ABSTRACT—Humans are cultural animals, enveloped in the arbitrary norms, practices, and symbols—or conventions—unique to a particular community of people. The adaptive value for children of recognizing such cultural conventions is indisputable, raising critical questions concerning how they do so. This article first reviews the extant evidence indicating that from early in life, young children appreciate that certain socially available knowledge is known only by members of their cultural community. It then discusses 2 possible accounts of the development of such an assumption and outlines certain challenges facing those accounts. The article concludes by suggesting some directions for future work that are grounded in a sociocognitive approach to cultural acquisition.

KEYWORDS—conventions; culture; acquisition; social cognition

Humans are cultural animals. From the moment babies are born, they are surrounded by norms, practices, and symbols that are mostly arbitrary and often unique to a particular community of people. These are neither laws of nature nor idiosyncrasies of parents; rather, they are “habits” established historically and enforced by conventions. Yet the value of recognizing these conventions is undeniable. Children need to know, and hold the expectation that others know, what words to utter in order to express certain concepts, what objects to use to accomplish distinct functions, and how to respond appropriately to various gestures, symbols, and contexts. Moreover, children need to know with whom it is appropriate to communicate or interact using these particular forms.

Unfortunately for children, information available in the environment does not come tagged as being cultural. Consequently, children cannot know a priori who shares with them knowledge about such information. Some of the information is universal, applies to all events, and is known by all people (e.g., animals die); some of the information is idiosyncratic and known only by a few people (e.g., the family cat’s name is “Fausto”); and other information applies more broadly and is known by a community of people (e.g., any animal like Fausto is called by English speakers a “cat”). The imperative for identifying this last—cultural—type of information, on the one hand, and its semantic and epistemic indefiniteness, on the other, poses an immense and critical learning puzzle for children.

The growing literature on the development of assumptions about cultural conventions addresses precisely this puzzle. In this article, we review the relevant literature and conclude that, from early in life, children hold distinct assumptions about who shares with them the socially available knowledge they have. We then discuss some challenges facing accounts of how children derive these assumptions and suggest directions for future theorizing and empirical work.

CHILDREN’S ASSUMPTION OF CONVENTIONALITY

Building on the conceptual work of Lewis (1969), we define conventions as forms that are (a) socially conveyed (as opposed to naturally available), (b) cognitively opaque (as opposed to self-evident), (c) arbitrary (as opposed to objectively true), (d) community-bound (as opposed to idiosyncratic or universal), and (e) prescriptively powerful within the community (as opposed to completely flexible). These characteristics help highlight the challenge children face when determining the scope of an assumption of conventionality. Universal information lies at one end of a spectrum: It is usually naturally available, self-evident, and objectively true. For instance, to the extent that animals are
found around the globe, the knowledge that animals die becomes available to all observers. Children are thus justified to be liberal in assuming that all people know this type of information. Idiosyncratic information lies at the other end: Its availability is limited, and it is completely arbitrary. Only people who know Fausto’s owners would know the cat’s name. With this form of information, children are justified in being very conservative in their assumptions about who shares it. Conventional information represents a middle ground for liberal and conservative assumptions regarding the distribution of knowledge. On the one hand, it is somewhat general insofar as it is presupposed to be known by members of a cultural community. On the other, it is arbitrary in the sense that people from different cultures may hold different conventions. The question, thus, is whether and how children decide which pieces of information they are exposed to fall within this gray area.

A number of recent studies, in fact, indicate that, from early in life, children do manifest such an understanding of conventionality (see Kalish & Sabbagh, 2007). Namely, children treat certain forms as being shared knowledge among certain people. As will become clear, the criteria used by these studies as evidence for such an understanding vary—some having to do with an understanding of the community-boundness of the knowledge, and others, with its prescriptive force. Nonetheless, they converge to the conclusion that children manifest an initial mapping of the domain of conventions.

What Is Conventional?

