The role of morphology in phonotactically-supported alternation learning

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Abstract. The current study investigates whether morphological learning interacts with the link between phonotactics and alternations in artificial grammar learning. English speakers learned artificial languages with varying phonotactic support for a backness harmony plural alternation. Prior to learning the alternation, two groups were additionally trained on a non-alternating suffix that differed in function across two experiments. Contrary to previous findings, phonotactic support did not facilitate alternation learning across any conditions. The results also showed that exposure to the non-alternating suffix prior to the alternation impeded learning when the morpheme function was difficult to learn, but not when it was easily learned. These results suggest that the facilitative role of phonotactic support seen in previous studies is not robust across all experimental designs and that additional morphological knowledge can inhibit, rather than facilitate, alternation learning in artificial grammar learning.

Keywords. Artificial grammar learning; phonological learning; phonotactics; alternations; morphology

1. Introduction. It has been noted that many alternation patterns match more general phonotactic constraints on the lexicon (Hayes 2004). Whether these types of alternation patterns are easier to learn than those that do not have matching phonotactic generalizations has been a question of some current research (Pater & Tessier 2005; Chong 2016, 2017, 2021; Do & Yeung 2021). Empirical investigations using artificial grammar learning have shown that matching phonotactic generalizations facilitate alternation learning (Chong 2021; Pater & Tessier 2005), but some argue that this may be language-specific (Do & Yeung 2021). Furthermore, extending phonotactic generalizations to alternation patterns requires explicit training on the patterns in both phonotactics and alternations (Chong 2021). Previous studies focus solely on the phonotactics influencing alternation learning, but not whether other factors influence learning as well. For example, using a matching phonotactic generalization to facilitate alternation learning requires attention not only to the phonotactics and alternations, but also to the morphological properties of the alternation. The current study is an initial investigation into whether additional morphological knowledge can further facilitate learning of an alternation pattern with a matching phonotactic generalization.

Cross-linguistically, many morphophonological alternation patterns are *phonotactically supported* – that is, they match more general phonotactic constraints on the lexicon. However, this is not always the case as some alternation patterns and phonotactic generalizations have a mismatch. For example, a sequence can alternate in a derived environment but be phonotactically licit within stems. A canonical example of a *phonotactically-supported alternation* is the English plural /-z/. When the suffix creates an underlying obstruent cluster with a voicing mismatch, it is devoiced, assimilating to the voicing of the preceding consonant as in (1a). When suffixation instead creates a potential sibilant-sibilant cluster as in (1b), /ə/ is epenthesized, repairing the illicit cluster.

* I would like to thank Eric Baković and the members of UCSD's PhonCo as well as audiences at SCAMP 2025, CAMP8, and the 2026 LSA Annual Meeting for discussion and feedback on this work. I would also like to thank Ezgi Bayraktaroglu for recording the stimuli. Author: Travis Putman, University of California San Diego (trputman@ucsd.edu)

(1) a. /kæt-z/ → [kæts]
cat-PL
'cats'
b. /bʊʃ-z/ → [bʊʃəz]
bush-PL
'bushes'

This pattern matches more general phonotactic constraints on the English lexicon which prohibit tautosyllabic voicing mismatches in obstruent clusters and tautosyllabic sibilant-sibilant clusters.[1] Suffixation creates one of these phonotactically illicit clusters which is then repaired by the alternation.

Finnish, on the other hand, provides an example of a mismatch between the phonotactics and alternations. In Finnish, /ti/ sequences are preserved within morphemes but repaired across morphemes (Inkelas 2014). In (2a) and (2b), the stem of the verb /tilat/ contains a /ti/ sequence that is realized faithfully (data from Inkelas 2014). However, as seen in (2b) when the /-i/ suffix is concatenated to the same stem ending in /t/, an otherwise licit /ti/ sequence is repaired in the derived environment – the stem-final /t/ assibilates to /s/. This type of pattern shows a mismatch between the stem-internal phonotactics and the alternation. The phonotactics encode a generalization permitting /ti/ sequences while the alternation repairs the otherwise preserved sequence. I refer to these types of patterns as *phonotactically-unsupported alternations*.

