Subject relatives in typical and atypical language development

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In the present research we aim to determine whether relative clauses are successful in distinguishing Italian-speaking children with Specific Language Impairment (SLI) from their typically developing peers. Nineteen preschool-aged children with SLI participated in the study. They were matched to nineteen typically developing (TD) children on the basis of the age. Children were tested by means of an elicitation task. The results show that among the types of relative clauses tested, subject relatives, but not object relatives, proved successful in distinguishing the SLI and TD children. On the basis of the results, we propose that subject relatives could be a marker for SLI at preschool-age. Research should be pursued to replicate and extend these findings across-languages1.

1. Introduction

Specific Language Impairment is a condition of delayed or impaired language acquisition that occurs in children with otherwise normal development. The causes of this disorder are still largely unknown. Furthermore, the nature of the linguistic delay is still a subject of research, as it appears in rather variable forms across languages and it affects a wide range of grammatical domains. Thus, the search for a unifying account has yielded conflicting empirical results and hypotheses, due not only to diverse theoretical and methodological approaches, but also to the inherently heterogeneous nature of this language pathology (Bishop, 1997; Clahsen, 1989; Leonard, 1998; among others).

Children with SLI may experience varying degrees of difficulty in comprehension and/or production in one or more linguistic components:

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1 The present study is part of a wider research on relative clauses and long distance movement conducted by the two authors on both typical and atypical language development. The research has been inspired by the Relativized Minimality principle, first proposed by Rizzi (1990). We thank prof. Luigi Rizzi for being such a great source of inspiration and for his mentoring in teaching and research. It is a real pleasure for us to contribute to this issue.
phonology, semantics, syntax and pragmatics (Bishop, 1997; Bishop & Leonard, 2000). Moreover, the linguistic development of children with SLI may vary according to the severity and persistence of their impairment (Bishop, 1992; Leonard, 1998).

In the present study we take into consideration the morphosyntactic abilities of Italian children with SLI, by investigating the elicited production of relative clauses. Relative clauses like (1) and (2) are complex sentences that include embedding, and movement of a noun phrase. The movement can take place from a subject (1) or an object position (2), resulting in either a Subject relative or an Object relative, respectively.

(1) This is the girl that is hugging the mother (Subject relative)
(2) This is the girl that the mother is hugging (Object relative)

Across languages, TD children correctly produce Subject relative clauses (SRs) as in (1), very early (2-3 years of age: Guasti, 2002; Labelle, 1990), while Object relatives (ORs) like (2) appear later (Friedmann & Novogrodsky, 2004; among others) and children are unable to comprehend them until the age of 4-5 (Adani, 2011; among others).

In children with SLI, relative clauses have been investigated in a number of studies across languages (see Håkansson & Hansson, 2000 for Swedish; Stavrakaki, 2001; 2002 for Greek; Friedmann & Novogrodsky, 2004; Novogrodsky & Friedmann, 2006 for Hebrew; Marinis & van der Lely, 2007; Van der Lely & Batell 2003 for English; Contemori & Garraffa, 2010 for Italian; Hamman et al., 2007, for French), showing that children with SLI perform more poorly with relative clauses than unimpaired children do and they have more problems in comprehending and producing ORs than SRs.

Most of the previous studies on relative clauses tested a sub-group of school-age children and teenagers with a primary deficit in morphosyntax (Friedmann & Novogrodsky, 2004; Novogrodsky & Friedmann, 2006 for Hebrew; Marinis & van der Lely, 2007; Van der Lely & Batell 2003; Van der Lely & Marshall, 2011; for English). The studies focused on SLI’s inability to comprehend/produce Object relative clauses and Object Wh-questions (see footnote 2), showing that a difficulty with these structures can persist up to age of 18, with SLI children/adolescents being significantly less accurate than both age-matched and language-matched TD children (Novogrodsky & Friedmann, 2006 for Hebrew; Van der Lely & Batell 2003; for English). However, even though results on structures involving object movement seem to be very persistent, difficulties with subject movement in both relative clauses and Wh-questions are also reported. This difficulty seems to emerge mainly when SLI children are compared to age-matched TD children (Novogrodsky & Friedmann, 2006 for Hebrew; Van der Lely & Batell 2003; for English).