In Clark’s (1983, 1990) pioneering work on conventionality in language, she argued that children operate under the assumption that people know the names of objects, and thus if a person uses a novel name in the presence of both familiar and novel objects, children infer that the person likely does not have a familiar object in mind. Experimental studies have shown that children indeed draw this kind of inference (Markman & Wachtel, 1988). The crucial question is whether they do so because they assume that familiar names are shared knowledge. To address this question, a number of studies have manipulated the state of knowledge of participants in such contexts.

For instance, Diesendruck and Markson (2001) showed 3-year-olds pairs of novel objects and taught them a novel common name for one of the objects. For half of the children, the same speaker who taught them the novel name later asked them for the referent of a different novel name. For the other half, the referent requester was a different speaker, who had been absent during the children’s exposure to the first novel name. Diesendruck and Markson found that children in both conditions selected the object without a name as the referent of the second novel name, and did so to the same extent in both conditions. In other words, children drew the same inference about the referential intent of both speakers, arguably because they assumed that both knew that the novel common name applied to one of the objects. In fact, when explicitly asked, most children responded that they thought that the speaker who been absent during their exposure to the first novel name knew the novel name they had been taught.

More recent studies indicate that even infants seem to hold this assumption about object names. For instance, 19-month-olds expect two different individuals to refer to a novel object with the same name (Graham, Stock, & Henderson, 2006; Henderson & Graham, 2005), and 13-month-olds—but not 9-month-olds—are surprised if different individuals use the same name for two different objects (Buresh & Woodward, 2007).

Importantly, children and infants do not hold such an assumption about all kinds of socially conveyed information. For instance, by preschool age, children have different expectations about people’s knowledge of common versus proper names. In particular, children believe that only those who are familiar with an individual entity (e.g., a pet), or have been exposed to its proper name, may know the proper name of that entity (Birch & Bloom, 2002; Diesendruck, 2005). Moreover, preschoolers do not expect an absent speaker to know arbitrary facts about objects that only they themselves have been taught (Diesendruck & Markson, 2001), 19-month-olds do not generalize individual preferences across people (Graham et al., 2006), and 9- and 13-month-olds are not surprised if different people have different goals (Buresh & Woodward, 2007). Thus, while common names are thought to be conventional in the sense that they are treated as shared knowledge across a community of people, other types of information such as proper names, arbitrary facts, goals, and preferences are not.

Children also treat other types of knowledge as conventional in the sense that they have prescriptive force among members of a community. In a series of studies, Rakoczy and colleagues (Rakoczy, 2003; Rakoczy, Warneken, & Tomasello, 2008) taught 2- to 3-year-olds how to play a novel game, and then, in the critical conditions, children observed a new player (an experimenter) violate the previously established “game rules.” The researchers found that even 2-year-olds would often explicitly protest against the new player, explaining to him how the game was supposed to be played. Such a response suggests that the children (a) expected the new player to know the game rules and (b) treated the game rules not as flexible choices but as social conventions with prescriptive force within the participating community.

Children seem to hold a similar expectation about object functions. On the one hand, when exposed to an adult using an object for a given function, 2½-year-olds expect others to use that object for the same function (Casler & Kelemen, 2005). By contrast, when instructed to solve a novel problem, 5-year-olds are quite competent at using familiar objects in creative, nonconventional ways (German & Defeyter, 2000). As German and colleagues (Defeyter, German, & Hearing, 2009; German, Truxaw, & Defeyter, 2007) noted, it seems that children hold an assumption of conventionality with regard to what objects are for but are more flexible with respect to the actual uses of objects.
In sum, it appears that from a young age, children (a) assume that common object names, game rules, and objects’ intended functions are types of information that are known and shared by others, and (b) expect others to conform to this information. In other words, children do not treat these types of information as idiosyncratic. This generalizing tendency notwithstanding, as discussed in the next section, children are not “blind” generalizers who expect the kinds of information listed above to be known by all people. Rather, they uphold an assumption of conventionality only toward certain people.

