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L2 processing and memory retrieval: Some empirical and conceptual challenges

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Cunnings' keynote offers a new perspective on L2 processing by casting L1–L2 differences in terms of the memory system. One advantage of this approach is that it makes use of cue-based memory retrieval, a framework that has given rise to a wealth of research on L1 processing. However, there remain some questions about the evidence-base and predictions of the account, as well as conceptual challenges to its implementation.

One key tenet of Cunnings' account is that L2 speakers over-rely on discourse cues during processing. Cunnings implements this notion by proposing that features such as [+/-TOPIC] influence retrieval jointly with morphosyntactic cues. However, while morphosyntactic features can be obtained from the lexical entry of nouns or from the structural representations created by the parser, cues to topichood are variable and may occur after the relevant discourse referent has been encountered. For example, in the sentence "*When Sarah got home from work*...", *Sarah* becomes the topic only if the continuation is a coreferential pronoun but not if it is a name such as *John*. It is unclear how the features of *she* or *John* could be used within a cue-based architecture to (re)assign a [+/-TOPIC] feature to the chunk representing *Sarah* in memory. Further, the notion of discourse differs considerably between studies on pronoun resolution and structural ambiguity. In the former, discourse is associated with the notions of topichood and focus. In the latter, discourse is used to capture speakers' awareness of the pragmatic fit between a sentence and its preceding context. These two notions are not captured equally well with a [+/-TOPIC] retrieval cue.

Turning to the predictions of Cunnings' account, it posits that L2 speakers should show larger interference effects than L1 speakers during processing. However, a descriptive survey of the literature on agreement attraction, which has focused on number interference effects, does not offer much support for this prediction (see Table 1). In fact, similar rates of attraction are often found in L1 and L2. Interestingly, when stronger L2 interference effects do occur, they arise for learners whose L2 is richer or as rich in agreement morphology as their L1. Thus, the magnitude of interference effects may be influenced by the morphological richness of agreement morphology across languages, rather than their native or non-native status.

Further, the evidence discussed by Cunnings is not unambiguously supportive. For example, the eye-tracking study by Jacob and Felser (2016) is cited as evidence for retrieval difficulty in L2s. But in that study, L1–L2 differences were specific to particular online measures, with similar effects for L1 and L2 in offline and other online measures. Explaining such data patterns through retrieval difficulty requires additional assumptions about how memory retrieval differentially affects particular measures. Similarly, Cunnings explains L1–L2 differences in both online and offline measures through memory retrieval during processing. But offline measures are traditionally assumed to reflect stable differences in how native and L2 speakers ULTIMATELY represent grammatical constraints. Should we attempt to capture online and offline differences using the same retrieval mechanism?

Despite these issues, Cunnings' approach is promising and we hope to see it refined and extended to domains beyond sentence comprehension, as previous L2 accounts have done. For instance, some studies on morphological processing have suggested that L1–L2 differences are selective, such that they affect inflected, but not derived, words (e.g., Kırkıcı & Clahsen, 2013). This selective pattern points more towards inherent representational differences than to memory retrieval issues and thus provides an interesting challenge and a rich area for further development.

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Table 1. *Comparison of L1–L2 number interference effects in production and comprehension. Interference effects were quantified as the difference between* interferer *and* non-interferer *conditions (e.g., "*the key to the cabinets*" vs. "*the key to the cabinet*"). For comprehension studies, mean effect sizes are provided using Cohen's d and 95% confidence intervals. Of the twelve experiments, seven show similar interference effects in L1 and L2, two show larger L1 effects, and only three show larger L2 effects.*

Study	Modality	Measure	Participants	Attraction effect		Pattern
				L1	*L2*	
Tanner et al. (2012)	comprehension	acceptability judgments	English native speakers ($n = 31$) vs. Spanish advanced learners of L2 English ($n = 20$).	0.51 [0, 1.01]	0.52 [-0.12, 1.14]	L1 ~ L2
Lim & Christianson (2014)	comprehension	total reading times at the critical verb	English native speakers ($n = 35$) vs. Korean intermediate and advanced learners of L2 English ($n = 37$).	0.09 [-0.38, 0.56]	0.20 [-0.26, 0.66]	L1 ~ L2
Lago & Felser (submitted)	production	error rates				
	Experiment 1-2A		German native speakers ($n = 40$) vs. Russian advanced learners of L2 German ($n = 40$).	2.63%	5.16%	L1 < L2
	Experiment 1-2B		German native speakers ($n = 59$) vs. Russian intermediate and advanced learners of L2 German ($n = 62$).	6.05%	2.17%	L1 > L2
Nicol & Greth (2003)	production	error rates	English late learners of L2 Spanish of intermediate-to-advanced proficiency ($n = 18$).	10.70%	10.55%	L1 ~ L2
Hoshino, Dussias, & Kroll (2010)	production	error rates				
	Experiment 1		English intermediate learners of L2 Spanish ($n = 38$).	5.05%	4.55%	L1 ~ L2
	Experiment 2		Spanish intermediate learners of L2 English ($n = 15$).	6.75%	9.55%	L1 < L2
			Spanish advanced learners of L2 English ($n = 20$).	4.60%	9.35%	L1 < L2
Foote (2010)	production	error rates	English late learners of L2 Spanish with intermediate and advanced proficiency			
	Experiment 1		intermediate ($n = 52$)	3.30%	3.20%	L1 ~ L2
			advanced ($n = 18$)	1.70%	1.40%	L1 ~ L2
	Experiment 2		intermediate ($n = 16$)	4.50%	4.90%	L1 ~ L2
			advanced ($n = 16$)	9.40%	2.30%	L1 > L2

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