CHAPTER FOUR

# The Authentic Object? A Child's-Eye View

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In S. G. Paris (Ed.) (2002). Perspectives on Object-Centered Learning in Museums. (pp. 55-77) Mahwah, NJ, Lawrence Erlbaum Associates.

A core assumption in object-centered learning is that real objects "speak" in ways that representations of those objects do not. Objects evoke personal reactions as well as a shared knowledge and history. Furthermore, central to museum lore is the belief that it is the authenticity and uniqueness of the museum-based object that summons the most powerful reactions. Questions have been raised as to whether "the locus of authenticity and meaning resides not in the object but in its mark" (p. 104) or interpretation (Roberts, 1997). Also addressed is the role of the visitor. Different perspectives are likely to be held by visitors for whom the object might have been part of their cultural tradition or lived history (e.g., Gurian, 1999). Yet, the core idea that the authenticity of objects is a characteristic acknowledged by all has not been disputed.

Nevertheless, this assumption should be challenged. It has been argued that authenticity is a relatively recent concept, a 20th-century reaction to the industrial revolution's capacity to mass produce simulated objects (see Roberts, 1997). Such arguments suggest that the idea of authenticity is not intuitive. If authentic objects do speak for themselves (Conn, 1998), what do children make of these voices? Children are among the most frequent museum visitors, and their understanding of authenticity may provide a provocative new view of this issue. Do they appreciate that they are viewing the real object, not some made-to-order simulation? What do they make of the claim of original design? Do they even care?

In this chapter, we argue that the understanding of objects that children of different ages bring to the museum setting offers a unique perspective. Little direct work on this topic has been conducted in museums. However, there is a body of related work to be found in contemporary studies of children's emerging understanding of the natural and the artificial worlds that can be used to develop a framework for understanding how children might approach the world of museum objects. Recent evidence on the development of children's thinking on this subject is presented in the larger context of the historical development of object-based learning in museum settings.

## CHAPTER PREVIEW

This chapter begins with an overview of the historical evidence for an object-based dialogue particularly as it evolves from an object-based epistemology (Conn, 1998) to an object-based discourse or narrative (Gurian, 1999; Roberts, 1997). The chapter then proceeds by relating children's (and adults') understanding of the reality, originality, and awe-inspiring nature of objects to specific features of this object-based dialogue. The central thesis is that the distinction between what is natural and what is artifactual lies at the heart of an object-based dialogue. Only by addressing this distinction can the implied initial question be adequately answered: What is an authentic object?

In the first section, we summarize the shift from an object-based epistemology, the language of late-19th-century museums, to an object-based discourse, the dominant voice in late-20th-century museums. This shift, we contend, represents important transformations in our understanding of the object. In an object-based epistemology, the focus was on the clear presentation of unembellished facts regarding the natural history and taxonomy of the object. In this case, the perspective of the visitor was virtually ignored. An object-based discourse, on the other hand, centers on the participation of the object in the cultural or lived history of the visitor. In the latter case, ironically, it is the natural history of the object that is downplayed; moreover, instead of bare facts, we maintain that there is an emphasis on explanation, which could be that of the expert or that of the visitor or both (but it is rarely that of the child).

In the subsequent two sections, we claim that the distinction between the natural history and the cultural history of the object maps onto important conceptual distinctions made by children and adults in their understanding of the natural and artifactual worlds. These distinctions should be clearly marked, we further argue, if children are to learn from and fully participate in an object-based dialogue. To this end, we first review recent evidence on children's conceptual development and their capacity to generate explanations for natural and artifactual phenomena. Then, we relate findings from such studies to three clearly identifiable aspects of authenticity: the reality, the orig-

inality, and the awe-inspiring nature of objects. In the final section, we return to our original theme and consider what this work reveals about the nature of the authentic object.

## AN OBJECT-BASED EPISTEMOLOGY: A ONCE AND FUTURE DIALOGUE

The term *object-based epistemology* was coined by Conn (1998) to describe the orientation toward objects of the creators of many United States museums, during the late 19th and early 20th centuries (1876–1926). The serried ranks of meticulously ordered object-filled glass cases that dominated the museums of that period represented a widely held view of how objects should be presented to the public. Unlike the chaotic miscellany of objects found in museums of the antebellum era, this new approach was thought to reveal the inherent order and meaning of objects to the interested observer (Conn, 1998).

Given the influx of immigrants from Europe, curators were well aware that many visitors were unlikely to be fluent in English. Therefore, it fell to the curators to present the objects in ways in which their meaning was readily visually apparent (Conn, 1998). Although labels designating the name and origin of the object were evident, overt interpretation was kept to a minimum. However, the grouping and ordering of the objects themselves represented a covert interpretative act. The arrangement of objects suggested not only sentences in an object-based text, but stories in which the objects, rather than the text, were the sources of knowledge (p. 4). Each unique object was the perfect exemplar of a class of unseen objects; their arrangement depicted object taxonomies and levels of increasing object complexity, symbolizing, perhaps unconsciously, a worldview of inexorable progression (Conn, 1998). The value of a museum object may have derived from its claim to an authentic voice, yet it was the nature of the display that made this voice audible to the visitor (p. 22). Thus, an object-based epistemology provided the foundation on which the language of museums was constructed (p. 5).

Motivating this radical approach was the newly energized field of natural history (Conn, 1998). Even though Conn did not totally discount a Foucauldian analysis in which museum presentations are seen to be implicitly reproducing the power relationships apparent in society-at-large, he argued that a more potent source of influence in that period was the intellectual authority and scholarship of the natural historian. In their systematic description of the world of nature, the natural historians in their collective role as museum curators uncovered what was previously unknown; they were in the business of creating new knowledge. Moreover, this new knowledge was invested with religious significance insofar as it was thought to reveal the handiwork of God

(Shapin, 1996). Interestingly, the authority of the natural historian was manifest not only in natural history museums, but also in museums of anthropology, commerce, history, and even art, as a sustained attempt was made to put "all of the world's knowledge under glass" (Conn, 1998, p. 25).

The natural historian's authority came to a natural demise in the early part of the 20th century, when the center of scholarship moved from the museum to the university laboratory. Motivating this transfer was a change in the nature of the scholarship, from the description and classification of natural entities to a theory-based biological science in which explanation was paramount, especially that of evolutionary theory (Conn, 1998; Wilcove & Eisner, 2000). Conn claimed that a casualty of this shift was an object-based epistemology. Nonetheless, despite this decline, the mark of the natural historian is not so easy to erase, and an object-based epistemology survives, we contend, in many of today's museums but, perhaps, with a richer and more nuanced vocabulary. More recently, the focus of the exhibit designer has moved from the object itself to the relationship between visitor and object, with interesting consequences, we argue, for our understanding of the object.

## From Object-Based Epistemology to Object-Based Discourse

Whether an object-based epistemology has evolved or has been completely eclipsed by the inclusion of the visitor's perspective in an object-based discourse is a question that is beyond the purview of this chapter, although the evolved role seems more likely. Nevertheless, in both cases, museum designers create stories in which objects play central characters, but different features of the object's character are highlighted. In the original object-based epistemology, the natural history of the object played center stage; in an object-based discourse the central role is likely to be that of the object's participation in the cultural or lived history of the visitor, with the scientific nature of the object relegated to a supporting part (e.g., Gurian, 1999; Roberts, 1997).

