

Children's Developing Ideas About Knowledge and Its Acquisition

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Abstract

We review key aspects of young children's concept of knowledge. First, we discuss children's early insights into the way that information can be communicated from informant to recipient as well as their active search for information via questions. We

then analyze the way that preschool children talk explicitly and cogently about knowledge and the presuppositions they make in doing so. We argue that all children, irrespective of culture and language, eventually arrive at the same fundamental conception of knowledge in the preschool years. Nevertheless, despite the universality of this basic conception, young children are likely to show considerable variation in their pattern of information seeking, depending on the conversational practices of their family and culture.



1. INTRODUCTION

There is agreement that young children rapidly develop an understanding of various key mental states, including desires and beliefs. In this chapter, we focus on children's early conception of a mental state that is of central importance for cognitive development—their developing insight into the state of knowledge. Research on children's early conception of knowledge is quite extensive but the findings are relatively scattered. In addition, the findings have been overshadowed by the extensive program of research on children's understanding of belief (Wellman, 2014). In this chapter, we seek to draw together the evidence on children's early conception of knowledge into a set of testable propositions.

We review the pertinent evidence in four steps. First, we analyze toddlers' insight into the transmission of knowledge, especially via communication. Second, we document how children actively seek information from other people. Third, we discuss aspects of children's explicit talk about knowledge and ignorance. Based on available evidence, we propose that young children display a universal conception of knowledge. This conception—rooted in their participation in communicative exchanges—emerges no matter what language they speak and no matter what culture they grow up in. And, finally, despite this universal backdrop, we argue that children vary in the way that they set about acquiring knowledge. We claim that much of this variation can be traced back to the early communicative environment that children experience. Children are socialized within families that vary dramatically in the conversational environment, and effectively in the epistemic environment, that they provide. For example, differences between families in the extent to which claims to knowledge are taken for granted, discussed, or queried are likely to lead children to develop different working assumptions about the extent to which knowledge is absolute or defeasible and the merits

and the demerits of asking questions to acquire or check their knowledge. In the following sections, we present evidence for each of these steps in our argument.



2. UNDERSTANDING THE TRANSMISSION OF INFORMATION VIA COMMUNICATION

Human beings are outstanding cultural learners. Alongside their capacity to acquire information from first hand, perceptual observation, young children are also disposed to acquire information from other members of their group or culture. Indeed, as compared to nonhuman primates, children are especially attentive, deferential, and conscientious in the degree to which they are receptive to information provided by others (Harris, 2012; Tomasello, 2016).

When children acquire information from other people, they are likely to receive information that they lack and might not easily obtain for themselves. For example, they are told the location of a hidden object, the function, or name of a novel artifact, or the causal explanation for an activity or event. Recent research shows that even before they are proficient at spoken language, toddlers are adept at: (i) acquiring new information from the nonverbal gestures of an informant; (ii) providing information to an ignorant recipient via such nonverbal gestures; and (iii) from a third-party perspective, understanding the consequences of an act of communication between an informant and a recipient. By implication, infants understand how information can be acquired from others' testimony and that knowledge and ignorance guide the exchange of information (Harris & Lane, 2014). We document these three early competencies in more detail below and underline their implications.

2.1. Receiving Information

Across varied cultures, infants begin to respond to, and engage in, index finger pointing at around 11 months of age (Liszkowski, Brown, Callaghan, Takada, & de Vos, 2012). A caregiver's point at an object of interest is likely to elicit a point from the infant and vice versa. Such "declarative" pointing—i.e., pointing aimed at establishing joint attention (rather than "imperative" pointing aimed at obtaining an object or outcome)—is predictive of children's later language skills (Colonnese, Stams, Koster, & Noom, 2010; Rowe & Goldin-Meadow, 2009). Indeed,

adult pointing is not just correlated with children's later language, it also helps to promote their spoken vocabulary as shown by a recent intervention study (LeBarton, Goldin-Meadow, & Raudenbush, 2015).

Beyond establishing joint attention, when are infants able to acquire new information from an interlocutor's communicative act—such as pointing? Following warm-up trials in which 12-month-old infants became accustomed to searching for a hidden object in one of two boxes, they received test trials in which an adult pointed to one of the boxes. Most infants noted the pointing gesture, searched in the indicated box on the first test trial, and went on to perform well above chance on subsequent trials (Behne, Liszkowski, Carpenter, & Tomasello, 2012). Gliga and Csibra (2009) showed that 12-month-olds can also acquire information about the location of a *named* object from a pointing gesture. When an adult pointed to one of two screens and named the object allegedly behind it (Wow, a duck!), infants were puzzled (looked longer) if, when the two screens were raised, a different object was behind the indicated screen and the named object was behind the other screen—as compared to when the named object was positioned, as expected, behind the indicated screen. Thus, infants of 12 months can form an expectation of both the location and identity of object on the basis of an adult's coordinated naming and pointing.

2.2. Providing Information to an Ignorant Recipient

Infants of 12-months are also able to provide information to an interlocutor via pointing. Behne et al. (2012) altered the search set-up just described so that 12-month-old infants saw where an object was hidden. When an adult who had not seen the hiding subsequently asked where the object was, infants often “told” them by pointing with their index figure at the correct box. Liszkowski, Carpenter, Striano, and Tomasello (2006) found that 12-month-olds would even volunteer such location information spontaneously. When an adult mislaid an object that she was working with, infants often pointed to it before she asked where it was. A follow-up study confirmed that infants' points were prompted by the adult's ignorance of the object's location and not its disappearance per se. When the adult witnessed the object sliding to the floor, 12-month-olds were less likely to point to it than when she missed seeing it slide to the floor.

A similar sensitivity to an interlocutor's ignorance was observed by O'Neill (1996). Two-year-olds were shown a new toy that was then placed in a container on a high shelf. When their parent had not been present to witness the placement of the toy, children were likely to name the toy, to name its location, and to gesture toward it when the parent returned. They were less likely to do so if their parent had been with them all along and had witnessed the toy's placement. Thus, when appropriate, 2-year-olds inferred their parent's ignorance of the toy's location and transmitted that information to their parents so that they could retrieve it.

