On the comprehension and production of passive sentences and relative clauses by Italian university students with dyslexia

Anna Cardinaletti & Francesca Volpato

This study investigates the comprehension and production of relative clauses and passive sentences by a group of 10 university students with dyslexia in order to check their competence of marked word orders. Comprehension was tested through the oral modality using picture and agent selection tasks, and production was tested using oral elicitation tasks. The results show that relative clauses are comprehended and produced with difficulty, whereas passive sentences are more preserved, particularly as far as comprehension is concerned. The greater difficulty experienced with (object) relative clauses can be attributed to a specific deficit affecting the structures involving A-bar movement and regarding the length of the syntactic dependency, which places a heavy load on the computational system.

Keywords: dyslexia; relative clauses; passive sentences; comprehension; elicited production

1. Introduction

In this paper, we aim at investigating the performance of a group of 10 Italian students with dyslexia in the comprehension and elicited production of passive sentences and relative clauses using oral tasks. These structures are derived through syntactic movement and are characterized by a marked word order. They are difficult to comprehend and produce for a number of different populations (typically-developing children and adults, children with specific language impairment, children with hearing loss, aphasic patients), across different languages. As for individuals with dyslexia, the acquisition and use of sentences with marked word order in Italian has been only investigated in children (for passives, see Reggiani 2010), but to our knowledge, no data are available for adults. In this study, we aim at investigating whether the difficulties with these structures are also observed in Italian university students with dyslexia, and whether the deficit affects both linguistic structures, or it is restricted to specific properties and syntactic dependencies.
The term Developmental Dyslexia (DD) is normally used to refer to difficulties in learning how to read despite normal intelligence (Ramus et al. 2003; Snowling 2000). According to the literature on dyslexia, this deficit is characterized by difficulties with reading and writing texts, spelling, decoding, and recognizing words. Some studies observed that subjects with dyslexia show difficulties in processing rapidly presented auditory information (Marshall et al. 2001) and could be distinguished from their matched controls in phonological abilities and working memory skills (Stanovich 1988; Siegel 1999). In addition to difficulties with reading, spelling, and writing, subjects with dyslexia also perform lower than controls in tasks investigating oral language production and comprehension of properties which belong to the morpho-syntax domain. In particular, they find it difficult to deal with relative clauses (Bar-Shalom et al. 1993; Mann et al. 1984; Stein et al. 1984; Smith et al. 1989; Wiseheart et al. 2009), binding principles (Waltzman & Cairns 2000; Fiorin 2010), morphosyntactic agreement (Wilsenach 2006), and passive sentences (Reggiani 2010; Wiseheart et al. 2009). Low memory resources are claimed to be the main cause of the difficulties that subjects with dyslexia show with these different morpho-syntactic properties.

Using tasks presented orally, recent research investigating the comprehension of clitic pronouns, relative clauses, and passive sentences in Greek-speaking children with dyslexia (Talli et al. 2013) and the production of wh-questions and object clitics in Italian-speaking ones (Guasti 2013) has (re)raised the issue of the possible comorbidity of dyslexia and Specific Language Impairment.

Clinicians normally use standardized tests to assess language impairment. This type of assessment could be insufficient with adult subjects with dyslexia, who might have developed strategies to cope with their reading difficulties, or might not have been diagnosed at a younger age. Standardized tests do not make it possible to carry out accurate analyses on the acquisition and use of specific linguistic properties. For this reason, it is necessary to use specific tests on single or classes of structures, based on well-defined linguistic hypotheses, to provide an analysis as detailed as possible of the deficit.

As said above, in this paper, we concentrate on relative and passive clauses. These types of sentences are both characterized by syntactic movement. In the following derivations, the merge position of the moved constituent is signalled by italics. (1) shows a subject relative, (2) shows an object relative, (3) is a passive sentence (we adopt a raising analysis of relatives, and Collins’ (2005) two-step derivation of passives):

(1) \[
\text{CP la tigre che IP (la tigre) colpisce gli elefanti)}
\]
\[ \text{the tiger that hits the elephants} \]

(2) \[
\text{CP la tigre che IP gli elefanti colpiscono (la tigre)}]
\[ \text{the tiger that the elephants hit} \]

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On the comprehension and production of passives and relative clauses

2. Object relatives and passives in language impairment and dyslexia

A large number of studies claim that object relatives are problematic for Italian children at young ages both in comprehension and production (tasks) (Belletti & Contemori 2010; Contemori & Belletti 2014; Guasti & Cardinaletti 2003; Volpato 2010). Even at adolescence, some individuals exhibit difficulties with these structures, not displaying full adult competence (Volpato 2010). In addition, these constructions are deeply compromised in different populations, including SLI children (Adani 2008; Contemori & Garraffa 2010), hearing-impaired individuals (Volpato 2010), and agrammatic patients (Garraffa & Grillo 2008). In production, object relatives are mainly avoided, and a number of different strategies are adopted instead. Object relatives are especially attested in child production and tend to disappear as children grow older. Object relatives are produced at the rate of 37% at the age of 3, 52% at the age of 4, and 45% at the age of 5 and 6 (Belletti & Contemori 2010). After the age of 7, object relatives begin to be avoided and passive relatives and reflexive causatives with a passive meaning (si-fare constructions) are massively used instead (Re 2010). Before the age of 5, the percentage of passive relatives is 1.5%; between 5;11 and 6;9, they are 9%; between 6;10 and 7;7, they are 19%. They increase at 55% at the age of 8. By the age of 7, the si-fare constructions are produced as well, at the rate of 30%. At the age of 10, they gradually reduce to 20%, and completely disappear at the age of 11 (Carpenedo 2011; Re 2010). At adolescence and adulthood, both object relatives and si-fare constructions are no longer attested, and the use of passive relatives is the prevailing strategy.

