GERMAN 5-YEAR-OLDS' INTONATIONAL MARKING OF INFORMATION STATUS

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ABSTRACT

This paper reports on findings from an elicited production task with German 5-year-old children, investigating their use of intonation to mark information status of discourse referents. In line with findings for adults, new referents were preferably marked by H* and L+H*; textually given referents were mainly deaccented. Accessible referents (whose first mentions were less recent) were mostly accented, and predominantly also realised with H* and L+H*, showing children's sensitivity to recency of mention. No evidence for the consistent use of a special 'accessibility accent' H+L* (as has been proposed for adult German) was found.

Keywords: information status, given/new, accessibility, intonation, children, German.

1. INTRODUCTION

1.1. Intonation and information status in adult language

Intonation is – among other things – used to signal the information status of discourse referents. For West-Germanic languages like English, Dutch or German, a basic assumption has been that new referents are typically marked with a pitch accent (PA), while given referents are said to be 'de-accented'. However, some scholars assume that referents may also have varying degrees of givenness ([4, 11]). For example, [4] views givenness in terms of the activation of the discourse referent that a speaker assumes to be present in the consciousness of the hearer. Referents may be inactive (thus new), fully activated (given), or between these two extremes ('accessible').

It has furthermore been suggested that this differentiation is also reflected in the speaker's intonation by the use of different PA types. For English, [9] propose that contours containing a low PA (L*) indicate that the speaker does not want to add something new to the mutual beliefs of the speaker and the hearer, so that L* accents – in addition to deaccentuation – seem suitable to mark given information. H* accents are assumed to signal newness. Furthermore, downstepped accents like H+L* (H+!H* in GToBI transcription, adapted from [2]) are suggested to imply that the information should be mutually accessible (cf. [2]).

Recently, the idea that the type of PA plays a role in the marking of information status in German has received some empirical support from two perception experiments. [2] found that H* was perceived to be the most appropriate marker of new referents. For given referents, listeners judged deaccentuation most appropriate, whereas H* was least acceptable. Concerning 'accessible' referents, [1] asked listeners to rate reintroductions of intonational phrase-final referents whose first mention was three clauses away, and which were therefore assumed to be 'accessible'. While H* was found least acceptable, deaccentuation and H+L* were judged equally appropriate. [1] conclude that H+L* can mark accessibility. This is compatible with [9]'s claims, as there is evidence that H+L* and H+!H* may not be phonologically different ([12]). Furthermore, [1] conjecture that the distance of three clauses they used "may cause a referent just to be on the border between accessible and given information" ([1]: 1655). This could explain why deaccentuation was also perceived to be a well-formed realisation.

These results indicate that German native listeners are sensitive to the degree to which a referent is 'given', and that they have intuitions about the intonational marking, which go beyond the dichotomy of accented vs. deaccented. Acquiring this mapping between information status and intonation poses an important challenge to German children. If we can find evidence for a differentiated use of PAs in their production, this would strongly suggest that they have mastered these distinctions.

1.2. Information status in child intonation

The evidence about children's competence in this area is scarce. [13] studied spontaneous two-word utterances of five children between 1;9 and 2;5. The utterances' accentuation patterns were assessed auditorily by two judges. She found that in adjective + noun combinations, the noun was accented when mentioned for the first time, but not accented when it

was repeated, as in the sequence "MAN. BLUE man". Similarly, in noun + locative combinations, the prominence would normally fall on the locative expression, but in cases in which it was given, the prominence was instead put on the (new) noun, as in the mother-child exchange: "What's in the street?" "FIREtruck street". The author concludes that " ... children operate with an appreciation of what is new in their utterance and apply stress accordingly" ([13]: 286). It has to be noted, however, that only seven examples of this kind were found in the entire data.

Only a handful of other studies looked at children's intonation in connection with information structure (e.g., [7, 8]), yet these did not look at information status independently of other information structural dimensions (e.g., focus). Moreover, none of the cited works provides any detailed phonological or phonetic analyses, so that nothing is known about the types of PA (including deaccentuation) children use.

The present study is the first to systematically investigate (German) children's intonational patterns (i.e., types of PA) in the domain of information status marking. Here we report on a subset of the data obtained from children aged five.

The first question we seek to answer is whether children use different types of PA to distinguish between new ('inactive') and (textually) given ('active') referents. The second aim is to find out whether there is evidence for the marking of different degrees of givenness. Here the distance between the first and the second occurrence of a referent was manipulated. By increasing the distance the referent's status was expected to shift from entirely given to accessible ('semi-active').

2. METHOD

2.1. Participants

Twenty-nine 5-year-olds (range = 4;11 – 5;11, mean = 5;8, 11 boys, 18 girls) participated. The children were recruited from nurseries in the Niederrhein area of Germany. All participants were monolingual speakers of German and had no reported history of speech/language or other developmental deficits.