2.3. Understanding Communication From a Third-Party Perspective

In the studies described so far, infants were involved in the communication, either as recipients or providers of information. Do they also display an understanding of information transmission from a third-party perspective? More specifically, when they are bystanders to an act of communication, do they understand that an informant can convey information to an otherwise ignorant or ill-informed interlocutor? Krehm, Onishi, and Vouloumanos (2014) found that 9- and 11-month-old infants looked longer if, when an informant had pointed to a preferred but out-of-reach object, her interlocutor subsequently handed her a nonpreferred object. Similarly, 12-month-olds also looked longer if, when an informant named a preferred object (koba) that she could not reach, her interlocutor handed her the wrong object. Infants' differential looking patterns suggest that they construed the new word as a request for the preferred object and were surprised when the interlocutor did not respond accordingly. Control conditions showed that nonlexical vocalizations by the informant (e.g., a cough or an exclamation "Oooh!") did not elicit differential looking and nor did the word "koba" produced by the interlocutor rather than the informant (Martin, Onishi, & Vouloumanos, 2012). By implication, the infants in these experiments expected the interlocutor to understand the request for a particular object, to comply with that request, and were puzzled when she failed to do so.

Other studies show that, as third-party observers, 18-month-olds realize that communication can be used not just to request an object but to offer information concerning its whereabouts. Song, Onishi, Baillargeon, and Fisher (2008) found that 18-month-olds were surprised when an adult searched in the former location of an object, if, on her return after a

brief absence, she had been “told” (via a pointing gesture) by a second adult of its displacement to a new location during her absence. Fusaro and Harris (2013) had 18-month-olds witness an exchange between two adults about a hidden toy. Pointing to each of two boxes, one adult asked: “Is it here?” The second adult nodded in reply to the question about one box and shook her head in reply to the other. Infants subsequently searched for the object in the correct box—as inferred from the exchange between the questioner and the respondent.

In summary, in the months around and beyond their first birthday, when infants witness an act of communication they understand its fundamental features (Harris & Lane, 2014). They realize that information can be transmitted from an informant to a recipient. They understand that a gesture, and/or a verbal assertion, can inform someone about which object is wanted by the informant or where an object sought by the recipient is located. Effectively, infants accept that communication can substitute for, or add to, information supplied by direct perception and that communication is often used to remedy differences between interlocutors in what they know. Infants not only participate in such acts of communication themselves, whether as informant or recipient, they also make sense of such acts from a third-party perspective.



3. SEEKING INFORMATION FROM OTHER PEOPLE

Granted that infants appear to receive and supply information and, as bystanders, understand its transmission between other people, when do they actively seek information from potential informants? Recent research has established two notable conclusions: (i) infants adopt an “interrogative” stance—they use gestures and vocalizations to seek information from an interlocutor and (ii) toddlers ply their conversation partner with many questions, often aimed at obtaining simple, factual information but also at obtaining explanations for a range of phenomena. By implication, infants and toddlers appear to track their own knowledge and ignorance as well as that of their interlocutors. We make these two claims in more detail below.

3.1. An Interrogative Stance

Begus and Southgate (2012) found that when 16-month-olds were shown a series of novel objects, they were more likely to point them out to an

apparently well-informed adult than to an apparently poorly informed adult (who had previously named familiar objects incorrectly). By implication, infants were not simply calling attention to the novel objects but engaging in “interrogative” pointing, which they directed at a well-informed adult.

Naturalistic studies also confirm that parents readily construe toddlers' gestures as interrogative. Olson and Masur (2013) videotaped mothers and their 13-month-old infants while they played together. Mothers were nearly twice as likely to produce an utterance containing a word (labeling an object, action, and/or internal state) if the immediately preceding communicative bid by their infant had included a manual gesture (e.g., pointing at, reaching toward, or showing an object). Chouinard (2007) asked parents of infants aged 12–14 months to keep a record of their children's early interrogative efforts. Parents took note of “questions” that were expressed via a gesture (e.g., pointing or showing) and/or vocalization (e.g., “Uh?”) rather than in words. Of the hundreds of such “questions” that were recorded by parents, approximately 80% appeared to be aimed at eliciting information, rather than securing help or attention. Moreover, Begus and Southgate (2012) found that the information supplied in the wake of an interrogative point was likely to be better remembered. Infants of 16 months were shown two objects, and when they pointed at one or the other, an adult would show them how to use the indicated object or, less obligingly, the other object. Later, when given an opportunity to act on the object for themselves, infants were better able to reproduce the demonstration on the object that they had “asked” about. Similarly, 18-month-olds displayed better learning of an object's name (as indexed by a selective looking measure) if they had been told its name after they had pointed toward it rather than after they had reached for it or simply gazed at it (Lucca & Wilbourn, 2017). These results show that, by 16–18 months, infants seek relevant information from an informant via pointing and retain what they are told.

Around the same time, children begin to communicate their ignorance. Based on recordings from the Language Development Project (Goldin-Meadow et al., 2014), a longitudinal study of early communication, Harris, Bartz, and Rowe (2017) found that nonverbal expressions of ignorance—notably a shrug or flip gesture involving the lifting of the shoulder and/or the outward flipping of the palms—started to emerge toward the end of the second year. By 22 months, almost one-third of the

sample had been observed producing such a gesture and by 42 months three quarters had done so. This increase in nonverbal expressions of ignorance is accompanied by an increase, in the second year, in explicit verbal utterances, notably “I don’t know” alongside or instead of nonverbal gestures, especially in response to a question from the interlocutor (Harris et al., 2017; Harris, Yang, & Cui, 2017). Thus, prior to being able to ask verbal questions, infants and toddlers use gestures to request information and to communicate their ignorance.