Who Is Conventional?
In general, one should hold an assumption of conventionality only toward members of one’s cultural community. They are the ones who presumably share one’s language, artifacts, and customs. A study by Diesendruck (2005) indicates that in the domain of language, children are aware of this stipulation by age 4. In that study, an experimenter taught Hebrew-English bilingual children an English novel name for one of two novel objects. Then, either a bilingual Hebrew-English speaker or a monolingual Hebrew speaker asked children for the referent of a novel Hebrew name. The rationale was that children should select the unnamed object only in response to a speaker who they believe knows a name for the other object. It was found that children did so only in response to the bilingual speaker, implying they did not believe the monolingual Hebrew speaker knew the name of the object for which they had been taught an English name.

Children modulate the deployment of an assumption of conventionality based not only on categorical distinctions regarding the sources of knowledge—for example, speakers of one’s language—but also on more context-specific distinctions. For instance, young children prefer learning object names and functions for novel objects from people who have demonstrated knowledge of conventional object names or functions than from people who have demonstrated ignorance of them (Birch, Vauthier, & Bloom, 2008; Koenig, Clement, & Harris, 2004; Koenig & Harris, 2005; Sabbagh & Baldwin, 2001). In fact, a speaker’s prior record of reliability in object naming trumps other presumed markers of expertise such as age (Jaswal & Neely, 2006). A recent study directly assessed whether a person’s record of conventional knowledge affects not only children’s preference for learning but also their decision as to whether to withdraw an assumption of conventionality toward that person. In this study, 3- to 4-year-olds were exposed to agents who were either knowledgeable or ignorant of conventional object names or functions. Children then had to draw an inference about the agent’s referential intent that required them to consider whether or not the agent knew additional conventional object names or functions. It was found that children’s inferences indeed varied according to the agent’s prior record of conventional knowledge (Diesendruck, Carmel, & Markson, 2010). Additional evidence consistent with this conclusion comes from a study by Rakoczy, Warneken, and Tomasello (2009), which found that 4-year-olds not only prefer to imitate the rules of a game as enacted by a puppet who had been previously accurate in his actions on objects but also believe that the reliable puppet’s rules constitute the right way to play the game.

Summary of Data
The picture emerging from the data reviewed above on the scope of children’s conventionality assumption is that within a short period of time, children create seemingly systematic boundaries concerning what and who is assumed to be conventional. A crucial question this conclusion raises is: How do children accomplish this?

ACCOUNTING FOR CONVENTIONALITY: CHALLENGES AND POSSIBLE SOLUTIONS
Two recent proposals suggest that children might start off with a relatively promiscuous supposition of conventionality. One proposal builds on children’s widely documented limited theory-of-mind capacities, particularly their difficulty understanding that others might have different representations of reality than they themselves do (see Wellman & Liu, 2004; cf. Onishi & Baillargeon, 2005). According to Sabbagh and Henderson (2007), this limitation in sociocognitive capacity may lead children to overattribute to others knowledge that they themselves have been privy to. This claim is consistent with children’s difficulty tracing the source of their own knowledge (Taylor, Esbensen, & Bennett, 1994) and their tendency to inflate their estimation of others’ knowledge of information after being exposed to it (the so-called curse of knowledge; Birch & Bloom, 2003).

A second proposal derives from Csibra and Gergely’s (2006) notion of a pedagogical bias. The argument is that adults have a natural disposition to transmit knowledge to others, and do so by ostensibly making reference to information that is relevant in the context. Crucially, in such pedagogical contexts, children interpret the knowledge they are “taught” as general, insofar as they take it to relate not only to particular instances or events but to categories as well, and as universal, in the sense that they interpret it not as unique to the individual who has taught them but rather as known by everyone.