What inspired these changes? Previously, it was assumed that in an object-based dialogue, communication was virtually a one-way process, that is, from object to visitor. The reasoning behind an object-based epistemology appeared to be that once the language problem was solved, with labeling kept to a minimum, and the object appropriately displayed, then the visitor would see what the curator saw (e.g., Roberts, 1997). It was a visual act requiring minimal intellectual work. In fact, the visual act is an interpretive one, although this was not known with any certainty until much later in the 20th century (e.g., Rosenfield, 2000). The perspective of the lay visitor was effectively ignored in an object-based epistemology. The lifetime of knowledge the curator brought to bear on the object influenced the curator's perception of that object. For all intents and purposes, the curator and the lay visitor saw different objects. More recent scholarship recognizes that there is no single au-

thentic voice: the object, the presentation, the visitor, even the friends and family accompanying the visitor, jointly participate in an act of meaning (Falk & Dierking, 1992, 1995; Gurian, 1999; Roberts, 1997).

However, the insertion of the visitor's perspective into an object-based dialogue introduced an element that effectively upended the original aim of an object-based epistemology. The natural historian cum curator of the late 19th century attempted to present objects as nature intended, stripped of human (if not God's) intent. Although in practice this is a difficult task as the curator introduces his or her own biases, it is the rationale underlying the scientific enterprise. In contrast, the modern museum designer often tries to put human intent back into the dialogue, making exhibits more attractive by emphasizing their relevance to the typical visitor. In the recently refocused mission of the University of Michigan's Botanical Gardens , for example, the taxonomic presentation of plants, with Latin labels, is gradually giving way to more dynamic exhibits in which people, plants, and cultures comingle. An exhibit on food plants from the African Diaspora provided enthusiastic audience members, many of them African American, with an opportunity to view living examples of plants, such as plantains, first-hand. For many visitors, this was the first time they had seen plants long associated with the lived history of their immediate ancestors. Such exhibits encourage visitors to engage in an object-based dialogue.

There is a downside, though, to such an approach: The natural history of the object could well become obscured in the process. This is not a problem for those objects, especially art objects, that derive much of their meaning from their role in human affairs, but it may well be a problem for the presentation of objects of nature. It is as if the intellectual authority of the natural historian, which previously was imposed on exhibits from museums that potentially had entirely different missions, has been finally reversed. In the late 19th century, for instance, anthropological objects were presented as objects of nature in much the same way that exotic species were presented in natural history museums, or even alongside such species (Conn, 1998). Now, as in the Botanical Gardens example, nature is often presented as an artifact of human culture rather than the other way round. Moreover, some have claimed that the study and practice of natural history has not only been marginalized, but it may well be headed for extinction (Wilcove & Eisner, 2000).

The tug-of-war over Kennewick Man (Lederman, 2000) gets to the heart of some of these issues (see also Gurian, 1999, for similar examples). These 9,300-year-old human remains, discovered by the U.S. Army Corp of Engineers in 1996, are considered part of the cultural history of five Native American tribes, who wish to rebury them as befits their ancestral status. Such an act would effectively deny access to the remains. However, scientists view the remains as an important source of evidence as to the origins of the first peoples in the Americas; moreover, they want to examine their DNA, an act considered offensive by the tribes. Clearly, this object, preserved human remains, has both a

natural history and a cultural history, and it appears unlikely that both voices can be heard insofar as one voice stifles the expression of the other.

Yet, there have been additional, more subtle changes in the characteristics of an object-based dialogue that, we argue, could well have served as the catalyst motivating the shift to the visitor's perspective. Paralleling the historical change in the nature of scholarship, modern museum exhibits seem as likely to focus on explanation as on description. For example, Conn (1998) detailed how the dry fact, taxonomic approach to natural history exhibits has given way to one in which their ecology and relationship to the environment is emphasized. Leaving aside the question of whether facts can ever be value- or theory-free, this apparent shift in the quality of the revealed knowledge with the current emphasis on explanation evokes a whole new set of issues: Whose or what explanation should be marked? That of the scientist or the visitor? If the visitor, which visitor (see Gurian, 1999; Roberts, 1997)? In many cases this cacophony of voices has settled, somewhat, into a muted discourse in which museum curators, designers, and educators jostle for position as they try to represent the interests of both the object and the visitor (see Roberts, 1997, for an intriguing example). The future of museums rests on the ability to achieve an appropriate balance between these competing interests while still attracting and retaining the loyalty of the lay visitor as well as providing a haven for original scholarship.

What about the child's perspective? Not only is children's education an important function of the modern museum, but this relationship is a symbiotic one insofar as children's continued interest ensures the future of museums. Yet, children's emerging understanding of the world has not been systematically included in the visitor's perspective. Two aspects of this understanding are particularly pertinent to the object-based dialogue just described. Recent scholarship reveals that a critical aspect of children's developing understanding is their capacity to generate explanations for phenomena: their naïve theories. Children do not merely classify or describe, they explain, and ask why. Further, the distinction between what is artifactual and what is natural is central to children's naïve theories. Following a summary of some studies of children's emerging theories of the world around them, we relate selected aspects of these theories to children's appreciation (or not) of the singular nature of museum objects.

## CHILDREN'S NAÏVE THEORIES

> All good teachers have always realized that one must start where the student is. . . . The main barrier to learning is not what the student lacks, but rather what the student has, namely, alternative conceptual frameworks for understanding the phenomena covered by the theories we are trying to teach.
>
> — Carey, 1998: Testimony before the House Committee on Science

Children are not sponges effortlessly absorbing all knowledge; instead, they filter or interpret information using their own sets of rules or frameworks. Characterizing the nature of children's alternative frameworks is a core component of recent programs of research in which children's knowledge systems are conceptualized as naive theories focused on specific domains of knowledge. Carey's studies on children's naïve biology were among some of the early contributions to this field. This program goes beyond the well-established body of work showing that prior knowledge places constraints on what the student, or, for that matter, the adult is likely to learn (summarized in Roschell, 1995). Although the naïve theory approach shares some of the same theoretical roots that succored the prior knowledge movement (see Roschell, 1995), the emphasis of this new approach is on causal explanation and a characterization of the body of knowledge that very young children are likely to have about the world, prior to any formal educational experiences. More importantly, it is a developmental approach. Young children appear to have causal intuitions or skeletal structures (Gelman, R., 2000) that enable them to "guess right" (Keil & Wilson, 2000) most of the time when they are trying to figure out how or why something happens. A goal of this new approach is the specification of the nature of those initial causal principles and how they are elaborated and, perhaps, transformed with the appropriation of new knowledge (Evans, 2001; Gelman, R., 2000; Keil & Wilson, 2000; Poling & Evans, in press).

