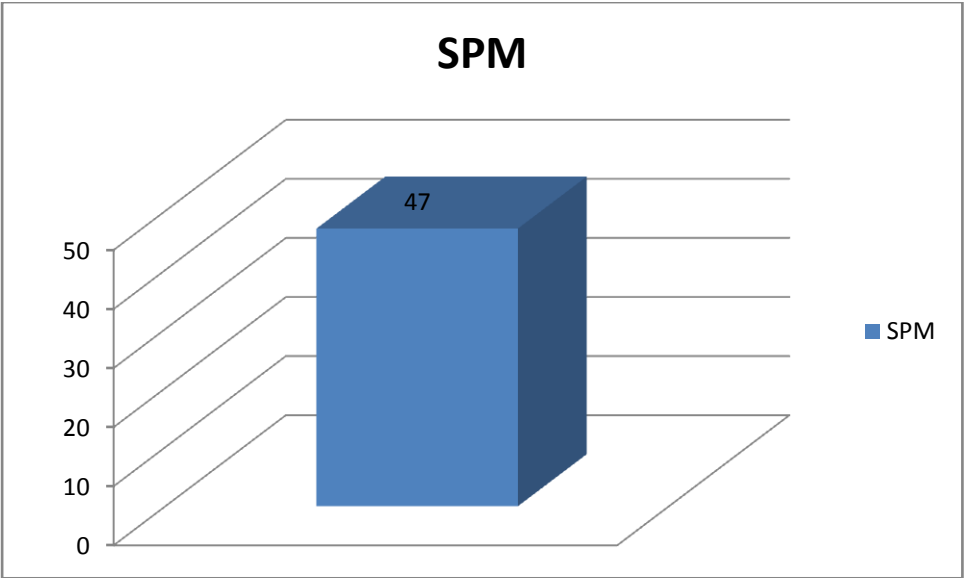
Turkey

This study involved a total of 150 participants, 81 males and 69 females (F=46%, M=50%). The mean age of the group was 23 years old and 2 months.



Nonverbal intelligence

The results show a good performance in Standard progressive matrices.



Rapid automatized naming

The sample performance (n = 50) to the RAN test is described in the table:

	RAN_Colour seconds	RAN_colour errors	RAN_numberseconds	RAN_number errors	RAN_letter seconds	RAN_letter errors
Media	25,41	0,28	16,89	0,03	17,10	0,12
ds	4,89	0,67	3,85	0,20	4,62	0,38

The results show that the most significant parameter is time, as evidenced by the literature. There are no statistically significant differences between the times in the test of RAN letters and RAN numbers. The Turkish sample takes more time in color naming like other countries.

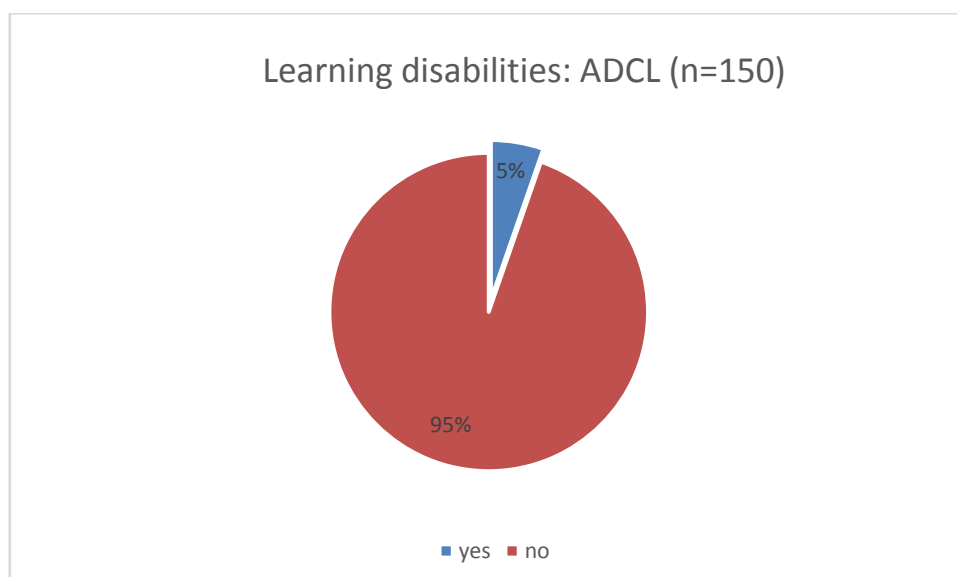
Math: Counting in reverse 100-1

At the counting in reverse, the average sample performance (n = 150) is 42.44 seconds (ds 9.13) with an average 0.62 error (ds 1.84).

