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**Profiling relative clause constructions in children with Specific Language Impairment**

**Key words:** syntax, assessment, relative clauses, SLI

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## **Abstract**

This paper highlights the importance of error analysis in providing a comprehensive profile of an individual's grammatical ability with regard to relative clause constructions. The aim was to identify error patterns in the production of relative clauses by English-speaking, school-aged children with SLI, and to relate them to their level of competence with these structures.

Children with SLI (*mean age* = 6;10, *n* = 32) and two control groups – a typically developing group matched for age (AM-TD, *mean age* = 6;11, *n* = 32) and a younger typically developing group (YTD, *mean age* = 4;9, *n* = 20), repeated sentences containing relative clauses that represented a range of syntactic roles. Data is presented on three distinct error patterns – the provision of simple sentences, obligatory relativizer omission and relative clause conversions. Each is related to the level of competence on relative clauses that each child has achieved.

## **Introduction**

In assessing the grammatical competence of English-speaking children with SLI in relation to relative clause constructions, quite naturally researchers have concentrated on the structural types that these children are able to control. The errors that they make have played a lesser role in the evaluation of these forms. However, the errors that children with SLI make in attempting these constructions could be informative about what Rispoli and Hadley (2001) refer to as the 'leading edge' of their grammatical development: different types of error may identify distinct levels of approximation to mastery of the constructions of interest.

The function of a relative clause is to post-modify a nominal in a matrix clause as in (1). In this example the embedded clause is post modifying *the man* which is the object of the matrix clause and the subject of the relative clause- there are two clauses.

(1) I met the man that pushed the girl.

As in (Frizelle & Fletcher, 2013) in this paper we will refer to complete bi-clausal sentences (with a matrix and relative clause) as 'relative clause (RC) constructions' and we will reserve the term 'relative clause' for the post-modifying clause itself.

One type of error that has been highlighted in the literature on children with SLI is the omission of subject relativizers in RC constructions. Compare (2) and (3):

(2) she's get all the dishes \_\_\_ need to be washed

(3) she's get all the dishes that need to be washed

Example (2), from Schuele and Nichols (2000), omits the relativizer, supplied in (3), that is obligatory in most English dialects when the relativized item from the matrix sentence, in this case *dishes*, is the subject of the relative clause. Schuele and Tolbert (2001) found low rates of supply of the obligatory relativizer in subject relatives in 5, 6 and 7 year old children with SLI: 9%, 38% and 49% respectively. In three groups of typically developing children who were on average two years younger than the SLI group they were matched with, there were no instances of subject relativizer omission. Oetting and Newkirk (2008) also examined the provision of subject relativizers by 6 year-old children with SLI, compared to their age-matched typically developing peers and TD children who were two years younger. Because of possible dialectal differences from children speaking what they refer to as mainstream American English (MAE), Oetting and Newkirk selected children who spoke other dialects, namely African American English, and Southern White English. Although there was some subject relativizer omission among the typically developing children from the two dialect backgrounds, provision did not fall below 80%, even in the younger group. For the SLI group the average rate of provision was 59%. So the discrepancy between children with SLI and typically developing children that Schuele and Tolbert (2001) found is replicated even in dialect groups which appear to permit some degree of subject relativizer omission. However, not all studies of relative clauses in children with SLI have found such high rates of subject relativiser omission. Hesketh (2006) found an overall omission rate of only 6% on an elicitation task, where participants were using British English.

Schuele and Tolbert (2001) list various possible explanations for the omission of subject relativizers by children with SLI. Perhaps the most likely of these is overgeneralization from object relatives. In a corpus-based study of conversations among US adults, Fox and Thompson (2007) found that 60% of all object relative constructions did not have an overt relativizer. Thus examples like (4) are preferred in their data to sentences like (5):

(4) There was something we needed

(5) I have one *that* you can use

If this level of omission is equalled in caregiver-child conversation, then it is at least possible that children with SLI are extending to subject relatives the licence for relativizer omission afforded in object relatives. The issue of why children with SLI should adopt this strategy while TD children do not is certainly worth pursuing. But we will concentrate here on what examples like (2) may tell us about the child's control of relative clauses.