In this paper we present new evidence on the production of relative clauses in Italian children with SLI, showing that at an earlier age relative clauses are challenging for language impaired children, and SRs (but not ORs) discriminate

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2 Studies on English focused on Wh-questions, which are an instance of A-bar movement as relative clauses (see Haegeman, 1994, among others)
between impaired and typical development. On the basis of our results, we suggest that SRs might be a good candidate as a marker for children with SLI at preschool age, up to the age of 6. Furthermore, we stress the importance of identifying linguistic structures that are early acquired cross-linguistically by typically developing children, and examine their validity as markers for language impairment. Finally, we underline that the identification of markers for SLI that are cross-linguistically reliable is very helpful for an earlier and more accurate identification of the pathology, and hence an earlier and more appropriate treatment of the disorder.

1.1. Markers for SLI and previous studies with preschool children

Recent research has found a number of clinical markers for SLI. These include poor nonword repetition and poor grammatical morphology. Screening for these markers could help with earlier diagnoses and hence earlier treatment of the disorder (e.g. Bishop, 2004; Bortolini, et al. 2002; 2006; Botting & Conti-Ramsden, 2001; Conti-Ramsden, et al., 2001; Rice & Wexler, 1996; Rice, 2000).

Concerning morphology, English-speaking children with SLI are known to have problems with the production of regular past tense forms and third person singular present tense forms. These morphological difficulties together with nonword repetition have proved to be reliable markers of SLI in English-speaking children from the early stages of language development (Bedore & Leonard, 1998; Botting & Conti-Ramsden, 2001; Rice & Wexler, 1996).

Differently from their English peers, Italian children with SLI tend to omit articles, pronouns and the copula and seem to have problems in mastering the third person plural form of verbs (Bortolini et al., 2002, 2006; Bottari, et al., 2001; among others). Bortolini et al. (2002, 2006) found the use of direct object clitics and third-person plural verbs to be successful measures for distinguishing Italian-speaking children with SLI from their TD peers, due to their high sensitivity and specificity. In addition to these morphological markers, Bortolini et al. (2006) showed that nonword repetition constitutes a reliable marker for Italian SLI, with high sensitivity and specificity.

The ability with relative clauses in young children with SLI has been previously investigated in a number of studies (Håkansson & Hansson 2000, for Swedish; Leonard, 1995; Schuele & Nicholls, 2000; Schuele & Tolbert, 2001; Schuele & Dykes, 2005 for American English; Contemori & Garraffa, 2010 for Italian). They all found that pre-school children with SLI showed a difficulty with relative clauses, emerging as the frequent omission of complementizers both in elicitation tasks and in spontaneous speech, and as a delay in the onset of relative clause production.

For Italian, a previous study by Contemori & Garraffa (2010) tested the elicited production, imitation and comprehension of SRs and ORs in four preschool children with SLI aged 4;3-5;9, whose expressive abilities were severely impaired. The results on elicited production showed that children could not produce any type or relative clause, and when they could complete the task, they produced either SVO declaratives or relatives with omission of the complementizer, which are ungrammatical in Italian. The qualitative analysis of the results suggested that children with SLI have difficulties in the construction of the relative clause and avoid the syntactic syntactic embedding operation. Similar
results are observed with Swedish and American English children with SLI at a preschool-age (Håkansson & Hansson 2000; Schuele & Dykes, 2005; among others).

However, none of the previous studies on relative clauses in SLI focused on SRs as a possible marker for SLI in the early stages of language development.

In the present study, we follow up on Contemori & Garraffa (2010) and aim at investigating further the status of subject relatives in SLI's elicited production. The interest for SRs results from several characteristics of this syntactic structure. First of all, SRs are among the earliest type of dependencies that are acquired by TD children. Hence, they could be a reliable measure for the comparison between typical and impaired language abilities. Secondly, a general difficulty with SRs would suggest an impairment in the syntactic embedding operation, rather than a problem with the movement operation, at least at the earlier stages of language development (see Novogrodsky & Friedmann, 2006, among others, for evidence of difficulties with SRs also at school-age). Finally, SRs are not language-specific, and could therefore be a useful indicator for language impairment not only in Italian, but across languages.

2. Research questions

To sum up, in the present study we address the following research questions:

1) Do pre-school children with SLI have difficulties with relative clauses? Does this difficulty clearly distinguish between SLI and TD?
2) Can Subject relative be an early marker for SLI?
3) Is the source of difficulty with relative clauses the syntactic embedding operation?

3. Method

3.1.1 Participants

Nineteen monolingual Italian children with SLI aged 4;3-6;3 (Age mean: 5;5; SD: 0;7) participated in an elicitation study. Their non-verbal IQ is between 90 and 115. Children with SLI were selected on the basis of their general comprehension and expressive abilities, measured on their MLU and on their performance on language standard tests (expressive abilities: Frog story; receptive lexicon: PPVT; receptive grammar: TCGB).

