



# Subordinate clause comprehension and tense/agreement inconsistency in children with specific language impairment



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## ABSTRACT

Several recent studies have suggested that the production errors of children with specific language impairment (SLI) such as *The girl singing* may be explained by a misinterpretation of grammatical adult input containing a similar structure (e.g., *The boy hears the girl singing*). Thirteen children with SLI and 13 younger typically developing children with comparable sentence comprehension test scores (TD-COMP) completed a comprehension task to assess their understanding of sentences involving a nonfinite subject-verb sequence in a subordinate clause such as *The dad sees the boy running*. TD-COMP children were more accurate on subordinate clause items than children with SLI despite similar performance on simple transitive (e.g., *The horse sees the cow*) and simple progressive (e.g., *The cow is eating*) items. However, no relationship was found between the SLI group's specific subordinate clause comprehension level and their specific level of auxiliary *is* production, casting some doubt on this type of structure as a source for inconsistent use of auxiliary *is*.

**Learning outcomes:** The reader will learn that children with specific language impairment (SLI): (1) have difficulty understanding complex sentences that include nonfinite subject-verb sequences; (2) that this difficulty is apparent in comparison to younger typically developing peers who have similar scores not only on a sentence comprehension test, but also on simple sentences that correspond to the component parts of the complex sentences; and (3) that this weakness is concurrent with these children's inconsistent use of auxiliary *is* in production. Although novel verb studies show a clear connection between how children with SLI hear new verbs and how they use them, we do not yet have evidence that this connection is tied to a poor understanding of the input sentences that house the verbs.

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## 1. Introduction

Young typically developing (TD) children acquiring English and most other Germanic languages go through a developmental period during which they produce tense and agreement morphemes inconsistently. Examples in English

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include *Mommy like coffee*, *Daddy drive to work*, *He watching TV*, and *Her fixing dinner*. This phase of development has been referred to as the “optional infinitive” period (Wexler, 1994), given that, when children fail to mark tense/agreement, they often appear to use an infinitive or some other nonfinite form instead.

For another group of children, this period of inconsistency is extended for a significant period of time. These are children with specific language impairment (SLI), who continue to show optional use of tense/agreement not only at a later age but even when their utterance length clearly reaches a level when most children have long mastered the use of these forms (e.g., Hoover, Storkel, & Rice, 2012; Leonard, Eyer, Bedore, & Grela, 1997; Rice, Wexler, & Cleave, 1995; Rice & Wexler, 1996; Rice, Wexler, & Hershberger, 1998).

There are several alternative accounts for optional infinitive use in both TD children and children with SLI (see Leonard, 2014 for a recent review). Probably the most prominent is the account proposed by Rice, Wexler, and their colleagues (e.g., Rice & Wexler, 1996; Rice et al., 1995, 1998). According to this account, the optional infinitive period is due to a biologically-based principle that has not yet matured. For children with SLI, the emergence of this principle is extremely delayed.

In this study, we take a different approach, by testing the idea that tense/agreement inconsistency in children with SLI might have its source in children’s misinterpretation of sentences that appear in the input. This work starts with the assumption that children’s processing limitations and/or syntactic comprehension limitations might lead them to inappropriately extract portions of larger input utterances, leading to their production of sentences that lack tense/agreement morphemes. Using computational modeling, Croker, Pine, and Gobet (2000) demonstrated that if young children had a strong tendency to process the ends of sentences, their early speech would mirror optional infinitive use, given the greater frequency of nonfinite forms toward the ends of utterances in child-directed speech. Since that time, computational modeling studies have been refined to show that a variety of errors as well as cross-linguistic differences might be explained in this way (Freudenthal, Pine, & Gobet, 2006; Freudenthal, Pine, Aguado-Orea, & Gobet, 2007; Freudenthal, Pine, & Gobet, 2009; Freudenthal, Pine, & Gobet, 2010). Experimental studies that directly measured input effects likewise demonstrated the feasibility of this idea (e.g., Finneran & Leonard, 2010; Kirjavainen, Theakston, & Lieven, 2009). For example, Theakston, Lieven, and Tomasello (2003) presented young TD children with novel verbs that appeared in questions such as *Will it mib?* or in third person singular form as in *Look, it mibs*. When tested, the children’s productions of these novel verbs showed a strong influence of how they appeared in the input. For example, *mib* was more likely to be produced in third person singular contexts as a nonfinite form (a bare stem) if it had been heard in *Will it mib?*

A parallel literature in SLI likewise provides hints that the input could be a source for nonfinite productions by these children. For example, Leonard et al. (2002) showed that presentations such as *We see the mouse eating the cheese* could induce preschool-age children with SLI to describe a subsequent picture without an auxiliary (e.g., *The horse kicking the cow*) even though an auxiliary was required in the context. In an intervention study designed to facilitate the use of auxiliary forms, Fey and Loeb (2002) found that preschoolers with SLI did not benefit in their acquisition of auxiliary verbs from input such as *Is daddy driving the truck?* They speculated that the children were heavily influenced by the nonfinite subject-verb sequence (e.g., *daddy driving the truck*) and may not have appreciated that this nonfinite sequence was permitted only because of the presence of the fronted auxiliary.

In a series of studies, Leonard and Deevy (2011) and Leonard, Fey, Deevy, and Bredin-Oja (2015) employed the novel verb paradigm used by Theakston et al. (2003) to determine whether four- and five-year-old children with SLI would be even more influenced by the presence of nonfinite subject-verb sequences in the input. These investigators identified a variety of input structures that contain nonfinite subject-verb sequences that might be extracted by children with SLI because of their propositional value. These structures are illustrated in input sentences such as *He saw the girl running*, and *Help me do the dishes*, in which the subcategorization frame of the matrix verb (*saw*, *help*) requires a nonfinite verb in the subordinate clause. They also appear in sentences such as *Is the girl running?* and *Does the boy like ice cream?* in which the fronted auxiliary leaves a third person singular subject (*the girl*, *the boy*) immediately preceding a verb that is unmarked for tense/agreement (*running*, *like*). These researchers proposed that extracted sequences such as *The girl running* and *The boy like ice cream* could serve as competitors to the simple declarative sentences also heard in the input (e.g., *Look, the girl’s running*, *The boy likes ice cream*), leading to a prolonged period of tense/agreement morpheme inconsistency, until the constraints imposed by the larger input structures are better understood by the children. Until this greater understanding occurs, the inappropriately extracted utterances could serve as the basis for new utterances generated by the children (e.g., *The boy running*, *The girl like popcorn*).

These structures are varied in their syntactic details, sharing only the fact that they contain verb forms that are not permitted in simple declarative sentences. Therefore, it seemed likely that their resolution would not be simultaneous. For example, an emerging awareness that *girl running* should not be extracted from *Is the girl running?* does not mean that the children will have learned that *girl running* should not be extracted from *We saw the girl running*. To test their general proposal, Leonard and Deevy (2011) and Leonard et al. (2015) used the above input structures in their novel verb studies. Both studies showed stronger input effects on children with SLI than on TD children. Because the children with SLI also showed much less use of tense/agreement morphemes than the TD children, the findings seemed consistent with these investigators’ proposal.

One advantage of this type of input-based proposal is that it serves to connect tense/agreement inconsistency with sentence comprehension problems. Even children with SLI described as having an “expressive” language problem are below age level in their comprehension of a variety of syntactic structures (e.g., Bishop, 1979, 2014). In a large twin study, Bishop, Adams, and Norbury (2006) found that inconsistency in the production of tense/agreement morphology and weak sentence

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