

**Head movement in Portuguese children with cochlear implants:
evidence for selective syntactic deficit in cases of late input**

1. Introduction. It is well known that some orally trained hearing impaired children exhibit certain syntactic deficits, even after receiving cochlear implants (Brannon 1968, among others). Many studies developed in the 70s and in the 80s identified global difficulties in the production and comprehension of syntactic structures, when these children are compared with their peers with typical development. However, only recently a more precise characterization of the structures that are affected in contexts of hearing impairment has started. Syntactic movement is considered to be problematic in the context of hearing impairment. Some authors report difficulties in constructions involving movement: this is true for passives (Power e Quigley (1973)), wh-questions (de Villiers, de Villiers e Hoban 1994) and relative clauses (Quigley, Smith e Wilbur 1974). One must be cautious, however. The most recent literature on language development reveals that not all passives, not all wh-questions and not all relative clauses are affected in different contexts of development, and in different contexts of language breakdown. Friedmann and Szterman (2006, 2009) argue that children with cochlear implants, because they have been subject to late exposure to the input, have selective difficulties with movement. They base this conclusion on their difficulties with relative clauses, and on the capacity that these children have to compensate these difficulties with different types of resumptive pronouns (interpreted as a strategy to create a dependency in the absence of movement) (cf. Friedmann and Costa 2011). In this paper, we contribute to the characterization of the language abilities of children with cochlear implants, by studying their ability to perform X⁰ movement in European Portuguese. We intend to contribute to provide answers to the following questions:

- a) Is movement selectively affected in hearing impairment?
- b) Is movement related to the AP-interface more affected than other types of movement?

2. The development of verbal answers in European Portuguese: how to say Yes. In European Portuguese, affirmative answers to yes-no questions can be given in one of two ways. Either with the adverbs *sim/yes* or with the verb, as illustrated in (1) (Matos 1992, Martins 1994, Santos 2006):

- (1) A: Leste o livro?
Read-2sg the book
B: Sim. / Li.
Yes / Read-1sg

The verbal answer is the most frequent one, and it involves VP-ellipsis (which, in Portuguese involves V-to-I – Matos 1992). Santos (2006/2009) shows that children acquiring Portuguese

have verbal answers since their earliest productions. This shows that they master the pragmatic principles involved in ellipsis, and crucially that V-to-I movement is available from very early on. As shown in Santos, verbal answers emerge much earlier than YES answers.

3. How hearing impaired children say yes. We analyzed the spontaneous production of verbal answers of hearing impaired children with cochlear implants orally trained in European Portuguese. All subjects had their implants after their first year of life. The data come from two sets of recordings of spontaneous production with an interval of 6 months. 10 children were recorded with following profile: chronological age between 4;04 and 8;09 and auditory age between 3;00 and 7;03. All children were implanted between 1;03 and 2;11. A total of 4658 utterances was analyzed.

We found that children avoided verbal answers, which almost did not exist in the corpus. Unlike their typically developing peers studied in Santos (2006/2009), the hearing impaired children used YES in their answers.

We take this to signal that there is a difficulty with X° movement affecting the capacity to perform VP-ellipsis in the language.

In order to corroborate this hypothesis, we present preliminary data with clitics, showing that the rate of clitic production, another case of X° movement is also very low.

4. X° vs. XP movement. The data on verbal answers confirms the hypothesis that movement may be affected in hearing impairment, as suggested in Friedmann and Szterman (2006, 2009), but we do not yet know whether all movement is equally affected. In order to address this question, we compare the data on X° movement with the children's production of wh-questions. We found that, unlike what happens for X° movement, children are able to perform wh-movement, displaying an asymmetry between X° and XP movement. The corpus has many instances of clear cases of wh-fronting for different syntactic functions (subject, object and adjunct wh-phrases).

Following Schoorlemmer and Temmerman (2012), Platzack (2009), among others, we contend that the difference between the two types of movement is that verb movement is relevant at the AP-interface, given its impact on morphophonological processes. On the contrary, XP-movement, and wh-movement in particular, has semantic import. By hypothesis, hearing impairment only affects movement that is relevant for the PF interface.

5. Conclusion. The present paper is a contribution for a more precise characterization of the linguistic behavior of children with hearing impairment. Moreover, it provides evidence for the need to use fine and detailed linguistic tools in the characterization of different clinical contexts. Crucially, it is shown that syntax can be selectively impaired, and that not all movement behaves alike in all contexts of language development.