Any particular domain of knowledge encompasses a set of interrelated causal principles, the rules governing their use, and the entities to which they can be applied (Gelman, R., 2000; Wellman & Gelman, 1998). Core domains are often characterized as carving the world at its joints, and they do so by focusing the young child's attention on particular kinds of inputs. These inputs are deemed privileged to the extent that they serve as building blocks for the elaboration of children's foundational or intuitive theories, which ground their understanding of the natural and intentional worlds (Gelman, R., 2000; Willman & Gelman, 1998). In effect, children would not be able to navigate the world of real entities if these entities did not easily map onto some system of analogous mental representations (Sperber, 1996). However, this approach acknowledges that the different environments encountered by children should lead to significant variability in the rate and nature of the knowledge acquired in any particular domain (Evans, 2000b, 2001; Gelman, R., 2000).

Which domains of knowledge are considered foundational? To date, several core domains have been identified that are thought to represent a limited but universal class of knowledge structures. These include naive theories of psychology, physics, biology, language, space, and number (Gelman, R., 2000; Wellman & Gelman, 1998). Most relevant to this chapter are the broad distinctions between the intentional and the natural but nonintentional worlds. Such distinctions, we contend, map onto the earlier dichotomy we identified, between the cultural history and the natural history of the object. Clearly, the

world of artifactual objects is a consequence of intentional human activity, whereas the world of natural objects is only tangentially related to the intentional activities of humans. Do young children realize such distinctions?

Children's theory of mind, also known as their naïve or intuitive theory of psychology, has been one of the most heavily investigated areas of inquiry. Broadly, this domain covers mental states such as intentions or beliefs; less obviously, it covers the intentional activities of humans, including the creation of artifacts. From this research, we know that infants exhibit an early understanding that animate and inanimate objects have different properties (Wellman & Gelman, 1998). In particular they distinguish between the movements of animate objects, which seem self-propelled and goal-directed, and those of inanimate objects, which are moved by external forces. During the preschool years there is a major reorganization in children's representation of mental states. Four- to 5-year-olds, but not 3-year-olds, demonstrate an understanding that other "minds" may not necessarily view the world in the same way that they do, known as a *representational theory of mind* (Wellman & Gelman, 1998). This realization, arguably, goes along with the ability to recognize deception. By the end of the school-age years, children have acquired what has been called an *interpretive or constructive theory of mind* (e.g., Carpendale & Chandler, 1996). In this case, children recognize the complexity of intentional states; any object or event affords multiple meanings, and human minds actively construct meanings based on prior as well as current experiences.

For reasons of space, we have briefly summarized the emergence of a naïve psychology only, although there is also a burgeoning literature on children's understanding of physics, biology, and number, all of which are relevant to object-centered learning. However, from a child's-eye view, to make an object-based dialogue effective, we believe it is important to mark those objects that are of intentional origin in ways that clearly distinguish them from objects of natural origin. Otherwise, we argue, children's emerging ability to demarcate the authentic and the nonauthentic may be undermined.

These kinds of studies may give the false impression that children are not much more than budding psychologists, physicists, and mathematicians, figuring out the physical and mental worlds in which they find themselves. Yet, paradoxically, just as children appear to be plunging into the world of the real, they seem to be simultaneously confronted with inexplicable or impossible phenomena: the world of the unreal, the magical, and the illusory (Rosengren, Johnson, & Harris, 2000). Children, it has been claimed, are also budding metaphysicians (Harris, 2000; Johnson, 2000). The emerging ability to demarcate the metaphysical, the physical, and the artifactual places constraints, we argue, on children's capacity to perceive and respond to the voices in an object-based dialogue. Next, we consider the implications of this recent scholarship for children's understanding of, and participation in, the world of authentic museum objects.

## AUTHENTICITY

> As museum professionals, most of the team members' knee-jerk reaction was to defend the "real," particularly since one of the museums' most sacred cows is their possession of original and uncommon objects. The designer in particular enjoyed reciting a popular bit of museum lore: that a fundamental, albeit intangible, difference exists between an original object, such as Linnaeus's microscope and its picture-prefect reproduction. —Roberts, 1997, p. 85

Roberts' (1997) description of the difficulties of presenting a seemingly straightforward exhibit on Linnaeus' contribution to the scientific world in a modern participatory format reveals some of the perils associated with an object-based discourse. Our interest here is not in the difficulties themselves (e.g., What happens if visitors handle original objects?) but to probe a little deeper: Do children appreciate the basis for this museum lore? Do they realize that they are viewing real, original, awe-inspiring objects? And, to the extent that children do not share the exhibit designer's understanding that an intangible difference exists between an original object and its copy, for example, what does that reveal about museum lore?

Drawing on the scholarship of MacCannell (1976) and Orvell (1989), Roberts (1997) made the case for two distinct, historically emerging concepts of reality. She then linked these 20th-century ideas to the pivotal roles of authentic objects in modern participatory exhibits, such as the one on Linnaeus. In the first example, the Victorian obsession with objects of all kinds (Conn, 1998) and replicas of important objects, in particular, paved the way for a reverence for the original authentic object, in the early part of the 20th century. Orvell (1989) detailed how the productive capacity of the Industrial Revolution led to the mass reproduction of poor quality substitutes of authentic objects. A yearning for a simpler, more authentic life was, he claimed, a reaction to this era of the fake and the illusory. Thus, real "original" objects, in this case, are contrasted with imitation, fake, or illusory objects (Roberts, 1997, p. 96).

In the second example, the new leisure class of the 20th century sought real authentic experiences, giving birth to the rise of tourism (MacCannell, 1976). Many late-20th-twentieth century museum exhibits underscore both senses of real, in that visitors are encouraged to participate in an authentic experience with real original objects, although it is the interpretation or signs mediating this experience that signal "reality" to the visitor (Roberts, 1997). Such experiences can be found, for instance, in recreated historic settlements such as Greenfield Village, where visitors sometimes literally try to place themselves in the shoes of their predecessors as they view authentic original historic objects. Interestingly, such participatory experiences merely create an illusion of reality. Adults should not be fooled by such illusions. What about children?

In the next three subsections, children's understanding of three aspects of authenticity — the reality, originality, and awe-inspiring nature of objects — is examined. The sense of the real detailed in Roberts' (1997) thesis focused on the authenticity of artifactual objects. We argue, however, that there is an important distinction to be made between the authenticity of artifacts and the authenticity of objects of nature. As Roberts pointed out, artifactual objects are authentic to the extent that they are original; they cannot be copies, fakes, or illusions. Natural objects, on the other hand, are authentic to the extent that they are natural, that is, they cannot be *artifacts,* fakes, or illusions. In other words, to be real, a natural object must be of natural, not of intentional origin, whereas, to be real, an artifactual object must be an original (and of intentional origin). It could be argued that gene-therapy, cloned sheep, and humanoid robots have eradicated such distinctions between the natural and the artifactual or intentional worlds. Yet, the reason such entities arouse such intense ethical debates is probably because they challenge our basic intuitions about what is real and natural.

First we provide evidence to show that children's understanding of both these senses of authenticity emerges slowly over the preschool to late school-age years; it cannot be imposed on them. Children construct such explanations online, we claim, and in doing so draw on experiences provided by a supportive environment, a constructive interactionism (Wozniak & Fischer, 1993). Finally, we address a puzzle. Adults' recognition of the awe-inspiring core of an authentic experience seems to be derived from their sense of the illusory. In this respect, perhaps, they appear to be as susceptible as children to the illusory and the magical.

