# Frequency modulates structural choices in Turkish non-local derivational morphemes

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This study tests whether the acceptability of suspended affixation (SA) in Turkish coordinate structures is mediated by lexical factors, specifically coordinate structure frequency. SA is a syntactic phenomenon on coordinate structures in which a suffix surfaces on the last conjunct but is interpreted on all (1-2).[1-5] There are different syntactic analyses of SA. According to one, a suffix is attached to the entire coordinate structure (3).[1,5] According to another, a suffix is attached to both conjuncts underlyingly, but is elided from all but the last conjunct (4).[2-4] Both structures might in principle be available for derivational affixes, but the acceptability of derivational SA appears to be modulated by the frequency of the coordination:[6-8] Recent observations suggest that derivational SA in Turkish is gradient in acceptability, with enhanced productivity with high (2) compared to low-frequency coordinate structures.[2, cf. 1]
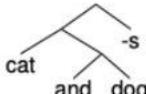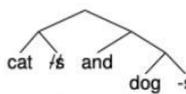
(1) kedi ve köpek-*ler*
    cat and dog-PL
    'cats and dogs'

(2) ana ve baba-*lık*
    mother and father-DER
    'mother- and fatherhood'

(3)

(4)

Here, we test the hypothesis that this gradient acceptability is due to the fact that the choice of the syntactic analysis of derivational SA is probabilistically related to the frequency of the coordinate structure. Complex expressions may be represented holistically if sufficiently frequent.[9,10] Building on this, we predict that when the coordinate structure (e.g., *cat and dog, mother and father*) itself is more frequent, Turkish speakers would be more likely to choose an initial analysis in which the coordinate structure is represented as a whole, and SA is derived via attachment of the suffix to the entire coordination, as in (3). On the other hand, when the frequency of the entire coordinate structure is lower, Turkish speakers would be more likely to adopt an analysis in which the stems in the coordinate structure are represented separately, and SA is derived through ellipsis, as in (4). We assume that it is difficult to elide derivational affixes because they are tightly integrated with the root. Thus, low-frequency coordinations with SA would receive low acceptability ratings since only the ellipsis structure is available.

We ran a **RATING TASK** (N=47) to compare the acceptability of 32 'stem+stem' coordinates with vs. without SA (see 5). Coordinates were sampled to cover equidistant bands of frequencies from a Turkish Web 2012 corpus (~3.4 billion words); with frequency counts ranging from 131657 (*mother and father*) to 1 (*mouse and lion*). The choice of stem combinations ensured semantic naturalness. To examine the effects of SUFFIX type, we used four different highly productive derivational suffixes that formed adjectives: -cI (*supporter*), -lI (*with*), -sIz (*without*) and -lIk (*hood*). Participants rated 32 experimental sentences (each with a distinct binomial) in a 4x2 within-subject design and 64 fillers on a 6-point Likert scale. Our **RESULTS** indicate that SA generally reduced the acceptability for -*without* and -*supporter*, but not for -*with* or -*hood* (see Fig1). Crucially, interaction between the SA and frequency was only relevant for -*without*, and marginally suggestive for -*supporter*. These results were verified by our Bayesian cumulative link models, with rank frequency as a predictor for each SUFFIX (see Fig2). Our model showed a strong positive interaction between frequency and SA in both -*without* (β=0.06, P(β>0)=0.98) and -*supporter* (β=0.04, P(β>0)=0.89), but no such interaction for -*hood* (β=-0.01, P(β>0)=0.31) and reversed interaction for -*with* (β=-0.05, P(β>0)=0.07).

TAKEN TOGETHER, we find that the lexical frequency of coordinate structures modulates the choice of syntactic analyses available to speakers. The increased acceptability of SA in high-frequency coordinates supports our prediction that these structures favor a base generation syntax, while less frequent structures default to a decompositional analysis followed by ellipsis, assumed to be ungrammatical with derivationals. Crucially, the frequency effect was limited to suffixes that show the main effect. We speculate that suffix-specific factors may impact the structural choice. For instance, suffixes that failed to show the frequency effect may be more semantically stable and more

inflection-like, enabling ellipsis structures as well. We plan future studies to examine a range of suffixes with different semantic properties.