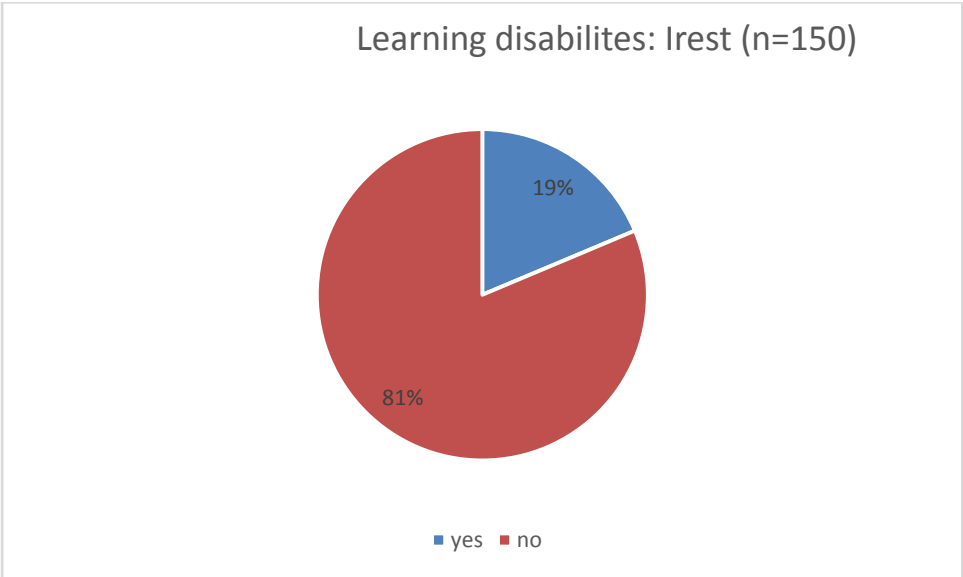
Adult Dyslexia Checklist

The results of the ADCL questionnaire show that 8 subjects (5%) report difficulties about verbal memory, difficulty with directions, spelling, reading and language, familial history of dyslexia, and other symptoms.

5 subject report difficulties in ADCL but the performance in reading tests is on average.



