

Abstract

This thesis focuses on one specific type of disfluency, namely filler particles (FPs). FPs occur in many languages in similar forms which is why phonetic differences and language-specific preferences are useful to investigate for fields such as second-language learning, speech synthesis, forensic phonetics, and language analysis for the determination of origin (LADO).

This work presents a new annotation scheme that includes different type of disfluencies, breathing noises, as well as a detailed segmentation of FPs into vowel and nasal. The annotation further includes the voice quality that is being used for FPs. The empirical part of the thesis includes four studies: a detailed investigation of the phonetic characteristics of FPs in a large corpus of native German speech, an investigation of FPs in L1 and L2 English and Spanish, a pilot study on FPs and other disfluencies in Arabic, and an evaluation of the previously reported recall effect using two different designs.

In the first study, different phonetic features of FPs such as the frequency distribution, the duration, the pause context, the voice quality and the vowel quality were investigated using a corpus of 100 native German speakers in a normal speech condition and a Lombard speech condition. Results show that glottal FPs and tongue clicks are frequent phenomena that should not be neglected in disfluency research. Considering the pause context of the FPs *uh* and *um*, there seems to be an influence on the duration of these particles affecting both types to the same degree. FPs surrounded by pauses are longest, followed by inter-pause unit (IPU) final FPs, and IPU-initial FPs. FPs that occur within speech stretches are shortest in duration. This finding is called a duration hierarchy. We also see, that the preferred type in IPU-initial position is *um* or *hm* rather than the vocalic FP *uh*, suggesting that this latter type is dispreferred for introducing new content. An analysis of the voice quality withing FPs shows that non-modal voice is very common in FPs as over 40 % of FPs begin with glottal stops or creaky voice of varying length.

A comparison between the normal and the Lombard speech condition shows that Lombard speech promotes the production of tongue clicks but discourages the use of the FPs *uh*, *um* and *hm*. Furthermore, the Lombard condition influences the vowel quality of FPs which is probably due to the increased muscle tension that is needed for the increased vocal effort in the Lombard condition. We see that in the normal condition, the vowel quality of FPs spread over a large area of the central vowel space. In the Lombard condition, the area of spread is much smaller and the lower F1 additionally lowers the vowel space area for FPs. We investigated speaker-specificity on the basis of 12 sample speakers. Results show a high between-speaker specificity as well as a high within-speaker specificity which may be due to the mismatch condition (normal vs. Lombard speech) and/or the high variability of this feature for each speaker.

The second empirical study investigates the frequency distribution and the vowel qual-

ity of FPs using a conversational corpus including English and Spanish speech from native speakers as well as second-language learners. Results show that native speakers of English prefer the vocalic-nasal FP *um* in their native language (L1) and foreign language (L2) while Spanish speakers prefer the vocalic FP *uh*. A reason for this may be the preferred syllable structures of the languages as well as other phonotactic rules. The analysis of FP vowel qualities shows very distinct vowels for each language: native English FPs include a low central vowel similar to English /ʌ/ but native Spanish FPs are produced with a high unrounded front vowel very similar to Spanish /e/. When considering the L2-speech of the same speakers, we see that some speakers are approximating the vowel quality of the target language while a few are achieving the vowel quality of FPs in a native-like manner.

The third study investigates the disfluency pattern of seven Egyptian Arabic speakers in two different tasks: a spontaneous report of their daily activities and a map task in which the participants describe the directions from a famous sight in the city to the University building. These tasks are considered to have different cognitive loads that are hypothesised to influence the frequency distribution of the disfluencies. Results show that the Arabic speakers of this corpus prefer the production of silent pauses and the vocalic FP *uh* over all other disfluencies. The disfluency patterns seem to be quite consistent for each speaker over the two tasks which is a promising finding for forensic phonetic casework.

A higher rate for the vocalic FP could be observed in the first task compared to the second task which may be due to the less restricted topic and higher number of options to talk about rather than a difference in cognitive load. A wide spread can be observed when looking at the vowel quality of FPs of this speaker group. Furthermore, an overlap with the German FPs was found suggesting a similar vowel quality for FPs in these languages. Results for the Arabic corpus, however, should be taken cautiously as the corpus is very small and includes male and well as female speakers.

The last empirical study consists of three consecutive experiments. The recall effect of FPs was assessed, i.e., whether particles such as *uh* and *um* help in the recollection of information as it has been suggested before. For this purpose, a study by Fraundorf & Watson (J Mem. Lang.) was partially replicated in German and in English (Experiments 1a and b) and a list experiment (Experiment 2) was designed that was aimed at finding the same beneficial memory effect of FPs. In Experiment 1a with German data, an improvement of memory was found for the fluent condition, but in Experiment 1b with English data, no significant effect of condition could be detected. When testing a list recall paradigm, again, no effect of FPs on the recall of information was found. That is, neither of the experiments confirmed the existence of a recall effect for FPs, which may be due to several reasons, e.g. the web-based experiment design or the phonetic characteristics of the FPs. In conclusion, the improved memory effect of FPs reported in the literature is more inconsistent than expected.