3.2. Verbal Questions

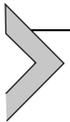
Chouinard (2007) analyzed the verbal questions that four children between the ages of 18 months and 5 years put to their caregivers during everyday activities. Two children were middle class, European-American children, one was a working-class, European-American child, and one was a middle class, African-American child. More than 200 h of recordings were analyzed, yielding a total of almost 25,000 questions. Children asked questions very often indeed—somewhere between one and three per minute depending on the individual child. Approximately two-thirds were aimed at eliciting information (rather than, for example, help or attention) and this proportion remained stable from 2 to 5 years. Until the age of 30 months, children mostly asked simple, fact-oriented *what* and *where* questions but from then onward approximately one quarter of children’s information-seeking questions were aimed at obtaining an explanation, typically by posing a *how* or *why* question.

What do preschoolers ask about? Scrutiny of the questions analyzed in three naturalistic studies of children talking with their caregivers (Callanan & Oakes, 1992; Chouinard, 2007; Tizard & Hughes, 1984) shows that many questions are targeted at ongoing activities—the activities of a person or an animal and some questions focus on the beliefs, desires, or personality of the agent in question. Nevertheless, preschoolers’ curiosity goes beyond the psychological. They ask about inanimate, natural phenomena (Why can we see stars?), biological phenomena (Do cow babies come from eggs?), physical mechanisms (How do electric wheelchairs work?), and cultural conventions (Does Santa Claus make Christmas?).

Such questions may also crop up with no obvious link to an ongoing activity. Indeed, explanation-seeking questions are often embedded in a longer conversational exchange in which children first ask a simple, fac-

tual question before asking for an explanation (Chouinard, 2007). By implication, preschoolers are capable of mulling over topics in a variety of domains and they use conversation to explore those topics. When provided with satisfactory explanations, they express their agreement and ask follow-up questions. When provided with no explanations or unsatisfactory explanations, they restate their questions or provide their own explanations (Frazier, Gelman, & Wellman, 2009). Indeed, Tizard and Hughes (1984) noted that 4-year-olds can be tenacious in trying to get clear on a topic that puzzles them. In what they dubbed "passages of intellectual search," children often posed a series of consequential questions, incorporating and building on the answers they received.

To summarize this section, infants and young children not only understand the transmission of information from informant to recipient, but they also seek out missing information from other people who are likely to be knowledgeable and they acknowledge their own ignorance. Initially, they ask "questions" via gestures and/or vocalizations but increasingly in the third year, they pose well formed, verbal questions about locations, objects, and activities and by 30 months they ask for explanations on a range of topics.



4. CHILDREN'S EXPLICIT TALK ABOUT KNOWLEDGE AND IGNORANCE

So far, we have argued that infants and toddlers understand that information can be transmitted via communication. In addition, they actively provide information to, and seek information from, other people. Research on the child's theory of mind adds to this conclusion by showing that 3- and 4-year-olds possess not just an implicit conception of information transmission and acquisition, but an increasingly explicit understanding of knowledge, as indexed by their comprehension and production of cognitive verbs, especially "know" and "think." Next, we make four claims regarding children's early conception of knowledge as revealed in the context of experimental tasks as well as spontaneous conversation.

First, by 3–4 years of age, children systematically differentiate between individuals who know and those who do not. They can explicitly state that people who have had access to a given piece of information will know it whereas others, lacking such access, will not know it. Sec-

ond, between 3 and 4 years of age, children become increasingly sensitive to the critical relationship between knowledge and truth—they acknowledge the distinction between knowing that something is the case and *thinking* that something is the case. They come to realize that the mental state of knowing is attributed only when a speaker presumes the attributed belief to be true. Third, 3- and 4-year-olds talk explicitly about the way in which knowledge can be obtained from different sources—from direct observation but also, in line with the various findings reviewed earlier, from what other people say. Finally, despite their grasp of what an attribution of knowledge presupposes, preschoolers do not adopt an absolutist position toward all domains of knowledge, such that they regard all beliefs as either true or false. In some nonfactual domains, they appropriately acknowledge both the divergence and the validity of conflicting claims. In the next section, we provide evidence for these four claims.

4.1. Knowledge vs Ignorance

By 3–4 years of age, children talk explicitly about how individuals may vary in what they know. In a typical experimental paradigm, children watch as one of two individuals acquires a given piece of knowledge—for example, comes to know the contents of a box by looking inside it. The other individual is given no opportunity to look inside. Children are then asked whether each individual “knows” what is in the box. Three- and 4-year-olds are quite accurate in differentiating between the individual who does vs does not know what is in the box. They do so whether they watch and comment on two other individuals, or comment on what they themselves know as compared to another person (Pillow, 1989; Pratt & Bryant, 1990). That said, children are typically able to produce accurate reports about their own knowledge some months in advance of being able to make accurate reports about other persons (Gonzales, Fabricius & Kupfer, 2017).

In a variant of the seeing–knowing task, created by Wellman and Liu (2004), children first look inside a drawer themselves and see that there is a toy. Next, they meet a doll and are told that she has “never ever seen inside this drawer.” They are then asked if the doll knows what is inside the drawer and, also (as a memory check) whether she has seen inside it. Children typically answer these knowledge access questions correctly at around 3–4 years. Longitudinal and cross-sectional studies have estab-

lished that children find this task easier than a relatively similar task—the false belief task in which they are first shown the unexpected contents (e.g., a toy pig) of a familiar container (e.g., a band-aid box) and then must figure out what a doll protagonist who has not seen the contents will mistakenly believe to be inside the familiar container (Wellman, 2014).

Thus, despite their well-established difficulties with standard false belief tasks (Wellman, 2014), 3- and 4-year-olds talk cogently about the fact that individuals may vary in what they know depending on their perceptual access. Children can differentiate between themselves and another person, appropriately affirming that they know what someone else does not—or vice versa. In addition, they comment on such interindividual differences when they occupy the role of a third party—they can state whether each of two other individuals does or does not know a given piece of information.