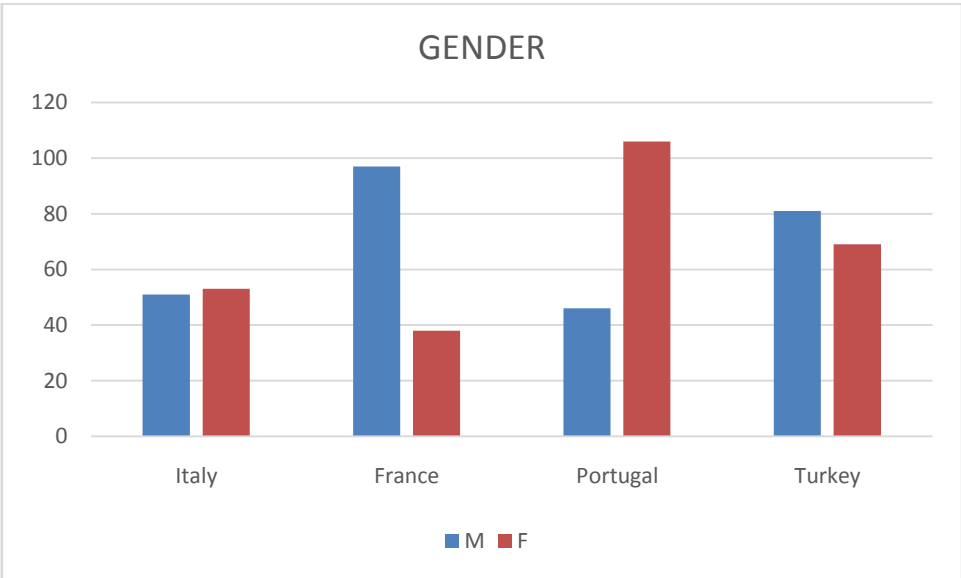
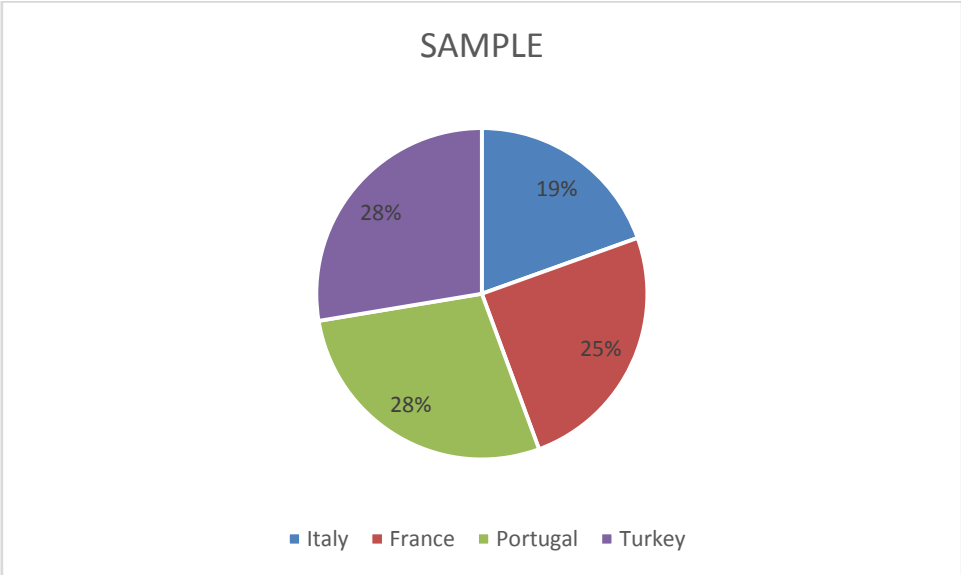
A part of the sample showed consistency between its perception of dyslexia symptoms and the lack of effective performance at reading tasks: 19% (28 subject) of the sample dropped to both tests. 24 participants are not perceived as dyslexic in ADCL but show poor performance at reading texts.



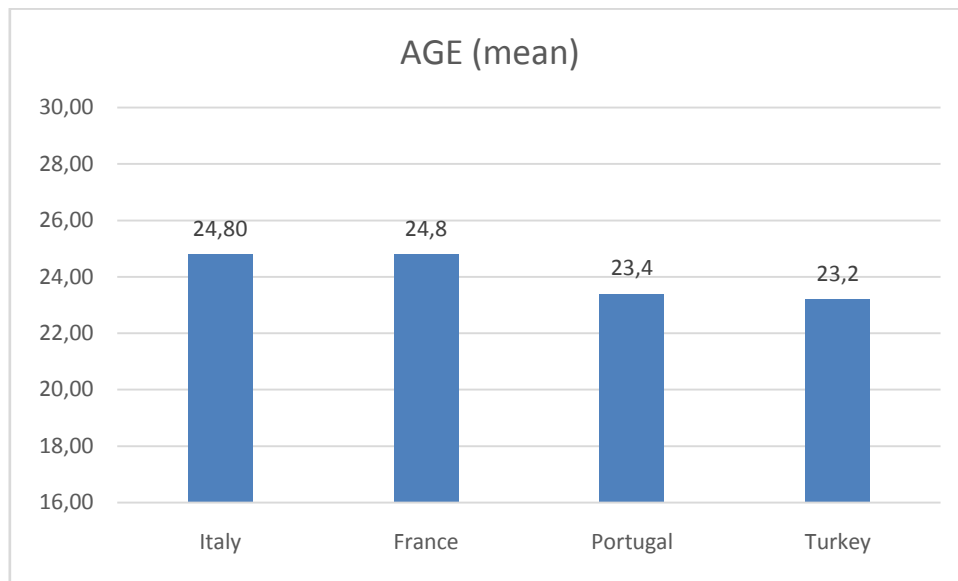
A small part of the sample showed consistency between its perception of dyslexia symptom and the lack of effective performance on reading tasks: 2% of the sample dropped to both tests.

