Morphological generalization in heritage Turkish

A controversial issue in psycholinguistic literature concerns the question of which mechanisms are employed in morphological generalization to nonce words. Different mechanisms have been suggested for morphological generalization, in particular associative extensions of existing patterns, and/or generalization based on morphological rules or rule-like operations (see Veríssimo & Clahsen, 2014 for a review). Heritage speakers (HS) have been shown to experience difficulties with inflectional morphology particularly with irregular morphology and to frequently overapply regular morphology (Benmamoun, Montrul & Polinsky, 2013), a 'resistance to irregularity' according to Polinsky and Scontras (2020).

The present study investigates morphological generalization processes in the Turkish aorist, which encodes habitual aspect or general present tense. Unlike most inflectional exponents in Turkish, the aorist is not completely regular but involves a restricted set of irregular forms specifically with respect to monosyllabic stems. Our aim is to get insight into HS' linguistic representations of inflected word forms and how these are generalized to nonce words in language production, the first study of this kind for heritage Turkish.

We carried out an elicited-production experiment with 50 non-heritage Turkish control speakers (CTR) resident in Turkey and 98 HS who had acquired Turkish from birth and were all recruited from the large Turkish/German bilingual community in Berlin and Potsdam. 78 nonce verbs were created in three 'similarity' conditions: (i) Irregular: nonce verbs similar to existing verbs with irregular aorist forms (e.g., *gal* in analogy to *kal* 'stay'), (ii) Regular: nonce verbs similar to existing verbs with regular aorist forms (e.g., *yel* in analogy to *gel* 'come'), (iii) No Similarity: phonotactically-legal nonce verbs not similar to existing Turkish verbs (e.g., *vöf*). Participants had to complete sentences by forming an irregular or regular aorist form of the nonce verb presented in its infinitive form.

As for the results, Table 1 provides means and standard deviations for the three similarity types and the two participant groups. Table 2 presents the results from the best-fit generalized linear mixed-effects model testing for between-group and similarity type differences of the proportions of regular vs. irregular responses. To determine potential similarity effects with existing Turkish verbs for the 'Irregular' and 'Regular' conditions, 'No Similarity' was used as the control condition. We obtained significant effects of Similarity Type for both the Irregular and Regular conditions, due to reduced proportions of regular responses in these conditions compared to the control condition. The model also revealed a significant Group-by-Similarity interaction for the Irregular but not for the Regular condition, which is due to a smaller (Irregular/No Similarity) contrast in the HS than the CTR group. Between-group comparisons for the similarity types revealed significant differences for the Irregular condition only, due to the larger proportion of regular responses in this condition for the HS than the CTR group (Table 2b).

We also explored the inter-individual variability within the HS and CTR group's generalization patterns, by calculating the difference between each individual's production of the regular aorist and the corresponding group's mean for each of the three similarity

conditions. Using Levene's tests, we found similar levels of inter-individual variability in both participant groups for the two similarity conditions (Regular: $F = 1.43$; $p = 0.23$; Irregular: $F = 0.02$; $p = 0.89$), whereas for the No Similarity condition the HS group exhibited significantly more variability than the CTR group ($F = 7.56$; $p = 0.007$). This latter contrast is due to largely regular responses for the No Similarity condition within the CTR group individuals and less homogeneous performance within the HS group for this condition.

We interpret our findings as supporting the distinction between rule-based and similarity-based generalization processes. The regular (rule-based) aorist functions as a default that is applied under 'no similarity' conditions in Turkish, when associations with existing verbs fail. By contrast, verbs with irregular aorist forms yield associative (similarity-based) generalizations. Evidence for this basic distinction was found in both the HS and the CTR group data. On the other hand, we found that (relative to the control condition) the HS rely less on associative generalizations in the Irregular condition than the CTR group, in line with the idea of a 'resistance to irregularity' in HS. Furthermore, rule-based generalization processes seem to be less robust amongst HS than for non-heritage speakers, as evidenced by the HS' more heterogeneous performance in the No Similarity condition relative to the rather consistent proportions of regular responses across the CTR group's individuals in this condition.

We conclude that HS employ both similarity-based and rule-based mechanism for morphological generalization of the Turkish aorist, with subtle differences ('resistance to irregularity', 'robustness of morphological rules') to the way these mechanisms are applied by non-heritage speakers of Turkish.

References

Benmamoun, E., Montrul, S., & Polinsky, M. (2013). Heritage languages and their speakers: Opportunities and challenges for linguistics. *Theoretical Linguistics, 39*, 129-181.

Polinsky, M., & Scontras, G. (2020). Understanding heritage languages. *Bilingualism: Language and Cognition, 23,* 4-20.

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Table 1: Means and SDs (in parenthesis) of regular responses for the HS and the CTR group

	HS	CTR
Irregular	0.64 (0.48)	0.56 (0.49)
Regular	0.81 (0.39)	0.83 (0.38)
No Similarity	0.89 (0.32)	0.92 (0.27)

Table 2: Fixed effects from the model of the three similarity conditions

Fixed Effects	Estimate	Std. Error	z value
(a) Overall Model			
Intercept	2.174	0.183	11.848*
Main effect: Similarity Type (Irregular vs. No Similarity)	2.729	0.307	8.890*
Main effect: Similarity Type (Regular vs. No Similarity)	0.910	0.289	3.151*
Group (HS vs. CTR)* Similarity Type (Irregular vs. No Similarity)	1.227	0.409	3.004*
Group (HS vs. CTR)* Similarity Type (Regular vs. No Similarity)	0.139	0.333	0.417
(b) Releveled by Similarity Type			
Group (HS vs. CTR, Irregular)	-0.837	0.384	-2.180*
Group (HS vs. CTR, Regular)	0.252	0.357	0.705
Group (HS vs. CTR, No Similarity)	0.391	0.387	1.009