Subject relative clauses without relativizers are well attested in adult speakers of non-standard dialects of English in England (e.g. Ihalainen, 1990; Trudgill, 1984). They are also reported for school-age children speaking Scottish English (Romaine, 1984). We can infer then that these constructions do not pose any barrier to comprehension. We can see why from this example:

(6) There was a man \_\_\_ would do it for you.

This utterance is quoted by Ihalainen (1990). In such constructions, *There was* serves as an introducer to the single proposition the sentence contains, *a man would do it for you*. The absence of a relativizer in (6) and similar constructions would not appear to present any barrier to parsing this structure. According to Ihalainen, in the dialects in which omission is possible, it more commonly occurs in this type of relative clause construction, which has a copular matrix clause. As Diessel and Tomasello (2005) propose, these structures (which they refer to as syntactic amalgams) can be seen as one step up from a simple sentence -- following the copular clause, the rest of the construction in (5) has the canonical constituent order of a transitive sentence.

A different error which Diessel and Tomasello (2005) identify from their study of the acquisition of RC constructions by typically developing children between 4;3 and 4;9 years of age are what they term 'conversions'. In the sentence recall task they utilized, they found that a significant number of responses maintained relative clause structure but altered constituent order in the relative clause, as in the conversion of (7) to (8):

(7) This is the boy who the girl teased at school this morning

(8) This is the boy who teased the girl at school this morning

So the child maintained the overall shape of an RC construction, but altered the thematic roles of the NPs in the relative clause so that the relativizer, instead of being the object, indirect object or oblique of the relative clause verb, became its subject, and the embedded clause maintains a canonical transitive shape. These young TD children showed a strong tendency to convert a sequence of (NP rel NP V) to (NP rel V NP) but in contrast conversions from (NP rel V NP) to (NP rel NP V) occurred very infrequently. Conversion errors were also found by Riches, Loucas, Baird, Charman, and Simonoff (2010). They found that 16% of object relatives were converted to subject relatives, in a sentence recall task completed by 15-year old children with SLI. Diessel and Tomasello (2005) note that of the other errors frequently observed in children's responses, many were 'ungrammatical, or incomplete'

A comprehensive account of an individual child's grammatical status in a given structural domain will first of all concentrate on what s/he gets right. So Diessel and Tomasello (2005) zero in on which relative clause types can be correctly recalled. But there is a strong argument to be made that a complete assay of the child's level of competence – especially for clinical purposes – should also weigh the implications of different kinds of mistakes. In cross-sectional studies, we are afforded a snapshot of a grammatical system in transition, and to make the best of it we need to examine not only what is clearly in focus but also the remainder of the picture. Here we provide a complementary analysis to (removed for anonymity (in press)) which concentrated on the syntactic accuracy with which children with SLI could recall different types of relative clause, and ask what the errors that they make in recall can tell us. The specific errors we are interested in are those we have highlighted – conversions and the syntactic amalgams resulting from subject relativizer omission. To these we add single clause sentences, which we assume are among what Diessel and Tomasello (2005) call 'incomplete' responses, and which are also attested by Hesketh (2006) and Schuele and Tolbert (2001) in the category 'other response types'. Our assumptions are that simple sentences, amalgams and conversions constitute increasing approximations to RC constructions proper. Specifically, our research questions are:

- Are simple sentences, amalgams and conversions found in the responses of children with SLI to RC constructions they are asked to recall?

- What is the relationship between these errors and the children's syntactically accurate performance on RC constructions?
- How do the error-responses produced by the children with SLI compare with those produced by aged-matched controls (AM-TD) and by younger typically developing (YTD) children (who are on average two years younger)?
- If children with SLI produce conversions, do they favour an NVN word order? i.e. do they produce object, oblique and indirect object relatives as subject relatives?

