

Pause length variations within and between speakers over time

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Abstract

In the current study, intra-turn pause variation has been investigated within and between speakers in dialogues. Results show that there is a tendency for different speakers to prefer different pause locations within turns. There was further a significant correlation in the majority of the dialogues between how the median lengths of pauses varied for the speakers over the course of the dialogues. The conclusion that can be drawn from this study is that speakers seem to show individual patterns as to where they prefer to pause within turns, but pause length variations tend to be correlated between speakers in the same dialogue.

1 Background

When two persons are engaged in conversation with each other, they tend to mirror each other in several ways, for example in which words they choose to use (Brennan, 1996). The terminology used to describe this is not uniform; a number different terms have been used to describe this process. In this study we will use the term *entrainment*. Edlund et al. argue that to capture the dynamics and temporal aspects of entrainment, it is necessary to use a method that does not rely on single measures but compares the speakers' behaviour over time (Edlund et al., 2009). In this study, we will use the method presented in Edlund et al. (2009) and develop it further to capture the pause variations in dialogues. We will also investigate the pause patterns each speaker presents, to analyze whether all pause features are equally affected by entrainment, or if

some features tend to be more affected than others. There is evidence that different persons employ different pause patterns which seems to be consistent regardless of the conversation partner (Van Donzel and Koopmans-van Beinum, 1996). We have two hypotheses:

- hypothesis 1: the speakers will adjust their pause lengths to become more similar to the speaker they are talking to
- hypothesis 2: each speaker has a particular pause pattern that does not change much despite interacting with different people

1.1 Pause categories

Silent intervals can occur within a speaker's turn, and between two speakers' turns. The majority of silences in conversation are shorter than 1000ms (Heldner and Edlund, 2010), but there is of course a lot of intra- and interspeaker variability. Silent intervals between speaker's turns are often referred to as *gaps*, while *pauses* then refer to the silent intervals within a speaker's turn (Sacks et al., 1974). In this paper the focus is on pauses (silent intervals within turns), which can be further subdivided into different categories. A pause that occurs within a turn can have at least two functions. Firstly, it provides time for the speaker to plan what he/she is going to say. Secondly, it may also allow the speakers to negotiate who is going to take the turn. Below, three different types of pauses within turns are described:

- pauses that occur within a speaker's turn but not at a possible TRP (Transition Relevance Point).

- pauses that occur within a speaker's turn, at a possible TRP, where speaker change does not take place.
- pauses that occur at the beginning of a speaker's turn, when the speaker has been nominated by the previous speaker.

2 Method and material

Five persons, all female speakers of Swedish, were recorded while speaking in pairs. Altogether, 6 dialogues were recorded, each lasting approximately 10 minutes. The subjects received a question to discuss but were informed that they were allowed to stray from the subject.

The dialogues were transcribed in Praat. As in Edlund et al (2009), a moving average window was used to smooth the pause length variations, and pause lengths were interpolated for each speaker to provide continuous pause lengths measurements throughout the dialogues.

3 Results and discussion

Our first hypothesis was that we would find evidence of entrainment in pause length variation. What we found was that in the majority of the dialogues, there was a significant positive correlation between pause length variations in the speakers. However, in one dialogue there was a significant negative correlation, and one dialogue showed no significant correlation at all. It would therefore be interesting to apply the method to a larger amount of data to see if there is still a positive correlation in the majority of the cases. It would also be interesting to investigate how the dialogue that showed a negative correlation differs from the other dialogues; if it is possible to find any explanation for the negative correlation within the conversation structure.

One problem when moving on to larger amounts of data is the time needed to transcribe the data and to identify pauses. It is common to detect pauses automatically, with some type of silence detector, and this is a very cost-efficient method of identifying pauses and makes it possible to handle larger amounts of data. However, it is likely that an automated method gives a somewhat different result than manual identification of pauses. For example, in automatic pause identification a minimum pause

length is often set to exclude occlusion intervals in stop consonants, but when identifying pauses manually there is no need to set such a minimum length, since it is possible to exclude occlusion intervals anyway. To see if, and then how, pause identification methods influence the results, a comparison between results derived with the different methods should be carried out.

Our second hypothesis was that we would find pause patterns that do not change much in spite of the different conversation partners. When we examined the percentages of different pause types for each speaker and dialogue, there did seem to be at least two different patterns. Some of the speakers tended to prefer to pause at possible TRPs, whereas others preferred to pause at a places which would not be perceived as possible TRPs. This is also something that should be investigated more extensively.

References

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