As for passive sentences, Italian-speaking typically-developing children master this syntactic construction very early (Manetti 2013; Volpato et al. 2013). At the age of 3 and 4, children are able to produce (verbal) passive sentences. The comprehension of this structure is above 90% between the age of 4;9 and 5;5 and approaches 100% between the age of 5;6 and 6;2 (Volpato et al. 2013).¹

Difficulties with both relative clauses and passive sentences have been observed in individuals with dyslexia. Among others, Wiseheart et al. (2009) investigated the written comprehension of relative clauses and passive constructions in a group of young adults with dyslexia. The authors found that in both sentence typologies, these

(3) \[ [IP \text{ Marco } \varepsilon [\text{VoiceP } \text{spinto } \langle \text{Marco} \rangle \text{ da } [VP \text{ Sara } \langle \text{spinto Marco} \rangle ]]] \]

Marco is pushed by Sara

1. However, the passive is acquired later according to most of the literature on English and a variety of other languages too (Snyder & Hyams this volume).
individuals are less accurate than their age peers without dyslexia. The analysis of performance showed that working memory and word-reading abilities affect the sentence processing of these structures in the experimental group.

3. The study

3.1 Participants

The experimental sample is composed of 10 university students with dyslexia (age range: 20–25 years) (DD group). Personal and clinical data were not available for all students. For three of them, the level of dyslexia was diagnosed as mild (S2, S4, S8); for two of them, it was diagnosed as moderate (S1, S7); for the other five students, this classification is not available (S3, S5, S6, S9, S10). Seven of them have trouble with reading (especially as far as reading speed is concerned), writing, and mathematics (S1, S2, S3, S4, S6, S9, S10); two of them, with reading and writing (S5, S8), and one of them with reading and mathematics (S7). Two students were diagnosed for the first time at primary school (S4, S5), five students were diagnosed between 14 and 19 years (S2, S6, S7, S9, S10), one student was diagnosed at the university (S3). For two students, the age of first diagnosis is not clearly stated (S1, S8). All students live in Milan or in the area near it.

For some students with dyslexia, data concerning reading speed of words, non-words, and texts (in syllables per second) were also available. Reading speed of words and non-words was assessed by using two tasks taken from Sartori et al. (1995). Reading speed of texts was assessed by using two texts for high school and university education (Funghi in città – mushrooms in town – and Un viaggio con le mucche – a travel with cows -, Judica & De Luca 2005). Data concerning reading speed are shown in Table 1:

Table 1. Reading speed in syllables per second for each DD participant. Values in brackets show the standard deviation (SD) below which the students are with respect to the mean. Values with * indicates that SD is not available

<table>
<thead>
<tr>
<th>Reading speed Syll/sec</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>S7</th>
<th>S8</th>
<th>S9</th>
<th>S10</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Words</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>0.27</td>
<td>na</td>
<td>2.62</td>
<td>5.24*</td>
<td>3.79</td>
<td>na</td>
<td>na</td>
<td>4.32</td>
<td>1.69</td>
<td>Na</td>
<td></td>
</tr>
<tr>
<td>(-4.3)</td>
<td>(-2.74)</td>
<td>(-1.54)</td>
<td>(-1.03)</td>
<td>(-3.70)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Non-words</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.49</td>
<td>na</td>
<td>1.48</td>
<td>2.97*</td>
<td>2.08</td>
<td>na</td>
<td>na</td>
<td>2.65</td>
<td>1.07</td>
<td>Na</td>
<td></td>
</tr>
<tr>
<td>(-2.5)</td>
<td>(-2.22)</td>
<td>(-1.46)</td>
<td>(-0.72)</td>
<td>(-2.74)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

(Continued)
On the comprehension and production of passives and relative clauses

3.1 Procedure

Each participant was tested individually in one or more sessions. All experimental trials investigating the use of passive sentences were presented on a laptop screen, whereas paper tests were used to investigate the comprehension and production of relative clauses. Before beginning the test administration, a training session aimed at familiarizing participants with nouns, verbs, items and experimental setting, and to make sure that they had correctly understood the instructions. The production of both relative clauses and passive sentences was audio-recorded and then transcribed.

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Table 1. (Continued)

<table>
<thead>
<tr>
<th>Reading speed Syll/sec</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>S7</th>
<th>S8</th>
<th>S9</th>
<th>S10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text 1</td>
<td>0,29</td>
<td>na</td>
<td>2,99</td>
<td>0,17</td>
<td>4,53*</td>
<td>0,35</td>
<td>na</td>
<td>3,91</td>
<td>2,46*</td>
<td>Na</td>
</tr>
<tr>
<td></td>
<td>(−3.86)</td>
<td>(−0.02)</td>
<td>(−9)</td>
<td>(−4.28)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Text 2</td>
<td>0,29</td>
<td>na</td>
<td>3,09</td>
<td>Na</td>
<td>4,29*</td>
<td>0,35</td>
<td>na</td>
<td>2,97</td>
<td>2,27*</td>
<td>Na</td>
</tr>
<tr>
<td></td>
<td>(−3.92)</td>
<td>(−8.5)</td>
<td>(−2.67)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Their performance in relative clauses and passive sentences was compared to different control groups of individuals. The control groups for the comprehension and production of relative clauses are composed of 16 adolescents (CG1 group; age range: 14;1–17;5, mean age: 15;5) and 16 adults (CG2 group; age range: 20–34 years, mean age: 24;11). Adolescents were recruited at a High-school in San Donà di Piave (Venice). They were enrolled in the second and third class and were monolingual speakers of Italian. At the time of testing, some adults were attending university, and some others had already finished it. One of them interrupted his university studies after the first year. In any case, for all of them, the age of schooling was at least 13 years. Some of them were students recruited at the Department of Language Sciences of the Ca’ Foscari University of Venice. All of them live in North-East of Italy, in the region of Veneto or near the border with Friuli-Venezia-Giulia. Some participants habitually use the dialect variety spoken in their area both with family and with their friends.

