Characteristics of pauses in fast, casual and slow speech

Pauses are important features of prosody that are involved in determining speech tempo and rhythm (Fletcher 2010). They are additionally considered as one of the most efficient speech structuring cues, and other prosodic markers such as pitch or amplitude are stated to be weaker cues (Männel, Schipke & Friederici 2013). It is however not yet fully understood how exactly pauses are related to speaking in different tempi, how easily the characteristics of pauses can be acquired in a foreign language, and whether pausing cues constitute universal characteristics of language. Our study addresses this gap by examining the pausing behaviour of native speakers of English, German and Serbo-Croatian that speak in different speeds. We recorded 37 participants reading out a standardized English text (*The boy who cried wolf*; cf. Deterding, 2006) in three different tempi: slowly, casually and fast. The pauses speakers made during these readings were analysed with regard to their mean duration, their number and their position in the text. In addition, we evaluated the total pause duration in relation to the total reading duration.

In all three languages, the number of pauses as well as the mean duration of individual pauses decreased significantly from the slow to the fast condition. Also, in all three groups, we observed a decrease in the relative total pause duration from the slow to the fast reading condition (Tab. 1).

	English (n = 18)	**German (n = 13)**	**Serbo-Croatian (n = 6)**
Slow	21 ± 6.2 %	21.8 ± 4.0 %	20.7 ± 4.2 %
Casual	15.4 ± 4.7 %	17.3 ± 4.0%	15.8 ± 4.8 %
Fast	8.0 ± 4.3 %	8.1 ± 3.2 %	9.2 ± 4.0 %

Tab. 1: Mean (± SD) pause duration in % of the total reading duration.

This indicates that in the fast condition pauses were shortened more compared to articulated speech (e.g. vowel sounds). Reducing pauses that carry less informational content than articulated sounds is hypothesized to hinder comprehension less than deleting or shortening articulated phonemes. The positions where speakers placed pauses depended on syntactic boundaries, independently of the speech tempo. This suggests that also in fast speech, pauses are used as structuring devices and not exclusively to breathe.

In general, the pause characteristics in the speech of our non-native English participants showed a great similarity to the ones of our native English participants, and to native speaker data reported in the literature (cf. Fletcher, 2010). It can therefore be concluded that the characteristics of pauses in English can be acquired easily, at least for native speakers of German, a stress-timed language like English, and Serbo-Croatian, which cannot be classified as either stress- or syllable timed (Smiljanic & Bradlow, 2005). This ease of acquisition of the pause characteristics of a foreign language is hypothesized to be the result of a transfer from the speakers' native languages, or to be rooted in universal preferences for pauses of certain durations and at certain positions in a text.

References

Deterding, D. (2006). The North Wind versus a Wolf: short texts for the description and measurement of English pronunciation. *Journal of the International Phonetic Association*, *36*(2), 187–196. https://doi.org/10.1017/S0025100306002544

Fletcher, J. (2010). The Prosody of Speech : Timing and Rhythm. In W. J. Hardcastle, J. Laver, & F. E. Gibbon (Eds.), *The handbook of phonetic sciences* (2nd ed., pp. 523–602). Hoboken: Wiley-Blackwell.

Männel, C., Schipke, C. S., & Friederici, A. D. (2013). The role of pause as a prosodic boundary marker : Language ERP studies in German 3- and 6-year-olds. *Developmental Cognitive Neuroscience*, *5*, 86–94. https://doi.org/10.1016/j.dcn.2013.01.003

Smiljanic, R., & Bradlow, A. R. (2005). Production and perception of clear speech in Croatian and English. *Journal of the Acoustical Society of America*, *118*, 1677–1688.

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