(2) a. /tilat-a/ → [tilata]
order-INF
'to order'
b. /tilat-i/ → [tilasi]
order-3P.SG.PRET
'He/she ordered'

The distinction between these types of patterns has been used to investigate whether phonotactics and alternations are encoded separately in the grammar and whether there are distinct learnability differences between them (Hayes 2004; Chong 2017, 2021). Under Optimality Theory, the phonotactics and alternations are encoded under a single mechanism, a constraint ranking (Prince & Smolensky 2004). Because the phonotactics and alternations are intrinsically linked, a single mechanism predicts that phonotactically-supported alternations are easier to learn. The constraint ranking learned for the phonotactic pattern motivates the need for the alternation and the learner must additionally learn only the relevant repair. Other approaches propose a dual mechanism, where the phonotactics and alternations are instead encoded independently, like in some versions of SPE (Chomsky & Halle 1968). A dual mechanism predicts that both supported and unsupported alternations are equally learnable because the phonotactics are always encoded separately from the alternations. The learner must learn both a phonotactic generalization and an alternation pattern.

Empirical investigations using Artificial Grammar Learning (AGL) experiments have focused on whether the predictions of a single mechanism approach are borne out through learnability (Pater & Tessier 2005; Pizzo 2015; Chong 2021; Do & Yeung 2021; Chong 2016). The

[1] Both sequences are allowed across syllable boundaries such as in 'baseball' [beɪs.bɑl] and 'fish sauce' [fɪʃ.sɔs]

results have been generally mixed and often show directly opposing results. In Experiment 1 of Chong (2021), L1 English-speaking participants more robustly learned a backness harmony alternation when it had more phonotactic support in the training data. However, when L1 English speakers were not presented with alternations in the training phase in Experiments 2 and 3, they did not extend a phonotactic vowel harmony pattern to novel suffixes (Chong 2021). In a related study by Do & Yeung (2021), L1 Cantonese speakers did not learn a backness harmony better when it was phonotactically supported.

Chong (2021) claims that when learners are not able to extend a phonotactic pattern to a novel alternation, it is the result of paradigm uniformity. When not given explicit evidence of alternations in the artificial language, learners default to a single choice for the novel suffix, adhering to an expectation of non-alternating paradigms. Do & Yeung (2021) claim that L1 Cantonese speakers were unable to use phonotactics to facilitate alternation learning because Cantonese does not have phonotactically-supported alternations in their L1 phonology. These explanations do not cover one potentially confounding factor, however: how morphology interacts with the types of alternations present in both of the artificial languages.

Though Cantonese does not have phonotactically-supported alternations, it also does not have the same morphological system as English. Unlike English, Cantonese has relatively few suffixes and many can often appear independently (Matthews & Yip 2013). The backness harmony alternation seen in the artificial languages of Do & Yeung (2021) is created via suffixation. Therefore, the difference between Chong (2021) and Do & Yeung (2021) is not only limited to whether each population has an L1 with phonotactically-supported alternations, but also in the morphology of the L1. In order for phonotactics to facilitate alternation learning, the learners must understand that the patterns match across the two domains. However, when there is a marked difference between the morphology of the artificial language and the L1, it is possible that participants attend more to morphological than phonological cues. In turn, this may confound the results. By attending to the morphological cues, they may be able to learn the alternation equally well regardless of differences in phonotactic support.

A similar issue may be present in Chong (2021). In Experiments 2 and 3, participants were never trained explicitly on the morphology of the artificial language and did not encounter any stimuli with morphology until the test phase. Therefore, the participant must learn that there is morphology present in the artificial language only during the test phase. The training and test phases themselves are very different: participants are expected to learn words in the training phase, but are instead expected to provide a judgment in the test phase. This may cause the expectation of the task to differ, leading to participants defaulting to only one possible form. This is potentially more evident given that in Finley & Badecker (2009), participants were able to extend an alternation generalization to another novel alternation. Crucially, they had prior familiarity with morphology in the artificial language in the training phase.

