

Symbols Redefined

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To appear in:

Symbol Use and Symbolic Representation:
Developmental and Comparative Perspectives

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The goal of this chapter is to provide a thumbnail sketch of the traditional criteria for symbolic behavior, and to then outline new themes that have emerged in contemporary work and points of departure from the traditional views. This chapter and the volume as a whole suggest that it is time to move beyond the scope of traditional theories, and call for a redefinition of the criteria for symbolhood.

Traditional Criteria

Traditional psychological theories of symbol use and symbolic development stem from philosophical definitions of symbolhood that focus primarily on the nature of the symbolic form itself. Inherent in this focus is an assumption that the form of the symbol corresponds to its cognitive or representational status in the mind of the user. Three primary criteria for determining symbolic status have been predominant in traditional discussions. To earn symbolic status, a signal must (1) bear an arbitrary relation to its referent, (2) be decontextualized from its original learning environment, and (3) be part of an established conventionalized system that governs symbol meaning and usage. These criteria have been applied to a broad range of symbolic media and symbol systems, ranging from words to gestures, and from maps to musical notation. Below we review the rationale for each of these three criteria.

Arbitrariness. The first dimension of a signal that determines its symbolic status in traditional accounts is the relation between the signal and referent. Peirce (1932), among others, has argued that to achieve symbolic status, a symbol must be arbitrarily related to its referent. Peirce defines a range of referential signals that vary with respect to their resemblance to their referents. For example, in his terminology, “icons” and “indices” depict particular static or dynamic features of the referent. Peirce distinguishes these representations from more abstract representations for which the symbol-referent link can not be inferred through observation and therefore must be both abstract and learned. Piaget (1962), Werner & Kaplan (1963), and Vygotsky (1962) each also drew a fundamental distinction between those signals that resembled referents and those that were genuinely abstract and arbitrary. Inherent in this distinction is the assumption that icons and indices are readily recognized and interpreted from the onset of development, whereas the ability to learn arbitrary symbols develops gradually.

Decontextualization. Within the traditional framework, a representation may be granted symbolic status only when it is generalized beyond or decontextualized from the initial learning environment (Piaget, 1962; Werner & Kaplan, 1963; Deacon, 1997; Bates et al., 1979). For example, a child who waves “bye-bye” as people exit his front door might simply be enacting a ritualized routine for which he has been reinforced without necessarily understanding the

symbolic nature of the gesture. However, a child who spontaneously generalizes the gesture to people exiting other buildings (or even cars and trains) is displaying clearer evidence of having grasped the communicative content of the gesture. This decontextualization rule can be applied similarly to other symbolic domains. For example, within the domain of maps as symbols for space, a child who can point to her hometown on the map on her classroom wall may simply have learned the correct location through reinforcement and feedback. However, the child who can find her hometown on a new map with different markings is much more likely to have grasped the underlying symbolic relations between the map and space.

Conventionality. A third traditional criterion for symbolic status is the conventionality of the symbol-referent relation. Those representations that are fixed, systematically employed and culturally shared have been deemed symbols whereas those that are variable in their form or idiosyncratically used have not. Implicit in this criterion is the assumption that symbols are embedded within complex, rule-governed systems. Certainly some of the most prevalent symbolic media employed in day-to-day life –language, maps, musical notation – satisfy this criterion. Icons and emblems such as the thumbs-up gesture and the men’s and women’s restroom symbols are also standardized, conventionalized symbols. Excluded from the category of symbol under this criterion are spontaneously generated or idiosyncratic signals.

Contemporary themes

The traditional criteria outlined above are rigorous ones that have helped to shape our conceptions about what distinguishes symbolic from non-symbolic behaviors. However current work on symbolic development, and the contributions in this volume in particular, make clear that it is time to take a fresh perspective. Contemporary work reflects several points of departure from traditional criteria. Chief among these are 1) the role of intentionality in symbol use, 2) the nature of developmental change in children's insight into symbolic representation and 3) the degree of domain- and species-specificity of symbolic ability. In reviewing these points, we suggest that the emphasis has shifted from the nature of the symbol itself to the nature and history of the social context in which the symbol occurs and the cognitive processes employed by the producer and recipient of a symbolic act.

Intentionality

Symbol use is inherently a social activity implying both a producer who intends to convey information via some representational form and a recipient towards whom the information is directed. The producer uses a signal that is designed to capture her communicative goals in a manner that the recipient will be able to accurately de-code. Thus, contemporary theorists maintain that the communicative intentions of the symbol producer and the interpretive mental state of the recipient are of central importance in determining the symbolic nature of a communicative act. Although an emphasis on intentions in symbol processing is

far from a new idea, it received relatively sparse attention in traditional psychological theories.

Intentionality of the symbol producer. The intention to communicate is at the heart of symbol use. It is the drive to convey information to others that leads us to create interpretable symbols to represent objects, events and ideas. Indeed, as Goldin-Meadow (this volume, 2002) relates, the drive to communicate symbolically is so strong that even when deprived of symbolic input, young children create and systematically employ symbolic forms on their own. Does this imply that all communication is symbolic? Not at all. It is the intention to communicate that distinguishes symbolic from non-symbolic information. When a newborn cries because she is hungry, she is not producing her cries with any intention of conveying information about her physical state. Yet although the infant did not produce the signal with the intention to communicate (and hence, did not produce it as a symbol), the parent can use the signal to make inferences about the infant's internal state. In this case, the cry effectively communicates information about the infant's need, despite her lack of intention to do so.