The control group for the comprehension and production of passive sentences is composed of 17 adults (age range: 20–23 years). They were students recruited at the Department of Language Sciences of the Ca’ Foscari University of Venice and were from different Italian regions.

Control adolescents and adults did not have any language impairment or any hearing or mental disabilities.
by both authors. All items were presented in a random order, and all subjects were tested on the same list of items. Following Dixon (2008) and Jaeger (2008), a repeated-measure logistic regression analysis was carried out in order to analyse accuracy data, using the statistical software R (R Development Core Team 2008).2

3.3 The four tasks: Materials, coding, and results

3.3.1 Relative clause comprehension task

The comprehension of relative clauses was investigated using an agent selection task (Volpato 2010) following the models proposed by Friedmann & Novogrodsky (2004) and Arnon (2005). A picture with two opposite scenarios was presented to each participant. In one scenario, two referents performed an action and in the other, the two referents displayed reversed theta roles while performing the same action. The participants were asked to select one out of the four referents after listening to the sentence read by the experimenter. The task included 60 experimental sentences testing 10 different conditions (6 sentences for each condition) in which number features are manipulated on both the head and the embedded DP (the number feature on each DP can be either singular or plural): 12 ambiguous sentences (AMB),3 12 unambiguous subject relatives (SR), 24 object relatives with a preverbal embedded subject (OR), and 12 object relatives with a post-verbal embedded subject (ORp). Table 2 shows an example for each sentence condition:

Table 2. Test condition

<table>
<thead>
<tr>
<th>Test condition</th>
<th>Example Sentences</th>
</tr>
</thead>
</table>
| AMB 1 AMB_SG_SG | Il coniglio che colpisce il topo  
*The rabbit that hits the mouse* |
| 2 AMB_PL_PL | I conigli che colpiscono i topi  
*The rabbits that hit the mice* |
| SR 3 SR_SG_PL | Il coniglio che colpisce i topi  
*The rabbit that hits the mice* |
| 4 SR_PL_SG | I conigli che colpiscono il topo  
*The rabbits that hit the mouse* |

(Continued)

2. Jaeger (2008) and Dixon (2008) demonstrated that, when data are categorical (binomially distributed), mixed logit model analyses are more reliable than analyses carried out with ANOVA.

3. In ambiguous sentences, either the first or the second DP can be interpreted as the subject of the embedded verb. Depending on the selected referent, either a subject or an object reading of the relative clause was possible.

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All sentences were semantically reversible, namely both DPs could be appropriate subjects or objects for the verb, and were preceded by the instruction Tocca (touch). An example of experimental item matching the sentence Tocca il coniglio che i topi colpiscono (touch the rabbit that the mice hit) is shown in Figure 1:

Figure 1. Example of experimental sentence Tocca il coniglio che i topi colpiscono (touch the rabbit that the mice hit) – (correct referent: B)

4. English sentences in Examples 9 and 10 are not translations. They are the equivalents of sentences 7 and 8, respectively.
Experimental sentences were interspersed with filler sentences (20 items). These items were relative clauses containing either transitive verbs with animate subjects and inanimate objects or intransitive verbs with animate subjects.

3.3.2 Results

Table 3 displays the percentages of correct answers for each subject in the DD group on each sentence condition:

Table 3. % of accuracy for each DD subject on each sentence condition (100% = 6 correct answers; 83% = 5 correct answers; 67% = 4 correct answers; 50% = 3 correct answers; 33% = 2 correct answers; 17% = 1 correct answer)

