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DISCUSSION

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Overgeneralizations, competition, and recovery: solving the logical problem with positive evidence

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It would seem to be incomplete for any introduction to language acquisition to leave the 'logical problem of language acquisition' untouched – in fact, it would seem to be logical to just start the introduction with the logical problem. MacWhinney lays out a proposal here that attempts to dismantle the logical structure of the logical problem: there is no logical problem, if we consider carefully (a) the actual input that children receive from parents, and (b) the mechanisms that children use to handle possible pitfalls in extracting grammar from the input.

The central argument in MacWhinney's emergentist proposal is that children can learn language by the use of positive evidence without direct negative evidence (perhaps with some indirect negative evidence). Although many connectionists and empirically minded researchers think that positive evidence is all that is needed, the thesis that language acquisition can succeed with just positive evidence would sound like a behaviorist renaissance to most generative linguists. However, MacWhinney provides a detailed list of psycholinguistic mechanisms, explained and situated within the modern dynamical systems theory that he calls 'emergentism' (MacWhinney, 1999). Of particular interest among these mechanisms is the competition principle, which MacWhinney believes is the core to the recovery of overgeneralizations. In other words, when coupled with a few simple fine-tuning devices, competition solves the 'no negative evidence' problem.

MacWhinney's newly formulated competition principle is convincing: the competition between episodic support and analogic pressure drives language production to the correct form, which eventually eliminates the incorrect form. Overgeneralization errors that do not receive sufficient auditory support gradually give way to the correct forms that accumulate episodic support over time. For example, because *unbuild* is rarely heard in the input, the child eventually retreats to the correct forms such as *dismantle* or *knock down*. The competition mechanism would work equally well for morphological and syntactic overgeneralizations, for lexically

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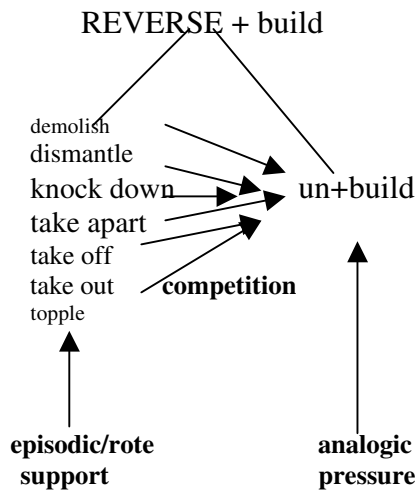


Fig. 1. Multiple competition forces to remove overgeneralization (diagrammatically larger fonts for more frequent words and smaller fonts for less frequent words; competition weights are not shown on the arrows).

based and semantically motivated errors, and for systematic gaps (e.g. the unavailability of *un-* for certain verbs) and incidental irregulars (*goed* for *went*).

One crucial aspect for competition to work in this manner is that the form supported by episodic or rote memory has to directly compete with the form produced by analogical pressure. However, it is not clear that competition should occur on a one-to-one basis in the actual learning situation. In the case of *went* and *goed*, it may be straightforward that in every context in which the child expects *goed* the adult would say *went*, and hence there is indeed a one-to-one competition. In other cases, however, the situation might be more complex. Consider the example of *unbuild*, an overgeneralization that could be produced when the child describes the action of detaching lego-blocks (Clark, Carpenter & Deutsch, 1995) or when the child refers to the detachment of decorative pieces from a snowman (Li, 2004). In English we have several words that could act as the correct forms for *unbuild*, depending on what *unbuild* is intended to express, such as *demolish, dismantle, knock down, take apart, take off, take out, topple*, and so on. These forms differ in how often they are used in spoken or written language. For example, *demolish* and *topple* are more formal (and less frequent to the child) while *knock down* and *take apart* are more colloquial (and more frequent to the child). The child would need to track the relationships between these correct word forms that he hears in the input and the incorrect, overgeneralized form that he would otherwise produce. In other words, we

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do not have a one-to-one competition link (as depicted by MacWhinney), but instead have multiple sources of competition in place (as depicted in Figure 1).

When these multiple competitions are at work, what we might see then is a connectionist network whose weights adapt in response to the linguistic environment – the contexts in which the overgeneralized form occurs, as well as the contexts where adults produce the correct forms but the child expects the overgeneralized form. Both low-frequency and high-frequency words would compete with the incorrect form, but to different degrees: high-frequency words gain stronger episodic support over time, while low-frequency words have much weaker episodic support. Weaker episodic support is less effective as a competitor than stronger episodic support, in which case the overgeneralized form supported by analogic pressure could linger on for a while. This explains why even adults are sometimes unsure of some forms with regard to their acceptability in the language, attesting to the probabilistic nature of well-formedness and grammaticality. That competition is a probabilistic mechanism is also important for us to account for the co-existence of both the overgeneralized form and the correct forms. For example, the child may produce *unbuild*, *take apart*, and *knock down* interchangeably, analogous to a period when the child says both *comed* and *came*.

When competition is weighted as a function of input characteristics as discussed here and in connection with other variables as discussed by MacWhinney, we can be confident then that the child has at her disposal a good set of tools to recover from overgeneralizations, with positive evidence only. Hence, a critical component of the logical problem of language acquisition, the 'no negative evidence' problem, can be solved.

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