Filled pauses in child-adult conversations: Data from 5- and 9-year-old Hungarian children

Judit Bóna1, Ágnes Hámori2

1 ELTE Eötvös Loránd University, Budapest, Hungary
2 Hungarian Research Centre for Linguistics, Budapest, Hungary
bona.judit@btk.elte.hu, hamori.agnes@nytud.hu

Abstract
In this study, we investigate the use of filled pauses in the speech of children aged 5 to 9 during their conversations with adults. We also analyzed the frequency, form and duration of filled pauses and whether they occur at the beginning of turns or within turns. Results show that 5-year-olds produce longer filled pauses than 9-year-olds, and they produce them more frequently. In both age groups, the use of filled pauses in turn-starting was common, allowing the child to take the turn even when the preparation for speech production is not yet fully complete.

Index Terms: child-adult conversation, filled pauses, turn-takings

1. Introduction
Filled pauses belong to hesitation phenomena, whose main function is to gain time for speech planning and self-monitoring processes. Filled pauses in Hungarian can occur as single sounds and as sound conjunctions, and their most common form in adult language is schwa [ǝ], but they can also appear in [m], [am], [sh] and other forms [1], [2]. The occurrence of hesitations is related to the complexity of language planning and language production [3], and is also influenced by many other factors, such as speech type, gender, or individual characteristics [4], [5]. Hesitations are also related to age, especially in children [6], [5]: although no uniform clear-cut developmental trends can be established, research has revealed characteristic patterns. Disfluency phenomena, such as repetition and filled pauses appear in children's speech around the age of 2-3 [7], characterized by a large individual variability in all preschool groups; however, the proportions of diverse types of disfluencies change with increasing age (e.g. the frequency of repetitions decreased and that of filled pauses increased) and the spontaneous speech of children shows more adult-like disfluency patterns toward the later preschool years [6]. In Hungarian children, research revealed that it is primarily age that affects the frequency, form and duration of filled pauses [8]. Horváth and Krepsz [8] found that the frequency of filled pauses increased between 6 and 8 years. Neuberger [9] also found in Hungarian children's speech that between the ages of 6 and 13, the proportion of filled pauses increases among the disfluencies.

The frequency of filled pauses is also largely determined by speech task. Recent studies show that filled pauses in conversational speech, in addition to their time-gaining function, may also serve interactive functions e.g. indicating turn-taking or turn-maintenance [10], [11]. Casillas points to turn-taking function of uh and umh by young children [12], investigating 6 children's conversations at age between 1 and 5 years (cf. also [14]); but little is known about the development and use of the filled pauses around age 5 and later in conversations. However, psycholinguistic research show that the age of 5-6 is a particularly important period in language development, especially in the area of conversation skills. One of the main stages of language development ends here, children have already mastered many language skills, which will play a decisive role for the future due to the beginning of school. At this age, significant changes also begin in the area of cognitive and social skills which are closely connected to language development, and which are highly influenced by conversational competences. One of the main sets of conversation skills is related to the organization of turn-taking, involving temporal management such as appropriate timing of turn-taking [14],[15],the proper distribution of speech or the application of turn- yielding and turn-holding cues; the latter also include the relevant use of some hesitation phenomena.

The analysis of these skills and their changes depending on agehelps to reveal more about language development and the acquisition of conversational competence. In addition, it is also important for applied fields, especially for language measurements and the diagnosis of language and social behavior disorders [16].

The aim of the present analysis is to investigate the characteristics of filled pauses in the speech of Hungarian children aged 5 and 9 when conversing with an adult. Our hypotheses are that:
1) 5-year-old children produce longer filled pauses than 9-year-olds;
2) more forms of FP-s occur in the speech of 5-year-old children;
3) children of both ages use filled pause both at turn beginning and within the turn; younger children (age 5) use them less frequently at turn beginning than 9-year-olds;
4) the turn-beginner FP-s are closely related to the turn-taking system and the norms of smooth turn-taking.

2. Procedure
For this study, recordings of twelve children were selected from the GABI Hungarian Child Language and Speech Database and Information Repository [17]. Six were 5 years old and six were 9 years old; all of them were male; Hungarian monolinguals; hearing intact and with typical speech development.