Adults too can communicate non-symbolically, even inadvertently. Facial expressions are a prime example. Among non-human animals, fear grimacing in primates and the colorful plumage of male birds are examples of signals that are non-symbolic but serve a communicative function. Note, however, that many of these typically involuntary forms of communication can be used intentionally as

well, and only then do they take on symbolic status. When Friend A rolls her eyes at Friend B behind Friend C's back to convey contempt for Friend C's behavior, Friend A is intentionally recruiting a facial expression in the service of transmitting a message. In this sense, the same signal can be produced symbolically or non-symbolically, depending on the intent of the user.

Indeed, it is likely that some symbols came into use by being transformed from unintentional to intentional communicative acts in this manner. Imagine a woman making a soufflé and trying to find her whisk. While searching, she unconsciously enacts a whisking motion with her hand. In this case, the gesture performed was not intended to communicate although it was a form of representation. However, if the woman's daughter, upon entering the kitchen, observes the whisking motion, she may interpret her mother's gesture as an intentional bid for assistance, and may join in the search. In this example, there is a mismatch between the intention of the signal producer (non-communicative) and the interpretation of a recipient (communicative). But this episode may itself establish a sort of communicative convention between the woman and her daughter, such that on future occasions, one can employ the whisking gesture symbolically, confident that the other will interpret it accurately.

Intentionality of the symbol's recipient. A variety of social factors influence the degree to which a symbolic message is understood. The experience that the producer and recipient have with each other, the immediate physical and

social context, and the cultural conventions employed in the producer's and recipient's environments can all influence the successful transmission of information via symbols. It is because these factors influence the recipient's ability to glean the producer's communicative intentions that these factors matter. And because these factors come in to play, symbols need not be fixed, culturally agreed upon formats. A fluidity and flexibility comes with context, as in Rakoczy et al.'s example (this volume) in which an individual responds to the query "How are you?" by holding up an arm in a cast. Similarly, we use oblique sentences and new word forms every day that may be ambiguous on their own but are interpretable within context, largely because the intention can be understood from the context. The very study of linguistic pragmatics is focused on how we use extra-linguistic contextual or social information (either established conventions or in-the-moment influences) to infer meaning beyond the literal.

By the same token, cultural conventions do streamline the communication process, freeing the producer and recipient from having to perform as many steps in projecting each other's perspectives and taking into account contextual factors. As Uttal (this volume) points out, conventions are so pervasive that we often lose sight of the ways in which they are imperfect representations of the information they convey, and yet we also spontaneously construct novel but utterly interpretable symbols in online interaction.

Because successful symbolic exchange relies on a recipient's accurate interpretation of a producer's intent, the cognitive work of the recipient is as important as that of the producer. In the whisk example described earlier, there was a mismatch between the producer's non-symbolic intention and the recipient's attribution of symbolic intent, resulting in the recipient misinterpreting the behavior as symbolic. Conversely, we could also imagine a scenario in which the mother used a whisking motion in order to solicit her daughter's help in finding the whisk, but in which her daughter failed to grasp her mother's intention. This illustrates that symbolic insight may be considered from the perspective of either the producer or recipient. From a researcher's point of view, the ability to consider separately the intentions of the producer and the attribution of intent of the recipient enables us to frame questions about the symbolic insight of individuals (e.g., at a particular developmental level or from a particular species) by monitoring their ability to take intention into account as a recipient. This may prove particularly useful for studying symbolic insight in populations and individuals with low symbol production.

Developmental Change

It is clear that children's symbol use (as both symbol producer and interpreter) develops over time. But it is not simply the ability to use symbols that develops. The very ability to understand intentionality, to reason about the mental states of others, to attend and adhere to cultural conventions, to represent abstract

concepts and to recognize iconicity all vary as a function of age and experience (see e.g., Baldwin, 1993; DeLoache, 2004; Karmiloff-Smith, 1992; Namy, Campbell & Tomasello, 2004; Tomasello, 1999). How does this play into our goal of understanding the relation between symbol use and symbolic insight? Recent research offers several suggestions.

First, children may use conventional symbols (e.g., words, gestures) well before they have any explicit symbolic understanding. Thus, apparently symbolic behaviors on the part of a child do not necessarily imply true symbolic ability. The developmental change in the neural processing of words reported by Mills et al. (this volume) may well reflect children's developing insights about intentionality. Changes in children's use of other symbolic media may further reflect such shifts in insight (DeLoache, this volume; Namy et al., 2004; Namy & Waxman, 1998; Sevcik & Ronski, this volume; Woodward & Hoyne, 1999).

Second, relative to older children and adults, very young children have a limited capacity to process information. Recent theories have proposed that this limited processing may actually work in children's favor initially (see, e.g., Newport, 1990). Limited processing may strip away some of the less salient information, enabling children to identify patterns and associations between symbolic forms and their referents even before they have mastered the full range of social cognitive skills that underlie symbolic insight.