While these accounts highlight different factors contributing to children’s assumption about the distribution of knowledge, they concur that, early on, children assume that everything they know, everybody knows as well. In light of the data reviewed above, we believe that a full account of the development of an assumption of conventionality needs to explain how children come to uphold the assumption only toward some information and some people. In other words, limited theory-of-mind abilities or a pedagogical disposition may be taken to define children’s default assumption. Nonetheless, the data indicate that from early on, children narrow the scope of conventionality. In this light, the theoretical challenge is to define the mechanisms that allow the fine-tuning of these default biases.
One of the theoretical parameters the data establish is that whatever acquisition mechanism underlies the fine-tuning of this assumption, it needs to be in place and functioning reasonably well within the first few years of a child's life. A second is that in addition to these potential upper-bound ontogenetic constraints on the to-be stipulated mechanisms, there might also be lower bound phylogenetic constraints. We began this article by stating that humans are cultural animals. Archeological evidence suggests that they have been so—particularly as creators of conventional artifacts—for hundreds of thousands of years (Toth & Schick, 2006). In fact, by some accounts, nonhuman primates also show signs of learning and transmitting certain conventional knowledge (Whiten, Horner, & de Waal, 2005), although it is debatable whether they do so by the same means as human infants do (Buttelmann, Carpenter, Call, & Tomasello, 2008). Thus, whatever the acquisition mechanisms turn out to be, a rudimentary form of them might be cognitively plausible for nonhuman primates. Those in children, nonetheless, would be qualitatively superior, corresponding with their presumably unique social learning strategies, complex cultural systems, and sophisticated assumptions about the distribution of knowledge (Tomasello, 2009).

With these parameters in mind, and inspired by sociocognitive approaches to the acquisition of culture (Callanan, Siegel, & Luce, 2007; Tomasello, Carpenter, Call, Behne, & Moll, 2005), we posit below a number of candidate cues children might use to define the domain of conventionality. These are cues about how people use certain forms—which should inform children about what is conventional—and cues about who uses these forms—which should inform children primarily who is conventional. To illustrate how the above-cited double constraints should inform the conceptualization of the mechanisms, let us take “sensitivity to intentionality” as a case in point. On the one hand, the capacity to detect intentionality is arguably available in both young human infants (Meltzoff, 1995; Woodward, 1998) and primates (Call & Tomasello, 2008). On the other hand, there seem to be qualitative differences between human children’s and primates’ capacity to recruit intentional understanding for the sake of social learning (Hermann, Call, Hernandez-Lloreda, Hare, & Tomasello, 2007).

Cues About What Is Conventional
As mentioned above, one of the most basic cues children likely rely on to determine whether or not a form is conventional has to do with the intentionality of the action in which the form is embedded. Put simply, forms embedded in intentional acts are candidates for being conventional. In particular, intentionality helps distinguish between culturally bound acts and universal or accidental acts. For instance, burping is a universal and frequently accidental act. However, in certain cultures, it is customary and even expected, and thus likely also done intentionally. In fact, intentionality is a critical factor in children’s learning of cultural forms such as words (see Akhtar & Tomasello, 2000; Baldwin, 1991; Bloom, 2000), artifact functions (Bloom, 1996; Kelemen, 1999), communicative gestures (Campbell & Namy, 2003), and symbolic representations (Bloom & Markson, 1998; Gelman & Ebeling, 1993). Recent evidence indicates that the intentional nature of one’s use of objects also affects children’s inferences about the shared nature of objects’ functions (Casler & Kelemen, 2005; Wohlgelehrter, Diesendruck, & Markson, 2010).

A second cue children might rely on for defining what is conventional is the consistency with which the form is used, both by the same person and across different people. The idea is that the more consistently a form is used, the more likely that it manifests a “correct” or “common” way to do or express something. Indeed, recent studies show that children’s determination of what an object is for is influenced by consistency both across individuals (Siegel & Callanan, 2007) and within an individual (Wohlgelehrter et al., 2010).

A third cue that children might rely on in determining the conventionality of a form is whether or not the action in which the form is embedded involves coordination between individuals. The hypothesis is that children will be more likely to treat forms as conventional when their use by an individual depends on and affects the actions of another individual. Some evidence for the role of coordination in children’s assumption of conventionality comes from the work on game rules described earlier (Rakoczy, 2003; Rakoczy et al., 2008). In these studies, when children were tested in a condition in which the agent who violated one of the game rules had not committed to participate in the game, they tended to protest less. Furthermore, children’s sensitivity to eye contact as a cue to learning might derive from their interpretation of such a cue as a signal that they are engaging in a coordinated activity (Topal, Gergely, Miklosi, Erdõhegyi, & Csibra, 2003).

