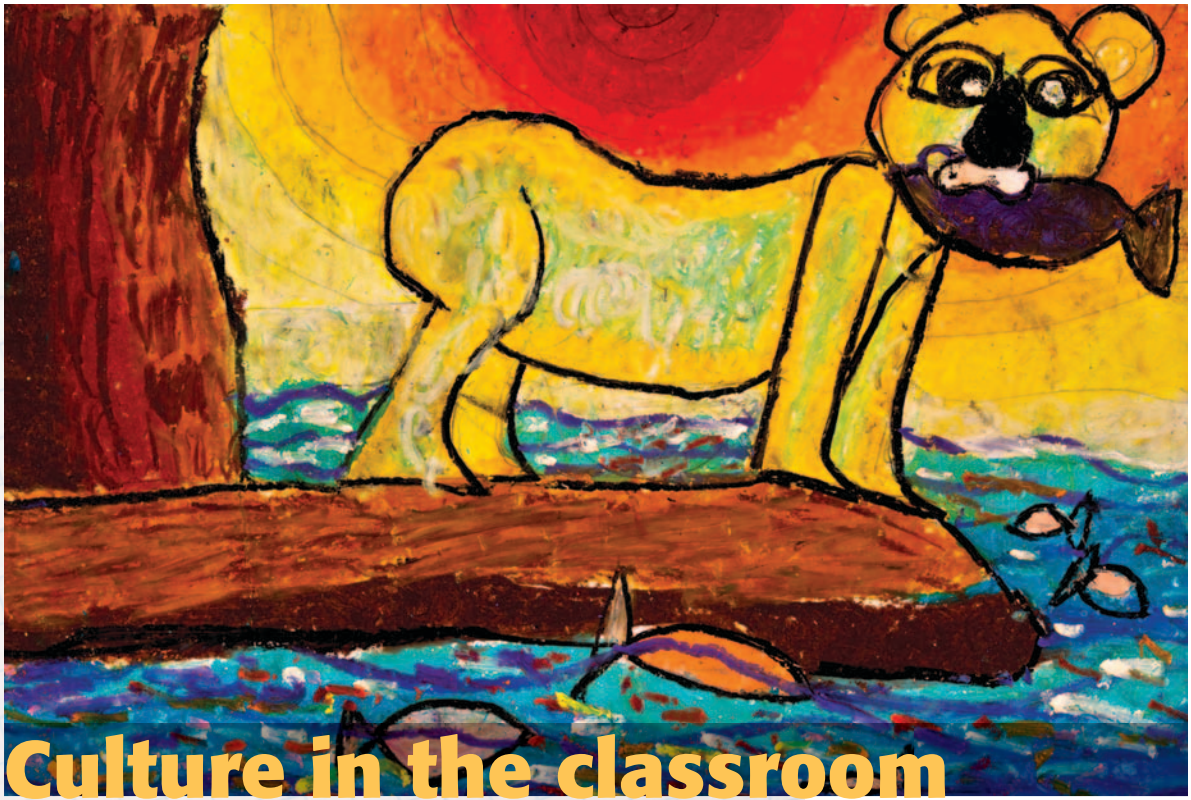

Culture in the classroom

Culture is everywhere in our schools and classrooms, including in places where we least expect it. That influences everything about student learning, including how children see themselves in relation to nature.

By Douglas L. Medin and Megan Bang

We've come a long way in the last 40 years when it comes to technology. We have the Internet, smartphones, and GPS at our fingertips, and in that sense we live in a very different world. But elementary school classrooms largely remain recognizable, not only by their child-sized furniture but also by things like displays of the alphabet, typically accompanied by corresponding illustrations of animals, from aardvarks and baboons to yaks and zebras. Presumably the animals are there because children like animals, and they attract attention, but are there other implications?

Classrooms also have cultural messages, and these too have remained largely the same in the last 40 years. In fact, nearly all aspects of school reveal particular cultural orientations that tend to reflect European-American orientations. Our work has been focused particularly on science education and reasoning about the natural world. Our studies with Native American and European-American children and adults suggest significant variations in how these different groups see themselves in relation to the rest of nature.

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These differences are revealed in everyday practices and in cultural artifacts, which serve to reinforce the very cultural differences that they reflect.

Our work has been in partnership with the American Indian Center of Chicago (AIC) and the Menominee Tribe of Wisconsin (see Bang et al., 2010, for a more detailed description.) Much of our focus has been on informal science learning and notions of biology that children may bring to the classroom. We've also conducted summer science programs and weekend family science activities with Native youth in Chicago and on the Menominee reservation in Wisconsin (Bang & Medin, 2010). This research and these activities have been community and culturally based.