In the audio recordings, the child is conversing with an adult about topics such as his or her family, school or kindergarten experiences, free time etc. The average duration of the conversations was 10 minutes, of which an average of 5 minutes
(about 50 turns) were analyzed per recording. The total duration of the analyzed audio material was approximately 60 minutes and contained a total of 614 turns, of which 304 were made by children. The audio recordings were annotated using the Praat software [18], with separate tier markings for the filled pauses. Then the frequency of filled pauses was calculated in the children's speech (per 100 words), examined the form of their realization, measured their duration and also analyzed their position – whether they were in turn-starting position or provided thinking time within the turn. The quantified data were statistically tested using SPSS 20 software at a 95% confidence level. Kruskal–Wallis-test was used because of the small data size and the non-normal distribution of the data.

After that, qualitative analysis was also used to examine the strategies associated with turn-taking in children, with a particular focus on turn-starting. This means that each turn start was examined in the children's speech to see if there was any hesitation or other disfluency at the beginning.

3. Results

Figure 1 shows the frequency of filled pauses in the two age groups. Five-year-olds produced filled pauses more frequently than 9-year-olds. The mean frequency was 6.8 filled pause in 100 words in 5-year-olds, and 2.7 filled pause in 100 words in 9-year-olds. There were big individual differences in both groups, mainly in five-year-olds.

Filled pauses occurred in different forms (Figure 2). The schwa [ə] occurred in the highest proportion in both age groups. However, there was a large difference in the proportions between the two groups, as the occurrence of schwa was 45% for 5-year-olds and 68% for 9-year-olds. There was also a difference between the two groups in the proportion of other types of filled pauses. Filled pauses in the form [m] and [əm] were much more frequent in 5-year-olds than in 9-year-olds, while [əh] was significantly more frequent in 9-year-olds.

There was a significant difference in the duration of filled pauses (Figure 3) between the two groups, with 5-year-olds having significantly longer filled pauses than 9-year-olds (Z = -3.866; p < 0.001).

There was also a difference between the two age groups in the location of the filled pauses (Figure 4). While 55% of the filled pauses in 5-year-olds were turn-starting hesitations, and only 45% of them occurred within the turn, only 8% of the filled pauses in 9-year-olds were turn-starting, and 92% of them were within the turn.
It was also investigated whether the position influences the duration of the filled pauses (Figure 5). There was no difference in the duration of the filled pauses at the start of the turn between the two age groups. There were no differences in the duration of filled pauses between the two types (at the start of the turn and within the turn) in either age group. However, therewas a significant difference between the two age groups in the duration of filled pauses within the turn ($Z = -3.233; p = 0.001$).

![Figure 5: Duration of filled pauses depending on age and position](image)

After that, we analyzed the turn-starting positions specifically to see whether filled pauses or other hesitation phenomena appear.

**Filled pauses and discourse markers at turn-starting position**

Hesitation phenomena FP-s often appeared at the beginning of children's turns, including not only FP-s but also some filler words, mainly the Hungarian discourse marker hát 'well'. In addition to their primary function of hesitation, they served here as a tool for a special turn-taking strategy, the "time-gaining turn-taking". The idea is that the turn begins with a time-gaining linguistic means (usually a filled pause, or ööö, or the hát discourse marker), with which the child formally takes the floor, but the actual utterance starts only afterwards, somewhat later. The function of this linguistic means is to bridge the time needed for the production of the response, i.e. to gain time; and to perform turn-taking at the same time. A similar time-gaining strategy was described in English children aged 3-5 years using hesitations, 'fillers', by Casillas [12]. In adults, a similar turn-starting function was pointed out in relation to the ööö by [19], or in relation to the hát "well" by [20]. Even more, the time-gaining turn-starting strategy found here does not simply serves turn-takings and time-gaining in children, but also to follow the normative time-taking durations, too: this is indicated by the fact that such delaying means were typically found at the beginning of longer and more complex turns, which typically require more time to initiate, yet their FTOs were still similar to those of other, shorter turns [12], [14].

An example of this strategy is illustrated by the following example (1); in this dialog excerpt, a question from the adult (F) and the child's (GY) answer can be read, it is worth noting the rapidity of the turn-taking (0.46 s).