## The Real Object: Neither a Fake, nor an Illusion

Preschoolers grasp a variety of appearance-reality distinctions, such as pretense-reality, and real-natural versus artifactual appearances, in which they have to distinguish a (real) natural rock from a rock-like sponge (Flavell, Flavell, & Green, 1983). Moreover, they use the terms *real* and *really* with some sophistication, even as early as 3 years of age (Woolley & Wellman, 1990). Preschoolers also honor distinctions between the worlds of fantasy and reality, even though they may mistakenly assign the reality label to a fantasy figure (Woolley, 1997). However, this precocious understanding appears to break down when children are confronted with the illusory, which tends to be less clearly marked than the world of imagination or fantasy. In the Western world, events in which an intentional agent deceptively creates an illusion of reality are often labeled as *magical.*

An assumption is that adults are only temporarily fooled by such illusions, yet children are still sorting out this very basic understanding of reality. However, a brief excursion into the history of the illusory should rapidly convince

the skeptical that adults were certainly not immune to such beliefs in the past, nor are they today (e.g., Aveni, 1996; Wyse, 1997). Even so, children are portrayed as more gullible than adults and more apt to tricked by the illusory. The emerging capacity to distinguish the natural from the artificial, the illusory, and the magical underlies the development of a scientific understanding and an appreciation of the real or the natural in an object-based dialogue.

The onset of magical explanations in the early preschool years is now thought to be an achievement (Rosengren, Johnson, & Harris, 2000) rather than a sign of confusion (Piaget, 1929). They signal children's increasing awareness that some phenomena may be illusory, even when they give the appearance of reality. But as children learn about the art of the artificer or magician, magical explanations for illusory events decrease and such events are more likely to be labeled as tricks rather than magic or magic-tricks (Phelps & Woolley, 1994; Rosengren & Hickling, 1994; Woolley, 1997). For example, we showed preschool and elementary-school children videotapes of different kinds of illusory transformations including deceptive sleight-of-hand transformations (e.g., a color-changing scarf) performed by a "scientist" in a white laboratory coat. We then asked children whether they thought the transformations were magic or a trick (Mull & Evans, 2001). From the preschool years into middle-to-late childhood magical explanations decreased and trick explanations increased (see Fig. 4.1).

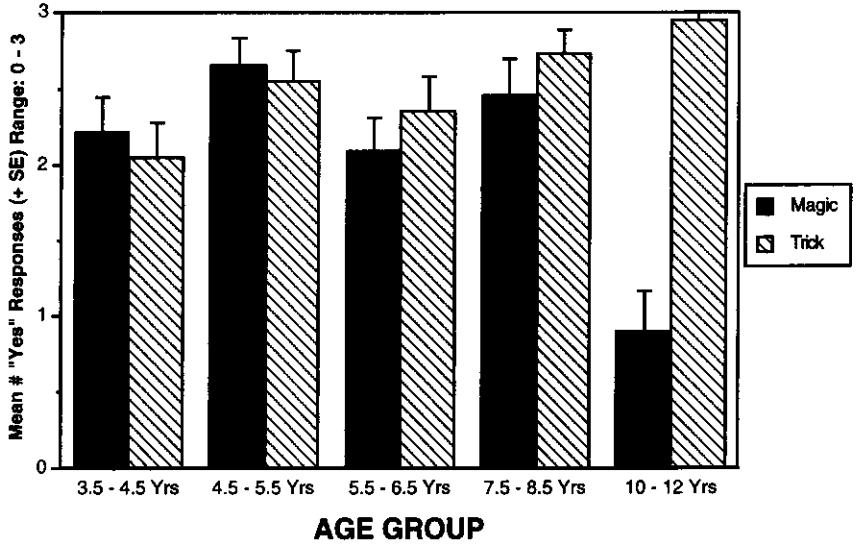


FIG. 4.1. Is it a trick? Or is it magic? Children's responses to magic and trick explanations for illusory events

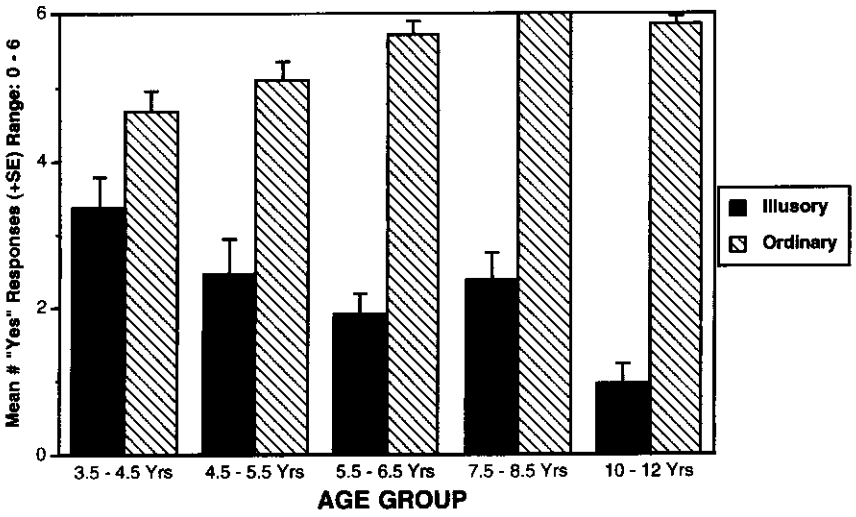


FIG. 4.2. Can that really happen? Children's responses to questions about the reality of ordinary and illusory events

In the same study (Mull & Evans, 2001), children were asked if ordinary and illusory events could really happen (e.g., Can that person really break a pencil? Can that person really make the scarf's color change? Can dogs really talk?). Children should respond that ordinary events (breaking a pencil) could really happen, whereas illusory or fantastical events could not. A similar developmental pattern emerged. Many (but not all) young preschoolers (3- to 4-year-olds) understood that ordinary events could really happen, but they responded at chance levels for the illusory events, whereas 10-year-olds performed at an adult level, claiming that illusory events could not really happen, whereas ordinary events could (see Fig. 4.2).

We also measured children's ability to recognize false beliefs, a standard measure of a representational theory of mind. We found that both children's false belief reasoning and their recognition that illusions cannot really happen contributed, independently of each other and of age, to children's ability to mark illusory events as magical tricks. In other words, in this and related studies (Evans & Mull, 2001) we identified two of the conditions that appear to influence children's emerging realization that a deceptive agent has intentionally created an illusion of reality. One is a child's increasing ability to reason about mental states, such as false beliefs. The other is the child's level of understanding of the reality of the natural world.

To sum up, in order to identify illusory events and distinguish them from real events, children have to simultaneously integrate information from multiple sources or core domains. First, children have to recognize that certain

events do not obey the laws of nature, in that they are unnatural or illusory. Second, they have to recognize that intentional agents can create illusions by manipulating natural phenomena. Clearly, children's ability to detect illusions is grounded in their emerging understanding of both the intentional and the natural worlds. This is not to say that social context does not play a part. We also assessed the parental role, independently of the effects of the previously mentioned factors. We found that children were also much less likely to label illusory events as magical when parents explained the deception underlying such events.