## **Methodology**

### *Participants*

Eighty-four children completed the study – thirty-two children with SLI, thirty-two AM-TD children and twenty YTD children. The children with SLI and the AM-TD group ranged in age from 6;0 to 7;11 years, with mean ages of 6;10 (SD = 7.12) and 6;11 years (SD = 6.52) respectively. Each group contained twenty-two boys and ten girls. The YTD children were between 4;7 and 4;11 years, (M = 4;9 years, SD = 1.49) and included twelve boys and eight girls. . The YTD group was not language matched to the children with SLI. Language matching has inherent validity problems (Plante, Swisher, Kiernan & Restrepo, 1993) particularly when children with SLI are no longer in the preschool period. All of the children were native English speakers living in Ireland. Written consent was given by the parents / guardian of each child in the study. Ethical approval was obtained from the Cork Teaching Hospitals Clinical Research Ethics Committee.

The children with SLI were included in the study if they scored at or below - 1.25 standard deviations (SD) on the composite score derived from the receptive language subtests of the CELF- 4 (Semel, Wiig, & Secord, 2006). The children met all usual exclusionary criteria for SLI. However in order not to mask the children's syntactic potential on the experimental task, those with verbal articulatory dyspraxia or any significant phonological problems were also excluded from the study.

The control children were required to score at or within 1 SD of the mean for their age on receptive and expressive language composite scores of the CELF-4, UK

(AM-TD group - (Semel et al. 2006) and the CELF-Preschool 2, UK (YTD group) (Semel, Wiig, & Secord, 2006). They had no reported history of speech, language or hearing problems or any type of exceptional needs. All three groups of children had IQ scores within the typical range i.e. no less than 1 SD below the mean on the Raven's Test of Progressive Matrices (Raven, 2008). Table 1 shows the age, receptive language score and IQ for each group of children.

**Table 1** - Summary of Cognitive and Language Profiles for each of the three groups

	SLI (n = 32)			AM-TD (n = 32)			YTD (n = 20)		
	M	SD	Range	M	SD	Range	M	SD	Range
Age	6;10	7.12	6;0 - 7;11	6;11	6.5	6;0 - 7;11	4;9	1.5	4;7 - 4;11
RLS	68.4	8.52	46 - 81	107.8	8.8	92 - 125	108.5	6.2	96 - 120
IQ	97.1	7.61	85 - 115	104.7	10.2	90 - 130	110.8	7.8	95 - 130

RLS - Receptive Language Score

### *Materials*

A sentence recall task was devised which included 52 relative clause constructions and 17 filler items. The filler items were simple sentences, matched for length with the RC constructions and included to reduce priming effects. They were inserted randomly in the RC sentence list. All stimuli were between 10 and 13 syllables in length. The task included seven types of relative clause, intransitive subject-, transitive subject-, object-, indirect object-, oblique-, genitive subject- and genitive object-relatives. Oblique relatives refer to those where the post-modified noun functions as the object of a preposition. Genitive relatives refer to those with a genitive relative pronoun, in which the relativizer 'whose' + following noun sequence can function as either the subject or object of the relative clause. (for examples see – Frizelle & Fletcher, 2013). Each was attached to either a presentational matrix clause



(PN - single proposition) or to the direct object of a transitive matrix clause (DP- dual proposition). This resulted in the opportunity for 1,664 relative clauses to be produced by the children with SLI and the AM-TD group and 1,040 by the YTD group (as there were fewer children in this group). In each condition, two of the four sentences included a copular matrix clause (PN) and the other two sentences included a transitive matrix clause (DP). The object relatives were sub-divided into those with an inanimate head noun and pronominal relative clause subject (Oi-relatives) and those with an animate head noun and noun phrase in the relative clause subject slot (O-relatives). The procedure to elicit the children's productions was an adaptation of that used by Diessel and Tomasello (2005). Full details are provided in (Frizelle & Fletcher, 2013).

### *Categorization System*

For the purposes of this report, the children's responses were assigned to five categories as follows:

1. Syntagmatically correct (the response maintained the overall structure of both the matrix clause and the relative clause construction but may contain lexical items or morphological forms that are different to the target structure).
2. Relative clause with obligatory marker omitted
3. Conversion (the constituent order of the response relative clause was altered from the stimulus item)
4. Simple sentence
5. Other (including ungrammatical relatives, co-ordination, other complex sentences, reduced relatives and un-interpretable responses).

An example of each category and sentences assigned to that category is given in Table 2.

