Laughter and Other Non-Verbal Vocalisations Workshop 2020
5 October 2020, Bielefeld, Germany

L1 and L2 Production of Non-Lexical Hesitation Particles of German and English Native Speakers

Beeke Muhlack
Department of Language Science and Technology, Saarland University
Saarbrücken, Germany

muhlack@lst.uni-saarland.de

Abstract

This study focuses on the vowel quality of non-lexical hesitation particles produced by 24 English and German native speakers in their native language (L1) and their second language (L2) both of which are English and German. The aim is to show that a) English and German hesitation particles employ a different vowel quality and b) L2-learners of the respective language can adapt the native-like vowel quality if they are sufficiently proficient in their L2.

1 Introduction

Filled pauses are an integral part of spontaneous speech and very few speakers are able to speak entirely without filled pauses entirely (Belz et al., 2017). Speakers are usually not aware of their production of filled pauses which suggests they lack conscious control of them (Künzel, 1987). (For a different take see Clark & Fox Tree, 2002 who suggest that fillers have word status.) Furthermore, non-lexical hesitation particles – which are a form of filled pauses – occur in several languages in which they are employed with the same function. They are used to gain time during speech which is often considered as a reflection of the cognitive workload that the speaker is employing at that time (Krech et al., 2016). While Shriberg describes the vowel of English non-lexical hesitation markers as a central vowel "typically close to Schwa" (1994, p.175), Künzel suggests for the German counterpart a vowel quality ranging from an open [ɒ] to a central [ə] (1987). However, none of these assumptions are empirically tested by the authors. The present study aims to compensate for this shortcoming. In addition to that, the production of native non-lexical hesitation particles is compared with that of intermediate and advanced L2-learners. Gósy, Gyarmathy and Beke (2017) looked at Hungarian speakers comprising three different CEFR L2-levels (B1, B2, C1) with a similar focus. They analysed 4612 filled pauses from 10 native Hungarian speakers in their L1 as well as in their L2, English. Besides length and position of the filled pauses they also examined the form of the non-lexical particles, i. e. the formant values (F1, F2) of the vowel. Both formants showed no consistent variation for both native and foreign language which led the authors to suggest that the Hungarian speakers transfer their native non-lexical hesitation particles into their second language (Gósy et al., 2017). De Boer and Heeren (2019) found a deviance of formant values in L1 and L2 hesitation particles when looking at female Dutch speakers with English as their second language over the course of three years. As the particles of the two languages in question employ similar vowels the variance of the first two formant values does not exceed 40 Hz, respectively (De Boer & Heeren, 2019). Both studies only focused on one speaker group and compared native hesitation particles with those in the L2 of the same speakers. However, a comparison of L2 hesitations with native hesitations (i.e. English in the studies by Gósy et al., 2017 and De Boer & Heeren, 2019) might lead to further insights into the field of second language hesitation particles.

The aim of this study is to compare the vowels of non-lexical hesitation particles produced by native speakers of English and German in their L1, as well as their L2. The speakers can be grouped into two subgroups according to their L2-level that being *Intermediate* and *Advanced* in accordance with the Common European Framework (CEFR).

2 Methods

2.1 Participants

24 native speakers of English and German (12 each, 50 % female/ 50 % male, mean age = 37) participated in this study with written informed consent. All speakers produced their L2 with a proficiency level of B1 (and lower) or C1 (and higher) according to the CEFR. The L2-levels were determined using the lexical decision test LexTALE (Lemhöfer & Broersma, 2012). Speakers with scores of 65 % and lower were assigned to the level *Intermediate* (INT), speakers achieving 80 % and over were assigned to the level *Advanced* (ADV). In both groups of native speakers (English and German) there were 6 subjects for each proficiency level, again balanced in gender. Prior to each recording the participants filled out a survey which collected biographical information about their language history.

