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Review

Question-asking in childhood: A review of the literature and a framework for understanding its development

Samuel Ronfard[a,*], Imac M. Zambrana[b,c], Tone K. Hermansen[b], Deborah Kelemen[a]

[a] Boston University, Department of Psychological and Brain Sciences, Child Cognition Lab, Room 157, 64 Cummington Mall, Boston, MA 02215, USA
[b] Norwegian Center of Child Behavioral Development, Essendrops Gate 3, Pb. 7053 Majorstuen, 0306 Oslo, Norway
[c] University of Oslo, Department of Special Needs Education, University of Oslo, Sem Sælands vei 7, 0371 Oslo, Norway

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ABSTRACT

Children's ability to query others is remarkable because it attests to their coordination of a range of complex cognitive capacities and because it allows them to initiate and redirect pedagogical exchanges. It is therefore a catalyst for their ability to learn from others. However, despite its importance for cognitive developmental theorizing and its implications for educational practice, relative to other aspects of children's exploratory behavior, research on children's questions has been relatively sparse and siloed across several disciplines. The aim of this review is to provide a framework for organizing past and future research on question-asking and to use this framework to describe what development and variability in children's question asking looks like between infancy and the elementary school years. We propose that question-asking can be divided into four components: (1) initiation, (2) formulation, (3) expression, and (4) response evaluation and follow-up. Drawing on research from the fields of psychology, education, and developmental psycholinguistics we review what is known and not known about these four components between infancy and elementary school as well as describe sources of variability across development.

Introduction

The ability of children to engage in direct first-hand exploration and their ability to indirectly learn from other people allows them to quickly acquire a great deal of information about their world. On the one hand, children display an incredible capacity for learning on their own. Through observation and experimentation, they construct common sense understandings of the physical, biological, and social world. They track patterns and regularities, make inferences based on those patterns, and test out and revise hypotheses as they accumulate relevant evidence (Gopnik & Wellman, 2012). On the other hand, children rely heavily on the accumulated knowledge of their community across domains. They readily learn from direct instruction and quickly internalize, transmit, and enforce the beliefs and practices of their culture (Clegg & Legare, 2016; Kenward, 2012; Paradise & Rogoff, 2009). Indeed, through the testimony of other people, children can learn about ideas and entities they could not discover on their own (Harris and Koenig, 2006). However, children do not have to wait for the opportunity to explore or for information to be given to them. They can query other people to "gather just the information they want, on just the topic that interests them, at just the time they require it" (Baldwin & Moses, 1996, p. 1934). Thus, the ability to actively gather information from other people and to integrate it with what they are learning through exploration, observation, and testimony is one of the most powerful learning mechanisms available to children.

Despite its importance for cognitive developmental theorizing and education, we know very little about how the ability to request

* Corresponding author at: Boston University, 64 Cummington Mall St., Office 155, Boston, MA 02215, USA.
E-mail addresses: sronfard@bu.edu (S. Ronfard), i.m.zambrana@isp.uio.no (I.M. Zambrana), t.k.hermansen@nubu.no (T.K. Hermansen), dkelemen@bu.edu (D. Kelemen).

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information from others develops. This is in significant part because research on this topic has been split across multiple disciplines, most prominently, the fields of psychology, education, and developmental psycholinguistics. Unfortunately, research across these different disciplines has rarely been brought together to tell a complete developmental story. As a result, we lack a coherent understanding of how children develop the ability to ask questions, the relative continuity of this process, how culture, domain-general cognitive processes and domain-specific knowledge constrain that development, and how contextual and individual factors explain variability in the questions people ask.