**Table 2 – Categories of Responses**

<b>Response Category</b>	<b>Target Sentence</b>	<b>Sentence Produced</b>
<i>Syntagmatically Correct</i>	Joe watched the cat that chased the mouse in the garden.	Joe watched the cat that chased him in the garden.
<i>Obligatory Relativizer omission</i>	Emma saw the man who patted the dog on the back.	Emma saw the man patted the dog on the back.
<i>Conversion</i>	There is the rabbit that the girl chased in the park.	There was the rabbit who chased the girl in the park.
<i>Simple sentence</i>	The girl cleaned up the milk that spilt in the fridge.	The girl spilt the drink in the fridge.
<b>Other</b>		
<i>Subordinate Clause</i>	Anne kissed the baby whose face Joe cleaned with a towel.	Mammy kissed the baby when Joe washed the little baby's head.
<i>Reduced Relative</i>	Joe saw the rabbit that jumped in the big field.	Joey saw the rabbit jumping over the fence.
<i>Ungrammatical RC construction</i>	Emma watched the girl who Joe gave some sweets to.	Emma showed who gave the sweets to.
<i>Un-interpretable</i>	Eddie saw the man whose horse Joe rode in the field.	Eddie saw a man lishing on a wheel.

For each child the total number of syntagmatically correct responses was tallied and this was referred to as the child's level of syntactic accuracy (SA score). Responses that were not syntagmatically accurate were assigned to one of the other four categories. Inter-rater reliability measures were obtained for the categorization of

the sentence recall data. A linguist familiar with child language data and provided with details of the criteria, re-analysed 5% of randomly selected responses, the agreement rate for syntagmatically correct responses was 97% and for the other categories was 92.7%.

## Results

### *Syntactic accuracy scores*

Statistical analysis of syntactic accuracy scores (Kruskal-Wallis Test) showed a significant difference in performance between the three groups. Post hoc tests were used to investigate pairwise differences (Mann Whitney for post hoc differences). The children with SLI (*Mdn* = 9, out of a possible score of 52, range 0 – 28) showed significantly greater difficulty than the YTD group (*Mdn* = 30.5, range 5 - 41), and the AM-TD group (*Mdn* = 41, range 27 - 50).

### *Error Analysis*

The children with SLI had considerable difficulties recalling the RC constructions presented and each of the error patterns outlined in our first research question were evident in their responses. A description of each error pattern is outlined below. The data was not normally distributed, therefore between-group differences were analysed using the non-parametric Kruskal-Wallis test and the Mann –Whitney U for post hoc differences. Bonferroni corrections were made. The relationship between the children’s level of syntactic accuracy and the total number of each error type was also explored using Spearman’s rho non-parametric correlation analysis. The correlation matrices for each group are shown in Table 3.

**Table 3:** *Correlational analysis between SA scores and each error pattern for the three groups*

	SLI – Correlation		AM-TD Correlation		YTD – Correlation	
	(P value)		(P value)		(P value)	
Simple sentence production	-.75	<.001**	-.30	.09	-.73	<.001**

Omission of obligatory relativizer	-.42	.016*	_____	_____	.12	.617
Conversions	.61	<.001**	-.84	<.001**	-.29	.223
Conversions (without genitive)	.46	.009*	-.73	<.001**	-.55	.013*

\* Significant at  $p < .05$ , \*\* Significant at  $p < .001$

*Simple sentences:* The children with SLI produced 15% of RC constructions as simple sentences. This compared with 4.2% for the YTD children and .12% for the AM-TD group. A Kruskal-Wallis test indicated that the groups differed significantly ( $\chi^2(2, n = 84) = 53.92, p < .001$ ). Post hoc tests (Mann-Whitney U) were used to investigate the pairwise differences and showed that differences between all three groups were significant (for SLI and AM-TD  $p < .001, r = .86$ , for YTD and SLI  $p < .001, r = .57$  and for YTD and AM-TD  $p < .001, r = .59$ ).