While these studies appeal to other factors to explain their results, there is another potential explanation – that is, participants do not possess the same knowledge of morphology. Cantonese speakers in Do & Yeung (2021) do not have the same L1 support for suffixation as English speakers, and participants in Experiments 2 and 3 of Chong (2021) do not receive any exposure to morphology. The current study examines whether differences in morphological knowledge can influence phonotactically-supported alternation learning. L1 English-speaking participants learned artificial languages that differed in phonotactic support for a backness harmony alternation. Two groups additionally learned a non-alternating suffix prior to learning the alternation. The results were unable to corroborate that phonotactic support facilitates alternation learning, contrary to Chong (2021). Furthermore, additional morphological information impeded, rather than facilitated, alternation learning when the function of the morpheme was also difficult to learn. These results raise questions about the inability to replicate past findings as well as whether morphology interacts with phonotactically-supported alternation learning.

2. Experiment 1. In Experiment 1, participants learned one of four artificial languages with lexicons of 32 CVCV stems balanced for segment frequency. Each language contained an alternating plural suffix [-mi] or [-mu] based on the backness of the stem-final vowel. To emulate varying phonotactic support, the artificial languages were split into two groups: Harmonic and Disharmonic.[2] In the Harmonic languages, all stems conformed to the backness harmony pattern while in the Disharmonic languages, only half conformed to the pattern. To test the effect of prior morphological knowledge, two of the four languages additionally contained a non-alternating diminutive morpheme, [-n]. Overall, this resulted in a 2×2 design of varying phonotactic support and presence/absence of the non-alternating morpheme.

2.1. PARTICIPANTS. A total of 186 English-speaking participants were recruited for the study online through Prolific (Prolific 2026). 47 participants were excluded for self-reported note-taking (n = 14), mnemonic usage (n = 22), both note-taking and mnemonic usage (n = 8), or speaking a second language with vowel harmony (n = 3). The results from the remaining 139 participants (58 female, 81 male, aged 18-68, mean age = 38) were used for the analysis.

2.2. STIMULI. Artificial languages consisted of CVCV words derived from the set of consonants: {p, t, k, b, d, g, m, n} and of vowels: {i, e, o, u}. Plural forms were created by adding one of two suffixes: [-mi] or [-mu], based on the backness of the final vowel. Diminutive forms were created by concatenating the suffix [-n] to each of the stems. The phonological form of the suffix, a nasal [-n], was chosen to limit the effects of L1-transfer from frequent English morphemes like plural /-z/ or past /-d/, and to provide more direct comparison with the plural morpheme of the artificial language.

Phonotactic support was varied across the artificial languages by the proportion of harmony-conforming stems in the lexicon. In the Harmonic languages, all of the stems conformed to backness harmony, consisting of either all front or all back vowels, e.g. [kepi] and [kupo]. In the Disharmonic languages, half of the stems conformed to the backness harmony pattern and the remaining half did not. In other words, half of the stems consisted of only front or back vowels while the other half consisted of one front and one back vowel in either order, e.g. [kepi] and [kopi].

32 unique stems were created for each of the Harmonic and Disharmonic languages. Additionally, 16 unique stems were created for the Non-alternation test and another 16 for the Alternation test. All stems of the test stimuli conformed to the harmony pattern to avoid exposing participants learning the Harmonic language to disharmonic stems. A sample schematic for the stimuli is shown in Table 1.

Audio stimuli were recorded in a sound-attenuated booth by a female phonetically-trained L1 speaker of English who was unaware of the phonological pattern and goals of the study. Each

[2] Chong (2021) varied phonotactic support more gradiently by including a Semi-harmonic or 75% pattern-conforming stem condition in addition to the two categories presented here. However, this was not significantly different from the Disharmonic language in the results. Also, Do & Yeung (2021) varied phonotactic support at 0%, 50%, and 100% proportions, thus only the 50% and 100% conditions are directly comparable between both studies. Therefore, I elect to only separate the artificial languages' lexicons into two categories.

