

alveolar click averages 30 ms, which is “noisy.” Mixed effects logistic regression models tested the effects of rise time and burst duration. Burst duration differed significantly among the two clicks ($p < 0.001$), while the effect of rise time was not significant. The ratio of energy in the click noise-bursts below 20 ERB to the energy above 20 ERB is between 1.0 and 1.5 for the post-alveolar click, but between 0.5 and 1.0 for the alveolar click. The ratio was a significant predictor of click type ($p = 0.014$). The highest concentration of energy for the post-alveolar click is between 12 and 18 ERB, while the highest concentration of energy in the alveolar click is between 25 and 30 ERB. We attribute the frequency difference to a larger lingual cavity volume in the post-alveolar click, and a smaller volume in the alveolar click.

4aSC3. Cross language speech-in-noise perception by early Spanish-English bilinguals and English monolinguals. Page E. Piccinini and Marc Garellek (Linguist, Univ. of California, San Diego, 9500 Gilman Dr., La Jolla, CA 92093-0108, ppiccinini@ucsd.edu)

Bilinguals have shown a hyper-awareness of fine phonetic detail in speech, while also sometimes losing out on higher-level syntactic and semantic information in speech-in-noise studies. This study seeks to determine how bilinguals process speech in noisy environments across different language contexts. Specifically, this study tests whether bilinguals utilize certain phonetic cues to access higher-level information. Two experiments will be conducted. First, to determine how bilinguals process speech in different language contexts, early Spanish-English bilinguals and English monolinguals learning Spanish listened to sentences mixed with white noise in English, Spanish, and code-switching (English to Spanish and Spanish to English) contexts. Preliminary results suggest early Spanish-English bilinguals perform significantly above chance on word identification in all contexts, performing best in the Spanish context. The second experiment will determine specifically which noise types (lower versus higher frequency) are most detrimental to word identification. This in turn will suggest what kind of phonetic information is utilized most by bilinguals versus monolinguals. These results will aid our understanding of how bilinguals could use their hyper-awareness of phonetic detail to overcome difficulties in other aspects of processing.

4aSC4. Native language interference on the overnight consolidation of a learned nonnative contrast. Sayako Earle and Emily B. Myers (Speech, Lang., and Hearing Sci., Univ. of Connecticut, 123 Davis Rd., Storrs, CT 06268, frances.earle@uconn.edu)

In a prior investigation, discrimination of a trained nonnative (dental/retroflex, Hindi) contrast was mediated by different effects of overnight consolidation depending on the time of day of training. For individuals trained in the evening, sleep appeared to promote continued improvement in discrimination for ~24 h without further training. For participants who were trained in the morning, performance returned to baseline following the overnight session interval. A possible explanation for the lack of improvement in the morning training group is that incidental exposure to the alveolar /d/, the category in which dental/retroflex are considered allophones in English, throughout the daytime interval interfered with overnight consolidation of the nonnative variants. We tested this interpretation directly, by training all participants ($n = 44$) in the evening and assigning them to one of two conditions of interference: passive exposure to a stream of either 1500 /bV/ or /dV/ tokens immediately after training. We observed continuous improvement in discrimination for ~24 h in those who were exposed to /bV/ tokens, while those who were exposed to the /dV/ tokens did not improve. Our results support the interpretation that incidental exposure to English prior to overnight memory consolidation interferes with sleep-mediated improvement in discrimination of an L2 contrast.

4aSC5. Vowel systems of quantity languages compared: Arabic dialects and other languages. Judith K. Rosenhouse (Linguist, SWANTECH Ltd., 89 Hagalil St., Haifa 3268412, Israel, swantech@013.net.il), Noam Amir, and Ofer Amir (Commun. Disord., Tel-Aviv Univ., Tel-Aviv, Israel)

The acoustic phonetic features of colloquial Arabic vowel systems are still not entirely researched. This paper studies phonetic structure of several Arabic dialects and other languages. A basic issue is the fact that Arabic is a

quantity language; but from the published literature we see that vowel systems of Arabic dialects differ in many acoustic details. We researched two colloquial Arabic dialects which are spoken in Israel, and hitherto not acoustically studied. These dialects constitute the axis around which we conducted the literature-based comparison with vowel systems of a few other Arabic dialects and other languages which share similar quantity features (i.e., long and short vowels). The study reveals similarities and differences in pitch (F0), the first three formants and duration. These differences appear between the two Arabic dialects spoken in Israel, between them and other Arabic dialects, as well as between non-Arabic languages (English, German, Swedish, and Hungarian). The findings of our study are discussed in relation with the questions of (1) vowel spaces of short and long vowels and (2) speaker's sex-dependent differences.