4.2. The Presuppositions of Knowledge Attribution

English, like many other languages, has a variety of cognitive verbs—such as *know*, *learn*, and *forget*—that are factive. When speakers use these verbs, they presuppose the truth of the complement of the verb. For example, when we say that someone knows or that someone has forgotten that Caesar invaded Britain, we presuppose in either case that such an invasion actually took place. Indeed, factive verbs carry that presupposition even when they are negated. If we admit that we did not know that Caesar invaded Britain we are still presupposing that he did so. Nonfactive mental verbs—such as *think*, *believe*, *expect*, or *guess*—do not presuppose the truth of their complements. I can think that Caesar invaded Ireland whether or not he actually did so. Here, we concentrate on the contrast between *know* and *think* because these two verbs dominate children's early talk about cognition—they produce verbs like *learn* or *believe* much less often (Bartsch & Wellman, 1995).

Do children understand the different presuppositions of *know* as compared to *think*? Johnson and Maratsos (1977) invited preschoolers to listen to stories dramatized with the help of toy characters and props. A hider would play a trick on a seeker by first hiding an object in one place (A) and then telling the seeker it was in another place (B). Having watched such stories, 4-year-olds did well on a set of questions asking them to say what the seeker knew and thought as compared to the hider.

More specifically, when asked about the hider, they were able to appropriately affirm that the hider *knows* the object is in A, to deny that the hider *thinks* that it is in A and, when given a forced choice, (Does the hider think it's at A or does he *know* it's at A?), to choose *know*. Conversely, they were able to appropriately affirm that the seeker *thinks* that the object is in B, to deny that the seeker *knows* that it is in B and, when given a forced choice, (Does the seeker think it's at B or does he *know* it's at B?), to choose *think*. Taken together, these findings show that 4-year-olds grasp an important presupposition of *know*, namely that unlike *think*, what is known is true.

If a speaker claims to *know* something, it is plausible that he or she is more confident of the truth of that claim than a speaker who claims only to *think* something. Of course, that confidence may be misplaced. A speaker who claims to know a given piece of information may be wrong. Nevertheless, under normal circumstances, it is reasonable for listeners to accept the information provided by a speaker who claims to *know* something rather than the information provided by a speaker who claims only to *think* something. Several studies confirm that, as listeners, 4-year-olds display exactly this type of selective trust. Moore, Bryant, and Furrow (1989) presented children with two puppets, one who claimed to *know* that candy was in, for example, a red box and one who claimed to *think* that it was in a blue box. Children were invited to choose one of the two boxes after receiving this conflicting testimony. Three-year-olds did not choose systematically but children aged 4 years and older were likely to endorse the puppet claiming to *know*. Moore and Davidge (1989) ran a similar study and confirmed this developmental change.

Koenig and Harris (2005) presented 3- and 4-year-olds with two informants, one who named familiar, everyday objects correctly and one who said that she "didn't know" their names. Subsequently, children were given an opportunity to learn either the names or the functions of novel objects from the two informants. In each case, children were likely to seek information from, and endorse the information provided by, the knowledgeable rather than the avowedly ignorant informant. Moreover, when asked to say why the ignorant informant had not been good at answering the initial questions about familiar objects, two-thirds of the children appropriately mentioned her lack of knowledge or competence: "She didn't know what they were" or "She wasn't too smart."

In short, 4-year-olds grasp when it is appropriate to attribute knowledge as well as what may be inferred from a claim of knowledge. They understand that attributions of knowledge are appropriate if the claim or belief under consideration is true but not if it is untrue. Moreover, appropriately enough, they are prone to trust someone who claims to know that something is the case whereas they are more skeptical toward someone who claims to think that something is the case—or admits to not knowing.

4.3. Sources of Knowledge

Most studies of children's attribution of knowledge vs ignorance have focused on perception as a source of information. However, as argued earlier, toddlers also understand communication as a source of information as indexed by various behavioral measures. When do children start to talk explicitly about different sources of knowledge? In a study by Gopnik and Graf (1988), 3-, 4-, and 5-year-olds learned about the contents of a drawer in one of three different ways: they looked inside it; they were told its contents by the experimenter; or they inferred its contents from a verbal clue. Afterward, children were asked to identify the source of their knowledge. Thus, once children had correctly stated what was inside the drawer, the experimenter asked: "How do you know there's an (X) inside, did you see it, did I tell you about it, or did you figure it out from a clue?" Performance improved with age but even 3-year-olds performed above chance and one-third made no errors at all. By implication, 3- and 4-year-olds not only differentiate between individuals who know a given piece of information and individuals who do not, but they are also able to differentiate between different sources of knowledge. They explicitly acknowledge that testimony or testimony-based inference, and not just perception, can lead to knowledge.

Subsequent research has lent solid support to this conclusion. Papafragou, Li, Choi, and Han (2007) found that both Korean and English 3- and 4-year-olds were able to indicate whether they knew what was inside a drawer because they had been told its contents or because they had looked inside it. They also realized that someone who had heard someone whisper its contents or had seen its contents would know what those contents were—unlike someone who had been involved in some superficially similar but noninformative activity. Correct answers increased with age but even 3-year-olds performed above chance.

Not only are 3-year-olds able to identify different sources of knowledge, they can also identify some sources of knowledge as better than others and use this understanding to select between competing claims. Koenig (2012) presented 3-, 4-, and 5-year-old children with pairs of speakers who provided different kinds of evidence supporting their beliefs about the contents of an opaque box. The speakers were paired such that a stronger reason (e.g., having looked inside the box) was paired with a weaker reason (e.g., pretending that something is in the box). All children judged looking in the box, a teacher's testimony, and inference as better reasons for belief than pretense, guessing, and desiring. Further evidence for children's ability to calibrate particular sources of knowledge comes from Einav and Robinson (2011). They found that 4-year-olds but not 3-year-olds appropriately distinguished between an informant whose accuracy was based on previously stored knowledge rather than on whispered answers from a third party. In summary, 3- and 4-year-olds increasingly differentiate between different sources of knowledge and assess the relative strength of competing sources in choosing between competing claims.