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>S7</th>
<th>S8</th>
<th>S9</th>
<th>S10</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMB_SG_SG</td>
<td>83%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>83%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>97%</td>
</tr>
<tr>
<td>AMB_PL_PL</td>
<td>67%</td>
<td>100%</td>
<td>83%</td>
<td>100%</td>
<td>100%</td>
<td>83%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>93%</td>
</tr>
<tr>
<td>SR_SG_PL</td>
<td>83%</td>
<td>100%</td>
<td>83%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>83%</td>
<td>83%</td>
<td>100%</td>
<td>93%</td>
</tr>
<tr>
<td>SR_PL_SG</td>
<td>100%</td>
<td>67%</td>
<td>83%</td>
<td>100%</td>
<td>100%</td>
<td>83%</td>
<td>83%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>92%</td>
</tr>
<tr>
<td>OR_SG_SG</td>
<td>17%</td>
<td>67%</td>
<td>33%</td>
<td>83%</td>
<td>83%</td>
<td>33%</td>
<td>83%</td>
<td>100%</td>
<td>100%</td>
<td>50%</td>
<td>65%</td>
</tr>
<tr>
<td>OR_PL_PL</td>
<td>33%</td>
<td>100%</td>
<td>67%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>83%</td>
<td>100%</td>
<td>100%</td>
<td>67%</td>
</tr>
<tr>
<td>OR_SG_PL</td>
<td>33%</td>
<td>100%</td>
<td>33%</td>
<td>83%</td>
<td>100%</td>
<td>83%</td>
<td>100%</td>
<td>83%</td>
<td>100%</td>
<td>67%</td>
<td>78%</td>
</tr>
<tr>
<td>OR_PL_SG</td>
<td>17%</td>
<td>100%</td>
<td>67%</td>
<td>100%</td>
<td>67%</td>
<td>67%</td>
<td>83%</td>
<td>100%</td>
<td>100%</td>
<td>83%</td>
<td>78%</td>
</tr>
<tr>
<td>ORp_SG_PL</td>
<td>17%</td>
<td>100%</td>
<td>67%</td>
<td>100%</td>
<td>100%</td>
<td>83%</td>
<td>100%</td>
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<td>85%</td>
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<td>ORp_PL_SG</td>
<td>33%</td>
<td>100%</td>
<td>33%</td>
<td>83%</td>
<td>100%</td>
<td>67%</td>
<td>100%</td>
<td>67%</td>
<td>100%</td>
<td>83%</td>
<td>77%</td>
</tr>
<tr>
<td>Mean</td>
<td>48%</td>
<td>93%</td>
<td>65%</td>
<td>95%</td>
<td>95%</td>
<td>78%</td>
<td>95%</td>
<td>95%</td>
<td>92%</td>
<td>97%</td>
<td>85%</td>
</tr>
</tbody>
</table>

At the group level, Table 3 shows high percentages of accuracy in ambiguous sentences and subject relatives for the DD participants. From Table 3, it is evident that high inter-individual variability can be observed within the group. Some subjects show a high level of performance with percentages of accuracy exceeding 90%. Other students instead showed low overall percentages, below 80% (S1, S3, S6). Using the binomial distribution, for each sentence type, we checked the scores corresponding to above chance performance. Since the participants had to choose among four possibilities, the probability of responding correctly to subject and object relatives was 25%. A subject was considered above chance when he/she correctly answered at least 4 items (67%) for each type of relative clauses (p = 0.03). For ambiguous sentences, for which the probability of answering correctly was 50%, a subject was considered above chance when he/she correctly answered all 6 items (100%). On the basis of the
binomial distribution, the participants who showed below chance performance in more than one condition are S1, S3, and S6.

Table 4 compares the performance of the DD group with that of adolescents (CG1) and adults (CG2):

<table>
<thead>
<tr>
<th></th>
<th>DD</th>
<th>CG1</th>
<th>CG2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>AMB_SG_SG</td>
<td>97%</td>
<td>7%</td>
<td>99%</td>
</tr>
<tr>
<td>AMB_PL_PL</td>
<td>93%</td>
<td>12%</td>
<td>97%</td>
</tr>
<tr>
<td>RS_SG_PL</td>
<td>93%</td>
<td>9%</td>
<td>100%</td>
</tr>
<tr>
<td>RS_PL_SG</td>
<td>92%</td>
<td>12%</td>
<td>100%</td>
</tr>
<tr>
<td>RO_SG_SG</td>
<td>65%</td>
<td>30%</td>
<td>83%</td>
</tr>
<tr>
<td>RO_PL_PL</td>
<td>85%</td>
<td>23%</td>
<td>91%</td>
</tr>
<tr>
<td>RO_SG_PL</td>
<td>78%</td>
<td>26%</td>
<td>96%</td>
</tr>
<tr>
<td>RO_PL_SG</td>
<td>78%</td>
<td>26%</td>
<td>97%</td>
</tr>
<tr>
<td>ROp_SG_PL</td>
<td>85%</td>
<td>26%</td>
<td>97%</td>
</tr>
<tr>
<td>ROp_PL_SG</td>
<td>77%</td>
<td>26%</td>
<td>90%</td>
</tr>
</tbody>
</table>

All adults performed at ceiling, while some adolescents provided some incorrect responses. Only one adolescent showed a below chance score in the sentence type RO_SG_SG, despite the fact that he had not been identified for dyslexia.

Overall, the repeated-measure logistic regression analysis of results revealed a significant difference between the DD group and CG2 (Wald Z = –3.003, p = .003). All subjects were 1.5 SD below the mean of adults. The level of accuracy was instead comparable to that of adolescents (CG1). The overall performance of 3 subjects (S1, S3, S6) falls 1.5 SD below the mean of adolescents. However, if we consider the performance of the students with dyslexia on each sentence type, also other subjects were 1.5 SD below adolescents’ level of performance.

A linear regression was carried out in order to verify whether reading speed (independent continuous variable) is a significant predictor in the comprehension of relative clauses. Results showed that the reading speed observed in text 2 (see Table 1 in Section 3.1) is a significant predictor in the comprehension of ambiguous sentences (Beta = .855, p = .030).
3.3.3 Relative clause production task

The production of relative clauses was assessed using a preference task (Volpato 2010 following the model proposed by Friedmann & Szterman 2006). Each subject was shown a picture with two scenarios, in each of which one or more children were the agent or the patient of the action. After the experimenter had described the two scenarios, the participant was invited to express a preference between the two options, being thus forced to produce a relative clause. The task included 24 experimental items (12 eliciting subject relatives and 12 eliciting object relatives) and 12 filler items. Experimental items were all semantically reversible, whereas filler items were easy items consisting in the production of simple subject-verb-(object) sentences with intransitive verbs or transitive verbs with animate subjects and inanimate objects. A trial eliciting a subject relative is given in the following example:

\[(4)\]  
Ci sono due disegni. Nel primo disegno, i bambini accarezzano il gatto. Nel secondo, i bambini colpiscono il gatto. Quali bambini ti piacciono (di più)? Inizia con ‘Mi piacciono i bambini…’ oppure ‘I bambini…’ Target: ‘(Mi piacciono) i bambini che accarezzano/colpiscono il gatto’.
‘There are two pictures. In the former, the children are stroking the cat. In the latter, the children are hitting the cat. Which children do you like? Start with ‘I like the children…’ or ‘The children…’ Target answer: ‘(I like) the children that are stroking/hitting the cat’.