Third, the ability to engage in seemingly adult-like symbolic behavior well before they have any clear understanding of symbolic intent may help bootstrap children into symbolic insight. Rochat and Callaghan (this volume) illustrate this process in their investigation of children's emulation of adult's modeling of either a reflective (gazing but not manipulating) or interactive (manipulating) stance with pictorial and three-dimensional stimuli. By investigating a stimulus in the manner that they have seen modeled, children are likely to discover new perspectives on the stimulus that they might not have discovered on their own. Further, as Adamson et al (this volume) demonstrate, caregivers can tune their interactions with children so that symbols are infused in joint attention episodes that capitalize on this drive to emulate. Such tuning appears to provide important scaffolds (Vygotsky, 1962) that facilitate symbol acquisition for the child. Indeed, the fact that inexperienced symbol users may initially appear more competent than they are may be the impetus for further scaffolding on the part of the caregiver. In sum, by crediting children with greater symbolic capacity than they actually have mastered, adults may bootstrap children into intentional symbol use.

Domain and Species Specificity

Domain specificity. Contemporary work supports the notion that the fundamental capacity to use symbols is quite general. The inherently social, intentional and communicative nature of symbol use is applicable to a wide range

of symbolic media. Some symbol systems may involve greater complexity than others, permitting a wider range of messages and potentially greater flexibility. To the extent that there are unique factors associated with a particular system (e.g., syntax in language), there may be unique, cognitive processes associated with it. But at its core, the basic ability to use symbols seems to be a process that is shared across symbolic forms. For example, waving goodbye may be less complex than parsing the syntactic structure of a sentence or understanding how relative distance is denoted on a world map. But the basic ability to understand that a symbol, (be it a gesture, map or word) represents some information about the world appears to tap into a common mechanism.

Species specificity. The debate about whether humans are “special” and in what respects rages on. As Sue Savage-Rumbaugh et al. (this volume) point out, it is difficult to reason from outside an anthropocentric perspective. Savage-Rumbaugh et al. and Kuczaj et al. (this volume) each highlight the importance of taking both context and communicative goals into account when making attributions about non-human animals’ symbolic ability – a caution that applies equally to research involving human infants and very young children.

To be sure, humans appear to develop systems that are more elaborate and complex than most non-human species, but evidence from non-human animal communication suggests that many species share with humans a basic ability to use a symbol to represent and communicate intentionally with conspecifics. All

three contributors to the animal communication section of the current volume report behaviors among non-human species are at least as sophisticated as those of human infants. Gouzoules (this volume; Gouzoules, Gouzoules, & Tomaszycki, 1998) reviews the elaborate lengths to which he and his colleagues have gone to provide rigorous tests of alternative explanations before making attributions of communicative intention in their populations. His work helps to sharpen the criteria for judging intentional behavior and also serves to highlight the importance of the recipient and the social interaction in evaluating the symbolic nature of an information exchange across the animal kingdom.

Symbols Redefined

The above review of more contemporary themes in symbolic development leads to several conclusions regarding the types of criteria that most appropriately determine symbolic insight. Below we outline our redefinition of the basis for judging a behavior as symbolic, the viability of the more traditional criteria, and directions for future research in the area of symbolic representation and behavior.

1. Intention to communicate is the ultimate indicator of the symbolic nature of a communicative act. To attribute symbolic insight, one must have evidence of intentionality on the part of the symbol user (as either producer or recipient).
2. Symbolic insight develops over time, and apparently symbolic behavior may precede symbolic understanding.

3. The fundamental ability to use symbols need not be characterized as either domain- or species-specific.
4. Focusing on intention frees us from constraints on either symbolic form or context imposed by traditional criteria.
 - a. Arbitrariness - We argue that iconicity may facilitate the recipient's interpretation of intention by making the connection between symbol and referent more transparent, but that the same cognitive processes govern symbol user regardless of the degree of resemblance between symbol and referent.
 - b. Decontextualization - Because intentions can be in-the-moment and thereby contextually bounded, decontextualization may not always be appropriate or relevant. Generalization is neither sufficient nor necessary to achieve symbolic status.
 - c. Conventionality - This criterion, too, conflicts with current evidence and arguments in the field. We have argued that idiosyncratic intentional communication and established conventionalized symbols are equally viable ways to communicate intentionally and rely upon the same cognitive processes. Cognitive load may be eased in some cases by falling back on conventions for meaning, but we note that even

the most conventionalized symbols (e.g., word meaning) must be interpreted within context.

This leaves us with a challenge for the future: to continue to refine our methods in the service of examining carefully the contributions of the symbol producer (who must intend to communicate) and the symbol receiver (who must interpret the signal as symbolic). Ultimately, these form the crux of symbolic insight. Moving the psychological focus of symbolhood away from the symbolic form and back into the head of the symbol user may render the task of understanding symbolic representation more difficult. However, we believe that this redefinition will also advance the development of more accurate models of symbolic insight and its relation to symbolic behavior.

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