Introduction

The present study aims to demonstrate Hebrew rhythm class, showing the similarities between English and Hebrew and contrasting with Spanish and English, examining data from L1 English L2 learners from Hebrew and L1 English L2 learners of Spanish. The current investigation claims the hypothesis that Hebrew and English share more abstracts features of the phonology than the phonological system between Spanish and English, stating that Hebrew is more stress- like than syllable-like rhythm pattern. On the other hand the current investigations is a empirical study of rhythm that shows that rhythm can be quantified by the duration of the vowels within a word.

Rhythm class

Rhythm is prosodic characteristic of speech

the idea of cross-linguistic rhythmic variation was first documented by Arthur Lloyd James in his work as a linguistic advisor to the Royal Air Force of Great Britain during World War II to aid in the development of communication systems. In his brief manual on speech, two rhythm categories were proposed: “Morse code rhythm” and “machine gun rhythm” (Lloyd James, 1940, p. 25), in reference to the short (dot) and long (dash) pattern of Morse and the even beat of a machine gun. Lloyd James theorized that rhythm was a combination of linguistic patterns of duration, lexical stress, and melodic contour (p. 26), and that prominent changes to these phenomena from one period to the next constitute the Morse-code or machine-gun beat of a given language. Thus, according to this proposal, languages similar to English had Morse code rhythm, while those similar to French (i.e., Spanish) had machine gun rhythm.

Mehler et al. (1988) studied the ability of four-day-old French and two-month-old American infants to discriminate between-category rhythm. The study found that, even after low-pass filtering the stimuli, the French and American infants (whose languages, in the phrasing of Lloyd James, were machine gun rhythm and Morse code rhythm, respectively) were able to distinguish the speech of their native language from that of a language whose rhythm was typologically different—Russian (Morse code rhythm) and Italian (machine gun rhythm), respectively.

Nevertheless, the degree to which interstress intervals are considered equal may also depend on the perspective of whether a language truly exhibits patterns of isochrony (Dauer, 1983), and some studies have found at least partial support for isochrony in production in English and even stronger tendencies in perception (Lehiste, 1973).

Rathcke and Smith (2015) investigated trained phoneticians’ ability to determine the rhythm class—whether it be stress-timed or syllable-timed—of different dialects of their native language,

Dauer (1983) proposes that all languages exhibit some evidence of what Pike (1947) described as stress timing and proposes that the standard, categorical nomenclature be replaced with a continuum of “stress-based rhythm” (pp. 59-60).

Grabe and Low (2002) support the notion of gradient language rhythm: These authors found that some languages that had previously not been categorized into rhythm categories seemed to overlap between the two. Thus, language rhythm may be better described as a continuum rather than purely categorical

In any event, setting aside the notions of isochrony and categoricity, what is certain is that stress-rhythm languages and syllable-rhythm languages17 do tend to differ in regard to syllable structure, phonological vowel reduction (particularly in the case of English and Spanish), and the acoustic correlates of stress (Dauer, 1983

On the one hand, syllable structure in English allows for up to three consonants in the onset (e.g., straight) and up to four in the coda (e.g., twelfths) (Whitley, 2002, p. 34), whereas, in Spanish, up to two consonants are permitted in the onset (e.g., criar) and up to two in the coda (e.g., vals) (Hualde, Olarrea,

Escobar, & Travis, 2010, p. 101). On the other hand, English has phonological vowel reduction in unstressed syllables (Ladefoged, 2006, p. 94), whereas Spanish does not (Hualde, 2005, pp. 126–127). Lastly, in English, stress affects vowel duration: vowels in stressed syllables are longer than in unstressed syllables (de Jong, 2004; Van Summers, 1987). Although a similar pattern of stress-induced vowel lengthening is found in Spanish, as well (Marín Gálvez, 1995; Navarro Tomás, 1917), the effect is greater in English than in Spanish due to the tendency of unstressed syllables in English to reduce in quality and quantity (Whitley, 2002, p. 68). Working under the view taken by Dauer (1983) in which rhythm is composed, in part, by a language’s syllable structure, propensity toward vowel reduction, and the phonetic realization of stress, both of which are observable via duration measures, these distinctions between English and Spanish are relevant to the empirical analysis of rhythm

Hebrew- Spanish and English rhythm class

The analysis of Hebrew as a clearly iambic, although not a syllable-timed language, may thus prove more comparable to the results documented for English (Segal, O., Nir-Sagiv, B., Kishon-Rabin, L., & Ravid, D. (2009).