Figure 2. A picture used to elicit a subject relative

A trial eliciting an object relative is provided by the following example:

\[(5)\]  
Ci sono due disegni. Nel primo, la maestra sgrida i bambini. Nel secondo, la maestra premia i bambini. Quali bambini ti piacciono? Inizia con ‘Mi piacciono i bambini…’ oppure ‘I bambini…’ Target: ‘(Mi piacciono) i bambini che la maestra sgrida/premia’.
‘There are two pictures. In the former, the teacher is punishing the children. In the latter, the teacher is praising the children. Which children do you like? Start with ‘I like the children…’ or ‘The children…’ Target answer: ‘(I like) the children that the teacher is punishing/praising.’
3.3.4 Coding

Subject relatives and object relatives were counted as correct when they were produced as shown in (6) and (7), respectively:

(6) I bambini che lavano la tigre  
    ‘The children that wash the tiger’

(7) I bambini che la maestra premia  
    ‘The children that the teacher praises’

Other strategies which are considered as grammatical and appropriate for the context when object relatives were targeted consisted in the production of passive relatives (8) and *si-fare* constructions (9):

(8) Il bambino che è pettinato dal papà  
    ‘The child that is combed by the father’

(9) Il bambino che si *fa* pettinare dal papà  
    the child that himself makes comb by the father  
    ‘The child that has himself combed by the father’

A strategy which was grammatically correct but not appropriate for the context in which it was produced consisted in sentences with head inversion, namely in object relatives turned into subject relatives, making the target embedded subject become the relative head, as in (10):

(10) Target: I bambini che il papà pettina  
    ‘The children that the father combs’

Production: Il papà che pettina i bambini  
    ‘The father that combs the children’

5. Although passive relatives and *si-fare* causatives can be both considered as passive constructions, they will be kept separate in our analysis since in typical language development, they behave differently. As we have seen in Section 2, the *si-fare* construction disappears as children grow older, and passive relatives become the (almost) exclusive strategy.
Another strategy used when an object relative is targeted is the production of ambiguous sentences:

(11) Target: Il bambino che il papà pettina
       ‘The child that the father washes’
Production: Il bambino che pettina il papà
       ‘The child that washes the father’

This sentence is ambiguous between a subject and an object reading since the DP *il bambino* ‘the child’ could be considered as either the postverbal subject or the object of the relative clause.

### 3.3.5 Results

Table 5 shows the percentages of target subject and object relative clauses produced by each participant with dyslexia:

**Table 5. Percentages of target subject (SR) and object (OR) relatives produced by each participant**

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>S7</th>
<th>S8</th>
<th>S9</th>
<th>S10</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>92%</td>
<td>92%</td>
<td>100%</td>
<td>92%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>OR</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>8%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 6 shows the percentages of target subject and object relative clauses produced by the group of students with dyslexia (DD) in comparison with the two control groups (adolescents (CG1) and adults (CG2)):

**Table 6. Group mean (M) and standard deviation (SD) of target subject (SR) and object (OR) relatives produced by each group**

<table>
<thead>
<tr>
<th></th>
<th>DD</th>
<th></th>
<th>CG1</th>
<th></th>
<th>CG2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>98%</td>
<td>100%</td>
<td>98%</td>
<td>5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

In all groups, subject relatives are produced almost 100% of time. Object relatives are only found (in a very low percentage) in the group of students with dyslexia.

### 3.3.6 Answering strategies in targeted object relatives

Table 7 shows the different answering strategies adopted by each participant when object relatives were targeted:

All rights reserved
Table 7. Answering strategies in targeted object relatives by students with dyslexia

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>S7</th>
<th>S8</th>
<th>S9</th>
<th>S10</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Object relatives</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>8%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>Passive relatives</td>
<td>75%</td>
<td>92%</td>
<td>100%</td>
<td>92%</td>
<td>84%</td>
<td>92%</td>
<td>84%</td>
<td>100%</td>
<td>84%</td>
<td>75%</td>
<td>88%</td>
</tr>
<tr>
<td>Si-fare constructions</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>8%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>Ambiguous relatives</td>
<td>8%</td>
<td>8%</td>
<td>0%</td>
<td>0%</td>
<td>8%</td>
<td>0%</td>
<td>8%</td>
<td>0%</td>
<td>8%</td>
<td>17%</td>
<td>6%</td>
</tr>
<tr>
<td>Head inversion</td>
<td>17%</td>
<td>0%</td>
<td>0%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>8%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Table 8 shows the strategies used by the DD group in comparison with the two control groups:

Table 8. Group mean (M) and standard deviation (SD) of the different answering strategies in targeted ORs for all groups