	Stem	Diminutive	Plural
Harmonic	kibe	kiben	kibemi
	gubo	gubon	gubomu
Disharmonic	kibo	kibon	kibomu
	gube	guben	gubemi

Table 1. Sample stem and inflected forms in the artificial languages.

word was produced with primary stress and spoken in a carrier phrase. Recordings were done using a Shure SM1015A microphone at a sampling rate of 44.1kHz and 16-bit resolution. Intensity was normalized across all stimuli to 50 dB. Visual stimuli were gathered from an open-access database for psychological experiments (Moreno-Martínez & Montoro 2012).

2.3. PROCEDURE. Participants were recruited online through Prolific (Prolific 2026). Experiments were created using PsychoPy (Peirce et al. 2019) and hosted online on Pavlovia (Pavlovia 2026). Participants were instructed to listen to words from an alien language and silently mouth along to each word. After reading the instructions, all participants moved on to the Exposure phase. In the exposure phase, participants heard and saw picture-audio combinations corresponding to words in the artificial language. The number of trials of the exposure phase differed across conditions. Participants learning only the alternation heard each of the 32 stems four times in a randomized order for a total of 128 trials before moving directly to the Plural training phase. Those who additionally learned the non-alternating morpheme heard each of the 32 stems only once before moving on to the Diminutive training phase.

In the Diminutive training phase, participants saw both stem and diminutive forms side by side on the same trial. Stem forms were consistently presented on the left of their screen and diminutive forms were consistently presented on the right. Stem and diminutive audio stimuli were separated by 0.5s increments of silence. Participants heard each of the 32 stem and diminutive forms twice for a total of 64 trials. After completing the Diminutive training phase, participants were tested on their ability to learn the diminutive morpheme in the Non-alternation test.

In the Non-alternation test, participants were instructed to choose the correct word for novel stimuli in a two-alternative forced-choice task. Participants saw a picture depicting either the stem or diminutive form for a novel word. Participants were presented audio for both the stem and diminutive forms. Additionally, they saw flashing on-screen buttons corresponding to the audio samples with labels ‘a’ or ‘b’ while they heard each choice. A ruler was presented on screen to create a point of reference for the size of the image. Participants were instructed to press either ‘a’ or ‘b’ on their keyboard to respond. Stem and diminutive choices were randomized between each button. This continued for 32 total trials (16 stem and 16 diminutive). Because participants had not been exposed to only singular or only diminutive forms, the first four trials were used as familiarization. After completing the Non-alternation test, they moved on to Plural training.

The Plural training proceeded like Diminutive training. Participants saw stem and plural forms side-by-side on the same screen. Stem forms appeared on the left and plural forms on the right. Audio stimuli for each word played with 0.5s increments of silence separating them. Each of the 32 stems as well as their plural forms were heard four times, totaling 128 trials. After completing Plural training, participants were tested on their ability to learn the alternation.

In the Alternation test, participants were presented with 16 novel plural forms in a randomized order and heard words with both harmonic and disharmonic plural suffixes for each word. They were again instructed to press either ‘a’ or ‘b’ on their keyboards corresponding to flashing on-screen buttons for the harmonic or disharmonic alternations. Harmonic and disharmonic choices were randomized between each button. After completing the Alternation test phase, participants were redirected to Qualtrics (Qualtrics 2026) to complete a debriefing survey.

2.4. ANALYSIS. Data were analyzed using a mixed-effects logistic regression model created using the *lme4* package (Bates et al. 2015) in R Studio (R Core Team 2021). Non-alternation test results were modeled with a fixed effect of phonotactic support. Alternation test results were modeled with fixed effects of phonotactic harmony and morpheme presence. By-participant and by-item random intercepts were included in both models following recommendations from Barr et al. (2013). An interaction between morpheme presence and phonotactic support was also included in previous models, but it did not significantly improve model fit in any model; thus, I report only simpler additive models. To assess whether participants’ accuracy was greater than chance, I use a one-sample t-test as well as inspecting the significance of model intercepts.

