The Role of Expectability and Sub-Phonemic Detail in Speech Perception:
English *has*-clitic /s/ vs. plural /s/

Traditionally, the form of a morpheme is assumed to be phonological in nature. Recent research on American and New Zealand English, however, has shown that non-morphemic and different morphemic and clitic /s/, which are supposed to be the same phonologically, actually differ in duration (Plag, Homann & Kunter 2015; Zimmermann 2016) and that the expectability of a plural given its preceding word has an effect on plural /s/ duration (Rose, Hume & Hay 2015). For some contrasts, the described differences reach well above the perceptibility threshold of 25-30ms (Klatt & Cooper 1975).

The next logical question to ask is whether listeners can make use of these sub-phonemic differences in perception. We will present the results from a visual-world eye-tracking experiment in which we tested the discernibility of plural and *has*-clitic /s/ in ambiguous contexts. In the experiment, 20 participants listened to recordings of sentences such as *My /ʃɪps/ appeared in numerous feature films,* while seeing the two possible interpretations of */ʃɪps/* printed on the screen, i.e. SHIPS and SHIP'S. They were asked to look at the word they heard as soon as they recognized it. This paradigm has successfully been used to investigate the perception of sub-phonemic detail (e.g. Shatzman & McQueen 2006, Derrick & Bürkle 2016).

We tested a total of 192 recordings, i.e. 96 test items and 96 control sentences, by two different speakers, one of which showed the described duration differences while the other did not. The test items contained two different base nouns in three contexts with varying plural expectability rates. Each context was read twice with a plural /s/ and twice with a *has*-clitic /s/ by each of the speakers. Each recording was rated twice by every participant.

We will discuss how the participants employed duration differences and plural expectability in the distinction of plural and *has*-clitic /s/. Preliminary analyses of the data of ten participants using Chi square tests suggest that gazes were more on target for items produced by the speaker who showed a difference in /s/ duration than for items produced by the speaker who did not show a difference in /s/ duration, $p<0.0001$. The final analyses that are to be presented will use generalized additive models to fully factor in the complex non-linear nature of the gaze patterns recorded in the eye-tracking data.

References:
Derrick, Donald & Daniel Bürkle. 2016. *Speech Prediction from Subphonemic Production*. Paper presented at LabPhon 15, July 13-17, Cornell University, Ithaca, NY, USA.
Klatt, Dennis H. & William E. Cooper. 1975. Perception of segment duration in sentence contexts. In Antonie Cohen & Sibout G. Nooteboom (eds.), *Structure and process in speech perception*, 69–89. Berlin: Springer.
Plag, Ingo, Julia Homann & Gero Kunter. 2015. Homophony and morphology: The acoustics of word-final S in English. *Journal of Linguistics*, Available on CJO 2015 doi:10.1017/ S0022226715000183.
Rose, Darcy E., Elisabeth Hume & Jen Hay. 2015. *Morphological predictability shapes the phonetic realization of morphemes*. Paper presented at the Linguistic Society of New Zealand Conference, December 14-15, University of Otago, Dunedin, New Zealand.
Shatzman, Keren B., & James M. McQueen. 2006. Segment duration as a cue to word boundaries in spoken-word recognition. *Perception & Psychophysics, 68*(1). 1-16.
Zimmermann, Julia. 2016. *Morphological Status and Acoustic Realization: Findings from NZE.* 1st Workshop on Spoken Morphology, August 24-26, Heinrich-Heine-Universität, Düsseldorf, Germany.