

### Agreement attraction in nonnative language processing: The effect of sentence complexity

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It is well-known that native English speakers sometimes fail to notice subject-verb agreement violations when there is a number-matching attractor in the subject noun phrase (e.g., \*The key to the *cabinets* were old and rusty; [1]). This is commonly referred to as agreement attraction, and it is a robust effect observed cross-linguistically with various types of agreement in different populations, including nonnative speakers like Spanish-English bilinguals (e.g., [2]).

Interestingly, it has recently been reported that Chinese-English bilinguals seem to be immune to this effect [3]. In that study, Chinese speakers were equally able to detect agreement violations in English whether there was an attractor or not in the sentence, indicating that they were in some sense performing *better* than native speakers in detecting a grammatical error. The authors explained this lack of L2 attraction under a cue-based memory retrieval account, proposing that while native speakers use both the structural [+subject] and number [+plural] cues to retrieve a matching head noun in memory, Chinese-English bilinguals utilize the L1/L2 shared structural cue but not the number cue which is specific to L2 processing. That is, the lack of S-V agreement in Chinese enables the bilinguals to avoid interference from partially-matching attractors when processing agreement in English. The findings are, however, inconsistent with those of another study where Korean-English bilinguals, whose L1 also lacks S-V agreement, showed L2 attraction effects [4]. One critical difference between the two studies is that the former used prepositional phrase (PP) modifiers while the latter used relative clause (RC) modifiers. This study set out to test whether the conflicting results were strictly due to the different structures, by comparing PPs and RCs within the same group of participants and using carefully balanced items. A group of 41 highly-proficient Korean-English bilinguals and a control group of 23 native English speakers performed a speeded acceptability judgment task, where sentences with manipulations of grammaticality, attractor, and modifier type (Table 1) were presented quickly word-by-word on the screen. Participants' acceptance rates were analyzed through mixed-effects logit models.

The most important and novel finding was that unlike the native controls who showed clear attraction effects regardless of modifier type (as in [2]), the nonnative speakers showed attraction with (syntactically more complex) RC modifiers but not with (simpler) PP modifiers, indicating that L2 attraction is modulated by sentence complexity (Figure 1). The discovery of attraction with nonnative speakers whose L1 does not have S-V agreement and its unique modulation by structural complexity provide valuable evidence for and against existing accounts on L2 sentence processing: 1) The attraction observed with RCs serves as evidence against the proposal that L2-specific cues are not used in L2 memory retrieval [3], since the bilinguals' susceptibility to interference from plural attractors indicate that they do make use of cues which are not relevant in their L1 processing; 2) The null-attraction observed with PPs is inconsistent with the prediction that L2 learners are *more* prone to attraction than native speakers [5], or that both groups rely on the same cue-based retrieval mechanisms [4]. Rather, this study provides the first direct empirical evidence for the hypothesis that cues may be *weighed* differently in L1 and L2 processing, such that cues specific to the nonnative language is weaker than those shared between the languages. Under this theory, Korean-English bilinguals rely more on the shared structural [+subject] cue than the L2-specific [+plural] cue which helps them successfully avoid interference from plural attractors. However, when the attractor is embedded in a more complex structure that requires greater processing load (in RCs than PPs), the effortful parsing of that structure in the L2 may increase activation level of the attractor and make the originally weaker number cue more readily available to the parser, hence leading to increased misretrieval of the attractor in RCs. This seems to capture the different L2 attraction effects between PPs and RCs and why the modulation only occurs with nonnative speakers whose L1 does not have S-V agreement. More research is encouraged to further explore the possibility of different cue-weighting in L2 processing, through systematic manipulations of sentence complexity and cue familiarity.

Table 1. Experiment conditions and example sentences

Type	G/U	Attractor	Condition	Example
PP	G	N	SSS	The <b>artist</b> with the tall <i>sculpture</i> <b>is</b> very talented.
		A	SPS	The <b>artist</b> with the tall <i>sculptures</i> <b>is</b> very talented.
	U	N	SSP	The <b>artist</b> with the tall <i>sculpture</i> <b>are</b> very talented.
		A	SPP	The <b>artist</b> with the tall <i>sculptures</i> <b>are</b> very talented.
RC	G	N	SSS	The <b>artist</b> who made the <i>sculpture</i> <b>is</b> very talented.
		A	SPS	The <b>artist</b> who made the <i>sculptures</i> <b>is</b> very talented.
	U	N	SSP	The <b>artist</b> who made the <i>sculpture</i> <b>are</b> very talented.
		A	SPP	The <b>artist</b> who made the <i>sculptures</i> <b>are</b> very talented.

Note: G = grammatical, U = ungrammatical, N = no attractor, A = attractor, S = singular noun, P = plural noun.

Table 2. Participants' mean accuracy (% correct) on the speeded acceptability judgment task

Group	Conditions							
	PP				RC			
	SSS	SPS	SSP	SPP	SSS	SPS	SSP	SPP
<b>NS</b> (N = 23)	94.78 (9.53)	87.54 (13.57)	85.22 (16.96)	64.20 (18.24)	96.38 (10.00)	91.74 (13.40)	89.28 (16.04)	57.83 (31.41)
<b>NNS</b> (N = 41)	93.21 (10.17)	94.39 (9.90)	84.07 (24.64)	80.57 (23.89)	95.85 (10.51)	91.59 (12.17)	89.27 (15.67)	74.39 (28.95)

Note: NS = native speakers; NNS = nonnative speakers; Standard deviations are in parentheses.

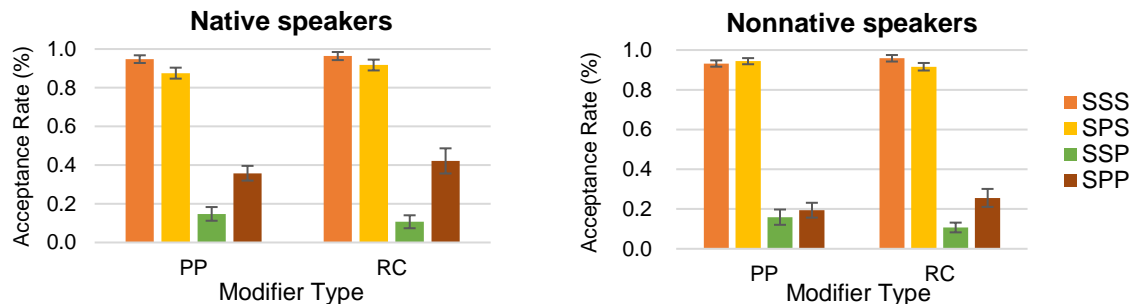


Figure 1. Native speakers' (left) and nonnative speakers' (right) mean acceptance rates

Note: Error bars represent standard errors.

[Potential weighing of cues in processing L2 subject-verb agreement]

NP The <b>key</b> ...	PP to the brown <b>cabinets</b> ...	VP <b>were</b> ...	→ no competition (key > cabinets)
<u>[+subject]</u> [-plural]	<u>[-subject]</u> [+plural]	look for <u>[+subject]</u> <u>[+plural]</u>	
NP The <b>key</b> ...	RC that opened the <b>cabinets</b> ...	VP <b>were</b> ...	→ competition (key = attractor)
<u>[+subject]</u> [-plural]	<u>[-subject]</u> [+plural]	look for <u>[+subject]</u> <u>[+plural]</u>	

Note: Matching cues are in matching colors: blue = matching structural cue; red = matching number cue. More readily used cues are bolded and underlined.

References

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