As can be seen there was a strongly significant negative correlation between simple sentence production and SA score for both the children with SLI and the YTD group. The lower the SA score the greater the number of simple sentences produced. However the profiles of simple sentence production were very mixed within the SLI group. Two children (who had extremely limited abilities in relative clause production) used this as their primary strategy, with almost half of their responses being produced as simple sentences. A further ten children produced between 20% and 30% of their responses as simple sentences. There were in fact only two children with SLI who did not produce any relative clauses as simple sentences. In contrast half of the YTD children did not produce any simple sentences and one child accounted for 50% of the total simple sentence production by this group of children. It was also noted that simple sentences produced by the children with SLI were more likely to contain vocabulary errors than those produced by the YTD group.

*Obligatory relativizer omission:* As documented in previous studies (Hesketh, 2006; Oetting & Newkirk, 2008; Schuele & Nicholls, 2000; Schuele & Tolbert, 2001) children with SLI, albeit to differing degrees, tend to omit the obligatory relativizer in subject relatives. This error was noted in almost 8% of their subject relative productions (58% of these were from PN relatives and 42% from DP relatives). It

occurred in 4.7% of the subject relative responses from the YTD group and did not occur in the AM-TD group. A Mann-Whitney U test was carried out and indicated no significant difference between the children with SLI and the YTD group ( $z = -.771, p = .077, r = .1$ ). One child, who was responsible for almost half of the YTD omissions, skewed the scores for this group. A re-analysis of the data omitting this outlier showed a significant difference between the children with SLI and the YTD group ( $z = -2.18, p = .029, r = .3$ ).

Relationship analysis showed a significant negative correlation between obligatory relativizer omission and subject relative SA score for the children with SLI. The higher the SA score the less likely the children with SLI were to omit the obligatory relativizer. Again there was considerable variation within the group of children with SLI. 38% of the children did not use this as a strategy in relation to the production of target subject relative clauses and a further 22% did so only once. There were two children in particular who appeared to use this as an approach to relative clause production, both of whom did so, in between 40 and 45% of their subject relative responses. This was in contrast to the YTD group who otherwise tended to recall the sentence accurately.

*Conversions:* The production of a different type of relative clause than the target construction was classified as a conversion. If we include the genitive relatives (which caused considerable difficulty for all groups) in the statistical analysis the difference between the groups was not significant ( $\chi^2 (2, n = 84) = 4.02, p = .13$ ). Focussing on the five other relative clause types the children with SLI converted 10.2%, the YTD group converted 6.9% and the AM-TD group converted 3.2% of the remaining relative clauses. A Kruskal-Wallis test indicated that groups differed significantly ( $\chi^2 (2, n = 84) = 14.9, p < .001$ ). Post hoc tests (Mann-Whitney U) showed that the differences were significant between the AM-TD and SLI groups ( $p < .001, r = .47$ ). The differences between the YTD group and both other groups were not significant. However many of the conversion attempts for the children with SLI were unsuccessful and if we include the number of attempted conversions (28.8% for the children with SLI, 16.8% for the YTD and 7.1% for the AM-TD group) the differences between each of the three groups are significant (for SLI and YTD  $p = .027, r = .36$  and for YTD and AM-TD  $p = .02, r = .38$ ).

An analysis of the relationship between total SA score and the number of conversions carried out revealed a significant positive relationship between these two variables for children with SLI. The higher the SA score the higher the number of conversions. In contrast the relationship was significant but negative for the other two groups such that the higher the SA score the lower the number of conversions.

In most cases conversion errors altered the word order of the given relative clause, which could occur in two directions: Subject relatives converted to object relatives and all other relative types converted to subject relatives. Table 4 provides a sample of each conversion type.

**Table 4:** *Example of each conversion type*

	Target Sentence	Response
Subject to Object	This is the farmer who fed the cow in the shed.	That is the farmer that the cow fed in the shed.
Object to Subject	There is the rabbit that the girl chased in the park.	That's the rabbit who chased the girl in the park.
Inanimate Object (Oi) to subject	There is the picture that you drew on the wall last week.	There was the boy who drew on the wall last week.
Oblique to Subject	Joe rubbed the cat that the goat stood on last week.	Joe rubbed the cat that stood on the goat last week.
Indirect object to subject	There is the horse that the girl gave a drink to.	There was the girl who gave the drink to the horse.
Genitive (sub) to subject	Anne saw the farmer whose cow fell in the shed.	Anne saw the cow who fell in the shed.