A fourth and final cue has to do with pragmatic or semantic indications offered by adults (Callanan et al., 2007). For instance, Callanan and Sabbagh (2004) found that when interacting with their children, parents typically engage in labeling strategies that may convey to children that there is a best way to refer to objects (e.g., insisting on a single label for each object). Callanan et al. (2007) noted that parents also seem to provide children with subtle cues about the existence of preferred ways for using certain objects, such as using a generic noun form to describe object functions (e.g., “pens are for writing”). In general, the use of generic language for describing events or objects consistently leads even young children to consider the information as being generalizable across instances rather than unique to the referent (Cimpian & Markman, 2009; Gelman, 2009).

Cues About Who Is Conventional
One of the cues children might use in determining whether or not someone shares their conventions is the social category to which the person belongs. For instance, children believe that adults are knowledgeable about “adult” themes but that their
peers are more knowledgeable about “kid” themes (VanderBorgh & Jaswal, 2009). Moreover, even infants prefer to interact with a speaker of their own language than with a speaker of a foreign language (Kinzer, Dupoux, & Spelke, 2007), and from a young age, children selectively attend to same-gender individuals as models for learning (Ruble, Martin, & Berenbaum, 2006) and preferences (Shutts, Banaji, & Spelke, 2010). This line of work raises the possibility that the development of social categories aid children in recognizing relevant purveyors of conventional knowledge. For instance, an early differentiation between in- and out-groups may be functionally adaptive not only for the sake of identifying potential foes but also for recognizing potential “teachers.”

Finally, children are sensitive to cues about people’s confidence in their use of a form when assessing the conventionality of the form. In fact, children are influenced by both explicit (Jaswal & Malone, 2007; Numsoo & Robinson, 2009; Sabbagh & Baldwin, 2001) and nonverbal (Birch, Akmal, & Frampton, 2010; Fusaro & Harris, 2008) indications of ignorance.

**FUTURE DIRECTIONS**

This is a budding field, and much work still lies ahead. We have listed a few of the capacities likely to influence the fine-tuning of an assumption of conventionality. In most cases, the influence of these capacities on conventionality has been tested in only one or two domains. Evidently, to assess the potential of these capacities as explanations for the acquisition of an assumption regarding cultural conventions, more domains must be studied. A related recommendation is that future studies attempt to assess the discriminatory validity of the capacities. As noted earlier, for example, intentionality may help differentiate between conventional and universal or accidental information. However, intentionality does not differentiate between conventional and idiosyncratic information. For instance, proper names—which are typically delivered intentionally—are not treated as conventional. This example also illustrates the need to assess the sufficiency of the cues. Again, while intentionality may not be sufficient to discriminate between proper and common names, intentionality + cross-individuals consistency might. Thus, children likely figure out the domain of conventionality by relying on a unique combination of various cues.

A final recommendation for future research is to address further characteristics of conventions. Most of the studies conducted thus far within this literature have focused on the fourth and fifth characteristics of conventions we listed earlier—that is, that conventions are community bound and prescriptively powerful within the community. It would be valuable for researchers to tackle children’s understanding of the initial three as well. In fact, in some cases, there are other literatures that may provide helpful guidelines for such work. For instance, questions about children’s understanding of the arbitrariness of cultural conventions can draw inspiration from work on children’s understanding of the arbitrariness of morality (Levy, Taylor, & Gelman, 1995; Smetsen, 1981) and categorization (Kalish, 1998; Rhodes & Gelman, 2009).

**CONCLUSIONS**

Beginning early in development, children assume that certain pieces of information to which they are exposed are shared by members of their cultural community. This is a crucial developmental achievement because much of what children need to know to function adaptively in the world is knowledge that is socially dispensed and bound. One of the main challenges facing researchers in this area is to define the ontogenetically—and phylogenetically—plausible mechanisms that allow children to distinguish knowledge that can be assumed to be shared by other members of their cultural community from knowledge that is either specific—and thus not generalizable across instances and people—or global—and therefore applicable universally across people. Answering these questions will bring us closer to an understanding of what makes humans unique.

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