Given this information, it is important to consider what children might make of the reality of historical participatory exhibits, such as Greenfield Village, or even of the reality of talking dinosaurs in an amusement park. In an object-based dialogue, it would seem to be an imperative that the nonillusory or illusory nature of the objects is marked, especially in exhibits that might evoke magical responses. The uneasy relationship between conventional museums and those of Disney World rests on this distinction between what is real and what is illusory. Clearly, if the value of an object-based dialogue centers on children's experience of the real and the authentic, then the creation of an experience that gives the appearance of an illusion, as is found in many Disneyesque exhibits (Roberts, 1997), is likely to bewilder the young child, even as it entertains.

If such experiences are to contribute to a children's emerging grasp of authenticity, then more research needs to be done on exactly what happens when natural entities, such as dinosaurs or historical objects, are presented as an illusory, or, even, a virtual reality experience, versus as nature made them (e.g., in the context of a fossil hunt or an archeological dig). Natural historians, in particular, have expressed disquiet about the virtual disappearance of their topic from the curricula of elementary schools and even museum exhibits (Sicree, 2000; Wilcove & Eisner, 2000). A $250 stereo microscope can turn "a pinch of soil into a bustling world of springtails, oribatid mites, and nematodes, creatures as bizarre and engaging as anything to appear in a Star Wars movie" (Wilcove & Eisner, 2000, p. B24). Provided they understand the function of the microscope, such experiences can ground children's understanding of reality. But if the click of a plastic mouse replaces the song of birds as children navigate a virtual or a fantastical landscape rather than an authentic meadowland (p. B24), what happens to children's emerging appreciation of real authentic experiences?

### The Original Object: The Very First of its Kind

If we show a child a Moore sculpture and make the claim that it is an original, what does the child make of that statement? Then we show the same child a replica of a Moore sculpture that looks just the same as "the original." The

child should understand that the original object was the very first of its kind insofar as it did not previously exist, whereas the replica is a copy of a previously existing object. The authenticity of many museum artifacts rests, in most cases, on this claim of originality (Gurian, 1999). Further, to be original, not only does the idea conveyed by the object have to differ significantly from other ideas, but the object itself has to differ from other objects. The human designer has created the *very first* of a new kind of object. Although this explanation might seem obvious to any adult, we have preliminary evidence, addressed in more detail later, that this might not be as obvious to a young child.

Interestingly, if we move away from the world of artifactual objects to objects of nature, then the same kind of claim no longer makes as much sense: an original Tyrannosaurus Rex? If we replace the term *original* with *authentic*, then it becomes obvious that we mean a real fossil, not a fake. But if we carefully explain to the child that because scientists could not find all the bones, some of the bones are, in fact, fakes, how does the child (or for that matter the adult) learn to draw the line between fake and real (see Gurian, 1999)? When the term original is applied to a natural object, then it is often used in an artifactual sense. The original Tyrannosaurus Rex could be the very first of that species found by a particular fossil hunter. Less often, however, the term original might be applied to an ancestral species, such as the "original Eve," the implication being that this was the very first in a particular evolutionary line.

To complicate these issues, in order to make dinosaur exhibits more accessible, some museums have co-opted the services of a roving robot who recounts facts about the dinosaurs to any child who stops the robot and presses a button. In this case the exhibit designers may have succeeded only in confusing children. Can we be sure that the preschool or early school-age child is aware that a dinosaur and a robot have different origins, one natural, one intentional? The child may well believe that he or she is viewing a Hall of Monsters, consisting of human-created dinosaurs and robots such as the child might see on Star Wars. Returning to the theme of originality: If dinosaurs were created by humans — that is, if they were artifactual rather than natural — then it would make sense to claim that an original dinosaur is on display. Moreover, if God is substituted for human in the creation story, then biblical literalists might also find this a perfectly sensible thought. How do children sort out these issues?

We have addressed some of these questions, although we arrived at this point by a circuitous route via children's and adults understanding of origins. Earlier studies of children's understanding of the origins of species revealed that 8- or 9-year-old children endorse creationist explanations for species origins, regardless of their parents' religious or scientific beliefs: God [intentionally] created each animal kind (or species). Younger children, 5- to 7-year-olds, in contrast, endorsed a mixture of spontaneous generationist ("it came out of the ground") and creationist responses. By early adolescence there was a shift

to creationist or evolutionist beliefs, which could be predicted by parental belief system as well as by children's exposure to natural history and fossil knowledge (Evans, 2000a, 2000b, 2001).

Evolutionary theory is one of those scientific ideas that radically challenges our basic preconceptions, and one predictor of its acceptance or rejection is the worldview of the individual. Young children appear to endorse an essentialist viewpoint (Gelman & Hirschfeld, 1999) in which the world is seen as stable and unchanging. From an essentialist perspective, evolutionary transformations are resisted or seen as fantastical, not as part of the natural order (Evans, 2001). Among adult Christian fundamentalist populations, such a view is not only deified but given coherent expression in sacred texts, such as the Bible.

As described earlier, one of the earliest developing and coherent of the foundational theories that young children use to explain their world appears to be children's theory of mind (Wellman & Gelman, 1998). This theory includes an understanding of mental states such as intentionality. The very power of this theory, it is claimed, leads to its overextension and use in circumstances where it is unwarranted such as in a creationist explanation for the origins of species (Evans, 2001). However, social context exerts powerful as well as more subtle effects. By early adolescence, children reared in contexts that deify these intentional explanations, such as Christian fundamentalist homes and schools, are more likely to maintain and extend their creationist ideas. Their nonfundamentalist counterparts, however, are more likely to endorse evolutionist views. The latter endorsement of evolution, however, depends crucially on two factors: exposure to the fossil evidence and a willingness to accept the (incorrect) idea that animals change in response to environmental factors (e.g., giraffes' long necks result from their habit of stretching their necks to reach into tall trees to obtain food). How do such belief systems develop? The critical process, it is argued, is the interaction between the oftentimes conflicting ideas that children construct to explain natural phenomena and an environment that either transforms or suppresses such ideas: a constructive interactionism (Evans, 2000a, 2000b, 2001).

More recent work along these lines explored the emergence of this understanding in even younger children. A particular focus was young children's ability (or not) to distinguish between the artifactual (human-made) and creationist (God-made) origins of artifactual and natural objects (Evans & Gelman, 2001; Evans, Poling, & Mull, 2001). Moreover, a further question raised by these earlier studies was investigated: Do young children realize that objects, both artifactual and natural, did not previously exist? Questions about "the very first X" would make very little sense to a child who thought that "they were always here." Young children's answers to the earlier origins questions had suggested that they believed all animals existed from the beginning of time. These findings are perfectly consistent with the young child's essentialist

notions that the world is a stable and unchanging place. Nevertheless, they raise a more fundamental issue: How does a child come to contemplate questions of origins at all?