Genitive (obj) to subject	Eddie saw the man whose horse Joe rode in the field.	Eddie saw the man who rode in the field.
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Conversions from (NP rel NP V) to (NP rel V NP) have been previously reported by Riches et al. (2010) in relation to children with SLI. Six paired Wilcoxon tests were performed on the number of these two changes for each group and Bonferroni corrections were made. The *p* values given in Table 5 are following Bonferroni correction.

Table 5: *Conversion pairwise comparisons – p values*

	SLI S to O	AM-TD S to O	YTD S to O
O to S	.018 *	1.0	1.0
Oi to S	1.0	.28	.35
Obl to S	.01*	.33	.26
Io to S	1.0	1.0	1.0
GenS to S	.162	.15	.34
GenO to S	<.001*	.04*	.13

\*indicates significantly greater number of object to subject conversions than the reverse.

As can be seen the children with SLI favoured constructions that followed the NVN pattern showing a significantly greater number of conversions from object to subject, oblique to subject and genitive-object (GenO) to subject relatives, than conversions from subject to object relatives (NNV). The fact that there was no significant difference between the number of indirect object to subject conversions and subject to object conversions was an artefact of the categorization system – in that children did

attempt many more indirect object to subject relative conversions than subject to object conversions but were often unsuccessful. This relates to Diessel and Tomasello's acquisitional work, with typically developing children (2005). They found that when producing indirect object relatives, young typically developing children retained the sentence-final preposition but often tended to leave out the subject of the relative clause. This resulted in a hybrid ungrammatical construction with the same NVN word order as a subject relative. A similar error pattern was evident for the children with SLI in the current study (9). These attempted conversions were then categorised as ungrammatical and were therefore not included in this category. The children with SLI also usually produced other substantial errors in their indirect object relative responses. Therefore although they did attempt to convert a large number of indirect-object to subject relatives, the responses could not be categorized as such.

*Indirect object to subject (ungrammatical)*

(9) Target: There is the dog that the man kicked his football to.

Response: There's the dog who \_\_\_\_\_ kicked the football to.

It is also noteworthy that the incidence of Oi-relatives (i.e. those attached to an inanimate head noun and with a pronominal subject) to subject relative conversions was very rare. From the total sample there were only 3% of Oi-relatives converted compared to 22% of O-relatives and both the AM-TD and YTD groups did not convert a single relative of this type.

This NVN word order preference shown by the children with SLI was not evident in the performance of either the AM-TD group or the YTD group. The YTD group showed no significant differences in their numbers of any conversion types - therefore no word order preference was evident. For the AM-TD group there was a significant difference between the number of subject relatives converted to object relatives (which were very few) compared to the number of GenO-relatives converted to subject relatives ( $p = .04$ ) but no significant differences between any other pair of conversions. However, although many of the GenO conversions were to subject relatives (12%) (10) a considerably larger number were converted to object relatives (41%) (11). Thus indicating that although the Genitive structure caused difficulty for these children, they did not show a word order preference towards (NP rel V NP), rather, they produced an utterance that more closely matched the target utterance word order. This was also the case for the YTD group whose conversions included



16.1% of GenO-relatives to subject relatives and 27.4% of GenO-relatives to object relatives. The SLI group however continued to show a strong word order preference for (NP rel V NP) (19.5% GenO- to subject relatives) despite the fact that the object relative word order more closely resembled the word order of the GenO-relative (12.9% of GenO- to object relatives).

*(10) GenO to Subject*

Target: Emma met the girl whose bag Anne took to school.

*Response: Emma met the girl who took the bag to school.*

*(11) GenO to Object*

Target: Joe liked the girl whose dog Anne found in the park.

*Response: Joe liked the girl who Anne found in the park.*

Interestingly the preference for NVN word order was also shown in the responses categorized as ungrammatical conversions in the SLI group. 81% of their ungrammatical conversions included the NVN word order of a subject relative, this was in contrast to the other two groups, both of whom produced around 50% of their ungrammatical relatives with an NVN word order.