2.2. Materials

Picture stories were constructed to elicit the production of referents with three different information statuses: new, given and accessible. These were operationalised as new, immediate and distant, respectively, with the last two terms indicating the distance between the first and the second mention of the referent.

In the *new* condition, the target referent (TR) occurred for the first time. In the *immediate* condition, a referent was introduced in one picture, and occurred

again as the TR in the immediately following picture. In the *distant* condition, a referent was introduced at the beginning of the story, and re-introduced as the TR after four or five intervening pictures containing other referents.

Four different TRs were used, all refer to animals. The target words were disyllabic and had a sonorant segmental make-up to facilitate pitch analysis: *Kamel* ([kaˈmɛːl] 'camel'), *Möwe* ([ˈmøʊə] 'seagull'), *Biber* ([ˈbiːbəɹ] 'beaver') and *Biene* ([ˈbiːnə] 'bee').

Each of the four TRs appeared once in each condition. The new and the distant condition occurred within the same story, while the immediate condition was presented in a separate story. There were four additional filler stories. Altogether, there were 12 stories.

The target pictures showed transitive events, in which the TRs had non-agentive semantic roles whose canonical position was phrase-final. This was done in order to keep syntactic role and position constant, and to make the results comparable with [1]. The number of pictures following the target picture varied to prevent children from anticipating the end of a story in order to avoid 'paragraph finality' effects such as creaky voice.

2.3. Procedure

Children were tested individually at their nurseries. The test was designed as a 'story-telling game'. Prior to the game, Experimenter A told the children that she wanted to test Experimenter B's memory for stories. She then asked the children to help her with this by telling the (picture) stories to Exp. B.

Children sat at a comfortable distance in front of an Elotouch ET1525L touch screen, which served as the 'picture book'. Neither Exp. A nor Exp. B could see the screen.

Children went through the stories at their own pace. The screen presentation was controlled with the Nijmegen Experiment Set-up (NESU) software.

Before each target picture, Exp. B asked a broad-focus question (e.g., "And what happens then?") to keep the information structural context constant.

Each child was presented with all picture stories. Four lists were constructed by varying the order in which the stories appeared. Stories with the same TR (e.g., the new/distant story containing *Kamel* and the immediate story containing *Kamel*) were always separated from each other by three other stories, whereby the new condition always preceded the immediate condition.

There was a warm-up trial before the first story. Each session lasted about 30 minutes including a break of 3-5 minutes halfway through the session. Sessions were sound-recorded using a Roland Edirol R-1 24bit

digital Wave/MP3 recorder and a Sony ECM-950 DT microphone at 44.1 kHz (16bits precision, stereo sound). The microphone was placed at about 20cm distance from the child.

2.4. Data analysis

2.4.1. Annotation and measurements

Utterances in which the child had failed to produce the target word were excluded. The remaining utterances (N = 124) were annotated and analysed using Praat (© 2006 Boersma & Weenink).

As mentioned, our aim is to find out whether children use different PA types to signal information status. Hence, intonation of the target words was labelled following GToBI guidelines ([3]).

To make sure that the PA labels used represent indeed distinct categories, a number of phonetic analyses were performed. To allow statistical analyses, PA labels from the filler stories were also included (overall N = 192). The IP containing the target word was segmented at the level of the syllable using information from a wide-band spectrogram, and the onset and offset of the lexically stressed syllable (SS) were marked. Following this, position and value of local fundamental frequency (F0) maxima (max) and minima (min) were determined for H*, !H*, L+H* and L*+H. The domain in which these landmarks were set consisted of the SS, the preceding syllable and the syllable following it. For !H*, an additional F0 measurement was taken on the preceding high pitch accent. For H+!H*, only the high on the pre-accentual syllable was measured, and for L*, only the minimum. From these landmarks, several derived measurements were made:

- the excursion (F0 max-min; in semitones (st))
- the duration of the rise/fall (in seconds (sec))
- the slope of the rise/fall (in st/sec)
- the position of the high (in % into the SS)
- the position of the low (in % into the SS)

2.4.2. Validation of accent categories

PAs were compared along four phonetic parameters considered relevant for category distinction: excursion, slope, position of the high and position of the low. We focussed on pairs of accents which may be prone to confusion (cf. [5]). The pairs were analyzed using linear mixed effects (LME) models ([10]) with the parameter in question as dependent variable, PA type as fixed factor and items and subjects as random factors. With the exception of one pair, all pairs differed significantly from each other in at least the most important dimension (cf. Table 1). H+!H* and H+L* did not differ with respect to the excursion between the leading tone and the starred tone, and

were therefore subsumed under H+L*. In addition, the pitch of !H* was always lower than that of the preceding high pitch accent (mean difference 3.06st). These results validate the use of the different PA labels.

