The development of intonation in pre-school and school-aged children

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At least in Germanic languages such as English and German, the use of pitch accents and the lack of it are crucial for the informational content of referential information. Already Halliday (1967) associated the presence or absence of a pitch accent with the distinction between new and given information, respectively. Pierrehumbert & Hirschberg (1990) added a differentiation between high and low pitch accents, with deaccentuation and low pitch marking different degrees of given information and high pitch marking new information. Bates et al. (1984) showed that intonation has already been acquired by the age of three years. However, young children generically accent new but not given information (Wieman, 1976; Gruenlohr et al., 2015). For German, Müller et al. (2006) showed that monolingual 4-year-old children produced focused elements with a higher pitch than unfocused ones. Chen (2007) analysed the use of pitch accents and deaccentuation by Dutch preschool children at the age of 4-5 years. These children accented the focus more frequently than the topic and, like adults, they deaccented the topic more frequently than the focus. On the perception side, Arnold (2008) showed that children at the age of 4-5 years use accentuation during on-line categorization. De Ruiter (2010) elicited descriptions of picture books in order to analyse the use of pitch accents of children 5 and 7 years old. As already showed previously with shorter sentences, children were able to vary accentuation. Indeed, both age groups were able to accent (with L+H*) new referents and deaccent given tokens in a similar fashion as adults do (even though the latter use different pitch accents). However, none of these age groups made use of the typical phrase-final rising intonation to signal continuation of the story and the study found also some differences in the phonetic realization of intonation: children produced pitch accents with flatter slopes and smaller excursions than adults.

Regarding the development of narrative abilities, numerous studies revealed that narrative structure both at a macro- and micro-level shows an expanded developmental trajectory well into primary school (e.g., Halm, 2010; Stein & Glenn, 1982). These studies showed that until the age of seven/eight, children primarily produce utterances which refer to the chronological sequence of events in the story. From the age of nine/ten, children increase the use of metanarrative structures such as comments, summaries, interpretations, explanations or setting descriptions. Between the ages of six and ten, syntactic dependencies and different types of connectives marking the textual structure are used more productively by children (Colletta et al., 2010). However, the role of prosody in children’s narrative production is not yet well established. This seems surprising since the importance of prosody in narrative production had been shown for adults (e.g., Hirschberg & Grosz, 1992). Studies of prosodic development mainly focussed on early language acquisition (e.g., Behrens & Gut, 2005) or examined children’s use of prosody in single phrases (Wells et al., 2004). In contrast, the question of how older and more experienced children use prosodic means in spontaneous data has not attracted much interest yet (with the exception of De Ruiter (2010)).

At this point, this study aim to investigate developmental changes in the production of intonation of pre-schoolers and primary school’s children between the age of 5 and 9, in the context of a narrative retelling task. Wells et al. (2004) suggested that intonation development continues after the age of five and that some functional contrasts are not mastered until the age of eight. More specifically, we want to test the following hypotheses: a) whether both groups of children differentiate between deaccented, L* and H* pitched words, b) whether they make use of the continuation intonation not found in the analysed children by De Ruiter (2010), c) whether young children present flatter slopes and smaller excursions than the older group; and the same for the older group compared to the adult control group.

Methods. Participants were 20 five-year-old children (9 girls) between 5;1 and 5;11 (M=5;6) and 20 nine-year-old children (9 girls) between 9;0 and 9;11 (M=9;7) acquiring German. Standardized German measures of grammatical and vocabulary development, nonverbal intelligence and short term memory span confirmed children’s typical development. Additionally, 20 adult native speakers (12 women) between 21 and 58 (M=43) of German functioned as controls. All families (as for the
children) and adults gave informed consent to participate in the study which had been approved by the Ethical Committee of the Bavarian Medical Board.

**Material & Procedure.** The stimulus material consisted of a short Silvester and Tweety cartoon (duration: 47 seconds) which included music but no words. The participants were asked to watch the cartoon carefully in order to be able to retell the story to an interlocutor. After watching the cartoon once, the task was introduced by the neutral request “Tell me what happened in the story”.

**Measurements.** The data was manually segmented using G-Tobi (Grice & Baumann, 2002). For the pitch range, local min and max of the fundamental frequency was measured in Hertz and converted to semitones (using a logarithm $39.863 \times \log(\text{max/min})$ as in Grünloh et al. (2015) for comparison reasons). Generalized linear mixed models were run for each of the variants (pitch accent types and boundary tones; pitch range).

**Results.** Preliminary results show an increase in the use of low pitch accents between the three groups of participants ($5 < 9 <$ adults) and the same trend for the phrase-final rising intonation. Pitch range was significantly flatter by adults than by 5 years old children. **Discussion.** This study shows that primary school children make use of a more differentiated set of prosodic possibilities than preschoolers, since they differentiate H* and L* pitch accents and signal continuation of the story using raising boundary tones. Slopes were flatter in the adult production probably due to the exaggerated prominence of the smaller children’s group. Overall, the study gives empirical evidence for improvements in the realisation of pragmatic contrast due to intonation in pre-schoolers and primary school’s children.

**References.**