4aSC6. The articulation of lexical palatalization in Scottish Gaelic. Jae-Hyun Sung (Linguist, Univ. of Arizona, P.O. Box 210025, Tucson, AZ 85721, jhsung@email.arizona.edu), Diana Archangeli (Linguist, Univ. of Hong Kong, Hong Kong, Hong Kong), Ian Clayton (English, Boise State Univ., Boise, ID), Daniel Brenner, Samuel Johnston, Michael Hammond, and Andrew Carnie (Linguist, Univ. of Arizona, Tucson, AZ)

Scottish Gaelic (Gàidhlig, henceforth SG) exhibits a rich system of consonant mutation, which is mostly governed by its morphology (Ladefoged *et al.* 1998; Gillies 2002; Stewart 2004). For instance, *bàta* “boat” changes to [v] when the word undergoes morphological inflection—e.g., *a bhàta* “his boat”, in which the sound spelled *bh* is pronounced as [v]. Using ultrasound imaging, the present study investigates palatalization in SG, which is considered as one of lexicalized consonant mutation types. Experimental data was collected in Sabhal Mòr Ostaig, a college on the Isle of Skye. Preliminary results show a clear sign of palatalization across different consonant types in palatalization environments (i.e., when morphologically conditioned), represented by higher tongue contours in the front region of tongue. While the articulatory distinction between plain and palatalized consonants is significant, different syllabic positions (i.e., word-initial vs. -final palatalization) often yield individualized patterns.

4aSC7. An acoustic-phonetic account of phonotactic perceptual assimilation. Eleanor Chodroff, Anthony Arnette, Samhita Ilango, and Colin Wilson (Cognit. Sci., Johns Hopkins Univ., Krieger Hall 237, 3400 N. Charles St., Baltimore, MD 21218, chodroff@cogsci.jhu.edu)

Previous research has identified a coronal-to-dorsal ‘perceptual assimilation’ in which English and French listeners identify Hebrew word-initial /t/ and /d/ as beginning with /k/ and /g/, respectively (Hallé and Best, 2007). However, the acoustic-phonetic factors that contribute to this misperception have not been thoroughly identified, and previous results indicate that /t/ is misperceived more often than /d/—an asymmetry that is surprising on phonological grounds. The present study further explored this perceptual assimilation in two experiments with English listeners and Hebrew stop-liquid-vowel syllables ([t,k,d,g] × [l,ʁ] × [a,o,u]). The first experiment, which used the same stimuli as Hallé & Best, replicated previous findings, including the asymmetry between /t/ and /d/. The second experiment employed stimuli produced by a different native Hebrew speaker. While coronal-to-dorsal assimilation was observed, the previous /t/-/d/ asymmetry was not found: /d/ was perceived as dorsal-initial somewhat more often than /t/, suggesting that there can be no consistent phonemic or phonotactic explanation of the rate of assimilation. In support of a phonetic account, we find that misperception rates in both experiments are highly correlated ($r > 0.65$) with the stimulus-specific degree of anticipatory coarticulation of the lateral, as reflected in the spectral shape of the stop burst.

4aSC8. The effect of talkers' language dominance on subjects' speech production of sibilant fricatives. Ya-ting Shih (Teaching Chinese as a Second Lang., Chung Yuan Christian Univ., 200 Chung Pei Rd., Chung Li 32023, Taiwan, ninashih1982@gmail.com)

This study investigates the effect of talkers' language dominance on subjects' sibilant production in a bilingual community. Guoyu (Taiwanese Mandarin) has 3 sibilants: alveolar /s/, retroflex /ʂ/ and alveolo-palatal /ç/, while Taiwanese (a Southern Min dialect) only has /s/, which is palatalized