<table>
<thead>
<tr>
<th></th>
<th>DD</th>
<th></th>
<th>CG1</th>
<th></th>
<th>CG2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Object relatives</td>
<td>1%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Passive relatives</td>
<td>88%</td>
<td>9%</td>
<td>82%</td>
<td>15%</td>
<td>98%</td>
<td>5%</td>
</tr>
<tr>
<td>Si-fare constructions</td>
<td>1%</td>
<td>3%</td>
<td>4%</td>
<td>13%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Ambiguous relatives</td>
<td>6%</td>
<td>6%</td>
<td>11%</td>
<td>8%</td>
<td>2%</td>
<td>5%</td>
</tr>
<tr>
<td>Head inversion</td>
<td>5%</td>
<td>6%</td>
<td>1%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Other responses</td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Object relatives, which are found in children (Belletti & Contemori 2010; Contemori & Belletti 2014; Volpato 2010), are only produced by one student with dyslexia (S9). On a par with object relatives, passive relatives and reflexive causatives with a passive meaning are appropriate answers for the experimental setting. The use of passive relatives is the prevailing strategy in both adults (Volpato 2010; Contemori & Belletti 2014) and adolescents (Volpato 2010) and in each subject with dyslexia. Nonetheless, a difference in performance is found between the groups: the group of adults produced a significantly higher percentage of passive relatives than the experimental group (Wald Z = -3.294 p < 0.001). The use of passive relatives by students with dyslexia is instead comparable to that of adolescents. Indeed, no significant difference is observed between the two groups. As for the other answering strategies, some students (S1, S4, S5, S6, S10) produced sentences containing head inversion, which are usually found in young children (Volpato 2010; Volpato & Vernice 2014). The performance is once again comparable to that of adolescents, who also produced sentences with head inversion, albeit with a lower percentage. Indeed, only two adolescents used this strategy in one sentence. Adults never produced such a construction.
Passive sentence comprehension task

The comprehension of passive sentences was assessed by using a picture matching task (Verin 2010, adapting Driva & Terzi’s 2008 materials to Italian). For each stimulus, each participant was presented with three photos and had to select the one corresponding to the sentence read by the experimenter. The task was composed of 40 experimental sentences interspersed with 10 filler sentences. Experimental items contained transitive reversible actional (24 trials) and non-actional verbs (16 trials), and animate agents/experiencers and patients/themes. Twenty items contained the auxiliary venire ‘to come’, and twenty the auxiliary essere ‘to be’. Twenty sentences were tested with the by-phrase and twenty without it. Table 9 shows all experimental conditions:

Table 9. Experimental conditions

<table>
<thead>
<tr>
<th>Actional verbs</th>
<th>essere</th>
<th>In quale foto Marco è spinto (da Sara)?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>venire</td>
<td>‘In which picture is Marco being pushed (by Sara)’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-actional verbs</th>
<th>essere</th>
<th>In quale foto Marco è visto (da Sara)?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>venire</td>
<td>‘In which picture is Marco seen (by Sara)’</td>
</tr>
</tbody>
</table>

Figure 4 shows an experimental item matching the sentence In quale figura Marco è/viene spinto da Sara? (‘In which picture is Marco being pushed by Sara?’).6

![Experimental sentence](image)

Figure 4. Experimental sentence In quale figura Marco è/viene spinto da Sara? ‘In which picture is Marco being pushed by Sara?’

6. Since some children were photographed to create the picture items, we do not report the actual photos used in the experiment.
3.3.8 Results
Table 10 shows the percentages of accuracy in the comprehension of actional and non-actional passives by each DD participant:

Table 10. % of accuracy for each DD subject on actional and non-actional passives

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>S7</th>
<th>S8</th>
<th>S9</th>
<th>S1 Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actional</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Non-actional</td>
<td>100%</td>
<td>100%</td>
<td>81%</td>
<td>100%</td>
<td>94%</td>
<td>75%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

The level of accuracy in the comprehension of actional passives is at ceiling for all participants, while non-actional passives are characterized by lower percentage of accuracy for some students, in particular S3 and S6. For all the other students, performance is at ceiling. Using the binomial distribution, a subject was considered above chance when he/she answered correctly to at least 12 items (50%) in passives with actional verbs ($p = .04$) and to at least 9 items (75%) in passives with non-actional verbs ($p = .03$).

When the students selected the incorrect pictures, in most cases they selected the one in which the roles were reversed and the characters were the same. However, in a few cases also the picture with an outside person was chosen. Control adults performed at ceiling in this task under both verb type conditions.

3.3.9 Passive sentence production task
The production of passive sentences was assessed by using a picture description task (Verin 2010). For each experimental trial, the experimenter showed two colour pictures and described them to each participant. Then, the experimenter asked the participant what was happening to the patient in one of the two pictures. In such a context, in which the patient was the discourse topic, the subjects were forced to start the sentence with it, and a passive sentence was therefore expected. The task included 24 experimental trials (12 items contained actional passives and 12 non-actional ones). Half of the trials required the production of by-phrases, whereas in the 12 others, the by-phrase could be omitted. In order to force the production of the by-phrase, the experimental setting was controlled by providing two pictures with the same patient and two different agents, as in Figure 5. The question asked by the experimenter and the target answer are shown in (12).

Figure 5. Experimental trial eliciting a passive with the by-phrase
3.3.10 Coding
We coded as correct the passive sentences in which the verb used by the experimenter was produced:

(13) Marco è/viene spinto (da Sara).
'Marco is being pushed (by Sara).'

In addition to target structures, we coded reflexive causatives with a passive meaning:

(14) Target: Marco è baciato da Sara.
'Marco is being kissed by Sara.'
Production: Marco si fa baciare da Sara.
'Marco has himself kissed by Sara.'