Lockhart, Goddu, Smith, and Keil (2016) probed children's insight into the scope of knowledge based on direct observation as compared to knowledge based on testimony. They asked children aged 5–11 years and adults to think about an isolated individual growing up on a desert island. Children were quite good at realizing that the individual could acquire various pieces of knowledge via direct observation (e.g., that you cannot hold your breath for a whole day, and that birds fly) but would not acquire other pieces of knowledge that depend on others' testimony (e.g., that the Earth is round and that there used to be dinosaurs). Differentiation between these two types of knowledge improved with age but even 5–7-year-olds made a clear differentiation between them—with little overlap.

Despite their sensitive conceptualization of different sources, it is important to acknowledge that when young children have recently acquired a given piece of information, their later ability to remember and report its source is imperfect (Harris, 2002). In retrospect, they are prone to overestimate how long they have known the information (Taylor, Esbensen, & Bennett, 1994) and to claim that they saw a given event when, in fact, they were told about it (Principe, 2014; Principe, Kanaya, Ceci, & Singh, 2006; Principe & Smith, 2008). But such source-monitoring inaccuracies

should not be taken to imply that young children are incapable of making a principled distinction between different sources of information, and notably between being told and observing first hand especially when they initially encode information. In sum, even if source-monitoring difficulties are apparent in young children, the conceptual ability to differentiate between sources, such as being told vs observing first hand, emerges early in development.

4.4. Domains of Knowledge

By 4 years of age, children understand that people may hold conflicting beliefs over various issues—empirical issues such as the contents of a box, moral issues such as whether it is OK to steal, and matters of preference or opinion such as which color is prettier (Flavell, Mumme, Green, & Flavell, 1992). How do children construe these various types of disagreement? It is conceivable that young children are absolutists who conceive of all such conflicts similarly, namely as disagreements about the truth such that one person knows the truth whereas the other does not. Recent research shows, however, that children appreciate that there are different types of disagreement. More specifically, they are not absolutists across the board. They grasp that the status of a disagreement—whether it can be resolved, and if so, how it can be resolved—varies depending on the domain of knowledge. Wainryb, Shaw, Langley, Cottam, and Lewis (2004) asked 5-, 7-, and 9-year-olds to consider disagreements between two people over four different types of issue: an empirical issue (e.g., whether a dropped pencil will fall downward or upward), a moral issue (e.g., whether it's OK or not to break other children's toys), an issue of taste (e.g., whether chocolate ice cream tastes yucky or yummy), and an ambiguous causal issue (e.g., why a particular dog is not eating). Children were asked if only one or both of the individuals could be right in their conflicting claims. In all three age groups, children almost invariably said that only one person could be right in the case of the empirical and moral disagreements. There was also great developmental stability in the way that children justified their absolutist convictions for each of these two cases. All three age groups systematically referred to alleged factual truths in the case of empirical disagreements (e.g., “What that girl says is wrong and what this one says is right because pencils fall down, for sure, they never fall up”) and to deontic considerations in the case of

moral disagreements (e.g., “What this one says is very wrong because it’s mean and it’s unfair to break other people’s toys”).

By contrast, with respect to matters of preference as well as ambiguous causal issues, children were more likely to say that both people could be right. This pattern was already apparent among a minority 5-year-olds although it was more widespread among 7- and 9-year-olds. Children’s justifications in these two domains were also distinctive—and increasingly so with age. They referred to subjective factors in adjudicating the preference disagreement (e.g., “What she thinks is right and what she thinks is also right because ice cream can taste good to her and gross to her”) and to uncertainty in the case of the ambiguous, causal issue (e.g., “They can both be right because there’s no way to know for sure”).

Further evidence for absolutist thinking with respect to empirical and moral issues was found by Kim, Chen, Smetana, and Greenberger (2016). Preschoolers ranging from 2 to 6 years first made empirical judgments (about line length), moral judgments (e.g., about hitting another child), and social-conventional judgments (e.g., about standing during story time). They then watched two peers make opposing judgments to their own and were again asked what they thought. Children tended to stick to their original empirical judgments, and also to their original moral judgments, whereas they were prone to switch to the social-conventional judgment of their peers.

Evidence for domain-dependent recourse to absolutist vs relativistic thinking was also reported by Heiphetz, Spelke, Harris, and Banaji (2013). They presented children aged 5–10 years and adults with disagreements over matters of fact, matters of taste, and matters of religion—for example, whether or not people go to heaven when they die. Overall, absolutist reactions to these disagreements declined with age but all age groups, including 5-year-olds, displayed a similar differentiation among the three domains. In line with the findings of Wainryb et al. (2004), they typically adopted an absolutist stance toward factual disagreements—claiming that only one person could be right—but a relativistic stance toward taste disagreements—acknowledging that both people could be right. Finally, they situated religious disagreements in between, judging that only one person could be right in some cases but that both could be right in others.

In summary, these various findings suggest that the absolutist stance (i.e., the belief that only one view can be right) is widespread and likely

to remain so with respect to unequivocal empirical and moral issues whereas a relativistic stance (i.e., the belief that two conflicting views can both be right) emerges early for more equivocal issues. By implication, young children are disposed to absolutism in empirical and moral matters but recognize that the nature of a disagreement depends on the domain. They acknowledge that, although it is often the case that one person is right and the other person is wrong, in other cases, disagreements may be hard to adjudicate—given the subjectivity of individual preferences, the uncertainty of the available evidence, or variation in social conventions. These claims warrant further investigation in diverse cultures.