## **Discussion**

Our first research question asked whether simple sentences, amalgams and conversions are found in the responses of 6 – 7 year old children with SLI to RC constructions they are asked to recall. This clearly is the case. Our second research question addressed the possible relationship between these errors and the children's syntactically accurate performance on RC constructions. Our data suggests that these error patterns appear to be consistent with the level of competence on relative clauses that each child has achieved. The more stable their knowledge of RC constructions the less likely they were to produce simple sentences or omit an obligatory relativizer and the more likely they were to convert to another relative clause type. Our third question asked how do these error responses produced by the children with SLI compare with those produced by AM-TD and YTD children (who are on average two years younger)? Significant differences are shown between each of the three groups. These three research questions will now be addressed within the context of each error pattern.

### *The production of simple sentences*

Given the use of simple sentences precedes the development of more complex syntactic structures such as relative clauses, it is no surprise that children with SLI used this as a strategy in attempting to recall a full range of relative clauses. In their acquisitional work Diessel and Tomasello (2001) claim that the development of relative clauses begins with subject relatives in copular constructions, because these are most similar to simple sentences. This relates to the theory put forward by Bybee, (1985) and Bybee and Hopper (2001), i.e. the more frequently a grammatical construction occurs the more entrenched its mental representation becomes and the easier it is to activate in language use. Children with SLI have considerable experience with simple sentences and their production of a relative clause as a simple sentence is suggestive of an attempt to process the sentence for meaning and reproduce it in a syntactic framework that is both within their repertoire and easily activated (12).

(12) Target: The boy rode the horse that Anne put in the field.

*Response: Anne put the horse in the field.*

Ease of activation would seem an important influencing factor for children with SLI as they often showed grammatical knowledge of a structure in one example but produced a simple sentence in another example of the same structure. However the more stable the child's knowledge of relative clauses (reflected in their SA scores) the less likely they were to produce a simple sentence. This was reinforced by the performance of the YTD group whose SA scores were significantly better than the children with SLI, who produced significantly fewer simple sentences and who also demonstrated a strong negative relationship between the two. This pattern was absent in the AM-TD group, whose SA scores for the majority of RC construction types are close to ceiling.

### *Omission of the obligatory relative marker*

The next notable error type in the production of relative clauses by children with SLI was the omission of the obligatory relativizer in subject relatives. This was noted in almost 8% of their subject relative productions. In keeping with Ihalainen (1990) (when referring to non-standard dialects of English) this error occurred more often in RC constructions that had a copular matrix clause (58% of the total errors). The omission of an obligatory relativizer from these types of constructions results in structures that could be seen as one step up from a simple sentence (although they

contain two clauses they contain only a single proposition). Diessel and Tomasello (2000) refer to these structures as syntactic blends or ‘amalgams’ in their corpus report on typically developing children and suggest that this is in fact a stage in relative clause development. The omission of relativizers from subject relatives attached to a main clause object shows that despite omitting the relativizer these children were attempting two clauses, again suggesting a progression in their relative clause knowledge.

The strong negative relationship between relative clause knowledge (SA scores) and obligatory relativizer omission for children with SLI is also suggestive of omission reflecting a stage in relative clause production. The greater their ability to produce relative clauses, the less likely they were to produce this error. Interestingly this error was significantly less evident for the YTD group (whose SA scores were significantly higher) and completely absent from the AM-TD group whose relative clause productions were very well established.

The obligatory relativizer omission figures in the current study are roughly compatible with those reported by Hesketh (2006) who detailed a 6% omission rate on an elicitation production task by children of a similar age. However they are in stark contrast to the 57% figure reported by Schuele and Tolbert (2001) in their group of children of the same age. Although, Schuele and Tolbert’s figures are a percentage of the total subject relatives attempted whereas Hesketh’s figures and the initial figure reported in the current study are a percentage of the total number of opportunities to produce a target subject relative, a reanalysis of the current data based on total subject relatives attempted only elevated our figure to 12%. This therefore does not account for the discrepancy between the figures reported, which await explanation. One possible avenue of investigation is dialect variation between Britain and Ireland, on the one hand, and certain US dialects, on the other. Another path to explore is the distinct methodologies – sentence recall, elicited production, conversational samples – used to explore relative clause constructions in different studies. In conversational samples, where the selection of constructions is under the child’s control, there are generally considerably fewer examples of subject relatives produced (from which to analyse the omission of relativizers) when compared to sentence recall tasks.