2.2 Recordings

The recordings were conducted with the Sennheiser K6 powering module and a Sennheiser cardioid microphone head ME64 in a noise-controlled recording booth. Participants were asked to perform two tasks in both English and German to elicit spontaneous speech in both their L1 and L2. Task A consisted of free speech for several small talk topics while task B consisted of a picture description using pictures 2 and 9GF of the TAT (Murray, 1971). Both tasks in each language resulted in appr. 2,5 minutes of spontaneous speech, with a total of 10 minutes speech material gathered for each subject.

2.3 Preparation and Analyses of the Data

The annotation and extraction of the data were carried out in the speech analysis program PRAAT (Boersma & Weenick, 2019). The vowels of the non-lexical hesitation particles were marked manually by the author using visual cues from the spectrogram and pitch contour. A Praat script was used to automatically extract the formant values of the first two formants. 2068 hesitation particles excluding those produced with creaky or breathy voice are included in all further analyses. Statistical analyses were done using R (R Core Team, 2018) and the packages *lmer* and *effsize* (Kuznetsova, Brockhoff & Christensen, 2017; Torchchiano, 2017). Variance analyses using mixed-effects models were calculated for each formant. Whenever an interaction of two factors became significant the data was divided and further analyses were carried out.

3 Results

Initial t-tests for the formant values of the native hesitation particles were calculated to explore whether the speakers of the two languages employ different vowels in their L1. Significant results were only found for F1 ($t = -12.59$). The resulting F2-values did not reach statistical significance ($t = 1.26$) for either the native German or native English non-lexical hesitation particles. Further analyses of this factor did not lead to any relevant findings. Therefore, F2 is not included in the forthcoming analyses of this paper.

For F1, an ANOVA using the factors *native language* and *task language* (i.e. the language in which the task was performed) showed a significant result for the latter factor as well as an interaction of the two factors. A further analysis of the data divided by *task language* and including the *proficiency level* (L2-level) of the speakers showed a significant result for the native language in the German subset ($p = 0.02$) but not in the English subset ($p = 0.2$). The interaction of *L1* and *proficiency level* reaches significance in both subsets. Further t-tests comparing the F1-values of native speakers with those of either L2-intermediate learners or L2-advanced learners were calculated for both languages.

Task lang.	L2-Level	T value	P-value	Cohen's d
GER	INT	-24.517	2.2e-16	-1.1987
GER	ADV	-11.266	2.2e-16	-0.7208
ENG	INT	-14.275	2.2e-16	-0.7123
ENG	ADV	-5.754	1.091e-08	-0.3269

Table 1: T-tests comparing F1-values of native speakers and L2-learners divided by *L2-level* and *task language*.

Table 1 shows that the results of all t-tests are highly significant, they do, however, differ in effect size (Cohen's d). Taking that into consideration, the native English speakers with a lower German level (*Intermediate*) seem to differ more from the native German speakers than the English group with a higher German level (*Advanced*). Mean formant values of the *Intermediate* and *Advanced* group with the task language German do differ considerably too (220 Hz vs. 100 Hz). The effect sizes from the t-tests of the English subsets, however, remain lower than in the German subsets.

Here, the mean difference of the groups is merely 133 Hz for the intermediate learners of English and 47 Hz for the advanced learners of English.

The figures 1-4 show the data plotted in four vowel spaces, divided by *task language* and the *proficiency level* of the second language. This means that the native speakers are divided into two groups to test the effect their L2 might have on their native language. Note that the native speakers are divided by their L2-proficiency level even though they are speaking in their native language.

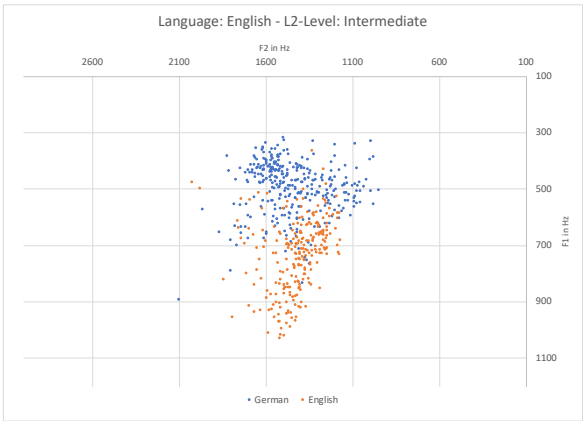

Figure 1: Scatter plot of the vowel qualities of the non-lexical hesitation particles of German (blue) and English (orange) native speakers with the L2-Level *Intermediate* while speaking English.