Comparison between countries

The sample consists of 543 subjects, 275 males and 266 females (F = 70%, M = 30%). The average age of the sample is 24 years.



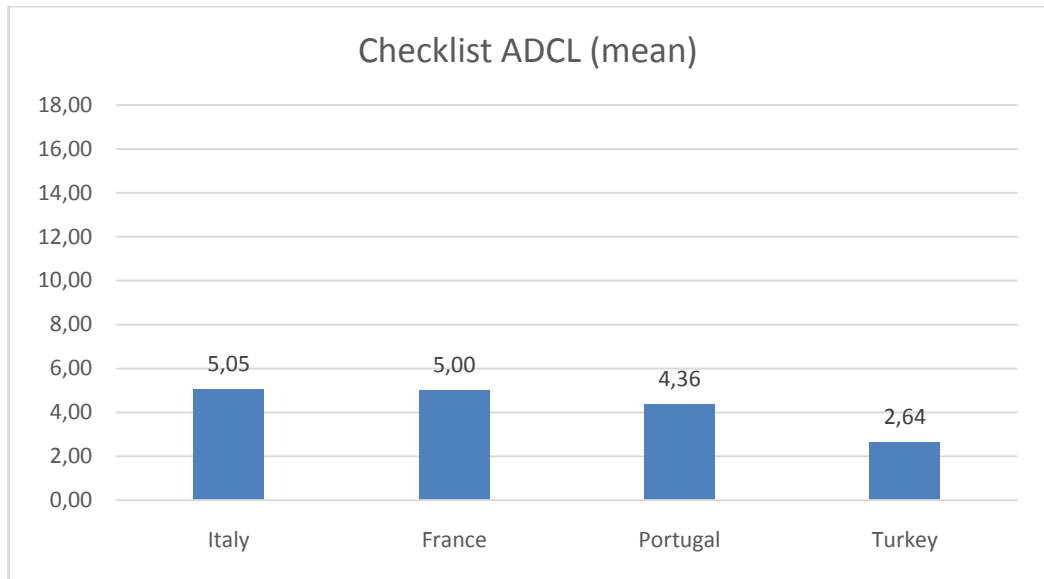
The Italian participants doesn't show gender differences; the differences in Turkish participants aren't significant. The French participants are predominantly males, while the Portuguese participants are predominantly females.



The years of school (Portugal, Italy and France only) is about 12.16, with a minimum of 9.59 years of school (France) to a maximum of 13.87 (Italy).

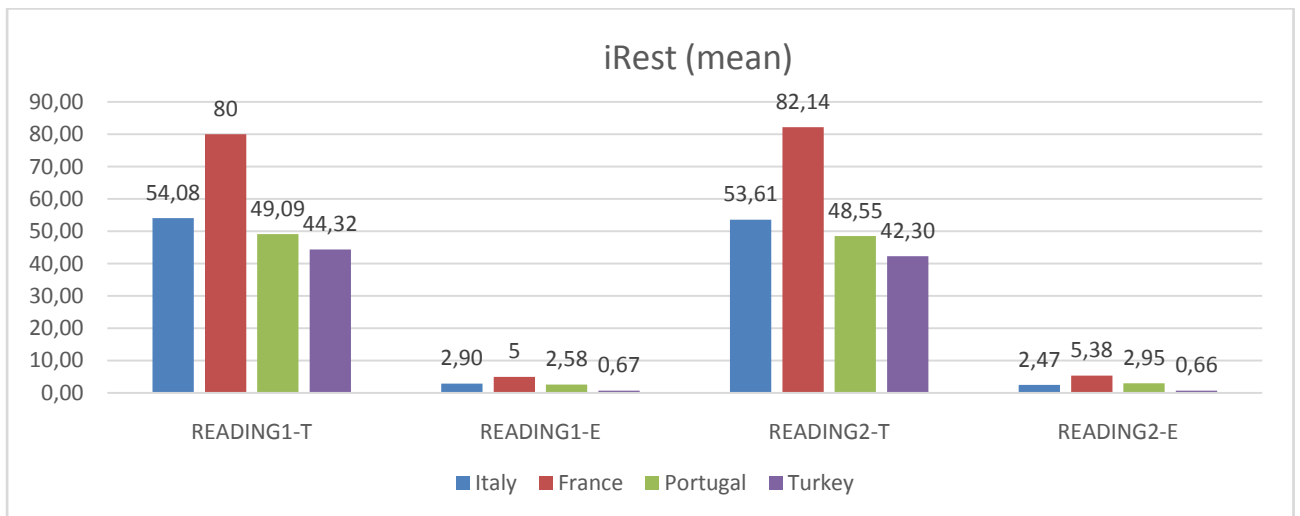
Years of school	Mean
Italy	13,87
France	9,59
Portugal	13,03