Nineteen monolingual Italian TD children age-matched to the SLI children (4;3 – 6;6; mean age: 5;1; SD: 0;9) participated as control subjects.

In Table 1, we illustrate the age and the mean score on standard language tests of children with SLI.

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3 The cross-linguistic validity of a marker has interesting implications for the diagnosis in bilingual populations (see Paradis, 2010, among others)

4 The cut-off for selection was a score of (at least) -2 SD on PPVT, and or 10 percentile on TCGB; and or (at least) one year delay on MLU compared to the chronological age of the subjects.
Table 1. Means and SD for standard language tests

<table>
<thead>
<tr>
<th></th>
<th>PPVT-R Mean Score (SD)</th>
<th>TCGB Percentiles (SD)</th>
<th>MLU Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>89 (29)</td>
<td>35 (22)</td>
<td>4.2 (1.2)</td>
</tr>
</tbody>
</table>

3.1.2 Procedure

The experimental task consisted of an act-out adapted from Hamburger & Crain (1982). As illustrated in Figure 1, the experimenter introduced three toy animals, two of the same type (e.g., two horses) and one of a different type (e.g., a dog). Then, the experimenter acted a scene with the three animals describing the action, and asked the child to describe the two animals of the same type. The task was constructed in such a way that the description of the animals would have to be formed as a SR and as an OR. An example is given in (3) and (4).

There are two horses and a dog. The horse is pushing the dog. Now you tell me: Which horse is this one? (Touching the second horse of the row):
(3) SR: (Questo è) Il cavallo che spinge il cane
(This is) the horse that is pushing the dog

Now the horse is pushing the dog. You tell me: Which horse is this one? (Touching the first horse of the row):
(4) OR: (Questo è) il cavallo che il cane spinge
(This is) the horse that the dog is pushing

Figure 1. Picture with animals and picture for eliciting an OR

4. Results

In Table 2, we present the responses produced by children with SLI and TD children.

Table 2. Type of responses produced by TD and SLI children in percentage, number, mean and standard deviation.

<table>
<thead>
<tr>
<th></th>
<th>SRs</th>
<th>ORs</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLI</td>
<td>37 %</td>
<td>12 %</td>
</tr>
<tr>
<td></td>
<td>[21/57; M = 1.1; SD = 1.3]</td>
<td>[7/57; M = 0.4; SD = 0.6]</td>
</tr>
<tr>
<td>TD</td>
<td>81 %</td>
<td>21 %</td>
</tr>
<tr>
<td></td>
<td>[46/57; M = 2.4; SD = 0.8]</td>
<td>[12/57; M = 0.6; SD = 0.8]</td>
</tr>
</tbody>
</table>
For the data analysis, we used a repeated measures ANOVAs with Group (TD, SLI) as a between subject factor, and Sentence type (SR, OR) as within subject factor. Interactions were followed using pairwise comparisons with Bonferroni correction.

The ANOVA revealed a main effect of Sentence type (F(1,36) = 50,312, p<.0001, \( \eta^2 = 0.583 \)), Group (F(1,20)=11,812, p<.002; \( \eta^2 = 0.247 \)), and an interaction between Group and Sentence type (F (1,36)= 9,899, p < .003; \( \eta^2 = 0.216 \)).

Pairwise comparisons showed a significant difference between SRs and ORs in the TD (F(1,18) = 84,934, p < .0001; \( \eta^2 = 0.825 \)) and SLI (F(1,18) = 5,633, p < .029; \( \eta^2 = 0.238 \)) group, with a higher accuracy on SRs than ORs.

An independent-sample t-test showed a significant difference between SLI and TD for SRs (t(36) = 3,944, p < .0001), with TD children being more accurate than SLI on SRs. No significant difference was found between the two groups for ORs.

In Table 3, we present the type of responses given by children with SLI and TD children, when either a SR or an OR was expected but not produced. Data are grouped by type of answer, and group of participants (SLI-TD).

**Table 3. Percentage of responses produced by TD and SLI children when a SR or an OR is expected**

<table>
<thead>
<tr>
<th></th>
<th>SRs</th>
<th>ORs</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Declarative</td>
<td>50</td>
<td>47</td>
</tr>
<tr>
<td>Fragment/DP</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>OR&gt;SR role reversal</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>No answer</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Ambiguous relative clause</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>TD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Declarative</td>
<td>13</td>
<td>22</td>
</tr>
<tr>
<td>Fragment/DP</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>OR&gt;SR role reversal</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>OR&gt;SR passive</td>
<td>-</td>
<td>14</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>No answer</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Ambiguous relative clause</td>
<td>-</td>
<td>18</td>
</tr>
</tbody>
</table>

In (5)-(12), we present examples of children’s productions. In (5) and (6) we present a declarative and a fragment when a SR is expected. (7) and (8) are examples of ORs transformed into a SR, by reversing the characters (7), and by means of passive (8). In (9) we give an example of a relative clause with ambiguous interpretation (ambiguous relative), and in (10) we present a response labeled as “other”.