One hundred 4-to-10-year-old children viewed pictured objects, consisting of familiar and unfamiliar mammals and simple artifacts (e.g., cup). They then answered a series of questions, to which they responded "yes" or "no," about the origins ("the very first X"), the previous existence, and the death of the objects (Evans, Poling, & Mull, 2001). One crucial question, from the point of view of an object-based dialogue, is whether children distinguished between artifactual and animal (natural) objects when responding to these questions. A second question was whether they grasped the concept of original design. Not until children were 8 to 10 years old did they consistently respond "No," animals and artifacts were not "always here" (see Fig. 4.3A). Yet, at the same time even the majority of preschoolers realized that death (nonexistence) was inevitable and universal for animals, but it made no sense to claim that artifacts die (Fig. 4.3B). As for animal and artifact origins, again, it was not until children were 8 to 10 years old that they consistently agreed that God created animals, whereas humans created artifacts: a coherent creationism (Figs. 4.4A & 4.4B).

Preschool and elementary school children's responses to the death question indicated that they were sensitive to one aspect of the artifactual–natural-object distinction: animals die, whereas artifacts cannot. Yet, 4- to 7-year-old children failed to grasp more subtle aspects of this distinction. Only the 8- to

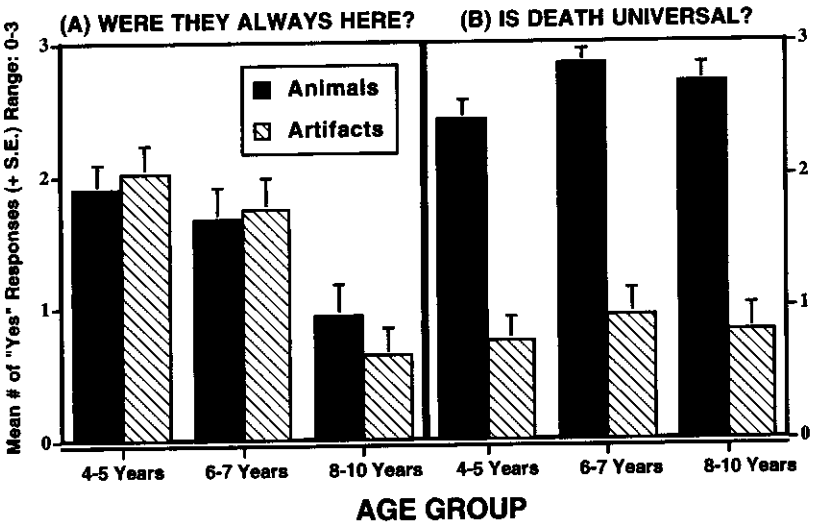


FIG. 4.3. Children's responses to questions on (A) the permanence of objects and (B) the universality of death, for artifacts and animals

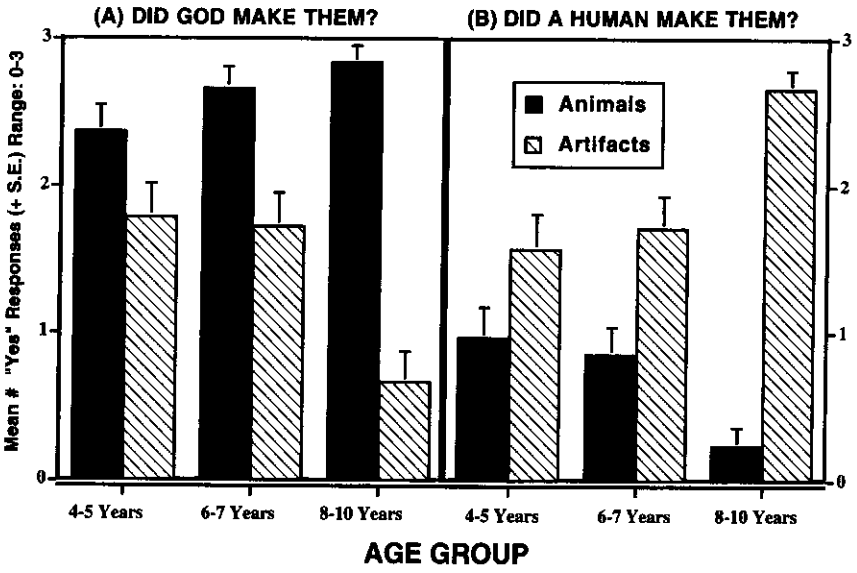


FIG. 4.4. Children's responses to (A) creationist and (B) artificialist explanations for the origins of artifacts and animals

10-year-olds demonstrated a coherent creationism. The younger children were likely to confuse the creative capacities of God and human. Furthermore, the younger age group failed to realize that artifacts and animals did not always exist. In other words, they did not appear to have a concept of "the very first."

Further analyses demonstrated that an understanding of death, and the prior existence and origins of artifacts, predicts a coherent creationist account of origins, regardless of the effects of age. Thus, a coherent understanding of existence and nonexistence appears to be knowledge-based and to emerge by the middle to late elementary school years (8 to 10 years of age). This, we contend, is a major intellectual breakthrough for a period that is often regarded as relatively quiescent. Moreover, these results also suggest that this might be a period of radical conceptual change as children savor their new-found abilities to grasp such existential questions and assimilate them into a range of knowledge domains from evolutionary biology to philosophy to religion (Evans, Poling, & Mull, 2001). As this appears to be an age-related but not age-dependent conceptual change, its emergence could be actively promoted by a supportive environment (Wozniak & Fischer, 1993).

Studies such as these suggest that the idea of original design is not one that is normally part of the repertoire of beliefs of 4- to 7-year-olds. Preschool and early elementary school children's understanding of the very first authentic original object appears to be quite limited. In particular, they are unlikely to appreciate the special nature of original artifacts, such as art-work or historic

objects, because they do not yet grasp that such objects were previously nonexistent. An original Moore will not have a special status until children can value the extraordinary nature of its origins.

### The Awe-Inspiring Object: Contagion Works Like Magic

In the conclusion of his book on the rise and fall of an object-based epistemology, Conn (1998) offered a semiapologetic addendum:

> . . . while these objects may no longer function epistemologically, they can still function—for me at any rate—magically. There remains something extraordinary, if finally inexplicable, about the experience of being in the presence of a Cézanne, a raven-mask from Alaska, or a fossil pterodactyl. . . . Even as prosaic a group as professional historians, most of whom do not study objects, will admit to the thrill of holding actual archival material in their hands. . . . Perhaps, this is why museums can still be places of education, of inspiration, or amusement, reflection and wonder. Perhaps, in the end, there are objects. (p. 262)

What is it about authentic objects that evoke this sense of wonder? Roberts (1997) suggested that museums offer the visitor the potential for direct access, via the object, to "the real"—the original creative act, or a living exemplar of a rare natural entity. Experiencing a work of art in living color, as the artist intended, or nature in the raw, is awe-inspiring. Such an act invokes our aesthetic sensibilities, our emotions, our intellectual curiosity, and our astonishment at the accomplishments of others. A successful object-based dialogue kindles some sense of an authentic experience mediated, of course, by the imagination of the visitor and the interpretive aids offered by the museum. Such an experience could also be described as *magical contagion* (Nemeroff & Rozin, 2000). In reality it is an illusion and in that sense it is a false experience. But in that it invokes the essence of the original, then it gives the appearance of something that is very close to a true experience (Roberts, 1997; MacCannell, 1976).