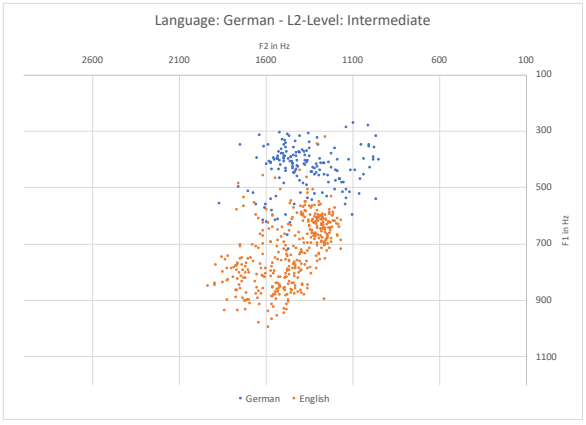

Figure 2: Scatter plot of the vowel qualities of the non-lexical hesitation particles of German (blue) and English (orange) native speakers with the L2-Level B1 while speaking German.

Figures 1 and 2 show that the vowels of English and German native speakers with an intermediate second language level overlap to a minimal degree with those vowels of the intermediate L2-learners. While the vowels from both groups can be classed as central vowels, they do differ in their F1 as suggested by the statistical tests. German speakers tend to use a vowel with a lower F1 value than English speakers. This can be found in both languages for the speakers with an intermediate L2-level.

Figures 3 and 4 show the scatter plots of the advanced learners in both languages with a different pattern visible. Here, the vowel qualities for both speaker groups overlap considerably. Both groups have merged in relation to their F1-value.

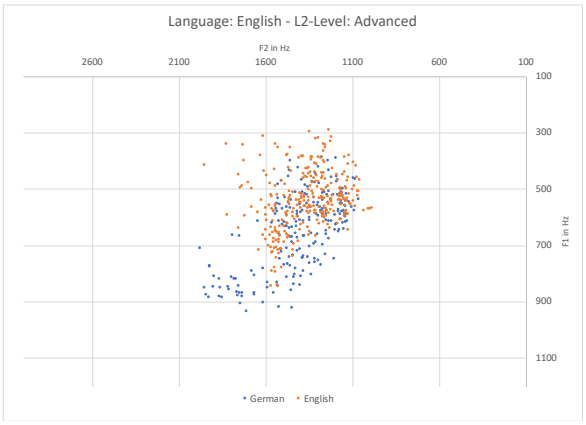

Figure 3: Scatter plot of the vowel qualities of the non-lexical hesitation particles of German (blue) and English (orange) native speakers with the L2-Level *Advanced* while speaking English.

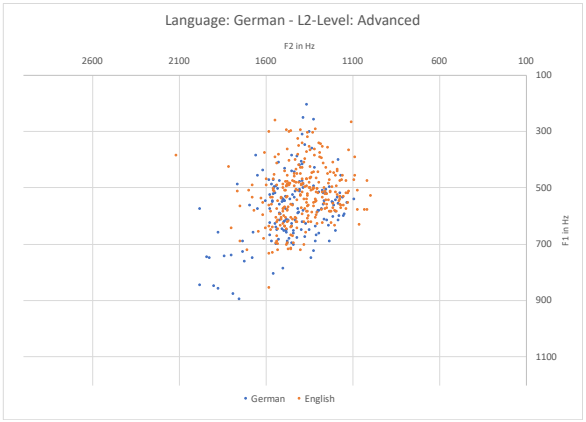

Figure 4: Scatter plot of the vowel qualities of the non-lexical hesitation particles of German (blue) and English (orange) native speakers with the L2-Level Advanced while speaking German.

