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Effects of prosodic variation on word-initial clusters in German

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Apart from durational and intonational means, prosodic structure is also marked by so-called articulatory strengthening, eg. Keating et al. (2003). In a previous study (Bombien et al. 2006), we analyzed the effects of varying prosodic boundary strength and word stress on the internal organization of initial /kl/ clusters in order to gain a better understanding of the interplay between the segmental tier and higher levels of the prosodic hierarchy. By means of electropalatographic recordings we addressed the question of which parts or properties of the cluster are affected: the first consonant, the second consonant or the structure of the entire cluster. Temporal and spatial parameters derived from the EPG data show that boundary effects are stronger for the first consonant while in the temporal domain stress affects the second consonant rather than the first. Overlap was found to be greater in unstressed position and at lower prosodic boundaries. Furthermore, /kl/ appeared to be more susceptible to stress effects when not preceded by a boundary. However, the overlap measure applied was dependent on the duration of the entire /k/ gesture. The /k/ gestures, in turn, depended on the duration of pauses which were frequently realized at higher boundary levels, because in some cases full contact for /k/ was present throughout the entire pauses. Furthermore, /k/ onset could not be separated from the pause acoustically. This poses a question which could not be answered satisfactorily: Are the effects on /k/ found in this study due to articulatory strengthening or due to the presence of pauses? This problem will be addressed by expanding our analysis to include word-initial /kn/ and /sk/ clusters. The latter, being a fricative-stop cluster, will hopefully allow for a clear separation of pause and consonant onset in the acoustic domain. Furthermore, we will have the opportunity to compare the patterns observed for /kl/ with those of the other clusters as the internal organization of clusters is also determined by simple constraints on the execution of the motor system, cf. Chitoran et al. (2002), Kühnert et al. (2006). Based on this information, we will discuss the potential role of pauses for articulatory strengthening phenomena and perceptual as well as motor-control factors determining the internal organisation of clusters.

References

Bombien, L., C. Mooshammer, P. Hoole, B. Kühnert, and J. Schneeberg (2006, December). An EPG study of initial /kl/ clusters in varying prosodic conditions in German. In *Proc. 7th ISSP*, Ubatuba, Brazil.

Chitoran, I., L. Goldstein, and D. Byrd (2002). Gestural overlap and recoverability: Articultory evidence from Georgian. In *Laboratory Phonology 7*. Berlin/New York: Mouton de Gruyter.

Keating, P., T. Cho, C. Fougeron, and C. Hsu (2003). Domain-initial articulatory strengthening in four languages. In *Laboratory Phonology 6*, pp. 143–161. Cambridge: Cambridge University Press.

Kühnert, B., P. Hoole, and C. Mooshammer (2006, December). Gestural overlap and c-center in selected French consonant clusters. In *Proc. 7th ISSP*, Ubatuba, Brazil.