Sympathetic magic, according to Nemeroff and Rozin (2000), is not a primitive form of reasoning. It is, instead, a singular form of thinking that can be found alongside scientific or religious thinking, in society-at-large, or in individuals. Moreover, they contend that it serves important functions. We believe that such thinking lies at the heart of the awe-inspiring experiences associated with authentic objects. The law of contagion, one of three principles of sympathetic magic, captures this experience: "It holds that . . . contact between the source and the target results in the transfer of some effect or quality (essence) from the source [authentic object] to the target [museum visitor]" (Nemeroff & Rozin, 2000, p. 3). This contact may be direct or mediated, and it leads to an increased feeling of connection between the target and the source, which can have a positive or negative valence.

When children play "cooties" and Western educated adults recoil from drinking out of a clean glass that may have contained poison (Nemeroff & Rozin, 2000), they are both exhibiting signs of magical contagion. Numerous studies carried out by Rozin, Nemeroff, and their colleagues indicate that negative contagion is fully appreciated by 6- to 8-year-old children, and that even preschoolers show some understanding of the principle. Its adaptive value is thought to rest on the avoidance of contact with infective agents, such as moldy foods or disease, in which the source has a negative valence (Nemeroff & Rozin, 2000). Positive contagion has not been studied in as much detail, but museum settings should provide an ideal laboratory for such investigations. When the source has a positive valence, some valued aspect of the source would be transferred to the target, who would presumably feel an enhanced sense of self (more courageous, artistic, etc.) and an increased sense of connection with the sublime. He or she feels a better person for the experience.

Museum buildings heighten this awe-inspiring experience. Reminiscent of the cathedral building of previous centuries, museums of the late 19th and early 20th centuries were built to house objects of reverence. Of course, if natural historians of this era were revealing God's handiwork (Shapin, 1996), then what better tribute to pay to the grand designer. The buildings themselves are signs signifying the appropriate veneration to be paid to the objects (Conn, 1998). Moreover, as Gurian (1999) remarked of museum professionals, "We were like priests and the museums our reliquaries" (p. 164).

In the last part of the chapter we were concerned with children's developing ability to separate the world of real objects from the illusory. Yet, in this section, on the awe-inspiring nature of objects, we expose a conundrum. We find ourselves making the claim that adults are not immune to the charms of an unreal, even a magical, participatory experience with an awe-inspiring authentic object. Moreover, museums and their staff actively promote such an experience. There is a partial solution to this puzzle. In order to truly appreciate the awe-inspiring nature of authentic objects, adults must first grasp the nature of reality and originality. Adult understanding, we claim, is qualitatively different from that of the preschool or early school-age child. Perhaps, though, some childlike illusions are never entirely abandoned. The extent to which children are sensitive to this sense of awe is unclear. Based on their understanding of original design and the contagion principle, it would seem reasonable to speculate that the awe-inspiring aspects of museum-based objects would not be appreciated fully until later in the elementary school years.

## CONCLUSION: WHAT IS AN AUTHENTIC OBJECT?

Peeling back the layers of the authentic object exposes a multivoiced entity. By tracing the emergence of children's potential responsiveness to these dif-

ferent voices, some fundamentals that underlie an appreciation of the nature of authentic objects are uncovered. Natural objects and artifactual objects engage in subtly different aspects of an object-based dialogue. Only human-made artifacts are normally construed as both real and original. Objects of nature, on the other hand, gain their handle on reality by virtue of their contrast with the artifactual and the illusory. Any object potentially has both a natural and an artifactual voice. Which voice is heard is a function of the nature of the object, the setting in which it is placed, and the perspective of the visitor. Ideally, to engage and broaden the experience of the visitor both voices are invoked, and although one voice might be muted, it should not be stifled by the other.

In this chapter there are several examples of the ways in which an artifactual voice can be invoked when a natural object plays a central role in an object-based dialogue. For instance, if plants are displayed taxonomically, then it is their natural history that is emphasized. However, if their role in the cultural life of the visitor is also marked, then their utility as cultural artifacts is voiced (Michener & Klatt, 1999). What about the converse? Can the natural be evoked when viewing quintessentially artifactual objects such as works of art? As neurobiologist Semir Zeki pointed out, painters often have an intuitive understanding of brain function, and the way they paint reveals aspects of that organization (see Rosenfield, 2000). The act of freeing color from form, a feature of Matisse's work, for example, is made possible because these are independent brain functions (p. 61). Contrary to popular belief, it turns out that a visual experience is created by the integration of disparate functions; seeing is not a passive activity (Rosenfield, 2000). Thus, the role of visual perception in an artist's work could be exploited in an art exhibit; it might even reveal why works of art are aesthetically pleasing.

Children' s developing ability to master distinctions between the worlds of the physical, the metaphysical, the artifactual, and the existential, underlies their capacity to fully engage an authentic object in an object-based dialogue. The authenticity of the object is not a given. Nevertheless, the fact that these emerging knowledge structures appear to be age-related, but not age-dependent, is a clear indication that supportive environments could promote the earlier and more nuanced emergence of such distinctions. This is the basis of a constructive interactionist approach: The child's developing conceptual structures are transformed through relevant experiences. Museums are in a unique position to capitalize on and enhance these emerging capacities. By marking these distinctions in their exhibits, the curator and museum designer both acknowledge and expand the child's-eye view.

Insofar as children are reared in an increasingly artifactual world, object-centered learning in museums has the potential of grounding (literally) their experience of reality. As described earlier, exposure to natural history knowledge, especially of fossils, undergirds children's grasp of a naturalistic theory

of origins: evolution (Evans, 2001). Yet, there is a tendency to move away from displaying real objects, such as dinosaur bones, even in museums of natural history, where they are often replaced with digital objects (Sicree, 2000). We do not yet know what effects such an exposure to the artifactual might have on children's emerging grasp of reality. Nonetheless, even in advance of such knowledge, it would seem prudent to immerse children in the world of real authentic objects, before or, at least, simultaneously with, their entry into the world of virtual reality. One could argue that children have always been exposed to a world of fantastical objects and that even preschoolers grasp fantasy–reality distinctions. However, the fantastical world is clearly marked as such: It is an "imagined world" experience. It is not presented as an authentic representation of the real world. More attention needs to be paid to the broader context in which we present an authentic object because, to the extent we highlight its not-real versus its real qualities, we may only succeed in blurring the boundaries between real-world and other-world experiences for children. Robots do not really belong in a dinosaur exhibit unless their function and origins are transparent.

Paradoxically, this analysis of the authentic object reveals an enigma. Not only do the magical and illusory play a role in children's emerging grasp of the authentic, but even for adults the awe-inspiring heart of the authentic experience in an object-based dialogue is illusory, perhaps magical. We engage in a participatory act with a real object, only to grasp a semblance of a realistic, original, experience. For most of us, this is the closest we will ever come to a true encounter with the sublime.

## ACKNOWLEDGMENTS

The studies reported in this chapter were supported in part by a National Academy of Education Spencer Fellowship.

## REFERENCES

Aveni, A. (1996). *Behind the crystal ball: Magic, science, and the occult from antiquity through the new age.* New York: Times Books.

Carey, S. (1985). *Conceptual change in childhood.* Cambridge, MA: MIT Press.

Carey, S. (1998, July/August). Policy: Giving away research. *American Psychological Society Observer, 6.*

Carpendale, J. I., & Chandler, M. J. (1996). On the distinction between false belief understanding and subscribing to an interpretive theory of mind. *Child Development, 67,* 1263–1277.