4.5. Overview: Young Children's Conception of Knowledge

In the first section, we claimed that infants and toddlers realize that information can be communicated to a recipient who is likely to adjust his or her behavior in light of that information. However, the evidence for such insights was behavioral. It would be difficult to use such evidence to argue that infants and toddlers have an explicit awareness of knowing as a distinctive mental state. By contrast, the evidence presented in the second section and especially in this third section is more persuasive. Preschoolers talk explicitly and cogently about knowing. Thus, 3- and 4-year-olds differentiate systematically between a person who *knows* a given piece of factual information and a person who *does not know* it. Four-year-olds recognize that the attribution of knowledge to someone implies the truth of the belief in question. They regard someone who claims to *know* a given piece of information (e.g., that an object is in one box rather than another) as a more reliable informant than someone who only claims to *think* that the object is in a given location. Indeed, when preschoolers encounter someone who explicitly and repeatedly acknowledges ignorance, they direct their questions elsewhere and characterize such an informant's limitations in cognitive terms (she was not too smart). Four-year-olds, and to some extent 3-year-olds, can respond appropriately to questions about the source of knowledge, distinguishing between direct observation (e.g., looking in a box) and communication (e.g., being told what is in a box). By 5 years of age, children appreciate that there are different domains of knowledge and, by implication, certain restrictions on the attribution of true knowledge. They judge that some claims—factual claims as well as moral claims—can be assessed in light of direct

observation or common knowledge as either true or false. Yet they recognize that other claims cannot be assessed in this way—such claims reflect personal tastes and preferences or they are based on insufficient evidence for deciding whose claim is true.

4.6. A Universal Conception of Knowledge?

Granted the key role of communication and information transmission in the human species, it would not be surprising if all children, irrespective of the culture in which they are being raised, acquire an understanding of the way that knowledge is gained and the extent to which agreement can be expected. Indeed, various pieces of evidence lend credence to the proposal that, barring a disability or pathology, all children eventually subscribe to the basic conception of knowledge set out above. Recent studies using the theory-of-mind scale devised by Wellman and Liu (2004) have shown that children in the United States, Australia, China, and Iran typically pass the knowledge access task (testing whether the child can judge another person's knowledge vs ignorance about the contents of a container) at around 3–4 years (Wellman, 2014).

Almost all studies of children's grasp of factive as compared to non-factive verbs have been conducted in English, with a concentration on the difference between *know* and *think*. However, a similar distinction emerges around the age of 3–5 years for Japanese-speaking children (Matsui, Yamamoto, & McCagg, 2006).

Cross-cultural studies of children's explicit awareness of the sources of knowledge also indicate that 3–4 years marks an important developmental change. In their systematic cross-cultural study, Papafragou et al. (2007) found that US and Korean preschoolers, aged 3–4 years, performed equally well in a source-monitoring task in which they were invited to say whether information had been acquired via perception or communication. The cross-cultural stability of these findings is all the more striking in that evidentiality, and more specifically whether or not a piece of information has been learned via observation or communication, is obligatorily marked in Korean. More specifically, speakers are obliged to add an inflectional morpheme to the main verb to indicate that the speaker has direct or hearsay evidence for the statement. By contrast, such markers are optional in English. For example, “allegedly” may be included to signal a statement based on hearsay evidence but it is not obligatory. By implication, the development of children's source-moni-

toring ability is not likely to be affected by the presence vs absence of obligatory evidential markers in their native language.



5. INFLUENCES ON CHILDREN'S KNOWLEDGE SEEKING

In this final section, we ask about the impact of children's family and cultural milieu on their knowledge seeking. As discussed in the previous section, we doubt that there is any major cultural variation in children's foundational conception of knowledge. Nonetheless, to the extent that children grow up in environments that vary considerably in their styles of communication, their pattern of knowledge seeking may vary accordingly. We consider three key dimensions of that variation. First, we consider variation among parents in the values that they bring to the socialization of their children. Second, we examine variation among parents in the way that they speak to their children. Third, we review differences among children in their pattern of knowledge seeking. More specifically, we focus on (i) variation in the frequency with which children ask questions; (ii) variation in children's tendency to defer to the surrounding consensus; and (iii) variation among children in their sensitivity to disagreement as compared to ignorance. Needless to say, these three types of variation are likely to be interconnected and to covary. To facilitate exegesis, we discuss them successively and then offer a brief synthesis.

5.1. Parental Values

In research on parental values, parents have been presented with pairs of qualities (e.g., respect for elders vs independence; obedience vs self-reliance; good manners vs curiosity; being well behaved vs being considerate) and asked to indicate which quality is the more desirable for a child. Analyses of these data highlight the existence of two different parental orientations—one aimed at nurturing autonomy or independence and the other aimed at nurturing deference or obedience (Feldman, 2003).

Further analysis of these parenting values has revealed marked variation across nations and across social classes. Park and Lau (2016) examined data from over 200,000 parents from 90 nations. Parents were presented with a list of "qualities which children can be encouraged to learn at home" and asked to choose up to five qualities that they considered

most important. Analysis focused on the frequency with which parents chose independence and obedience. When comparisons were made across nations, endorsement of independence was predicted by greater national wealth (as indexed by gross national income per capita) and by higher national levels of education (as indexed by a greater percentage of post-secondary enrolment in education). By contrast, endorsement of obedience was more widespread in nations with less wealth and lower levels of education. A similar pattern emerged when the pattern of variation across individual parents was analyzed. Parents with a larger annual income and higher levels of education were more likely to endorse independence whereas parents with lower annual income and lower levels of education were more likely to endorse obedience.

Arguably, these value choices indicate not just a parent's stance toward the child's social and moral behavior but also the way that a parent engages in conversation with his or her child. For example, parents who prioritize independence are likely to be more accepting of disagreement and debate than parents who prioritize obedience. Conversely, parents who prioritize obedience are more likely to expect deference and respect. These analyses of parental values are based on parental report and so we should be cautious in assuming that the values endorsed by parents in a questionnaire provide any direct reflection of how they behave and speak with their children. Nevertheless, analyses of parental speech are consistent with these expectations. As discussed in the next section, wealthier parents with higher levels of education vary both in the frequency with which they talk to their children and in the manner in which they do so.

