

Testing usage-based indices as modulating factors of second language sentence processing

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L2 processing is distinguished from L1 processing in various aspects (Hahne, 2001). While several factors have been attested to affect L2 processing (Cunnings, 2017; Poznan & Trueswell, 2016), less is known about the role of usage-related factors. Theoretical perspectives within the usage-based approaches claim that language development entails the growth of inventories of verbs and argument structure constructions (ASCs: a clause unit of form–meaning mapping), predicting that increasing proficiency allows learners to increase these inventories (Ellis, Römer, & O'Donnell, 2016). However, L2 sentence-processing literature has not specifically illuminated these usage-related factors.

This study addresses this gap by investigating how usage-based indices specific to verbs and ASCs modulate the L2-English sentence processing. Two accounts make different predictions regarding this issue. The verb-centered, lexical-rule hypothesis (Levin & Rappaport Hovav, 1994) predicts that verb-related information will have a dominant influence on modulating L2ers' sentence-processing behavior. In contrast, the constructionist approach (Goldberg, 1995) predicts that information about verbs and ASCs will jointly contribute to specific patterns of L2 sentence processing.

To test these predictions, we conducted a self-paced reading experiment in which L1-Korean L2-English learners (NNS) and native speakers of English (NS) read the English prepositional dative construction. To capture the effects of verb- and ASC-specific information in L2 sentence processing, we included two categories of measures as testing variables – a verb's lexical sophistication (*Frequency*, *Concreteness*, *Familiarity*, *Meaningfulness*) and verb–ASC association strength (*Delta-P*). The experimental sentences aligned across two verb-ASC association conditions, the stronger ($k = 24$) and weaker ($k = 24$) association conditions, each presented in 7 regions (Rs), as illustrated in (1).

The results of a linear mixed-effects regression (*lmer*) revealed a significant interaction of *Group* (NNS vs. NS) and *Association_Strength* (stronger vs. weaker) in the region immediately after the main clause (R4) such that only NNS ($b = 0.09$, $p < .001$), but not NS ($b = -0.03$, $p = .583$), spent a longer time integrating the ASC with the verbs of weaker than stronger associations (see Figures 1 and 2). We also found significant main effects for the verb's lexical sophistication indices at R4 in NNS with increased RTs as each of these values was lower: *Frequency* ($b = -0.04$, $p = .006$), *Concreteness* ($b = -0.05$, $p = .004$), *Familiarity* ($b = -0.05$, $p < .001$), and *Meaningfulness* ($b = -0.05$, $p = .001$). NNS also demonstrated greater difficulty with the verb–ASC integration when the verb and the verb–ASC combination were less frequent.

These results suggest that the L1-Korean L2-English learners' processing of the English prepositional dative construction was modulated by both the verb–ASC association strength and the verb's lexical properties including frequency, concreteness, familiarity, and meaningfulness. These findings are consistent with the prediction of the constructionist approach, arguing that both a verb's lexical information and the association between a verb and a construction jointly affect L2 sentence processing.

Keywords: usage-based constructionist approach, L2 sentence processing, verb-construction association, English prepositional dative construction

Sample stimuli

- (1) a. Stronger association condition:
The secretary (R1) / sent (R2) / the schedule to the president (R3) / after (R4) / work (R5) / on (R6) / Tuesday (R7).
- b. Weaker association condition:
The secretary (R1) / texted (R2) / the schedule to the president (R3) / after (R4) / work (R5) / on (R6) / Tuesday (R7).

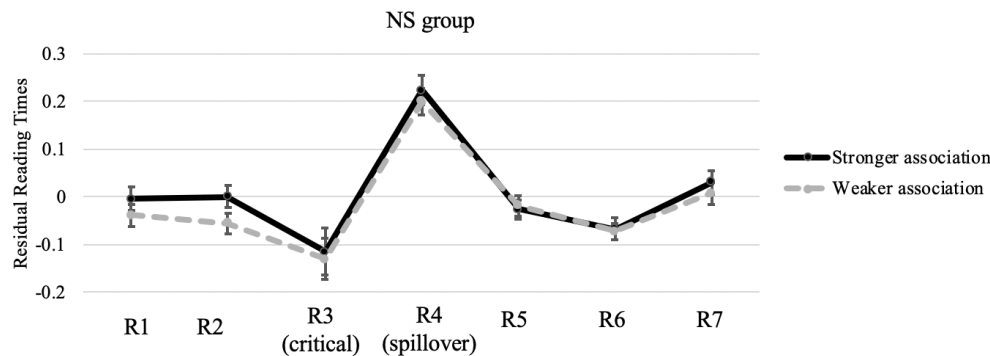


Figure 1. Residual RT profiles for the NS group; error bars denote 95% confidence intervals.

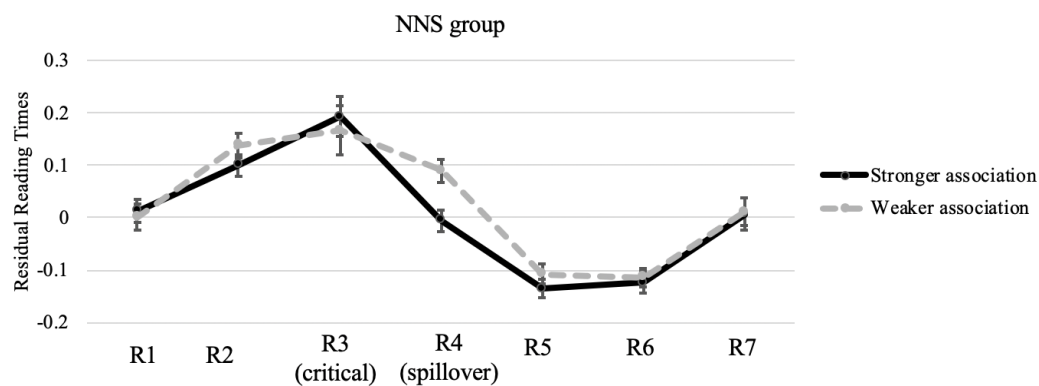


Figure 2. Residual RT profiles for the NNS group; error bars denote 95% confidence intervals.

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