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Words, Actions, Objects and Abstractions

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Abstract

Development is fundamentally a constructive process, creating new forms. This is certainly so at the level of the body; after all, we begin as a single cell, become a mass of identical cells, and then these differentiate into exquisite new structures with new higher level organizations. This talk is about the fundamentally constructive nature of processes of cognitive development: how development creates new forms of behaviors and abilities from interaction of multiple processes, engaged in different assemblies in overlapping tasks; how every developmental cause is itself a consequence of developmental process; how development is made of weird loops of causes and consequences with far-reaching and expected developmental dependencies. The talk will focus on one empirical example: the dramatic changes that occur in 3-dimensional visual object recognition between 18 and 24 months of age -- changes that appear deeply related both to children's actions on objects and also to their learning of object names.

Keywords: embodiment, object recognition, word learning, development.

Human beings are remarkably inventive, able to solve problems and to create things never created before. This chapter is about one early form of inventiveness that has long intrigued developmentalists -- what is some times symbolic play, but more narrowly, is also known as "object substitution in play." The specific phenomenon consists of young children using some object --not for what it is --but as a "stand in" for something else in play -- a banana as a phone, a box as a doll bed, a shoe as a toy car. Piaget considered object-substitution in play -- the using of a banana as phone, for example -- as "symbolic" because the substituted object could be interpreted as "standing for" the real thing. This view that object-substitution is a form of symbolizing (whatever precisely that means) has been disputed. Regardless on one's stand on this issue, object substitution in play remains a signal developmental achievement, emerging at the same time (18 to 24 months) as children's spoken vocabulary also expands. Perhaps most critically, object substitution in play is strongly linked to individual children's language development with the lack of this behavior is a strong predictor of significant subsequent language delay. At one level, this talk is about how and why these object substitutions may be linked to

language learning through developmental changes in visual object recognition.

At a broader level this talk is about the fundamentally constructive nature of developmental process itself: how development creates new forms of behaviors and abilities from interaction of multiple processes, engaged in different assemblies in overlapping tasks; how every developmental cause is itself a consequence of developmental process; how development is made of weird loops of causes and consequences with far-reaching and expected developmental dependencies.

A summary of the developmental story we will tell is provided by Figure 1: Learning object names increases children's attention to shape, which in turn speeds up object name learning. Learning object names also changes how children perceive object shape, which facilitates learning and generalizing object names and of actions. Acting on objects, in turn, refines and tunes --making even more abstract -- the representation of object shape. Along the way, we will suggest, and provide evidence for the idea, that the abstract representation of object shape is the critical link between object name learning and object substitutions in play.

Figure 1. Loops of causes and consequences in the development of visual object recognition

