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Individual differences and retrieval interference in L2 Processing

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Cunnings' keynote article outlines a novel approach to native/non-native differences in on-line language comprehension by proposing that L2 speakers are more susceptible to cue-based retrieval interference than natives. Cue-based, parallel access approaches to processing have been prominent in monolingual studies for around 15 years now, but have barely been applied to L2/bilingual processing. We are particularly excited about the possibilities that this approach offers for understanding L1, L2 and bilingual processing, as well as individual differences. In this commentary, we focus on two issues: 1) whether the existing evidence for cue-based retrial mechanisms in L2 processing support a deficit model, as Cunnings seems to claim, and 2) how individual differences may explain both similarities and differences in L1 and L2 processing.

Like many others, Cunnings explains processing differences between L1 and proficient L2 speakers by appealing to L2 processing deficits: "L2 speakers are more susceptible to retrieval interference when successful comprehension requires access to information from memory." However, we note that the scant research supporting this approach cited in the keynote article actually suggests similarities between L1 and L2 processing instead. For example, in the Tanner and colleagues' study (Tanner, Nicol, Herschensohn & Osterhout, 2012) on agreement attraction, the attraction effect magnitudes for both behavioral and ERP measures were essentially identical between the L1 and L2 groups. Additionally, both groups were equally influenced by syntactic structural effects. The qualitative L1/L2 similarities in deployment of retrieval mechanisms found in that study are striking. Moreover, in the anaphora studies mentioned in the keynote, the L2 speakers do not appear to be MORE susceptible to interference, but instead seem to weigh cues differently: L2 speakers place more weight on discourse cues than native speakers. In our view, these results point less to differences in susceptibility to interference, but instead to differences in the cues used when performing memory retrieval procedures, something that is only vaguely stated in Cunnings' article.

Regarding our second point, Cunnings suggests that a key goal for L2 research is documenting the role of individual differences (IDs) in retrieval interference as a window on the cognitive mechanisms supporting syntactic dependency formation. We wholeheartedly agree, and are currently performing a series of ID studies on L1 and L2 processing. Cunnings cites recent work by Van Dyke and colleagues arguing that processing working memory (WM)-based explanations for susceptibility to cue-based retrieval interference do not have as much predictive power as explanations appealing to the quality of individuals' lexical representations. However, while we agree that ID research is an important avenue for both L1 and L2 processing work, there are a few issues regarding ID research in this domain that must be pointed out. The first is the notion that WM is purely a capacity-constraint is not fully in-line with current thinking from the field of IDs in executive function. For example, the WM framework proposed by Engle and colleagues (Engle, 2002) conceptualizes what is traditionally called WM capacity as a skilled executive control mechanism. Indeed, attentional control as measured by inhibition tasks has shown to be an important component of IDs in WM span (Unsworth & Spillers, 2010).

Second, we note that most previous work on IDs in language processing has used single (observed) measures to tap what are presumably latent (unobserved) constructs (e.g., reading span to measure WM, or a single cloze test to measure proficiency). However, single measures of latent constructs have higher measurement error lead to an increased false positive rate in individual differences research (Westfall & Yarkoni, 2016), and do not adequately measure full constructs. A solution to this is to use multiple measures of each latent construct in tandem with latent variable analysis, such as principal

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components analysis or structural equation modeling (Conway, Kane, Bunting, Hembrick, Wilhelm & Engle, 2005; Westfall & Yarkoni, 2016). This is an approach we have begun taking in our own work. For example, emerging results from the second author's lab using ERPs shows an important role for individual differences in working memory during L1 semantic access (as measured by the N400), but (counterintuitively) little to no role for quality of lexical representations (Tanner, Bulkes, Shantz, Armstrong & Reyes, 2016). Although this study was not intended to target retrieval interference specifically, these new results suggest that 'capacity' measures indeed show predictive power for individuals' ability to manage sentence- and message-level meaning and perform semantic access during language comprehension. We are currently working on extending this to L2 populations.

Despite these issues, we are broadly enthusiastic about extending cue-based retrieval research into the L2 and bilingual domains and find Cunnings' contribution highly promising. Intriguing questions for future research are whether different speakers use different cues, what those cues are likely to be, how cross-linguistic differences influence cue use, and what individual differences predict what types of cues will be used when.

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