

Theories about 'theories': where is the explanation? Comment on Waxman and Gelman

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Waxman and Gelman [1] raise a central issue in cognitive development: whether all knowledge emerges from data. Their answer is 'no' – even in early development, the emergence of knowledge depends on rudimentary theories and data. Waxman and Gelman present four arguments to support their 'child-as-both' (CB) position. Their arguments, however, have a crucial limitation: no explanation is offered for how these theories come about or what the simpler components of these theories are. Consequently, in contrast to alternative accounts [2], CB fails to explain emergence of the very phenomena it enlists as supportive evidence.

Waxman and Gelman [1] argue: 'As infants and young children establish concepts and acquire words to describe them, they rely on both the (rudimentary) theories that they hold and statistics that they witness'. The description suggests that theories predate both 'concepts' and 'words'. Although this could well be the case, it raises two crucial questions. Without concepts, what is the unit of a theory? And how do theories get there? Are these theories akin to literacy, something that people eventually acquire? Or are theories rather akin to the universal grammar that has been claimed to precede any learning [3]? In the former case, theories emerge from data, and the CB account does not differ from the 'child-as-data-analyst' (CDA) account. In the latter case, theories do not emerge from data and the proponents of CB accounts have to explain where the theories come from. Without such answers, CB substitutes an explanation with 'a simple epistemic device that relieves one of the burden of demonstrating how knowledge got there' ([4], p. 150).

Consider an example provided by Waxman and Gelman as evidence that words refer [5]: 18-month-olds were shown a photograph of an object accompanied by a count noun ('a whisk'). When asked to extend the word to another photograph of a whisk, to an actual 3D whisk or to both, infants rarely generalized words only to the picture. Waxman and Gelman conclude that these findings are incompatible with the strictly associative account. Why not? Given that the majority of the early nouns are associated with 3D objects and not with pictures (i.e. babies spend more time roaming the world rather than reading picture books), 18-month-olds are likely to have more statistics about word-object associations than word-picture associations. Therefore, there is little surprise that a brief experience fails to override hard learned contingencies and such failure is testimony to the power of associations rather than evidence against it. By contrast, by simply stating that 'words

refer to concepts,' Waxman and Gelman use *explanandum* as *explanans*.

Although time is crucial in the study of development, it is missing from the Waxman and Gelman argument, thus resulting in an exceedingly static picture of human development. Consider the argument that words refer. For many researchers, reference is neither timeless nor universal, but is a product of development: 'One might think that it goes without saying that a symbol always represents something 'other than itself, but only gradually do infants appreciate how some symbols differ from their referents.' ([6], p. 68). Although, no full account of the development of reference has been offered yet, several proposals have been put forward about words starting out as features [7,8]. Therefore, if time is taken seriously, then 'words are features' and 'words refer' could be as non-contradictory as 'children babble' and 'children read'.

The CB account does not dispute the role of data, but argues for the role of theory. However, CB is yet to formulate in clear and testable terms what these theories are, where they come from, what their components are and how they interact with data. If theories are generalizations over data, then CB account is reduced to the CDA account. However, if the claim is that theories are not derived from data, then the CB account has to specify what the theories are a product of. Progress in understanding cognitive development requires more than metaphors; it requires quantifiable, testable and falsifiable theories.

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