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## Perception of conversations: The importance of semantics and intonation in children's development



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### ABSTRACT

In conversations, adults readily detect and anticipate the end of a speaker's turn. However, little is known about the development of this ability. We addressed two important aspects involved in the perception of conversational turn taking: semantic content and intonational form. The influence of semantics was investigated by testing prelinguistic and linguistic children. The influence of intonation was tested by presenting participants with videos of two dyadic conversations: one with normal intonation and one with flattened (removed) intonation. Children of four different age groups—two prelinguistic groups (6- and 12-month-olds) and two linguistic groups (24- and 36-month-olds)—and an adult group participated. Their eye movements were recorded, and the frequency of anticipated turns was analyzed. Our results show that (a) the anticipation of turns was reliable only in 3-year-olds and adults, with younger children shifting their gaze between speakers regardless of the turn taking, and (b) only 3-year-olds anticipated turns better if intonation was normal. These results indicate that children anticipate turns in conversations in a manner comparable (but not identical) to adults only after they have developed a sophisticated understanding of language. In contrast to adults, 3-year-olds rely more strongly on prosodic information during the perception of conversational turn taking.

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## Introduction

During social interactions, we are confronted with a large amount of verbal and nonverbal information. To act and react quickly and appropriately, the incoming flow of information needs to be analyzed on-line and upcoming events need to be anticipated. This holds especially true for conversations. Here, the principle of taking turns is helpful and most fundamental (Sacks, Schegloff, & Jefferson, 1974). In the current study, we investigated the development of the ability to anticipate turns during the perception of a conversation between two people.

When engaged in a conversation, it is easy to identify the end of the turn of a conversation partner and the beginning of one's own turn. The end of a speaker's turn is accompanied by a variety of different cues. On the one hand, language comprehension (i.e., the semantic content or utterance content) seems to be the most important factor for detecting the end of a turn (de Ruiter, Mitterer, & Enfield, 2006; Magyari & de Ruiter, 2012). de Ruiter et al. (2006) presented adult participants with audio recordings of isolated turns from natural Dutch telephone conversations and asked them to press a button when they suspected the turn end. The participants were instructed not to wait until the turn was finished but rather to anticipate its ending. The results showed that responses were very reliable and that the average response time was 200 ms *before* a turn was finished. This indicated that the participants not only were very accurate in detecting the end of turns they were even able to anticipate a turn end. Importantly, they were equally able to do so when listening to recordings where the intonation had been removed but leaving semantics and syntax intact.

On the other hand, in natural conversation, a turn end is usually accompanied by a number of acoustically marked prosodic boundary cues (Gerken & McGregor, 1998) such as intonation, syllable length, and pauses. In general, prosodic boundary cues help to segment linguistic units (Gerken & McGregor, 1998), making them an important feature in the acquisition of language (Gerken, 1996). At the end of conversational turns, the pitch (i.e., intonation) rises or falls, the last vowel is lengthened, and pauses are longer compared with the end of clauses or phrases. It has been shown that adults were, in principle, able to use these cues to identify a speaker's turn. When utterances are made unintelligible, with only prosodic cues (notably intonation) still intact, participants could identify the end and beginning of turns at above chance level (de Ruiter et al., 2006; Schaffer, 1983). But performance was better when participants could rely on both prosodic cues and utterance content to detect a turn end, compared with a condition where only prosodic cues were available (de Ruiter et al., 2006). Although it is unusual in natural conversation that only prosodic cues are available (except, e.g., when listening to a conversation through a wall or from far away), these experimental studies suggest that adults can use prosody to better anticipate the end of a sentence but mainly do so once neither semantic nor syntactic information is available (Grosjean & Hirt, 1996).

Taken together, the results of these studies indicate that adults are able to detect the end of a conversational turn even before the previous speaker has finished. If only linguistic cues are available, then they do so by focusing predominantly on the utterance content. Prosodic cues, such as intonation, primarily have a supportive function.

As children develop, conversations become increasingly important, and the principle of taking turns appears to be already relevant at a young age. Infants as young as 3 months reacted with adapted timing and more speech-like vocalizations if their mother (Masataka, 1993) or an experimenter (Bloom, Russell, & Wassenberg, 1987) interacted with them in a turn-taking pattern (as opposed to a random, temporally noncontingent pattern). Even 2-month-old infants were found to discriminate between contingent (turn-taking) and noncontingent interaction with their mothers (Murray & Trevarthen, 1985), and they were found to be more interactive and content in the turn-taking condition. Note, however, that this study has been criticized (Rochat, Neisser, & Marian, 1998) and that other studies failed to replicate its results (Muir & Hains, 1993; Rochat et al., 1998). Up to now, only a few studies have addressed children's perception of turn taking between other people. When watching two people having a conversation, infants at 6 months of age and above could follow the conversation more easily if speakers were engaged in a face-to-face interaction as opposed to an interaction where the speakers looked in opposite directions, not facing each other (Augusti,

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