In any case it appears that relativiser omission in subject relatives is a strategy implemented by some children with SLI in attempting to produce subject relatives and it is most evident in children with a lower level of relative clause knowledge. Our data

suggests however that it is not a strategy restricted to children with SLI, as 35% of our YTD children did show obligatory relativizer omission and one YTD child did so in 44% of his subject relative attempts.

*Relative clause conversions:*

Our fourth research question asked if children with SLI produced conversions and if so, do they show a preference for an NVN word order. This error pattern was very evident in our data – (aside from the genitives) the children with SLI converted 10% of relative clauses and attempted to convert a further 18.6% but were not successful. If we include these attempts, we find significant differences between our children with SLI and our YTD group who are on average two years younger. Our YTD children converted almost 7% of relative clauses and attempted a further 10%. These figures are compatible with those reported by Diessel and Tomasello (2005) (in relation to TD children aged 4;3 to 4;9 years) who noted a 9% conversion rate and a further 10% of attempted conversions.

The significant positive relationship between SA scores and number of successful conversions for the children with SLI indicates that conversions represent a level of relative clause knowledge for these children. The better their overall knowledge of relative clauses the more likely they were to use this strategy. However, there was also an inconsistency in their conversion errors in that despite repeating some relatives correctly, the children converted other examples of the same structure. A similar pattern was evident in Diessel and Tomasello's (2005) study in relation to younger TD children. They concluded that because children did show the ability to produce a structure correctly in some instances, these errors could not be a result of a lack of grammatical knowledge but were due instead to 'the activation of the wrong grammatical pattern' (p.17). This relates to our question regarding whether the children with SLI favour a particular word order pattern in their conversions. This was certainly the case in our data. The children with SLI showed a strong word order preference in their conversions ((NP rel NP V) to (NP rel V NP)) suggesting that this pattern is more easily activated for them. This word-order preference was further reinforced by their handling of the genitive relatives, where unlike both of the TD groups they continued to convert in the NVN direction. Given their frequent exposure to this word order in simple sentences and then in subject relatives (with the intervening relativizer) it is no surprise that children with SLI might activate this pattern more readily. However if we look at the conversion patterns from both types

of object relative we cannot suggest a purely configurational account. It seems that children with SLI do not seem to convert object relatives, which include particular lexical choices i.e. an inanimate head noun and a personal pronoun as the subject of the relative clause. Previous studies by Kidd, Brandt, Lieven and Tomasello (2007) in relation to TD children and Frizelle & Fletcher (2013) in relation to children with SLI, show that this type of object relative is easier to deal with. They are highly discourse relevant and therefore frequent in the ambient language. This appears to facilitate the ease with which the children with SLI can produce these structures. Therefore although it appears that the NVN structural configuration is more easily activated for children with SLI the lexical choice within that configuration is another influencing factor.

## **Summary**

Children with SLI show considerable difficulty producing all types of RC constructions included in this study. An analysis of these productions reveals three distinct error patterns, which appear to be consistent with the level of competence on relative clauses that each child has achieved. Each error pattern could be interpreted as a 'step up' from the previous pattern – from simple clause statements, to amalgam constructions to full bi-clausal relatives (even if not of the target stimulus type). This is reinforced by the fact that the first two error patterns are associated with a poor overall knowledge of RC constructions while the third pattern is more evident in children who are showing a higher level of grammatical stability with regard to these structures. Although each error pattern is also evident in YTD children who are on average two years younger, it is at a significantly reduced level. The production of conversions is the only error pattern noted (minimally) in the AM-TD group whose knowledge of relative clauses is well established at this age.

The error patterns that emerge from a sentence recall procedure have implications for the assessment of children's knowledge of relative clause constructions and for intervention. A comprehensive profile of performance should include not only construction types, on which a child is syntactically accurate, but also error types and their relative proportions. The fuller picture this provides of control, near-control or lack of control of specific types of relative clauses in this

extensive family of constructions can then focus intervention at an appropriate point of entry into the system.

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