Development of theory of mind on children with hearing impairment: a pilot study

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Introduction

Language acquisition plays an important role in the ToM development. In studies with deaf children of deaf parents who early learned sign language, it could be shown that these children performed significantly better in ToM tasks than deaf children of normal hearing parents (Sischck, 2007). These findings are explained with a delayed in first-language development in these children, while deaf children of deaf parents, acquire the first-language sign system from birth and benefit from a temporal advantage of the speech input. Netten et al. (2017) posit that the hindered access to speech in hearing impaired children can have a negative impact on ToM development. Ketelaar (2012) confirm these findings and also report a delay in ToM development in children with a severe hearing loss.

Only little date is available on ToM development in German-speaking preschool children with hearing loss. Therefore, this pilot study aimed to assess ToM performance in German-speaking preschool children with HA or CI and to explore their individual ToM profiles in relation to their language skills.

Study methods and design

Verbal tasks

1. False belief (place): 2 points

Masli task (Wimmer & Perner 1983)
  - Question 1: Where will Maxi look for the chocolate?
  - Question 2: Where is the chocolate?

2. False belief (content): 2 points

Smarties-ask (Perner et al. 1987)
  - Question 1: What does your mother think is in the box?
  - Question 2: What did you thought is in the box before you opened it?

Non-verbal tasks

3. False belief (with swap): 2 point

Child should realize that mother is acting out her (false) beliefs about reality
  - Car must be in the box: Mother does not choose (Figueiras-Costa & Harris, 2001)

4. True belief (without swap): 2 points

Beliefs of the mother agree with the reality
  - Child should choose the same box as the mother

Participants

- 4 monolingual German-speaking children
- Bilateral hearing impairment > 60 dB
- 3.5 to 5.6 years of age (mean 4.1) / bimodal HA/CI
- Normal hearing control group from 3.2 to 5.4 years of age (mean 4.1)

Language test

Patholinguistic diagnostic (PDSS) (Kauszke & Siegmüller, 2009)
  - 1. Word production
  - Nouns, verbs, adjectives
  - 2. Word comprehension
  - Nouns, verbs, adjectives

Results

TOM tasks

Children with hearing impairment scored fewer points in almost all test conditions than a normal hearing control group

Differences in TOM tasks (Mann-Whitney U test)

Significant difference between children with hearing impairment and normal hearing
  - False-Belief task with regard to the location (p = 0.04)
  - False-Belief task with swap (p = 0.04) and total score (p = 0.03).

Differences verbal / non-verbal tasks (Wilcoxon signed-rank test)

- No significant differences between verbal and non-verbal tasks in subject group (p = 0.16) and control group (p = 0.32)

Discussion

The results of the presented pilot study suggest that the existence of a severe hearing loss influences the development of early ToM abilities. To enable these children pragmatic skills, it requires an increased linguistic offer regarding mental states. The support of ToM development can be realized, for example, in the home environment by reading suitable picture books and discussing mental states of the persons involved. Additionally, contents of the ToM can be taken up in language therapy to develop an adequate vocabulary. However, it is important to look at these pilot data to see if these performance deficits can be demonstrated in a larger sample of children with hearing aids and / or CI, and if similar deficits exist in the same types of tasks. The descriptive view of the results shows heterogeneous ToM skills. Children with hearing impairment demonstrate better performance in the FB task regarding the place, than in the FB task regarding the content. A longitudinal data collection would help to assess ToM skills over time.

Literature