Table 1: Differentiation of pitch accent types.

Accent pair	Parameter	Sign.[a]	Direction
deacc. – H*	slope	****	steeper in H*
H* - H+L*	pos. of H	***	earlier in H+L*
H* - L+H*	excursion	****	higher in L+H*
L+H* - L*+H	pos. of L	*	earlier in L+H*
H+!H* - H+L*	excursion	n.s.	-

a. Significance levels: **** p<.0001*** p<.001; ** p< .01; * p<0.5

3. RESULTS

3.1. New vs. immediate

When mentioned for the first time (new condition), more than 90% of all TRs carried an accent (cf. Table 2). As regards PA type, H* was clearly the preferred marker for new referents, with more than half of all TRs produced with this accent. H* was followed in frequency by the accent L+H*, but this accent was used in only 13% of all cases. All other PA types played only a marginal role (each < 10%). In the immediate condition, the distribution is very different. The target words were frequently deaccented (63.2%). When they were accented, H* was used most often (23.7%). Other accent types were rare (each < 6%).

3.2. Immediate vs. distant

If we now compare the two 'given' conditions with each other, clear differences emerge. TRs in the distant condition were accented almost 90% of the time, compared to less than 40% in the immediate condition. H* and L+H* are the accents used most frequently for distant referents, accounting for 60% of the data. The accents L* and H+L* occurred more often than in the immediate condition (each 12.5%).

Table 2: Distribution of PA types by condition. [1]

Accent	information status					
	new		immediate		distant	
	N	proportion	N	proportion	N	proportion
deacc.	3	6.5%	24	63.2%	3	7.5%
H*	26	56.5%	9	23.7%	17	42.5%
L+H*	6	13.0%	0	0%	7	17.5%
H +L*	2	4.3%	2	5.3%	5	12.5%
L*	2	4.3%	1	2.6%	5	12.5%
other[2]	7	15.2%	2	5.3%	3	7.5%
Total	46	100.0%	38	100.0%	40	100.0%

1 Elliptical utterances were excluded. 2 Other: L*+H, !H*.

4. DISCUSSION

The first important finding of this study is that children use intonation to signal the information status of discourse referents. 5-year-olds clearly distinguish between new and immediate (given) referents. Newness was mainly marked with H* or the related L+H*, as has been suggested for adult German ([1, 2]). In contrast, immediate referents were predominantly deaccented, in line with [1], [2] and [9].

On the other hand, children also frequently used H* in the immediate condition. However, in 4 out of the 9 occurrences this can be explained by other factors. In two cases, which both occurred with the same story, the children set up a contrast with another referent. In another case, a child introduced a new referent between the two mentions of the TR, which could have decreased the TR's 'activation' (cf. [4]). In the last case, the child appeared to have confused the two referents in the picture (i.e., the TR and the agent) and broke off after uttering the TR. The remaining cases might be due to some children not differentiating between new and immediate referents, yet this does not change the overall pattern of deaccentuation as the preferred realisation of 'given' referents.

The second important finding is that recency of mention clearly plays a role. Unlike immediate referents, distant referents were predominantly accented. The expanded distance between the two mentions seems to have increased the need to re-introduce the referent with an accent. Thus, children do not only appreciate what's old and new (cf. [13]), but also take into account 'how old' something is.

However, the majority of PAs children that used for distant referents are notably the same as for new ones (i.e., H* and L+H*). One hypothesis may be that children only have a binary distinction of 'active'/'inactive'. They may have perceived distant referents to be similar to new ones in terms of their level of 'activation' (cf. [4]), and therefore used the same intonational marking. Interestingly, this differs from [1]'s findings for 'accessible' referents. Listeners in [1]'s experiment seem to have perceived 'accessible' referents more like 'given' and less like new ones (cf. the appropriateness of deaccentuation). The different results could either be due to the way that recency of mention was manipulated in the two studies (3 clauses in [1] vs. 4-5 pictures in the present study), or point at a true difference between adults and children with respect to the time course over which discourse referents remain 'activated'.

However, there also are some differences in the distributions between the distant and the new condition: Both the proposed 'accessibility accent' H+L* ([1]) and the 'given accent' L* ([9]) occurred more often with distant referents, which suggests a ternary distinction between 'active', 'in-active' and 'semi-active'. If [1]'s findings in perception extend to production, and accessibility is marked with a particular accent in adult German, then these children seem to be on their way to acquiring this distinction. 5-year-olds may still be in the process of building up their PA inventory, and may only later begin to use other PAs (than H* and L+H*) consistently. This hypothesis fits with previous observations that intonation develops until well into the school years (e.g., [6]). Further investigations will have to show how frequent other accent types are in adults' speech and whether their use increases with age.

5. ACKNOWLEDGMENTS

6. REFERENCES

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