Conn, S. (1998). *Museums and American intellectual life, 1876–1926.* Chicago: The University of Chicago Press.

Evans, E. M. (2000a). The emergence of beliefs about the origins of species in school-age children. *Merrill-Palmer Quarterly, 46*(2), 221–254.

Evans, E. M. (2000b). Beyond Scopes: Why creationism is here to stay. In K. Rosengren, C. Johnson, & P. Harris (Eds.), *Imagining the impossible: Magical scientific, and religious thinking in children* (pp. 305–331). Cambridge, UK: Cambridge University Press.

Evans, E. M. (2001). Cognitive and contextual factors in the emergence of diverse belief systems: Creation versus evolution. *Cognitive Psychology, 42,* 217–266.

Evans, E. M., & Gelman, S. A. (2001). *Revisiting the argument from design: Artificialism in young children and adults.* Manuscript in preparation.

Evans, E. M., & Mull, M. S. (2001). *Magic can happen in that world (but not this one): Constructing a naive metaphysics.* Manuscript submitted for publication.

Evans, E. M., Poling, D. A., & Mull, M. (2001, April). Confronting the existential questions: Children's understanding of death and origins. *Biennial Meeting of the Society for Research in Child Development,* Minneapolis, MN.

Falk, J. H., & Dierking, L. D. (1992). *The museum experience.* Washington, DC: Whalesback.

Falk, J. H., & Dierking, L. D. (Eds.). (1995). *Public institutions for personal learning: Establishing a research agenda.* Washington, DC: American Association of Museums.

Flavell, J. H., Flavell, E. R., & Green, F. L. (1983). Development of the appearance–reality distinction. *Cognitive Psychology, 15,* 95–120.

Gelman, R. (2000). Domain specificity and variability in cognitive development. *Child Development, 71,* 854–856.

Gelman, S. A., & Hirschfeld, L. A. (1999). How biological is essentialism? In D. L. Medin & S. Atran (Eds.), *Folkbiology* (pp. 403–447). Cambridge, MA: The MIT Press.

Gurian, E. H. (1999). What is the object of this exercise? A meandering exploration of the many meanings of objects in museums. *Daedalus, 128*(3), 163–183.

Harris, P. L. (2000). On not falling down to earth: Children's metaphysical questions. In K. Rosengren, C. Johnson, & P. Harris (Eds.), *Imagining the impossible: The development of magical, scientific, and religious thinking in children* (pp. 157–178). Cambridge, UK: Cambridge University Press.

Johnson, C. N. (2000). Putting different things together: The development of metaphysical thinking. In K. Rosengren, C. Johnson, & P. Harris (Eds.), *Imagining the impossible: The development of magical, scientific, and religious thinking in children* (pp. 179–212). Cambridge, UK: Cambridge University Press.

Keil, F. C., & Wilson, R. A. (2000). Explaining explanation. In F. C. Keil & R. A. Wilson (Eds.), *Explanation and cognition* (pp. 1–19). Cambridge, MA: MIT Press.

Lederman, D. (2000, October 6). U.S. says Indian tribes, not scientists, have rights to 9,300-year-old Kennewick Man. *The Chronicle of Higher Education,* A24.

MacCannell, D. (1976). *The tourist: A new theory of the leisure class.* New York: Stockmen.

Michener, D. C., & Klatt, B. (1999, April). Peoples, plants, and cultures at the University of Michigan Matthai Botanical Gardens. *Public Garden,* 27–30.

Mull, M. S., & Evans, E. M. (2001, April). Magic can happen in that world (but not this one): Theory of mind understanding and children's explanations for illusory events. *Biennial Meeting of the Society for Research in Child Development,* Minneapolis, MN.

Nemeroff, C., & Rozin, P. (2000). The makings of the magical mind: The nature and function of sympathetic magical thinking. In K. Rosengren, C. Johnson, & P. Harris (Eds.), *Imagining the impossible: The development of magical, scientific, and religious thinking in children* (pp. 1–34). Cambridge, UK: Cambridge University Press.

Orvell, M. (1989). *The real thing: Imitation and authenticity in American culture, 1880–1940.* Chapel Hill: University of North Carolina Press.

Phelps, K. E., & Woolley, J. D. (1994). The form and function of young children's magical beliefs. *Developmental Psychology, 30,* 385–394.

Piaget, J. (1929). *The child's conception of the world* (Joan & Andrew Tomlinson, Trans.). Totowa, NJ: Rowman & Allanhead.

Poling, D. A., & Evans, E. M. (in press). Why do birds of a feather flock together? Developmental change in the use of multiple explanations: Intention, teleology, essentialism. *British Journal of Developmental Psychology.*

Roberts, L. C. (1997). *From knowledge to narrative: Educators and the changing museum.* Washington: Simthsonian Institution Press.

Roschell, J. (1995). Learning in interactive environments: Prior knowledge and new experience. In J. H. Falk & L. D. Dierking (Eds.), *Public institutions for personal learning: Establishing a research agenda* (pp. 37–52). Washington, DC: American Association of Museums.

Rosenfield, I. (2000, September 21). A new vision of vision. *New York Review of Books, XL,* 61–64.

Rosengren, K., Johnson, C., & Harris, P. (2000). Preface. In K. Rosengren, C. Johnson, & P. Harris (Eds.), *Imagining the impossible: The development of magical, scientific, and religious thinking in children* (pp. xiii–xx). Cambridge, UK: Cambridge University Press.

Rosengren, K. S., & Hickling, A. K. (1994). Seeing is believing: Children's explanations of commonplace, magical, and extraordinary transformations. *Child Development, 65,* 1605–1626.

Shapin, S. (1996). *The Scientific Revolution.* Chicago: University of Chicago Press.

Sicree, A. (2000, October 20). Letters to the editor: Threats to natural history and to museums. *The Chronicle for Higher Education,* B21.

Sperber, D. (1996). *Explaining culture: A naturalistic approach.* Oxford, UK: Blackwell.

Wellman, H. M., & Gelman, S. A. (1998). Knowledge acquisition in foundational domains. In W. Damon (Series Ed.) & D. Kuhn & R. Siegler, (Vol. Eds.), *Handbook of child psychology: Vol. 2. Cognition, perception and language* (5th ed., pp. 523–574). New York: Wiley.

Wilcove, D. S., & Eisner, T. (2000, September 15). The impending extinction of natural history. *The Chronicle for Higher Education,* B24.

Woolley, J. D. (1997). Thinking about fantasy: Are children fundamentally different thinkers and believers from adults? *Child Development, 68,* 991–1011.

Woolley, J. D., & Wellman, H. M. (1990). Young children's understanding of realities, nonrealities and appearances. *Child Development, 61,* 946–961.

Wozniak, R. H., & Fischer, K. W. (1993). Development in context: An introduction. In R. H. Wozniak & K. W. Fischer (Eds.), *Development in context: Acting and thinking in specific environments* (pp. xi–xvi). Hillsdale, NJ: Lawrence Erlbaum Associates.

Wyse, S. A. (1997). *Believing in magic: The psychology of superstition.* Oxford, UK: Oxford University Press.