Level 1 and Level 2 Auditory Perspective-taking in 3- and 4- Year -Olds

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Abstract

The current experiment investigates the extent to which children understand and use auditory information to infer others' perceptions. Adults and children (36-59 months of age) were given a battery of tasks assessing knowledge of whether a person can hear a sound (called Level 1 perspective taking) and how another person would hear the sound (Level 2). Preliminary results suggest that 3- and 4-year-olds perform accurately on Level 1 tasks. Additionally, 4-year-olds are trending toward the adult standard on Level 2 tasks. These results will extend developmental findings from the visual to the auditory domain by demonstrating children's understanding of their own and others' audition.

Introduction

Understanding others' precepts is an important aspect of successful social interaction. In the visual domain, Flavell (1981) has identified two distinct levels of perspective-taking. Level 1, the ability to understand if others see what you see, emerges as early as 24 months of age (Moll & Tomasello, 2006). Level 2, the ability to understand how you and others may view the same event differently, is later developing (Masangkay, 1974).

In the auditory domain, research on perspective-taking has focused on Level 1 abilities (Melis, Call, & Tomasello, 2010; Moll, Carpenter, & Tomasello, 2012; Williamson, Brooks, & Meltzoff, 2013). To better link perspective-taking findings across the senses, the current research examines whether the developmental progression from Level 1 to Level 2 in the auditory domain is similar to that in the visual domain.

I hypothesize that, similar to findings in vision, 3-year-olds will succeed on Level 1, but not Level 2 tasks. Furthermore, 4-year-olds will succeed on both Level 1 and Level 2 tasks.

Method

Participants

16 adults (M=24.1 yrs, SD=10.3 yrs), 13 3-yr-olds (M=36.5 mos, SD=1.1 mos), and 9 4-yr-olds (M=49.3 mos, SD=1.1 mos)

Materials

- One plastic building block house (4 interior rooms, 1 yard)
- 5 plastic building block characters (2 female, 1 male, 1 dog, 1 cat)
- Computer with pre-recorded demonstration sounds

Figure 1: Examples of plastic building block house and characters.

Procedure

Participants watched an experimenter use the plastic house and characters to act out seven scenes. After each scene, participants answered forced-choice questions about the characters' auditory perception.

Level 1 tasks - Determining *if* a character can hear a sound

Sample questions

- In which of two locations should a character place her cell phone so that it will (or will not) wake her up if it rings?
- Which of two characters can (or cannot) hear a running dishwasher?

Level 2 tasks - Determining *how* a character would hear a sound

Sample question

- Which of two demonstrated sounds represents how a character in a certain position would hear a lawnmower?

Answer choice order and order of tasks and levels were counterbalanced across participants.

Results

- Adult responses establish baseline of correct answers
- Children's responses scored 1 (correct) or 0 (incorrect)
- Response Scale: 0-4 for Level 1; 0-3 for Level 2

Preliminary results suggest that 3-year-olds are significantly more likely than chance to answer correctly on Level 1, $t(11)=2.35$, $p=.039$, but not Level 2 tasks , $t(8)=.50$, $p=.631$. 4-year-olds perform significantly better than chance on Level 1 tasks, $t(8)=10.00$, $p=.000$, and are trending towards significance on Level 2 tasks, $t(8)=1.73$, $p=.122$ (see Figures 2 & 3.)

For Level 1 tasks, a one-way ANOVA shows a significant difference among age groups in mean correct scores, $F(2, 34) = 14.47$, $p= .000$. Specifically, 3-year-olds had significantly lower scores than did 4-year-olds and adults (Bonferroni-corrected pairwise comparison $ps \leq .001$). There was no difference in 4-year-olds' and adults' performance; ($p = 1.0$).

There was also a significant age difference on Level 2 tasks, $F(2, 31) = 7.52$, $p= .002$. Both 3- and 4-year-olds were significantly different from adults ($ps \leq .02$), but there was no difference between to two groups of children ($p = 1.0$).

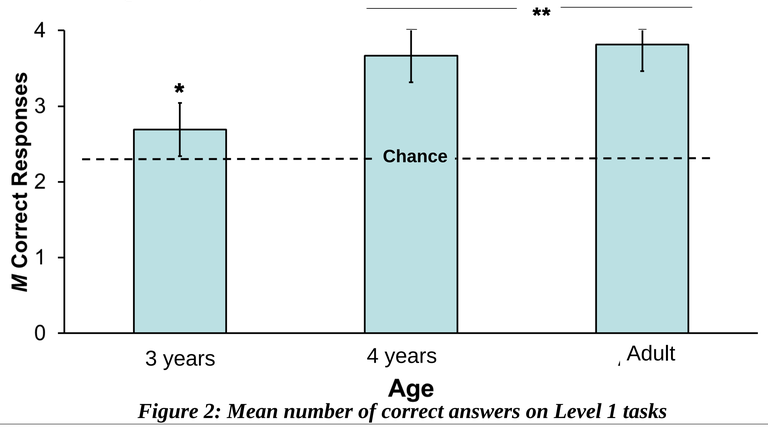

Figure 2: Mean number of correct answers on Level 1 tasks

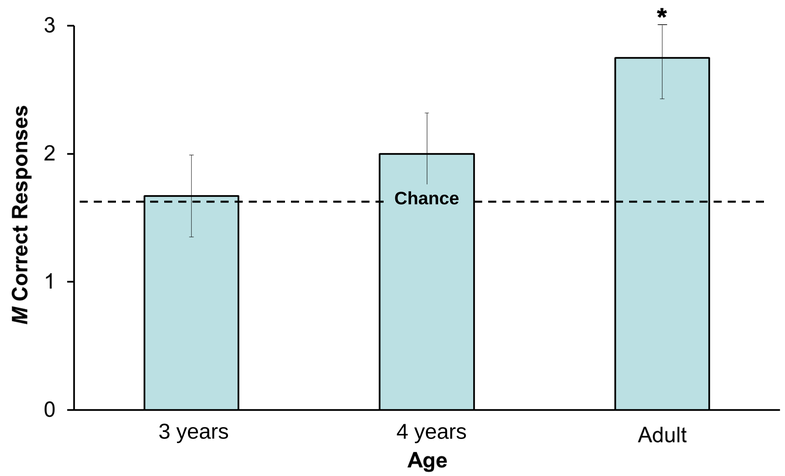

Figure 3: Mean number of correct answers on Level 2 tasks

Discussion

Results to date are in line with previous findings that both 3- and 4-year-olds are able to use auditory information to determine what others can or cannot hear. Furthermore, our findings expand previous research by illustrating that 3-year-olds cannot use auditory information to infer how two people may hear the same sound differently. Preliminary results suggest that the developmental progression from Level 1 to Level 2 in the auditory domain is similar to that in the visual domain. In addition to increasing our knowledge of audition in general, these results also suggest that auditory perspective-taking tasks may represent a viable method of assessing theory of mind in individuals with visual impairment.

References

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