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(1) F: és ööö mit szoktatok játszani az oviba? (0.460 s)
GY: mmm ööö szoktunk Bazsival játszani farkasosat

'what do you usually play in the kindergarten?
mmm uh we usually play wolf with Bazsi'
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This technique was in both five- and nine-year-old children, but there were individual differences in frequency and in the type of means (the types of hesitation) they used. For five-year-olds, an overall 38% (53) of turns began in this way; examples were found in all children, but there were significant individual differences in frequency. For the least frequent user, this technique appeared in only 10% of the turns, while for the most frequent user, two thirds (67%) of the turns started this way. For the other children, on average, rates ranged from 20-60% of the turns.

The main types of turn-starting time-gaining means used by both five and nine-year-olds included the filled pause (um, mmm), prolongation, and the hát discourse marker.

For the five-year-olds, the filled pause was the most common means in this role; it appeared among the turn-takings for all children. The phonetic realization of the filled pause was sometime ô, sometime m, often both of them appeared by the same child. In this age group, also filler words were found among the turn-starting means (much less frequently than filled pauses), the hát ‘well’ (9 occurrences).

Turn-starting hesitation was similarly common in 9-year-olds, with 54 turns starting this way, 36% of all turns, almost exactly the same as in 5-year-olds. Individual characteristics were also found in the nine-year-olds: one of them rarely used this technique, with only 13% of turns starting this way, while the most frequent user had 60% of turns. For the others, on average, between 35% and 50% of turns started with hesitations.

However, there was a significant difference in the type of turn-taking hesitation means compared to the five-year-olds: while the filled pause dominated in five-year-olds, the hát ‘well’ discourse marker was the most common turn-taking means for the nine-year-olds (90% of the cases), and the filled pause was rarely used in this position (in total, only about 10% of the cases). The turn-opening hát could have several functions in 9-year-olds. Most of the time, it had the time-gaining turn- starter function mentioned above, as indicated by the phonetic realization and the associated hesitations and pauses (e.g., well umm, well so, well and); in some cases, however, it had another function, such as an explanatory or general response marker, in addition or instead. This is in many respects in line with the findings of previous research on both discourse markers in child language and the turn-initial function of hesitations [20]. However, at age of 5 the most common turn-taking time-gaining means are filled pauses which later become hát ‘well’. The use of turn-taking time-gainers appeared in all children, but their frequency and type differed between individuals; this is also in line with other research that has pointed to individual strategies in the areas of the use of disfluencies and discourse markers [2], [20].
4. Discussion and Conclusion

In our study, we analyzed filled pauses in child-adult conversations in children aged 5 and 9. Our first hypothesis was confirmed, 5-year-olds produced longer filled pauses than 9-year-olds. The two groups produced filled pauses of the same forms (the second hypothesis was not confirmed), but at different rates, with the 5-year-olds having a much higher proportion of [m] than the 9-year-olds.

In terms of frequency, our results did not confirm previous findings in the literature, with 5-year-olds producing more filled pauses in the present recordings. Most of their filled pauses occurred in turn-starting position (the third hypothesis was not confirmed). There may be several reasons for the difference from previous research findings: it may be related to gender differences (e.g. Neuberger 2014 examined mixed-sex groups), to the size of the sample of the present research, or another factor; exploring this requires further analysis.

Our fourth hypothesis were confirmed, too: children of both ages used filled pause both at turn beginning and within the turn; and the turn-beginner FP’s were closely related to the turn-taking system and the norms of smooth turn-taking.

The use of strategies to support rapid turn-taking should be emphasized: in both age groups, the use of hesitation in turn-starting was common, allowing the child to take the turn even when the preparation for speech production is not yet fully complete. This strategic use of filled pauses and filler words for turn-taking is an important conversational pragmatic strategy in children, reflecting their recognition and adherence to the central principle of rapid turn-taking and the associated sociocultural norms. Also an important finding is the difference between the two age-groups in the means they applied to support normative turn-taking: while the use of filled pauses dominated in 5-year-olds, the use of [h] ‘well’, which is a more conventional linguistic item was more frequent in 9-year-olds.

The limitation of the present study is, that it did not address the issue of speech tempo, which is also related to the frequency of disfluencies and might be related to the duration of filled pauses; this needs to be explored in further research. It is also an important task to expand the size of the sample. In the future, we plan to include females in the sample as well as to examine gender differences. The results add new insights to research on types and functions of disfluencies, and also contribute to the exploration of language development.

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6. References