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5 In the ORs expected there is a match of number features between the head of the relative and the subject of the relative clause. In this context, if a relative clause with a postverbal or null DP is produced, this has an ambiguous interpretation in Italian (see Belletti & Contemori, 2010 for further discussion).
Internet celebration for Luigi Rizzi’s 60th birthday

5. Discussion

First of all, our study confirms the asymmetry between SRs and ORs in TD children aged 4-6, with the former mastered earlier than the latter in production, up to the age of 6 (for similar results on Italian see Contemori & Belletti, forthcoming). Furthermore, the task proved to be reliable, as the older TD children achieved a high level performance on the production of SRs. For children with SLI, a difference between SRs and ORs is observed, showing a higher accuracy for SRs as compared to ORs.

The comparison between SLI and TD children showed that preschool children with SLI are significantly less accurate than age-matched controls on SRs. No such difference between SLI and TD emerged on ORs.

Among the relative clauses tested in our study, SRs discriminated between SLI and TD children, up to the age of 6. On the other hand, SLI and TD children did not differ on the production of ORs. Hence, while the production of SRs clearly distinguishes between SLI and age-matched TD, the production of ORs does not show any difference between the two groups, as ORs are also hard to produce for TD children, and avoided by different types of strategies.

Interestingly, we observed an asymmetry between SR/OR in both TD and SLI children, suggesting a similar pattern of development in both groups, but with a delayed attainment in SLI. Further evidence from single age groups of children with SLI (4, 5 and 6) is needed to support this hypothesis.

A qualitative analysis of children’s productions in contexts requiring a SR or an OR provides us with some interesting insights into the production skills of SLI and TD children.

SLI children resort to the production of SVO declaratives in most of the cases when a SR or an OR is expected. Declarative sentences are also adopted by
TD children, mainly when an OR is expected, but to a lesser extent than SLI.

TD children tend to avoid ORs, and adopt different strategies to do so, preferring declarative clauses, or transforming the ORs into a SRs, either by changing the characters of the action (OR>SR role reversal, Table 3) or by means of passive morphology (OR>SR passive, Table 3).6

The preference for the production of declarative sentences in SLI clearly shows that children have difficulties in constructing the structure and avoid the syntactic embedding operation. The results are consistent with the study on Italian by Contemori & Garraffa (2010), in which preschool SLIs with severe verbal impairment were tested. The results showed that children could not produce any type or relative clause, and when they could complete the task, they produced either SVO declaratives or relatives with omission of the complementizer. In the present study, a larger group of SLI children showed higher expressive abilities, and omission of the complementizer was not attested. However, similarly to the study by Contemori & Garraffa (2010), the results clearly suggest that children with SLI have difficulties in the construction of the relative clause and avoid syntactic embedding, by producing declaratives to a large extent. The results of the present research are also in line with previous studies on English and Swedish children with SLI (Håkansson & Hansson 2000; Schuele & Dykes, 2005; among others), except for the complementizer omission that we did not observe in our data.

7. Conclusion

To conclude, in our study we tested preschool children with SLI in comparison to age-matched TD children, showing that the elicited production of SRs clearly discriminates between typical and atypical language development. Our results are a preliminary step to prove that SRs could be a good marker for preschool age children with SLI. Furthermore, SRs are not language-specific, and could be a valid tool for assessment at a cross-linguistic level.7

From our results, the difficulty with SRs seems to be a phase relatively stable that persists from age 4 to 6. Further research is needed to investigate the validity of SRs as a marker for younger children SLI, and to examine how persistent the difficulty can be in older children with SLI.8

References


6 See Contemori & Belletti (forthcoming), for similar results collected with a different elicitation task with Italian TD children.

7 We refer here to head-initial languages.

8 Interestingly enough, some studies observed a significant difference between the elicited production of SRs in school age children with SLI compared age-matched TD children (e.g., for Greek: Stavrakaki, 2002; for Hebrew: Novogrodsky & Friedmann, 2006).
production of Subject and Object Relatives by Italian (young) children and adults. In J. Costa, et al. (Eds.), Language Acquisition and Development, 3. Cambridge, UK: CSP.


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