Comparison of the different performance to the ADCL questionnaire shows that the average score among the 4 countries is 4.26.



Comparison of the different average performance to the Irest test shows that the average score among the 4 countries is:

- Irest 1: mean speed in seconds is 56,87 and mean errors is 2,79;
- Irest 2: mean speeds in seconds is 56,65 and mean errors is 2,87.

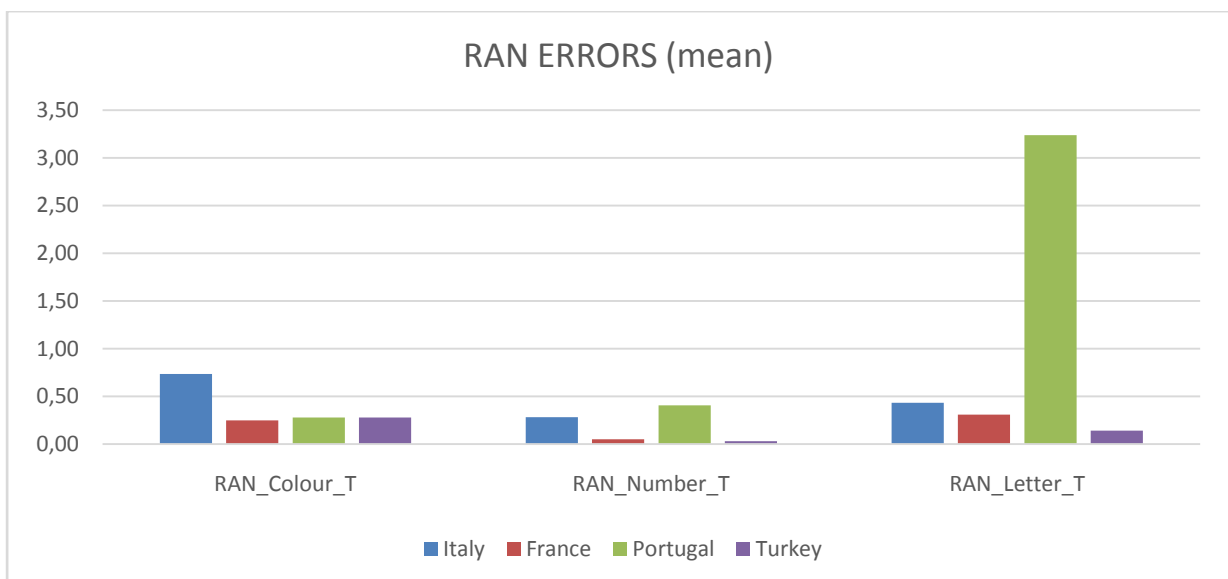
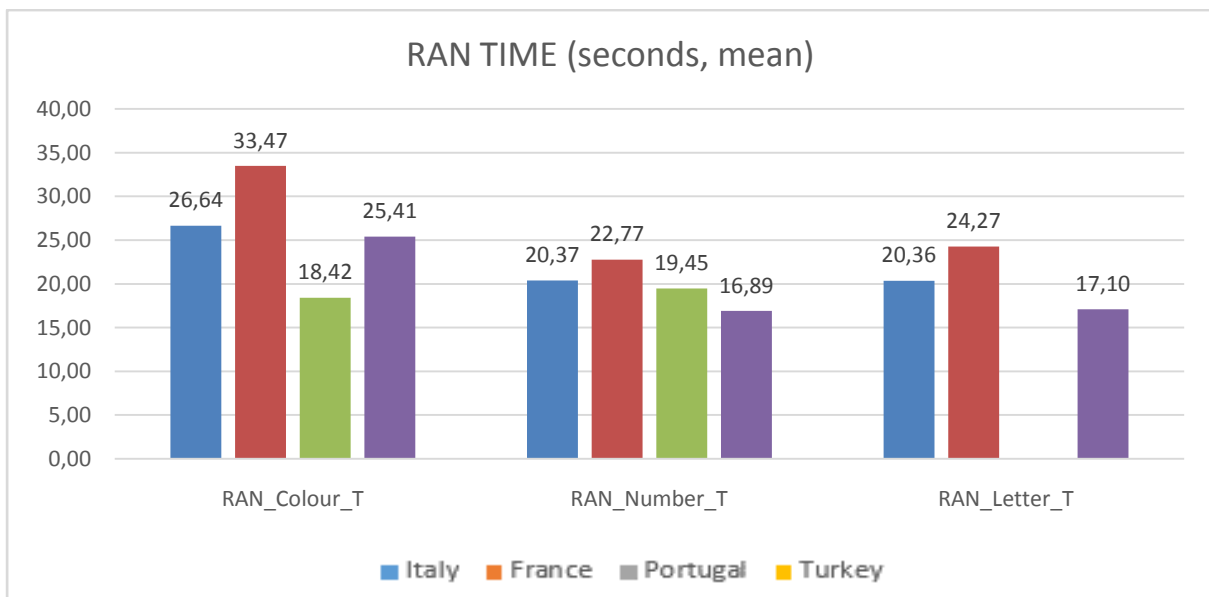


