BACKGROUND
- Studies show that languages can fundamentally differ in average pitch range even when speaker differences are accounted for [1, 2].
- These studies usually compare similar populations of monolingual speakers; very few consider bilingual speakers of the languages in question (but see [3]).
- The current study tests fundamental frequency (f0, or pitch) of both languages of English-Korean bilinguals, hypothesizing that they will differ.

METHODS
- Twenty Americans of Korean descent (female=13, average age=24) recorded natural speech during a bilingual interview.
- Interview had a Korean portion (10-20 min.), a Korean reading task, and an English portion (20-50 min.). Code-switching was not prohibited.
- Speech was digitally recorded and transcribed; f0 was analyzed using the IFC method [4].
- Average f0 per word, per language, and per interviewee was calculated and compared across individuals and groups.

BILINGUAL INTERVIEW

Figure 3: Interviews began in Korean and switched to English. One interviewee, S20 (19-year-old second-generation female) is sampled to demonstrate change in f0 over time.

RESULTS

Figure 1: Overall f0 measurements from all interviewees, separated by gender and language. Despite considerable overlap, f0 measurements from Korean words were greater on average than f0 measurements from English words by over 20 Hz.

Interviewees were categorized as being second generation Korean Americans (born and raised in the US) or 1.5-generation Korean Americans (born abroad but raised in the US), as part of a related study. Figure 2 illustrates means and distributions of each group; no effect of generation was found.

Results from a linear mixed effects model (Table 1) showed that Korean has significantly higher f0 than English, regardless of gender or generational status. Present data cannot tell us if the cause of this difference is phonetic (effect of each language’s phonetic inventory, such as Korean fortis consonants), phonological (effect of Korean vs. English prosodic structure), or socio-indexical (effect of speakers’ inhabited identities when speaking one language or the other).

Figure 2: F0 measurements broken down by interviewee gender, generation, and language. No significant difference of generation was found, but gender and language significantly predict f0.

SUPPLEMENTARY MATERIALS
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STATS

Table 1: A linear mixed effects model was run to determine the effects of language, speaker gender, and speaker generation on mean f0 of a particular word (f0_wd). In addition to significant effects of language and gender, an interaction effect of language and gender was found.

REFERENCES

FUTURE RESEARCH
- In the pipeline: more measurements such as f0 range, standard deviation, and pitch contours over similar prosodic phrases; exploration of whether code-switched words adapt to the pitch range of the context.
- Implications for acoustic and speech communication: consideration for bilingualism/bilingual speech mode as a variable, and other cross-language differences within the bilingual speaker, including as a result of code-switching.

CROSS-LINGUISTIC PITCH DIFFERENCES IN BILINGUAL SPEAKERS

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