The aim of this review is to provide a framework for organizing past and future research and to use this framework to describe what development and variability in children's question asking looks like between infancy and the elementary school years. We focus on early childhood because question-asking as an information-seeking strategy emerges and undergoes rapid development during this period and because it is the developmental period that has been most extensively studied. By synthesizing the research conducted in early childhood using a novel developmental framework, we hope to stimulate further research across the lifespan and across diverse contexts to identify the mechanisms underlying development in the ability to ask questions. In developing our framework we drew from both child and adult research in order to identify components of the question-asking process that were broad enough to allows us to consider development from infancy to adulthood but narrow enough to capture what appear to be "necessary" sub-elements of the process (Flammer, 1981; Graesser, Person, & Huber, 1992; Mills & Landrum, 2014; Todd, Hill, & Robbins, 2012; Ram, 1991). By necessity, this framework and its components are described in relatively broad terms as the current goal is to accommodate research from diverse theoretical perspectives and disciplines across a wide range of ages – a necessary first step in motivating more targeted investigations. We begin by delineating the scope of our review. We then introduce our framework for organizing the available developmental evidence. Finally, we review developments in question asking and conclude with next steps for research.

Scope

In this review, we focus on the epistemic function of questions – the intentional use of questions to seek information that bridges a knowledge gap or resolves uncertainty (Baldwin & Moses, 1996). However, questions are used for multiple purposes. They allow individuals to maintain and control the flow of conversations (i.e., pragmatic function), to manage social relationships and coordinate action (i.e., social functions) (Graesser, Person, & Huber, 1992), to make a point (Searle, 1969; Shatz, 1979), and even to teach (Cazden, 2001; Yu, Bonawitz, & Shafto, 2017). These different functions are typically studied independently and have rarely been examined together, but are nevertheless often overlapping (Fitneva, 2012). For example, a child can ask a question to obtain information *and* to maintain and control the flow of conversation. Thus, despite our focus on the epistemic function of questions, we consider the fact that questions serve multiple functions when interpreting age-related and individual differences in question asking.

Requests for information can be directed at the self and guide first-hand exploration (e.g., reading comprehension, Palinscar & Brown, 1984) or they can be directed towards other people. In this review, we follow the preponderance of current research to focus on question-asking as an other-directed social phenomenon. There are many ways to request information from other people: interrogative expressions (e.g., what is a pistol?), commands (e.g., tell me what is inside this box), statements (e.g., I don't understand this). Indeed, requests for information can also be conveyed through different modalities and behaviors, such as looks, gestures (e.g., pointing), and intonations (de Ruiter, 2012). Given that most of the data on epistemic questions in childhood have focused on pointing and verbal questions, our review has a similar focus.

Epistemic questions can be asked about diverse topics. For example, children (and adults) request information about labels, facts, procedures, and causal mechanisms and they can do so to obtain clarification, to rule out possible hypotheses, and out of curiosity or "wonderment" (Graesser & Person, 1994; Lehnert, 1978; Luce & Hsi, 2015). Our review does not focus on a particular sub-type of epistemic question. Rather, our aim is to highlight broad developments in the ability to ask epistemic questions across age. This is partly because, at the moment, there is not enough research to look at age-related changes across sub-types of epistemic questions. Thus, our assumption, to be tested in future research, is that age-related developments highlighted in this review hold across epistemic question sub-types.

A (brief) framework for thinking about question-asking

Before introducing our framework for thinking about question-asking, it is worth considering a few specifics about the practice of asking questions amongst adults. An intrinsic part of a question is that it builds on some conceptual starting point (Graesser & Olde, 2003; Harris, 2012). Furthermore, when someone asks a particular question, they have, at minimum, an overall idea of the information that they seek, that is, they sense the general *form* of what a satisfactory answer to that question looks like (Van der Meij, 1987). If one asks how something works, one expects a procedure or an explanation rather than a label. People ask questions because they expect to obtain reliable and relevant information from the person being queried and because they have determined that obtaining an answer to their question is valuable – people do not ask questions about everything they do not know (Flammer, 1981; Van der Meij, 1987). Finally, there is great variability in the quality and quantity of the questions people ask. For example, there is within-subject variability due to metacognitive failure; people ask imprecise, poorly worded questions about some topics rather than others, or, due to retrieval failures, ask questions for which they already know an answer (Todd et al., 2012). There is also between-subject variability; some people ask more questions, some people follow-up on their questions more often, some people ask more precise questions (Graesser & Person, 1994).

We argue that these specifics of adult question-asking as well as the occurrence of within- and between-subject variability can be explained using a question-asking model composed of four components: (1) initiation, (2) formulation, (3) expression, and (4)