Experimental stimuli. The suspended affixation conditions are shown with the parentheses around the derivational morphemes in the first conjunct. Abbreviations: AGT: agentive, we encode this as -*supporter,* however, it might have other agentive meanings. TYPE: In addition to, -*hood* meaning this suffix can have -*type* or -*kind-of* meaning as well.

(5) a. Selin tamir için kapı(-cı)   ve   pencere-ci   bir marangoz-la   anlaş-mış.
       Selin repair for door(-AGT) and window-AGT a carpenter-COM agree-PST
       'Selin made an agreement with a doorman and window specialist carpenter for the repair.'

   b. Selin tamir için kapı(-lı)   ve   pencere-li   bir atölye   tasarla-mış.
       Selin repair for door(-WITH) and window-WITH a workshop design-PST
       'Selin designed a door-and-windowed workshop for the repair.'

   c. Selin tamir için kapı(-sız)   ve   pencere-siz   bir atölye   tasarla-mış.
       Selin repair for door(-WITHOUT) and window-WITHOUT a workshop design-PST
       'Selin designed a workshop without a door and without windows for the repair.'

   d. Selin tamir için kapı(-lık)   ve   pencere-lik   bir desen   seç-miş.
       Selin repair for door(-TYPE) and window-TYPE a pattern choosePST
       'Selin chose a door- and window-type pattern for the repair.'
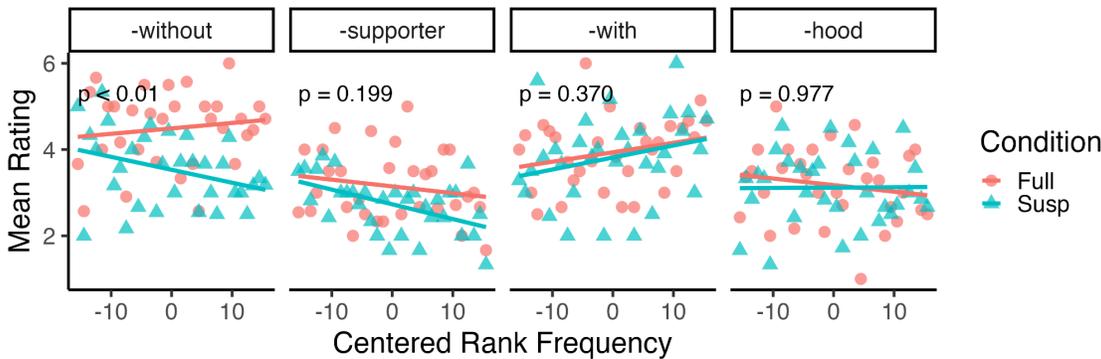
Fig1. Mean item ratings plotted against rank frequency for each suffix. Fitted lines indicate linear trends, and p-values denote the significance of interaction, just looking at item means
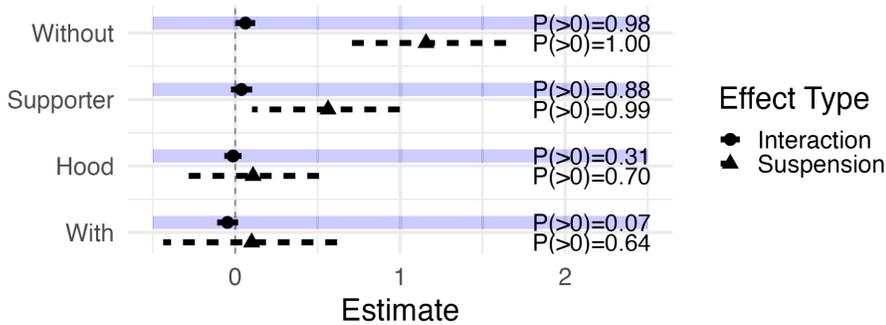
Fig2. Posterior coefficients estimates for the main effect of Suspension and Interaction with Frequency. Interactions and probability of a positive interaction is highlighted.

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