2.5. RESULTS. The results of the Non-alternation test are visualized in Figure 1. The final model included a fixed effect of phonotactic support with by-participant and by-item random intercepts. The model returned no effect of harmonic language, indicating no difference in the learnability of the morpheme across harmonic and disharmonic languages. The intercept was significant in the model, showing that participants’ accuracy was above chance ($\beta = 0.58$, $SE = 0.25$, $z = 2.35$, $p < 0.05$). To confirm this, a post-hoc one-sample t-test was also performed ($\mu = 0.5$; $M = 0.62$, $t = 4.53$, $df = 69$, $p < .001$). Results indicate that participants were able to learn the non-alternating diminutive morpheme, and that learning did not differ across groups.

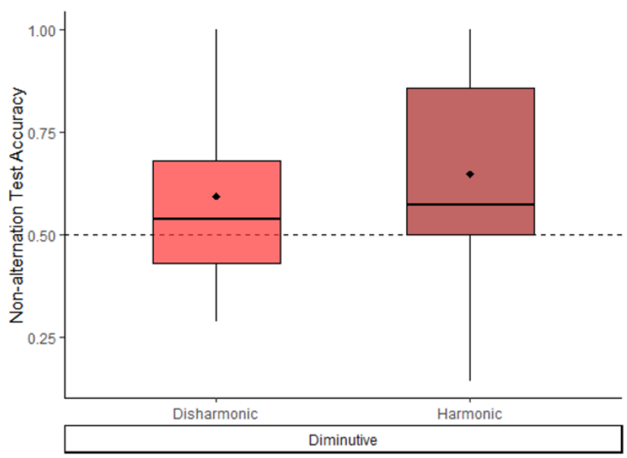

Figure 1. Participants’ mean accuracy on the Non-alternation test in Experiment 1. Diamonds indicate group mean.

The results of the Alternation test are shown in Figure 2. The final model contained fixed effects of phonotactic harmony, morpheme presence, by-participant and by-item random intercepts. Contrary to expectations, the model returned no significant effect of phonotactic support on alternation learning, indicating that both groups learned the alternation equally well. The presence of the diminutive morpheme was marginally significant ($\beta = -0.31$, $SE = 0.16$, $z = -1.93$, $p = 0.054$). However, the coefficient was negative, indicating that the presence of the diminutive morpheme *decreased* alternation learning. These results suggest that the increased phonotactic support of the Harmonic languages had no effect on the participants' ability to learn the alternation, *contra* Chong (2021) and that prior morphological information decreased alternation learning.

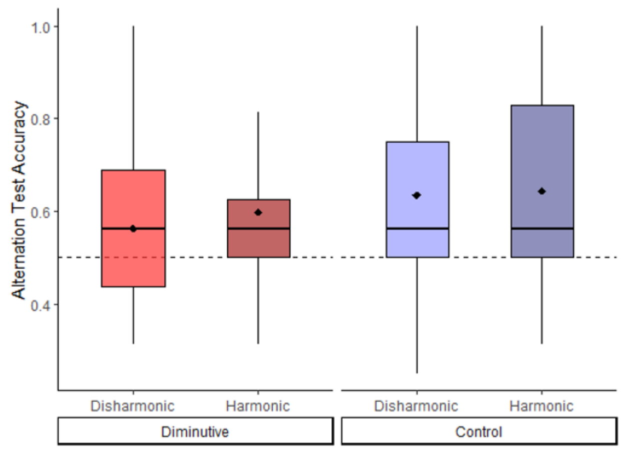

Figure 2. Participants' mean accuracy on the Alternation test in Experiment 1. Diamonds indicate group mean.