The second language learners with an advanced L2-level seem to have adapted a vowel quality that approximates that of the native speakers regarding their hesitation particles. This means when speaking a second language German learners of English show an increased F1-value and thus produce their vowels more open while English

learners of German show a decrease in their F1-value which means they produce their vowels more close.

Another interesting tendency can be seen when comparing the native speakers in all figures. The English natives in figure 1 show a different vowel quality than the English natives in figure 3, which seems peculiar as both groups share the same mother tongue. This trend may be explained with the long exposure to a German-speaking environment of the advanced English learners of German. All six subjects have been living in Germany for a minimum of eight years. This duration of living in a German-speaking environment and speaking predominantly German seems to have altered the vowel quality of the hesitation particles in their native languages as well. The German speakers in figure 2 differ slightly in their vowel quality from the German speakers in figure 4. This trend cannot be explained by an extensive stay in an English-speaking country as only two of the subjects have stayed abroad for longer than a year. It may be the case, however, that a low age of acquisition and/or extensive use of the language can still lead to an influence of the L2 vowel quality on the native language.

4 Conclusion

It has been shown that the non-lexical hesitation particles of English and German native speakers differ in their vowel quality when looking solely at the native languages of the speakers. While the F2-values do not differ, the F1-values can account for a difference in height of the vowels of the non-lexical hesitation particles between the languages. German non-lexical hesitation particles seem to employ a central vowel like [ə], while English non-lexical hesitation particles are produced with an open central vowel like a central [ʌ]. Furthermore, learners of different proficiency levels produce varying vowel quality patterns in their second language. While intermediate learners seem to transfer their native vowel quality to their foreign language, advanced learners show a tendency which suggests an adaptation of the foreign vowel qualities. In addition to this, the data suggest an influence of the second language on the production of native non-lexical hesitation particles. As this is only an incidental finding more research has to be conducted to shed light on this phenomenon.

Acknowledgments

I thank Mathias Scharinger and Jürgen Trouvain for their guidance in the planning and execution of this work. Furthermore, I appreciate the help of all participants whose voices were essential for realising this project.

References

Belz, M., Sauer, S., Lüdeling, A. & Mooshammer, C. (2017). Fluently Disfluent? Pauses and Repairs of Advanced Learners and Native Speakers of German. *International Journal of Learner Corpus Research*, 3:2, 118-148.

Boer, M. M. de & Heeren, W. F. L. (2019). The Speaker-Specificity of Filled Pauses: A Cross-Linguistic Study. Proc. 19th *ICPhS* Melbourne, 607-611.

Boersma, P., & Weenink, D. (2019). *Praat* (Version 6.0.40). Abgerufen von http://www.fon.hum.uva.nl/praat/download_mac.htht

Clark, H. H. & Fox Tree, J. E. (2002). Using uh und um in spontaneous speech. *Cognition* 84.1, 73-111.

Gósy, M., Gyarmathy, D. & Beke, A. (2017). Phonetic analysis of filled pauses based on a Hungarian-English learner corpus. *International Journal of Learner Corpus Research*, 3:2, 149-174.

Krech, E.-M., Stock, E., Hirschfeld, U. & Anders, L. C. (Hrsg.) (2009). *Deutsches Aussprachewörterbuch*. Berlin: De Gruyter.

Kuznetsova, A., Brockhoff, P. B. & Christensen R. H. B. (2017). lmerTest Package: Tests in Linear Mixed Effects Models. Journal of Statistical Software, 82 (13), 1-26.

Künzel, H. J. (1987). Sprechererkennung. Grundzüge forensischer Sprachverarbeitung. Heidelberg: Kriminalistik Verlag.

Lemhöfer, K. & Broersma, M. (2012). Introducing LexTALE: A Quick and Valid Lexical Test for Advanced Learners of English. Behavoir Research Methods, 44, 325-343.

Murray, H. A. (1971). Thematic Apperception Test. Cambridge, MA: Harvard University Press.

R Core Team. (2018). A Language end Environment for Statistical Computing. R Foundation for Statistical Computing, Wien.

Torchiano, M. (2017). effsize: Efficient Effect Size Computation. R package version 0.7.1.