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Fuzzy Representations

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Peer Commentaries

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Second language (L2) learners typically have considerably less experience using their L2 than their L1. This holds across hearing, speaking, reading, writing, and comprehending and communicating meanings, though to differing degrees dependent upon learner context, motivations, and gross cross-linguistic differences in problem space complexity. We learn from usage (Wulff & Ellis, 2018). Limited usage / practice / processing results in limited learning / accuracy / fluency / entrenchment / automatization / breadth / depth / richness / precision / idiomaticity / nativelike selection / proficiency / pragmatic competence / etc. Bordag, Gor and Opitz (BGO) (2021) provide an impressive catalogue of effects of this type, on the basis of which they propose the Ontogenesis model (OM) of L2 lexical representation wherein "fuzziness is a pervasive property of the L2 lexicon: most L2 representations are low resolution and the ontogenetic curve of their development does not reach the optimum (i.e., the ultimate stage of their attainment with optimal encoding) in one or more dimensions".

A Google Scholar search (vocabulary AND SLA AND language) currently returns more than 66,000 articles[1]. I certainly have not read them all, though I recognize many of the most relevant. I can remember only a very few that suggest that L2 vocabulary is better than L1 vocabulary in whatever facet of attainment the article addressed. So, the OM agrees with this large literature that L2 proficiency is typically less than L1.

I share BGO's fascination with fuzzy representations and the emergence of lexical systems from experience (Beckner, Blythe, Bybee, Christiansen, Croft, Ellis & Schoenemann, 2009; Ellis, 1998; MacWhinney & O'Grady, 2015). The challenge is to have precise testable theories explaining how particular aspects of experience lead to particular facets of expert representation. We have a long way to go. I see the following as being essential:

We need to understand the separate contributions of implicit and explicit learning (Ellis, 1994b). Explicit learning is essential in consolidating new explicit memories, particularly episodic or declarative memories that allow us to learn new vocabulary or to recognize new objects or concepts and to bind their features cross-modally (think of your initial fast-mapping of the concept of COVID-19, images of the spikes on the coronavirus, the spoken word-form as you heard the morning news…). It requires attention, Schmidt's "noticing", working memory, neural explicit memory systems involving the hippocampus — "explicit cognitive mediation" (Ellis, 1994a). Contrast implicit learning which is essential in tuning our knowledge to attain the competence, fluency, prediction, and idiomaticity of language expertise. Implicit learning occurs in various of our perceptual and motor systems — "the implicit ins and outs" (Ellis, 1994a). Ellis (2002) reviewed the evidence of frequency effects in the learning and processing of all levels of language representation: phonology and phonotactics, reading, spelling, lexis, morphosyntax, formulaic language, language comprehension, grammaticality, sentence production, and syntax. Given that we never consciously count our language use, these aspects of language learning must reflect implicit learning. Implicit learning rationally tunes us to the likelihood of perceiving things in the world and the things that likely co-occur with them. It gives us rational cognition (Ellis, 2006). Usage-based linguistics shows that language cognition rests on thousands of hours of implicit learning from usage from which emerge language-relevant representations and their associations.

Taking things forward, we should strive to give detail to the OM Ghostbusters graphics relating ill-defined "time" with "degree of acquisition" and "optimum reached". Replace "time" with precisely measured histories (or representative corpora) of input so to analyze the latent structure and its potential for processing in different dimensions of representation (Ellis, 2017). Ditto "degree of acquisition" and "optimum reached" (Optimal for what, exactly? Measured how?). Informed by appropriate theories of associative learning – either connectionist or Rescorla Wagner rational contingency learning (Ellis, 2006) – we should actively test theories of ontogenesis using computational simulations (e.g., Baayen, Chuang, Shafaei-Bajestan, & Blevins, 2019). We attempted some of these moves in Ellis, Römer, and O'Donnell (2016).

It is puzzling how research on bilingualism, lexicon, vocabulary, applied linguistics, and SLA often end up in different silos. I see BGO as a useful integrative step, as I do the more

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[1]This seems high. I would say that I've mis-specified the search except that the individual parts seem to behave appropriately and play together well, and the top hundred hits seem highly relevant. Whatever, it's a big number, and the two Pauls (Meara and Nation) should be happy with the interest they have engendered in this research area.

transdisciplinary perspectives of Douglas Fir Group (2016). There are many essentials to a theory of language cognition (Ellis, 2019).

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