Tables show that the performance of the Turkish participants is generally faster, and the French participants is slower.

The Turkish participants are more corrects in each texts than other countries.

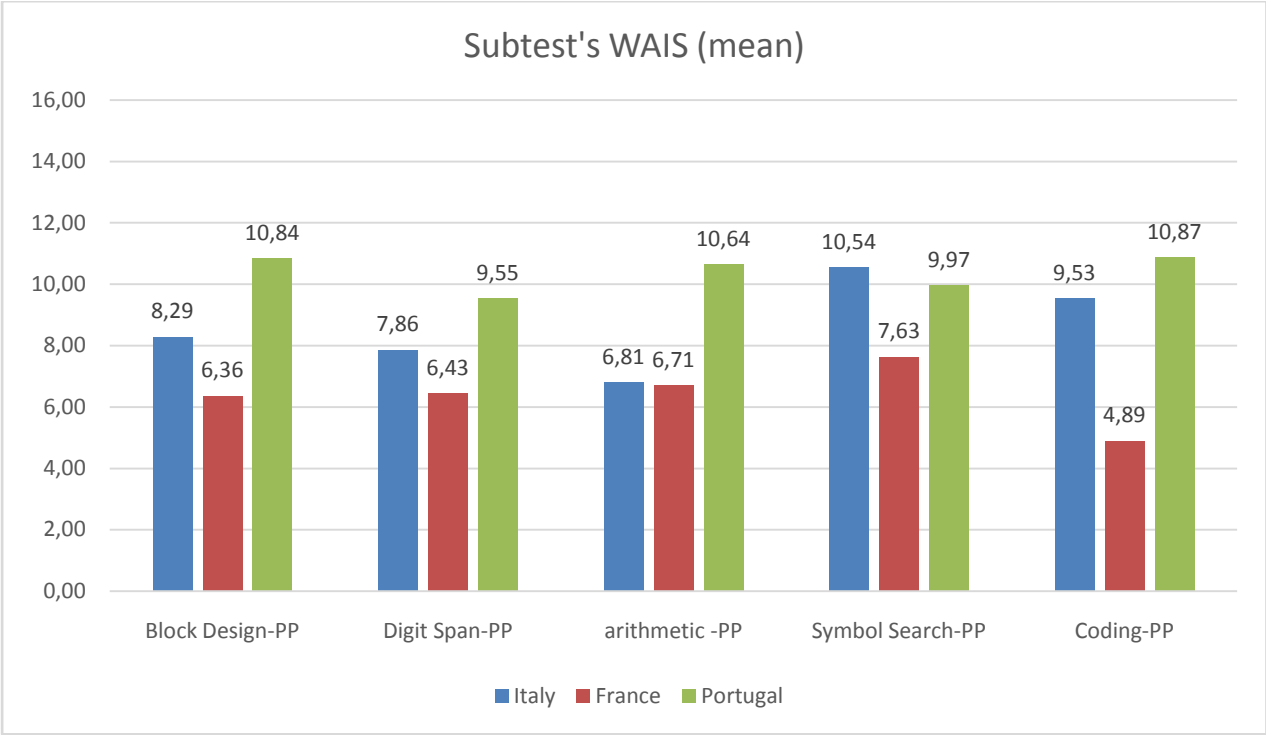
RAN

The results show that the most significant parameter is time, as evidenced by the literature. There are no statistically significant differences between the times in the test of RAN letters and RAN numbers. All participants are slower in the color naming.



WAIS-IV

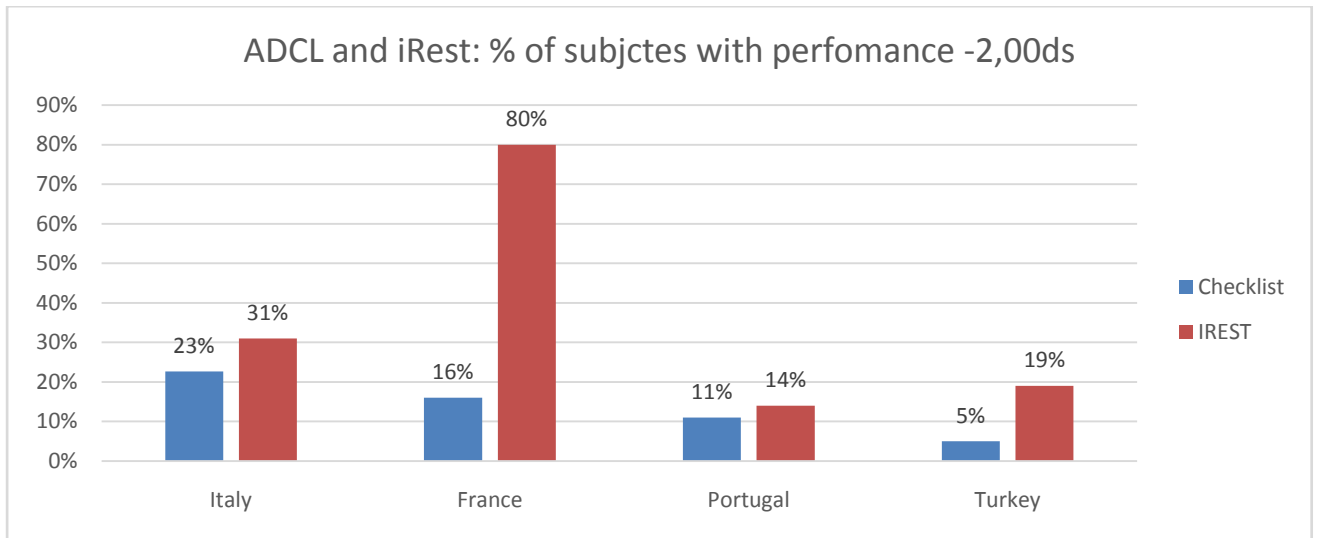
Portuguese subjects show a more advanced cognitive performance than Italian and French subjects.



ADCL-IREST

From the comparison ADCL-IREST there is that many participants report learning difficulties. Also reading tests show a high percentage of subjects with reading difficulties.

Country	Checklist	IREST
Italy	23%	31%
France	16%	80%
Portugal	11%	14%
Turkey	5%	19%



The high percentage of participants with learning difficulties in Vocational Educational Training(VET) confirms the literature data of a high percentage of school dropouts. It is important to identify learning difficulties to reduce school drop-out . In addition, once identified people with difficulty, strategies need to be put in place to reduce the failure.

Conclusions

The creation of a same protocol for all countries was very complex and for some tests it was not possible to use similar tests.The computerized procedure allowed reduces the probability of errors.

The next step is create tools and guidelines to help trainers with people with learning disabilities in VET.