Phonological Vowel Reduction in Guatemalan Spanish

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Phonological vowel reduction is a process that affects the acoustic characteristics of unstressed vowels (Fourakis, 1991). Much of our current understanding of the phenomenon stems from the spectrographic analyses of Lindblom (1963) and Delattre (1969). Since then, there has been steady interest in considering phonological vowel reduction across languages (see, for example, Liljencrants & Lindblom, 1972; Daur, 1980; Flege & Bohn, 1989; van Bergem, 1993; Johnson & Martin, 2001). Recently, Crosswhite (2004) and Flemming (2005) have attempted to formalize our understanding of vowel reduction in theoretical terms by offering a phonetically-based phonological account. Crosswhite (2004) chooses to frame her analysis in an OT framework and views vowel reduction in terms of sonority; Flemming (2005)'s work is an extension of Liljencrants & Lindblom's (1972) model of vowel inventory and incorporates aspects of the prosodic and segmental contexts of vowels.

Though vowel reduction is relatively common across many languages (Crosswhite, 1999), its existence (and use) is not fully understood with specific regard to Spanish. Whereas some researchers (Sebastián-Gallés et al, 1992) suggest vowel reduction in Spanish does not exist, others (Lipski, 1990) note that it does, but in only two varieties, namely in Northern and Central Mexican Spanish and Andean Spanish. Previous studies (Canellada & Zamora Vicente, 1960; Lope Blanch, 1963) have simply noted the phenomenon impressionistically. Delforge (2008) was the first to offer a spectrographic analysis specifically detailing unstressed vowel reduction in Andean Spanish. As such, we currently have very little understanding about this phenomenon in Spanish, beyond Delforge's (2008) seminal study on Andean Spanish.

The current study is novel in three distinct ways. First, it builds on Delforge's (2008) work by conducting a spectrographic analysis on empirical data for a previously untested variety of Spanish, namely Guatemalan Spanish. Second, it is the first to use laboratory data, as opposed to the conversational data found in Delforge's (2008) study. Third, it is the first to test phonetically-based phonological models (i.e. those proposed by Crosswhite (2004) and Flemming (2005)) with empirical data for vowel reduction in Spanish.

With regard to experimental design, I analyze the acoustic properties of unstressed vowels from a corpus that includes twenty-five speakers from Guatemala City, Guatemala; unstressed vowels are analyzed spectrographically using Speech Analyzer 2.7. Participant recordings are in MPEG format at a sample rate of 22,050 Hz and sample size of 16-bit. Each participant read a paragraph containing a maximum of 605 tokens per participant. F1 and F2 frequencies were measured, which included measuring the distance between F1 and F2 for both stressed and unstressed vowels to test vowel centralization.

Preliminary data results suggest that unstressed vowel reduction in Guatemalan Spanish is similar to Andean Spanish in that reduction is more likely to occur with high vowels (i.e. /i/ and /u/) and much less likely to occur in back vowels (i.e. /a/). In addition, devoicing and elision, in the case of the back vowel, /a/, are evidenced, as well. In theoretical terms, preliminary data suggest that phonological vowel reduction in Guatemalan Spanish is best viewed as a 'contrast-enhancing category' (Crosswhite, 2004). That is, the process occurs in unstressed vowels to avoid 'perceptually challenging vowel qualities' (Crosswhite, 2004: 225) evident in the stressed vowel. The study concludes with discussion on Crosswhite's (2004) claim that devoicing and elision are common traits of stress-timed languages and re-considers the 'syllable-timed language' categorization for Spanish.

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