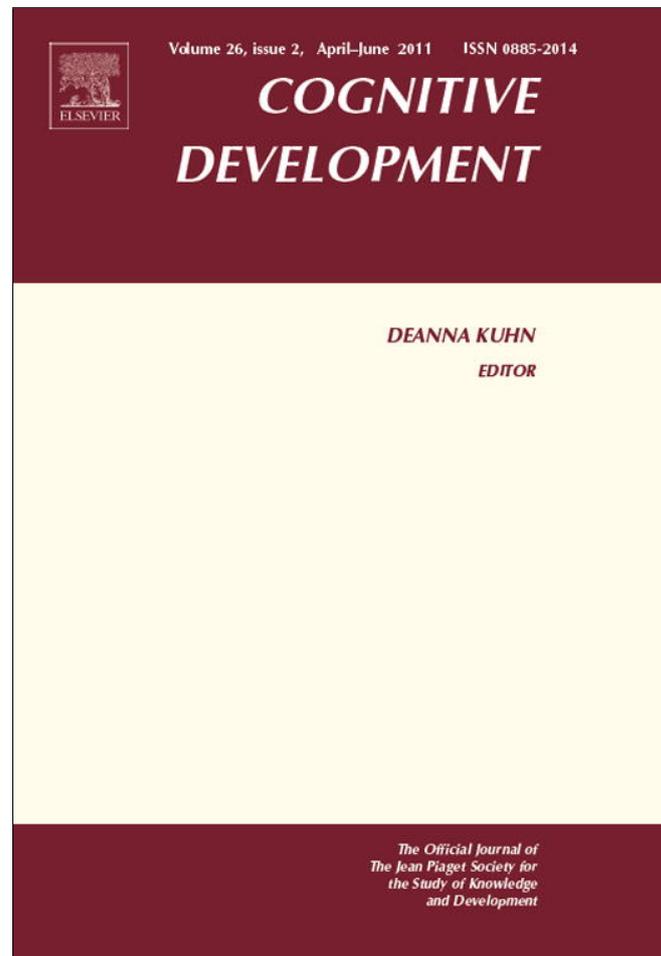


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## Cognitive Development



## Discussion

## Categorization, object individuation, and object manipulation: Commentary on “Object manipulation facilitates kind-based object individuation of shape-similar objects” by O.S. Kingo and P. Krøjgaard (2011)

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Kingo and Krøjgaard (2011) report a set of wonderful experiments investigating the role of kind representations and the role of object manipulation in object individuation. Their results replicate the results of Xu, Carey, and Quint (2004) with exemplars that belong to different global categories – it is always reassuring to see replications across different laboratories! – and they report very interesting effects of object manipulation as well.

I make two points in this commentary. First, what is the role of object manipulation and why should we care? Second, why are there disparities between studies of categorization and studies of object individuation in infants?

Object manipulation clearly differs from visual inspection of objects. One reason why object manipulation might facilitate the recognition of global categories, as Kingo and Krøjgaard suggest, is that it may increase attention to kind-defining features. Another possible reason why object manipulation helps is that there are perceptual differences between global categories, e.g., animals vs. furniture, that are better perceived through manipulation. Specifically, animals tend to be curvilinear whereas furniture pieces tend to be rectilinear – these straight lines and sharper edges may better be felt than seen. This could be one reason why object manipulation helped in the authors' Experiment 4 but not in Experiment 5.

More generally, I agree with Kingo, Krøjgaard and others that we must pay attention to the role of object manipulation and object function. For example, Wilcox and Chapa (2004) and Wilcox, Woods, and Chapa (2008) showed that if a red object is used as a hammer (in this case, the object is manipulated by the experimenter to convey a function) but a blue object is not, infants then pay attention to the feature of color, since it is now functionally relevant. Xu (2002) found that labeling provides a powerful cue for object individuation. Nine-month-olds, who fail at the standard object individuation task (Xu & Carey, 1996), succeed when provided with labels on-line (e.g., familiar count noun labels such as “cup” and “ball” as well as unfamiliar count noun labels such as “fep” and “zav”). Furthermore, Xu, Cote, and

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Baker (2005) found that just hearing two labels being used to refer to objects leads 12-month-olds to establish a representation of two objects. Based on these findings, we have argued that language may play a privileged role in helping infants establish representations of object kinds. Another possible means for infants to develop representations of object kinds may be through the discovery of distinct functions, afforded by different kinds of objects. Intuitively, discovery of functions is perhaps better accomplished through manipulation than only through visual inspection.

Second, there continues to be some tension between results from categorization tasks and those from object individuation tasks (Xu, 2005, 2007). At the broadest conceptual level, categorization and individuation tasks may tap different aspects of concept acquisition. Categorization is about how perceptual features cluster, and forming categories is an important milestone in conceptual development. Although Mandler and colleagues (Mandler, 2004; Mandler & McDonough, 1996) have found evidence for global categories in 11-month-olds (see also Pauen, 2002), I wonder if these global categories do have perceptual features in common (e.g., curvilinear vs. recta-linear, having eyes vs. having wheels). Object individuation tasks, at least as I have construed them, are meant to get at the issue of kinds, that is, clusters of correlated perceptual features that are conceptualized as *non-accidental*. This conceptualization is a step beyond representations of categories. One way to distinguish between kinds (i.e., sortals, or sortal-kinds, see Hirsch, 1982; Macnamara, 1987; Xu & Carey, 1996; Xu, 2007) and categories is that for a kind, an essence may be critical in its psychological representation, since an essence is *causally responsible* for the surface features we see. This is the main tenet of psychological essentialism (Gelman, 2003). To date, however, no studies have directly addressed the issue of whether infants represent the clusters of correlated features, perceptual or otherwise, as non-accidental, and whether infants represent that essences are causally responsible for these correlated features. Answering this question remains a challenge for future empirical work in this area.

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