2.6. INTERIM DISCUSSION. The results from Experiment 1 failed to replicate previous studies showing that phonotactic support facilitates alternation learning. This is unexpected, especially because both the pattern and population were identical to Chong (2021), which found positive results. Furthermore, contrary to expectations, these results suggest that prior morphological knowledge may inhibit alternation learning rather than facilitate it. One possibility is that while the morpheme was learned greater than chance, it may have been difficult to learn. This difficulty could have caused participants to perform poorly on the task, given the increase in difficulty caused by the non-alternating morpheme. To better understand if the learnability of the non-alternating morpheme interacts with alternation learning, the morphological function was varied in Experiment 2.

3. Experiment 2. In Experiment 1, while participants' accuracy on the Diminutive test was significantly better than chance, the overall accuracy remained low (∼60%). To determine whether the function of the morpheme had an effect on the learnability of the alternation, Experiment 2 investigates two additional morpheme functions, gender and dual, which have been shown to be robustly learnable in previous studies (Finley 2018).

3.1. DESIGN. The design of Experiment 2 is largely the same as that of the artificial languages with the diminutive morpheme in Experiment 1. The key difference between the two experiments lies in the semantic/morphological function of the non-alternating suffix, [-n]. Rather than depicting a diminutive function of the morpheme, participants were presented with either a gender or dual function.

In the languages with a gender morpheme, morphological gender was depicted with either a blue male or pink female symbol. Masculine forms were consistently unsuffixed (previously singular) while feminine forms were consistently suffixed (previously diminutive). In the training phase, participants saw two pictures of the same animal on either side of their screen with the blue male icon under the left picture and the pink female icon under the right picture. In the test phase, participants saw one animal accompanied by either the male icon or female icon in each trial. They were asked to choose the correct word for each picture between both the unsuffixed and suffixed forms. To ensure direct comparability with Experiment 1, participants did not see pictures with male symbols during the Exposure phase.

The dual morpheme was depicted similarly to the plural alternation. However, rather than three animal pictures side-by-side, the dual was represented with only two. In the Dual training phase, participants saw a single picture of the animal on the left and two of the same picture side-by-side on the right. In the Dual test, participants saw and heard either the singular form or the dual. They were also instructed to choose the correct form between the unsuffixed and suffixed forms.

After completing the Gender and Dual training and Non-alternation test phases, the experiment continued as in Experiment 1. Participants moved on to the Plural training and test phases. All other aspects of the experimental design remain the same as Experiment 1, including audio and visual stimuli, procedure, and plan of analysis.

3.2. PARTICIPANTS. A total of 162 English-speaking participants were recruited online via Prolific for Experiment 2. 35 participants were excluded for self-reported note-taking (n = 9), mnemonic usage (n = 18), both note-taking and mnemonic usage (n = 3), speaking a second language with vowel harmony (n = 2), or not answering the note-taking or mnemonic questions (n = 3). Responses from the remaining 127 participants (73 female, 51 male, 2 no reply, 1 non-binary, aged 22-82, mean age = 42) were analyzed.

3.3. RESULTS. Participants' accuracy on the Non-alternation test is shown in Figure 3. To compare the learnability of all morpheme functions, a model was fit using the results from all Non-alternation morpheme tests. The final model included fixed effects of phonotactic harmony, morpheme type, by-participant and by-item random intercepts, and a by-item random slope for morpheme type. The model showed that the dual morpheme was significantly easier to learn than the diminutive (β = 1.13, SE = 0.28, z = 3.97, $p < 0.001$). The gender morpheme was also significantly easier to learn than the diminutive (β = 0.57, SE = 0.28, z = 2.02, $p < 0.05$). Inspection of the overall accuracy and coefficients show that the gender morpheme was easier to learn than the diminutive and harder to learn than the dual. These results indicate that there is a difference in how accurately participants learned each morpheme. Together, these results suggest a scale where diminutive was the hardest to learn, followed by gender, and finally, dual.

