L1 biases, learning, and generalization in Semitic morphology
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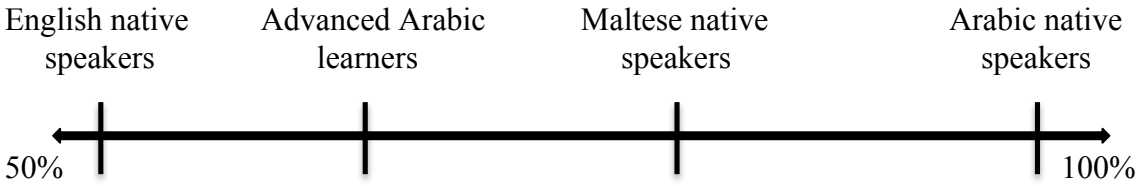
This work explores how native language biases affect how root-and-pattern morphology is learned in the lab. While researchers have shown that learning non-adjacent dependencies, such as those found in vowel harmony, root-and-pattern morphology, or in verb agreement, are very difficult to track and learn (e.g., Newport & Aslin, 2004; Bonatti et al., 2005), other work shows that if a speaker's native language requires them to attend to non-adjacent dependencies, they will be able to learn an artificial grammar that employs analogous non-adjacent dependencies (LaCross, 2011, 2015). To this end, my work uses participants from four speaker groups, each with different amounts of exposure to root-and-pattern morphology, to see whether performance on the artificial grammar is modulated by amount of exposure to root-and-pattern morphology.

Participants from three of the four groups will be discussed in this talk: native English speakers, native Arabic speakers, and native English speakers who have taken at least three years of university-level Arabic (referred to as advanced Arabic learners). Data from native Maltese speakers will be included at a later time, but predictions can be made about their performance.

Members of the groups are predicted to show different results in the non-concatenative grammar in both tasks based on the amount of exposure they have had to root-and-pattern morphology. As in previous research, English speakers are expected to perform roughly at chance, as they have had no exposure to non-concatenative morphology. Arabic speakers are expected to perform the best out of the four groups, as they natively speak a language that uses root-and-pattern morphology productively. Advanced Arabic learners are expected to perform better than the native English speakers, as they have been taught how root-and-pattern morphology works explicitly, but they should not perform as well as the native Arabic speakers due to their having far less exposure to root-and-pattern morphology. Maltese native speakers should perform almost as well as the Arabic native speakers, but arguments have been made about root-and-pattern morphology being fossilized in Maltese (Spagnol, 2011) although roughly half of the Maltese vocabulary is Semitic and employs root-and-pattern morphology. A schematic of the expected accuracy rates is below.



Participants were randomly assigned to one of two tasks, either a Wug Test (after Berko, 1958) or a word segmentation task (after LaCross, 2011, 2015; Newport & Aslin, 2004; and others), and were also randomly assigned to either a concatenative grammar (similar to English) or a non-concatenative grammar (similar to Arabic).

For the Wug Test, participants were shown ten imaginary animals (from Ohala, 1999) paired with nonsense singular and plural words, using three phonologically conditioned plural allophones. 20% of the stimuli had the allomorph conditioned by a nasal, 20% by a sibilant, and 60% fell into the "default" case. During the test phase, participants were provided with a pair of imaginary animals and the singular form, and were asked to provide the plural form. Native English speakers tended to overregularize to the default case, or a variant thereof, in both the concatenative and non-concatenative grammars. In the concatenative grammar, their answers were more consistent with the plurals provided in the training phase, while in the non-concatenative grammar, their responses reflected that they had learned the grammar incompletely: for example, most participants seemed to realize that the syllable structure of the words changed from the singular to the plural, but did not pick up on what conditioned the differences in syllable structure.

In the word segmentation task, participants listened to a speech stream consisting of six nonsense words, each repeated semi-randomly 200 times and concatenated to eliminate silence- or stress-based cues that could lead to easier segmentation. Participants then completed a recognition phase, where they had to differentiate between words that they had heard in the speech stream and partial words that crossed word boundaries. After this, participants performed a generalization task, where they heard new nonsense words and had to indicate whether what they had heard was a plausible word in the grammar. Native English speakers performed more accurately on the concatenative grammar than on the non-concatenative grammar once again in both the recognition portion and the generalization portion (see table below).

	Recognition (% Correct)	**Generalization (% Correct)**
Non-concatenative Grammar	62.22%	45%
Concatenative Grammar	77.78%	68.75%

Preliminary results from this research show that an artificial grammar employing root-and-pattern morphology is more difficult for native English speakers to learn than an artificial grammar employing concatenative morphology (similar to work by LaCross (2015) and Newport & Aslin (2004)). While English speakers must track other types of linguistic non-adjacent dependencies (e.g., syntactic non-adjacent dependencies, such as verb agreement or auxiliary agreement), they do not generally have to track phonological non-adjacent dependencies (such as vowel harmony) or morphological non-adjacent dependencies (such as roots and patterns).

The difficulty for English speakers learning non-adjacent dependencies is fairly well attested, but it is a mistake to assume that English speakers are representative of speakers of other languages. LaCross (2011, 2015) showed that speakers of a language using vowel harmony performed more accurately when learning an artificial grammar using a similar type of vowel harmony than English speakers did learning the same language. Thus, including speakers from different language backgrounds in my work fills this gap in learning morphological non-adjacent dependencies.

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