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Why the designer's intended function is central for proper function assignment and artifact conceptualization: Essentialist and normative accounts

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ABSTRACT

People tend to think that the function intended by an artifact's designer is its real or proper function. Relatedly, people tend to classify artifacts according to their designer's intended function (DIF), as opposed to an alternative opportunistic function. This centrality of DIF has been shown in children from 6 years of age to adults, and it is not restricted to Western societies. We review four different explanations for the centrality of DIF, integrating developmental and adult data. Two of these explanations are essentialist accounts (causal and intentional essentialism). Two of them are normative accounts (conventional function and idea ownership). Though essentialist accounts have been very influential, we review evidence that shows their limitations. Normative accounts have been less predominant. We review evidence to support them, and discuss how they account for the data. In particular, we review evidence suggesting that the centrality of DIF can be explained as a case of idea ownership. This theory makes sense of a great deal of the existing data on the subject, reconciles contradictory results, links this line of work to other literatures, and offers an account of the observed developmental trend.

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Introduction

If you look at your surroundings right now, most things that you see are probably artifacts created by people to fulfill different functions. Chairs, pens, light bulbs, and computers are part of an artificial environment that humans have created for themselves. To participate in a culture, people need to acquire the functions of its artifacts. There are some very simple functions (e.g., containment) that are acquired early in development (e.g., Aguiar & Baillargeon, 1998; Caron, Caron, & Antell, 1988). However, most functions need prolonged periods to be learned. As we shall see, the adult pattern of performance does not appear until 6 years of age.

A central aspect in learning an artifact's function is understanding that, though it may have many different functions depending on what it is used for (e.g., a hammer may be used to hold loose sheets of paper in place), there is one function that is proper to it (i.e., a hammer's proper function is to pound nails in place), which generally corresponds to what the object was originally designed for. In what follows, we will review evidence that the designer's intended function (DIF) is an important factor in the assignment of proper function and in artifact categorization, that the relevance of this factor develops from early childhood into adulthood, and that it generalizes across cultures. Then, in the subsequent sections, and after having described the phenomenon, we will critically discuss two kinds of explanations for it: essentialist and normative accounts. In Fig. 1, the reader may find a summary of the theoretical alternatives we will discuss, their main claims, and references to representative relevant work that supports each theory.

Function is a complex relational property which coherently organizes information from different conceptual domains (Barsalou, Sloman, & Chaigneau, 2005). An extended view among researchers is that understanding a function requires conceptually representing an event where an intentional agent uses the functional object to achieve a goal, revealing the object's physical properties that are causally relevant for the attainment of that goal (Futó, Téglás, Csibra, & Gergely, 2010). When subjects are allowed to understand it, artifact function becomes a central conceptual property, focuses attention to an object's functionally relevant physical properties, and guides categorization and artifact naming from early in development (reviewed in Chaigneau & Barsalou, 2008). In fact, evidence suggests that function can guide conceptualization from as early as 10 months of age (Futó et al., 2010).

As development proceeds, conceptual information about function acquires an increasingly complex structure. By 6 years of age, children already understand that though an artifact may afford different uses, it has a function that is proper to it, which generally coincides with the object's designer's intended function (i.e., what the artifact was made for) (see, e.g., Defeyter, Avons, & German, 2007). This tendency to conceptualize artifacts according to their designer's intended function (DIF), as opposed to other sources of information, is a stable and well documented phenomenon (see Fig. 1). Though the experimental paradigm that provides most of the evidence mirrors procedures used by Matan and Carey (2001), the phenomenon was first shown by Lance Rips (1989). In his experiment, Rips described the design of an object with a given function (e.g., a lampshade), but with the object resembling a different category (e.g., an umbrella). Participants were asked to provide categorization, typicality and similarity ratings. Results showed that though subjects recognized the low typicality of the artifact and the low resemblance to other members of its intended category, they still classified it according to its designer's intended function (e.g., participants thought the artifact was a lampshade, though it was atypical and more similar to an umbrella than to other lampshades).

In the affordances view of artifact function, an artifact is thought to be categorized according to its current function (i.e., the outcome that is achieved when using an artifact, depending on the interaction between its physical structure and an agent's intentional actions). Researchers have shown that adults attend to affordance information and use it centrally in categorization (Chaigneau, Barsalou, & Sloman, 2004; Puebla & Chaigneau, 2014). Similar results have been obtained with young children (Kemler-Nelson, Frankenfield, Morris, & Blair, 2000; Kemler-Nelson, Russell, Duke, & Jones, 2000; Madole & Oakes, 2005; Smith, 1999). Thus, an interesting issue has been whether DIF can override current function. In fact, Matan and Carey (2001) presented subjects (adults and young children) with stories about objects designed by a character for something (e.g., for watering plants) and later used by another character for something else (e.g., for making tea). Results showed that 6-year-olds (but not 4-year-

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