The results from the Alternation test are shown along with the results from Experiment 1 in Figure 4. Because the question under investigation relies on the comparison not only between morpheme presence but also all morpheme types (in other words, including diminutive), a model was fit with data from all conditions of Experiments 1 and 2. I refer to this model as the Full model. For interpretability and direct comparison, models were also fit with data comparing languages without additional morphemes and only gender or only dual morphemes, replicating Experiment 1. I refer to these models as GenderOnly and DualOnly, respectively.

The final Full model included fixed effects of phonotactic harmony, morpheme type and by-participant and by-item random intercepts. The model showed main effects of the gender morpheme (β = -0.41, SE = 0.15, z = -2.71, $p < 0.01$) as well as the diminutive morpheme (β = -0.30, SE = 0.15, z = -2.00, $p < 0.05$). The model showed no effect for presence of the dual morpheme or for phonotactic support.

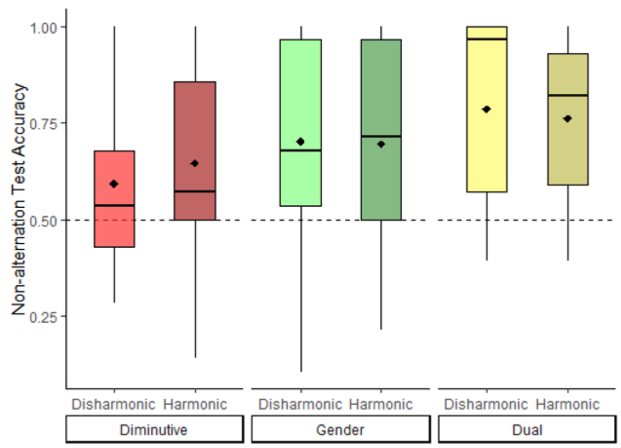

Figure 3. Participants' mean accuracy on the Non-alternation test in Experiments 1 and 2. Diamonds indicate group mean.

The GenderOnly model contained fixed effects of phonotactic harmony, morpheme presence, and by-participant and by-item random intercepts. The model also showed a significant main effect of the gender morpheme (β = -0.42, SE = 0.16, z = -2.58, $p < 0.01$).

The DualOnly model contained fixed effects of phonotactic harmony, morpheme presence, and by-participant and by-item random intercepts. Similar to the Full model, the DualOnly model also showed no significant effect of the dual morpheme.

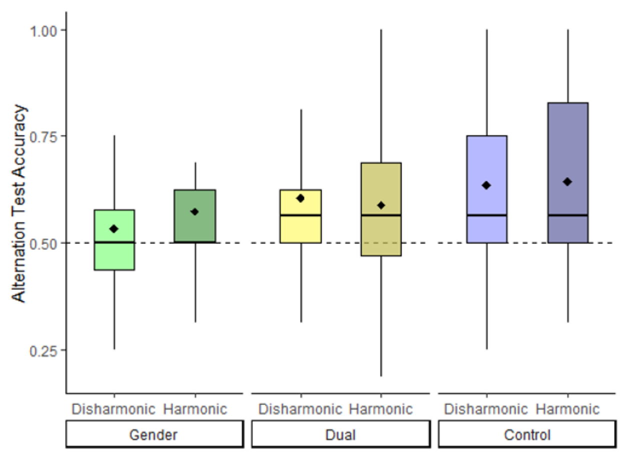

Figure 4. Participants' mean accuracy on the Alternation test in Experiment 2 alongside the control of Experiment 1. Diamonds indicate group mean.

3.4. Interim discussion. These results further confirm that there is no significant effect of the Harmonic language on alternation accuracy, *contra* Chong (2021). Again, this is surprising given that participants should be exposed to more instances of the backness harmony pattern overall and thus, learn the alternation pattern better. These results also show that morpheme type does not affect whether the Harmonic language increases plural accuracy. However, they do indicate that the prior non-alternating morpheme does affect plural accuracy across Harmonic and Disharmonic languages.