5.2. How Do Parents Talk to Their Children?

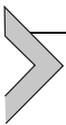
Parents vary dramatically in how much they talk to their children (Hart & Risley, 1995). Socioeconomic status (SES), and especially education, is a major predictor of this variation (Huttenlocher, Vasilyeva, Waterfall, Vevea, & Hedges, 2007) even though parents with the same socioeconomic background (Huttenlocher, Haight, & Bryk, 1991) and level of education (Huttenlocher et al., 2007) can also show stable individual differences. Data underlining the key role of parental education has also come from studies conducted outside the United States. In five developing countries, Levine, Levine, Schnell-Anzola, Rowe, and Dexter (2012) found that mothers' level of schooling, and more specifically the level of literacy that mothers had retained from that schooling, was a consistent

predictor of the frequency with which they engaged in conversation with their young child. Levine et al. argue that mothers who have been to school, in contrast to their unschooled and illiterate counterparts, come to view conversation as having a pedagogic potential. They use it as a vehicle for informing and instructing their child.

Indeed, emerging evidence suggests that parents' broader conception of child development is likely to account for much of the variation in parental speech to children, both within and across different social strata. Rowe (2008) showed that the way that mothers answered a questionnaire about various landmarks in child development was a stronger predictor of the amount of speech that they directed to their children than mothers' performance on test of language ability. A plausible interpretation of this finding is that mothers differ in their working assumption about children's language acquisition with some mothers assuming a relatively autonomous biological timetable and others assuming a pedagogic role for language input. A related but more far-reaching possibility is that mothers differ in their working assumption, not just about the course of language acquisition, but about how knowledge is transmitted and elaborated. More specifically, it is plausible that parents vary in the extent to which they assume that knowledge and reflection can be nurtured in the context of sustained conversation with their children. They express that assumption in the way that they communicate with their children, and in their turn, children come to share their parents' assumptions about the acquisition of knowledge. Next, we examine the claim that families vary not just in the amount but also in the type of talk that they direct to their children.

Based on a principal components analysis of multiple parenting variables, Hart and Risley (1992) identified three indices of variation in conversational style. First, parents varied in active listening to their child as reflected in the frequency with which they repeated or elaborated on the child's utterance. Second, parents varied in the number of questions that they asked. Third, parents varied in how often they produced prohibitions, such as "Stop" or "Don't." These three indices clustered together; active listening and questioning were positively correlated with each other whereas each of these two dispositions was negatively correlated with the frequency of prohibitions. By implication, parents approach parent-child conversation with different priorities. Some parents are prone to use talk to nurture conversation via questions and elaborations but oth-

ers are prone to use talk to regulate their child's activity, especially by means of prohibitions. Consistent with the analyses of parent values reviewed earlier, this variation in conversational stance was strongly related to SES. For example, questions were much more frequent than prohibitions in higher SES families but not in lower SES families. Moreover, individual families displayed a stable profile for asking questions (from fewer than 20% to almost 50% of the total number of utterances) across the 27-month period of the study. By implication, children growing up in different social milieux are likely to encounter marked and persistent differences in conversational style.



6. DIFFERENCES AMONG CHILDREN IN THEIR PATTERN OF KNOWLEDGE SEEKING

Do children vary in the conversational stance that they adopt toward their parents and other adults? More specifically, do children vary in the number of questions that they ask, in their tendency to defer to the surrounding consensus, and in their stance toward disagreement as compared to ignorance?

Various findings confirm that social class differences in question asking emerge early in children's development. In a pioneering study, McCarthy (1930) recorded children ranging in age from 18 to 54 months as they each talked to the same unfamiliar adult. She found that upper class children asked more questions than lower class children. This difference was not simply due to variation in children's overall talkativeness because McCarthy calculated the number of questions as a proportion of the first 50 utterances. Nor was it a matter of intelligence. When children from the two social strata were equated for mental age, the proportion of questions asked by upper class children was still double that of lower class children. Finally, the difference was not likely to have been due to class differences in social confidence, notably in questioning a stranger, because Tizard and Hughes (1984) observed a similar social class difference in the United Kingdom even when 4-year-olds were recorded in conversation with their mothers at home not with a stranger. As compared to lower class children, middle class children devoted more conversation turns to questions, and especially to curiosity based rather than "procedural" or authority-challenging questions. Middle class children also engaged in more persistent questioning. Thus, they were more

likely to ask several, successive questions on a given topic, building on the answers they had received.

How exactly are these social class differences in children's question asking established? Two plausible explanations are worth considering. One possibility is that when children ask a question, parents vary in how often they respond and also in the frequency with which they provide a helpful and informative reply when they do so. In short, some children may find that their questions are often answered satisfactorily and other children may find that this rarely happens. Such differential "reinforcement" might well affect the frequency with which children ask questions and the persistence with which they do so.

However, an alternative possibility is that children emulate the conversational stance and indeed the epistemic stance that their parents adopt. If their parents' conversation includes a high proportion of questions, children do likewise. When Tizard and Hughes (1984) asked what aspects of maternal discourse predicted the frequency with which children asked questions, the clearest predictor proved to be the frequency with which mothers asked questions themselves rather than the content or adequacy of mothers' answers. By implication, a mother's conversational style can signal a distinctive stance toward the exchange of ideas via conversation and children emulate that stance. In future work, it will be fruitful to establish how far children carry that stance into new social relationships. Are children who become accustomed to using conversation as an opportunity to exchange ideas with their parents prone to adopt that same stance when talking with educators or peers? Alternatively, is such a stance closely tied to a particular conversation partner?

In summary, wealthier and better-educated parents prioritize autonomy and they encourage their children to express themselves by asking them questions. Poorer and less well-educated parents are more likely to prioritize obedience and the frequency with which they produce prohibitions reflects that priority. Children appear to pick up on parental priorities. Middle class children ask more questions, and engage in more sustained questioning with regard to a given topic, than do lower class children.

In forming a judgment, preschool children are often receptive to guidance from other people (Harris, 2012). Recent findings indicate that children vary in the extent to which they rely on this deferential strategy. We focus on two sets of findings that highlight such variation, one examining

children's deference to a consensus and the other involving children's deference to an accurate as compared to an inaccurate speaker.

In a replication of the classic Asch paradigm, 3- and 4-year-olds were asked to select the longest of three lines—either independently or after misleading testimony from a consensus of adults. Children were consistently accurate in choosing the longest line when they made independent judgments but after misleading testimony, they were prone to defer on a minority of trials (Corriveau & Harris, 2010). The rate of deference was greater among Asian-American children as compared with Caucasian-American children.

