

## **Reading errors without reading impairment: The effect of syntactic movement impairment on text reading in hearing impairment and SLI**

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Hearing impairment from birth may restrict oral language input during the critical period for language acquisition. In children who communicate orally, this input limitation leads to difficulties in the development of syntax, with the result of marked difficulties in the comprehension and production of sentences derived by Wh-movement, such as relative clauses and Wh-questions (Friedmann & Szterman, 2006, 2011).

Children with hearing impairment are also reported to have difficulties in text reading and text comprehension. In this study we examine why this is so. An analysis of the processes that contribute to normal text reading suggests two domains: word reading (decoding) and comprehension (language skills). In the realm of language abilities, most studies have focused on the contribution of lexical abilities to reading comprehension (Coppers et al. 2013; Kyle & Harris, 2006; Kelly 1995).

This study examined the way syntactic abilities affect reading comprehension, focusing on the effect of sentences derived by syntactic movement on accuracy of oral reading and comprehension of texts.

**Syntactic abilities** were assessed using six tests of comprehension and production of sentences derived by Wh-movement and V-C movement. Three tasks assessed comprehension of relative clauses and Wh questions (2 auditory tests and 1 written); two tasks assessed sentence production (subject and object relatives), and one task assessed repetition of sentences derived by Wh movement, V-C movement, A movement, and sentential embedding. On the basis of these task we could determine, for each of the hearing impaired participants, whether they had a deficit in Wh-movement and v-c movement or not.

**Reading at the single word level** (decoding) was tested using the TILTAN screening test (Friedmann & Gvion, 2003).

We then examined **reading and comprehension of short texts** using a novel task in which the participants were asked to read 6 short texts with sentences derived by Wh- and V-to-C movement, compared with 6 parallel short texts in which the same stories, with the same words, were phrased in simple sentences.

**The participants** were 32 Hebrew-speaking children with hearing impairment. They were 16 boys and 16 girls, aged 9;1-12;2 years ( $M = 10;6$ ,  $SD = 0;9$ ). They had moderate to severe hearing loss. All the participants consistently wore binaural hearing aids (15 children) or used cochlear implants (17 children, 4 of them used two cochlear implants). All of them were educated only in oral language and had hearing parents. Their performance was compared to that of age-matched hearing controls.

**Results:** The children with hearing impairment showed significant difficulty in the comprehension of the sentences and paragraphs with syntactic movement. They made errors in reading aloud even though most of them did not have reading impairment at the single word level.

The three most important findings were the following:

- a. They made significantly more reading errors in the texts that included movement-derived sentences than in texts that only included simple sentences.
- b. The children with hearing impairment who had a syntactic deficit made significantly more reading errors when they read the texts aloud than the children with hearing impairment whose syntax was normal.
- c. Head movement was also impaired in many of the children with hearing impairment, as indicated by their impaired reading of construct state nominals.

**Conclusions:** These results suggest that errors in reading aloud of texts may result from a syntactic impairment rather than from a reading deficit. The syntactic impairment of children with hearing impairment underlies their marked difficulty in the reading and comprehension of texts.

#### **A further population showing similar pattern:**

We will conclude by showing that the same effect of syntactic impairment on reading texts can be seen also in syntactic SLI. We tested 17 children with S-SLI who had Wh-movement impairment. These children showed the same pattern of worse reading of texts with movement compared to texts without movement, and almost all of their reading errors were found in the sentences with syntactic movement.

#### **References**

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