The Full model showed main effects of both gender and diminutive morphemes. This suggests that participants learning the diminutive and gender morphemes had a more difficult time learning the plural alternation. This effect disappeared for participants learning the dual morpheme. These results are further confirmed when looking at the GenderOnly and DualOnly models. The GenderOnly model mimics the results of Experiment 1, showing that participants learned the alternation worse after learning the non-alternating morpheme. The DualOnly model confirms that there is no significant difference between learning both the dual and plural and learning only the plural. This means that the impeding effect of the prior morpheme on alternation learning disappears if the morpheme is learnable. Overall, these results suggest that introduction of a non-alternating morpheme prior to the alternation may impede alternation learning only when morphological learning is difficult.

4. General discussion. Two artificial grammar learning experiments investigated the role of prior morphological knowledge in phonotactically-supported alternation learning. In Experiment 1, the results showed that prior morphological knowledge may have inhibited alternation learning and that the experiment failed to replicate the facilitative role of phonotactic support seen in previous studies. Experiment 2 sought to confirm the results from Experiment 1 by investigating whether the negative findings were the result of morphological function. The results showed that the learnability of the morphological function affected whether alternation learning was impeded. Both the diminutive and gender morphemes impeded alternation learning while the dual morpheme did not. However, the results still failed to replicate the facilitative role of phonotactic support.

The inability to replicate previous findings on the role of phonotactic support is unexpected. Experiments 1 and 2 investigated the learning of a backness harmony alternation with a population of L1 English speakers, identical to Chong (2021). While this could be explained by the addition of extra morphological information, the results also showed no difference between the control conditions, where no additional morphological information is present. This is unexpected not only due to the results from other AGL experiments, but also through more recent evidence for the link between phonotactics and alternations from investigations into phonotactic and alternation productivity (Jo 2024; Jun et al. 2025; Chong 2017).

One potential explanation lies in differences in experimental design, specifically in stimulus presentation. Chong (2021) presents singular and plural stimuli across separate trials, such that participants are unable to directly compare uninflected and inflected forms. In the current study, participants are shown both singular and plural forms on the same trial, meaning that they could directly compare forms. This was done to ease the learning task so that participants could learn each of the morphological functions. Instead, it may have introduced a ceiling effect. In a series of similar AGL experiments, Finley (2020) found that alternation learning differed when stem and inflected stimuli were presented on the same or different trials. Highlighting the comparison between singular and plural forms in the current study may have eased the learning task, causing participants to reach a ceiling given the constraints of the task. This may also be the case in Do & Yeung (2021) and Chong (2016), which employ a similar style of stimulus presentation as the current study. Whether stimulus presentation induced the lack of effect seen in the current study is left to future work.

The results additionally suggest that prior knowledge of a non-alternating morpheme did not facilitate phonotactically-supported alternation learning. Furthermore, when learning that non-alternating morpheme is difficult for the learner, alternation learning is impeded overall. One possible interpretation of the results is that the cognitive load of the task increased when participants learned non-alternating morphemes with difficult functions. Lower accuracy on the alternation test resulted from the increased difficulty of the task overall. This seems likely given that when the difficulty of learning the non-alternating morpheme was lower, there was no difference between the presence or absence of additional morphological knowledge. However, the explanation is limited to the style of stimulus presentation used in the current study. It is possible that the difficulty of the morphological information only affected participants because the experimental design explicitly highlighted the relationship between singular and inflected forms.

The results of the current study have shown that the facilitative role of phonotactic support is not replicable across similar AGL experiments. Furthermore, the results show that prior morphological knowledge does not facilitate alternation learning and instead impedes alternation learning with difficult morpheme functions. These results raise further questions about the nature of the link between phonotactics and alternations in artificial grammar learning and how morphology interacts with phonotactically-supported alternation learning. Future work should aim to address the possible confounds illustrated here in order to better understand both the link between phonotactics and alternations and the further influence of morphology.

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