In interpreting their findings, Corriveau and Harris drew on a comprehensive metaanalysis of adult performance on the Asch task. Bond and Smith (1996) reported that a variety of factors were predictive of deference. For example, deference was greater the larger the size of the majority and the more ambiguous the stimuli to be judged. However, the strongest predictor of deference was the pattern of values associated with the nationality of the participants. More specifically, using three different multinational surveys (Hofstede, 1983; Schwartz, 1994; Trompenaars, 1993) a variant on the individualist vs collectivist dimension emerged and whichever survey was used this dimension proved to be a good predictor of deference. Thus, rates of deference to the consensus were lower among participants tested in countries with individualist rather than collectivist values.

Harris and Corriveau (2013) noted that the Asch task effectively places two ordinarily concordant bases for judgment—the individual's own perceptual judgment and the judgment of a consensus—in opposition to each other and probes the extent to which individuals give weight to one rather than the other. In Asian cultures, where respectful deference and accommodation to other people is valued, it is plausible that the judgment pronounced by a social consensus is weighted more heavily than in Western cultures where the individual's expression of his or her personal opinion and judgment is valued (Chen & French, 2008; Markus & Kitayama, 1991). It is plausible that these differential weights impact parents' attitudes and discourse vis-à-vis young children. Thus, as compared to parents in a more individualist culture, parents in a collectivist culture will be less prone to either invite or affirm expressions of opinion by their young children. Consistent with this emphasis on cultural values, Corriveau, Kim, Song, and Harris (2013) found that as compared to US

preschoolers, deference was especially pronounced among first rather than second-generation Asian-American preschoolers.

Further evidence for a link between parental values and children's deference was reported by Reifen Tagar, Federico, Lyons, Ludeke, and Koenig (2014). Children were first presented with two potential informants—one who labeled familiar objects in a conventionally accurate manner (e.g., called a shoe, a “shoe”) and one who labeled them in a deviant manner (e.g., called a shoe, a “ball”). Subsequently, children were presented with unfamiliar objects, heard one of the informants provided a novel name (e.g., “modi”) for each object, and were asked if they agreed with this name. Consistent with past findings (Koenig, Clément, & Harris, 2004; Koenig & Harris, 2005), children were more dubious about names provided by the deviant as compared to the conventionally accurate informant.

Reifen Tagar et al. (2014) went on to examine whether children varied in how strongly they differentiated between the two informants. They found that children whose parents favored conformity over autonomy—as indexed by the forced choice questions described above—were especially prone to doubt the deviant informant and to endorse the conventionally accurate informant. A plausible interpretation of this finding is that these children had been led by their parents' values and conversational style to be especially attentive to an informant's social conformity and to doubt information provided by a deviant or unconventional speaker who names objects inaccurately. By implication, parents can transmit strategies of selective trust to their children that help to maintain and perpetuate parental values: parents who favor conformity to the surrounding consensus are likely to have children who are mistrustful of deviation and dissent. This cross-generational transmission of an epistemic stance is operative even in the preschool years.

In summary, there is considerable evidence of cultural variation in the extent to which individuals are encouraged to express and defend their personal opinion or judgment rather than defer to the surrounding consensus. It is plausible that these values impact the way that parents speak to their children. In more collectivist cultures and in families that value conformity, children will be encouraged to acknowledge and respect the surrounding consensus whereas in more individualist cultures and in families that value autonomy, children will be encouraged to affirm their personal judgments and opinions.

Finally, we consider a third type of variation among children, notably in their stance toward disagreement as compared to ignorance. Recent cross-cultural findings concerning children's theory of mind suggest that children display different priorities in their sensitivity to cognitive differences between individuals. Some children are more sensitive to the way that individuals differ in what they know as compared to what they think or believe. Other children display the reverse pattern. The former type of sensitivity is found in Iran and China whereas the latter is found in the United States, Europe, and Australia (Wellman, 2014). More specifically, when assessed with the theory-of-mind scale mentioned earlier (Wellman & Liu, 2004), American and Australian children typically pass the diverse beliefs task before the knowledge-ignorance task, whereas Chinese and Iranian children typically pass the knowledge-ignorance task before the diverse beliefs task (Wellman, 2014).

A plausible explanation for this difference in the order of acquisition is that cultures vary in their emphasis on true knowledge as compared to individual belief. In individualistic cultures, such as the United States and Australia, family conversation is likely to deemphasize the factivity of knowledge, and to encourage children to voice their own potentially valid beliefs and opinions. By contrast, in more collectivist cultures, family conversation is likely to emphasize the factivity of knowledge—it presupposes the truth of many claims and discourages children from voicing or assuming the validity of their own beliefs and opinions. By implication, even if children in different cultures ultimately come to recognize that some claims reflect true knowledge whereas others only reflect a personal belief that may or may not be true, the surrounding epistemic culture prioritizes these domains differently. In individualistic cultures, there is an expectation that individuals will have, and are entitled to voice, their own beliefs. By contrast, in collectivistic cultures, there is an expectation that individuals will defer to established truths.

Taken together, these scattered findings underline the possibility that even in early childhood there are individual differences among children in the way that they gather information and in the weight that they attach to different sources of information. Such variation appears to be associated with parental variation in conversational and epistemic stance. Parents who emphasize conformity and respect have children who display three characteristics: they are less prone to ask questions, they are receptive to the surrounding consensus and skeptical of claims made by a non-

conformist, and they are alert to variation among individuals in who knows or does not know the truth. Conversely, parents who emphasize autonomy have children who are inclined to ask questions, who stick to their own judgment even if it runs counter to the surrounding consensus, and who are alert to variation among individuals in what they think or believe.

At present, the available studies are few in number, but it is to be hoped that future research will take seriously the idea that, even if they subscribe to the same basic conception of knowledge, children's epistemic stance is likely to be shaped not just by the volume of richness of the conversations in which they participate but by the values, assumptions, and uncertainties that parents communicate to them.

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