In some cases, actional and non-actional passive sentences were replaced by active sentences using a different verb, as in the following examples:

(15) Target: Marco è imboccato da Sara.
'Marco is being fed by Sara.'
Production: Marco mangia.
'Marco is eating.'

(16) Target: Marco è sentito da Sara.
'Marco is heard by Sara.'
Production: Marco parla a Sara.
'Marco is speaking to Sara.'

The use of active sentences was also observed in the typically developing children studied by Volpato et al. (2014). However, when using active structures, children produced a considerable number of sentences in which clitic pronouns were also added (Sara lo imbocca ‘Sara is feeding him’). Differently from what was observed with typically-developing children, the group of students with dyslexia never produced active sentences with clitic pronouns.

Answering strategies which were not coded within any previous category were counted as ‘other strategies’, as in the following example:

(17) Target: Marco è/viene spinto (da Sara).
'Marco is being pushed (by Sara).’
Production Marco è immobile.
‘Marco is motionless.’

3.3.11 Results
Table 11 shows the percentage of passive sentences produced by each participant with dyslexia for each verb type (actional vs. non-actional):

Table 11. % of actional and non-actional passives produced by each participant with dyslexia

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>S7</th>
<th>S8</th>
<th>S9</th>
<th>S10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actional</td>
<td>83%</td>
<td>100%</td>
<td>58%</td>
<td>100%</td>
<td>92%</td>
<td>42%</td>
<td>100%</td>
<td>92%</td>
<td>100%</td>
<td>92%</td>
</tr>
<tr>
<td>Non-actional</td>
<td>58%</td>
<td>67%</td>
<td>42%</td>
<td>67%</td>
<td>67%</td>
<td>75%</td>
<td>67%</td>
<td>67%</td>
<td>67%</td>
<td>67%</td>
</tr>
</tbody>
</table>

The asymmetry between actional and non-actional passives, which can be observed in Table 10 for some students with dyslexia in the comprehension task, is much more evident in the production task. Although no significant difference is observed between the two verb types (Wald Z = −1.162 p = .25), actional passives have higher percentages of accuracy than non-actional passives. In general, non-actional passives were more problematic than actional ones. It is worth observing that the participants who show considerable difficulties with these structures are once again S1, S3, and S6, although a different pattern of performance is observed for the three students. Low accuracy with non-actional verbs has also been observed by other studies (Messenger et al. 2009; Volpato et al. 2014) using similar tasks. Using the binomial distribution, we checked the scores corresponding to above chance performance. A subject was considered above chance when he/she correctly produced at least 9 items for each sentence type (percentages = or > 67%).

Table 12 shows the comparison between the experimental (DD) and the control (CG2) groups in the production of target passive sentences for both actional and non-actional verbs:

Table 12. Group mean (M) and standard deviation (SD) of actional and non-actional passives produced by the experimental (DD) and the control (CG2) groups

<table>
<thead>
<tr>
<th></th>
<th>DD</th>
<th></th>
<th>CG2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Actional</td>
<td>88%</td>
<td>20%</td>
<td>99%</td>
<td>3%</td>
</tr>
<tr>
<td>Non-actional</td>
<td>65%</td>
<td>9%</td>
<td>65%</td>
<td>13%</td>
</tr>
</tbody>
</table>
While in non-actional passives, there is no difference between the two groups, in sentences containing actional verbs the DD group performed significantly lower than adults (Wald $Z = -2.895$, $p = .004$).

In addition to target passive sentences, both groups of participants used a number of different strategies. Table 13 shows the answering strategies used by each DD participant when passive sentences were targeted:

**Table 13.** Answering strategies used by each DD subject

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>S7</th>
<th>S8</th>
<th>S9</th>
<th>S10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive sentences</td>
<td>71%</td>
<td>84%</td>
<td>50%</td>
<td>84%</td>
<td>80%</td>
<td>59%</td>
<td>84%</td>
<td>80%</td>
<td>84%</td>
<td>80%</td>
</tr>
<tr>
<td>Active SVO sentences</td>
<td>13%</td>
<td>16%</td>
<td>33%</td>
<td>16%</td>
<td>17%</td>
<td>13%</td>
<td>16%</td>
<td>17%</td>
<td>16%</td>
<td>17%</td>
</tr>
<tr>
<td>Si-fare constructions</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>25%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Other responses</td>
<td>12%</td>
<td>0%</td>
<td>17%</td>
<td>0%</td>
<td>3%</td>
<td>4%</td>
<td>0%</td>
<td>3%</td>
<td>0%</td>
<td>3%</td>
</tr>
</tbody>
</table>

The strategy most used by all participants consists in the production of a passive sentence. Nonetheless, all participants also produced active SVO sentences, especially when the target verb is *sentire* ‘to hear’. Some participants (S3, for instance) also produced active sentences with actional verbs. Only two participants also used *si-fare* constructions (S1, S6).

Table 14 shows a comparison between the different answering strategies adopted by the experimental (DD) and the control (CG2) groups:

**Table 14.** Group mean (M) and standard deviation (SD) of the different answering strategies used by the experimental (DD) and the control (CG2) groups

<table>
<thead>
<tr>
<th></th>
<th>DD</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>CG2</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passive sentences</td>
<td>Actional</td>
<td>88%</td>
<td>20%</td>
<td>99%</td>
<td>3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-actional</td>
<td>65%</td>
<td>9%</td>
<td>65%</td>
<td>13%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active SVO sentences</td>
<td>Actional</td>
<td>6%</td>
<td>11%</td>
<td>0%</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-actional</td>
<td>29%</td>
<td>9%</td>
<td>35%</td>
<td>10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Si-fare</em> constructions</td>
<td>Actional</td>
<td>4%</td>
<td>13%</td>
<td>0%</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-actional</td>
<td>2%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other responses</td>
<td>Actional</td>
<td>3%</td>
<td>4%</td>
<td>1%</td>
<td>3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-actional</td>
<td>4%</td>
<td>9%</td>
<td>0%</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The English verb *hear* has similarly been an exceptionally difficult verb for typically developing children to passivize, even in cases where English-learning children succeed on passives of other non-actional verbs. Discussion and further references can be found in O’Brien et al. (2006: 444, Footnote 1).
From Table 14, it is evident that despite the comparable age, the performance of the experimental group differs from that of controls. Whereas CG2 produced active sentences only with passives containing non-actional verbs, the DD group used active sentences also in those cases in which actional passives were targeted. In addition, the experimental group used some strategies that are not found in the control group, such as *si-fare* constructions. Interestingly, this strategy also occurs when relative clauses are targeted (see 3.3.6).

4. **Discussion**

This study focused on the comprehension and production of relative clauses and passive sentences in a group of university students with dyslexia, in order to investigate whether complex structures containing long-distance dependencies are problematic for this population. Their performance has been compared to different groups with no impairment in order to determine whether and to what extent their comprehension and production skills deviate from control groups.

Some students with dyslexia did not display ceiling performance with subject relatives in both comprehension and production. Despite the high variability of performance in the experimental group, accuracy in the comprehension and production of object relative clauses is comparable to that of a group of adolescents rather than a group of adult age peers. Differently from relative clauses, the pattern of competence of passive sentences changes according to the modality considered: these structures are comprehended well, but the percentage of target passive sentences produced by students with dyslexia is lower than in adults.

Overall, the analysis of performance showed that the group of students with dyslexia had more difficulties in handling relative clauses, in particular object relatives, than passive sentences. This asymmetry is also found in previous studies on English (Stein et al. 1984). From a linguistic point of view, the two structures differ with respect to the type of chain (A in passive sentences vs. A’ in relative clauses) which is built between the first merge position and the surface position of the moved element. The participants experience more difficulties in the use of A’ chains than of A chains. The two constructions also differ with respect to the computation load asked to the memory system to be interpreted. In individuals with dyslexia, the deficit might be attributed to their inability to keep in mind linguistic information, analyze, organize and reproduce it (Cornoldi 1999). This would account, on the one hand, for the difficulty found in the comprehension of relative clauses, which are characterized by long-distance syntactic dependencies across an embedded clause and can be problematic for the language computational system; on the other hand, it would explain the better accuracy in the comprehension of passive sentences which are composed of shorter sequences and dependencies, and can therefore be easier to memorize and process.
As for the production of object relatives, the pattern of performance of the students with dyslexia is comparable to adults with no impairment. However, they sometimes adopted strategies which rarely occur in adolescents and are never attested in adults, such as the use of sentences with head inversion. Such a strategy is instead frequent in young typically developing children (Volpato 2010; Volpato & Vernice 2014). In the group of students with dyslexia, the production of passive sentences was also compromised, with percentages far below the mean of the other students. Passive sentences were avoided through the production of active sentences and *si-fare* constructions. Active sentences are also frequent in adults with no impairment especially with non-actional verbs (in particular, *sentire* ‘to hear’). The problems observed with non-actional passives may be related to the difficulty in the representation of this class of verbs (Messenger et al. 2009).

At the individual level, it is interesting to observe that some participants are more prone to fail in the experimental tasks, namely S1, S3 and S6, for whom the percentages of accuracy in both comprehension and production are very low if compared to the remaining subjects included in the experimental group. S1 and S3 showed low accuracy in the comprehension of relative clauses (48% and 65% respectively). Their performance in the comprehension of passive sentences was instead much more accurate, with percentages of correct answers of 91% for S3 and 100% for S1. S6 showed instead difficulties in both comprehension tasks. These subjects also had some problems with production tasks.

Considering the difficulties that these subjects (S1, S3, S6) had with object relatives and passives, it is likely that they have a problem with language. These individuals would merit further testing to determine if they indeed have impaired oral language.

5. Conclusion

This study investigated the comprehension and production of structures involving marked word orders and long-distance dependencies between the sentence constituents, namely relative clauses and passive sentences. The analysis of the results shows that the difficulties with these structures involve a sub-set of the students with dyslexia. Some of these students experience difficulties in comprehending and producing object relatives and in producing passives (the comprehension of passive sentences with actional verbs is instead accurate).

The reason for their difficulties probably lies in the type of dependency involved in the two structures, *A* chains looking more problematic than *A* dependencies. The length and the type of the dependency also have important consequences on the memory resources necessary to process it, relative clauses being composed of longer sequences than passive sentences, and being therefore more difficult to analyse and produce.
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References


Carpenedo, Chiara. 2011. On the Production of Relative Clauses by Middle School Age Adolescents: An Elicitation Experiment. Tesi di Laurea (BA thesis), Ca’ Foscari University of Venice.


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Jaeger, T. Florian. 2008. Categorical data analysis: Away from ANOVAs (transformation or not) and towards logit Mixed Models. *Journal of Memory and Language* 59: 434–446. DOI: 10.1016/j.jml.2007.11.007


Re, Agnese. 2010. Strategies for the Production of Relative Clauses by 5, 6, 7-year-old Children. Tesi di Laurea (BA thesis), Ca’ Foscari University of Venice.


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