A Menominee classroom

In early 2012, Medin attended a community meeting on the Menominee reservation in Wisconsin that focused on the Menominee Head Start schools. We were discussing what 3- to 5-year-old children should be doing and learning, and a strong consensus emerged that, "When people walk into a classroom they should immediately know that it is a Menominee classroom."

What did this mean? First and foremost, these community members said, Menominee language should be present. (The first language for most Menominee children these days is English). Second, community members said children should learn about clan animals (bears and cranes, not baboons and camels), Menominee stories, and Menominee history. That was just the beginning, as other priorities and values emerged.

At the Indian center in Chicago, a parallel story unfolded in which community members also wanted to focus on tribal histories, stories, and traditions. After site visits to other early childhood programs, community members in Chicago suggested that the programs lacked an emphasis on children's relationship with the land and with each other. They began to think about what this might mean in classroom practice. As a part of this wondering, we focused on the material resources in classrooms — children's books, for example.

Books are cultural artifacts

Children's books are cultural artifacts. In one line of research, we examined children's books that were written and illustrated by Native Americans and others by non-Native Americans (Medin & Bang, in press). The books were aimed at 4- to 8-year-old children, had to include animals, and could not be special occasion or seasonal (holiday) books. The non-Native books were selected from the best-selling children's books on Amazon.com, and the Native books were drawn from a Native-operated literacy organization, Oyate.com.

When we looked at the illustrations, we noted the context in which the animals appeared. In Native illustrations, the animals were almost always in a natural habitat acting "normally." In typical non-Native illustrations, animals wore clothing and interacted in settings rich in human artifacts (driving cars, sleeping in beds, and so on), much like characters in a Disney movie.

These differences might be important because many young children come to school with a very human-centered understanding of biology. Consider a now classic study conducted by Susan Carey (1985). She taught different groups of 4-year-olds that bees, dogs, or humans had some biological property (e.g., an "omentum") inside them. A few days later, she tested to see whether they would generalize that knowledge to other biological organisms. The children taught that humans had an omentum believed animals similar to humans also had an omentum. But the 4-year-olds who learned that a dog or a bee had an omentum tended not to generalize this property to other biological kinds very much at all. This led to powerful asymmetries as young children generalized from humans to dogs but not from dogs to humans. Ten-year-olds generalized readily and appropriately from humans, dogs, or bees.

Carey suggested that an anthropocentric biology was a typical and inevitable stage of development and that children had to undergo a fundamental conceptual change to achieve a biology in which humans are one animal among many. But more recent evidence suggests that a human-centered biology is a learned perspective, one that is reinforced by movies, television, and children's books. One piece of evidence in favor of this idea is that neither rural European-American nor rural Menominee 4- to 5-year-olds show a biology organized around human beings (Medin et al., 2010). Given that Carey's results were based on studies with urban children, one could argue that rural children go through a stage with a human-centered biology, but, because of their greater outdoors experiences, they go through it sooner. To counter this argument, then-graduate student Patricia Herrmann developed a procedure to test children as young as three. Using this technique, she demonstrated that 3-year-old urban children show no evidence of an anthropocentric biology and generalize as readily from a dog base as from a human base, i.e., a human-centered biology appears to be a cultural model (Herrmann, Waxman, & Medin, 2010). So depicting animals wearing clothing in children's books isn't just cute; it may also be teaching a particular orientation toward nature. In ongoing research, we've been able to show that we can prime these different cultural models by exposing children

to anthropocentric or nonanthropocentric media.

Different lenses and views

Back to our analyses of children's books. The non-Native illustrations typically were presented from a medium distance at eye level from an observer's perspective. In contrast, Native illustrations presented a much greater variety of distances and perspectives. They were more likely to have an illustration that was "up close and personal," but also more likely to present a panoramic picture. They were also reliably more likely to depart from eye level by providing an above, high-angle view or a lower to the ground view.

Depicting animals wearing clothing in children's books isn't just cute; it may also be teaching a particular orientation toward nature.

Two other illustration devices are important in our results. In an "over-the-shoulder" depiction, the scene is presented as if the viewer is literally looking over the shoulder of a character; in an "embodied" shot, the viewer sees the scene through the eyes of an actor (often indicated by a cutoff view of the actor's arms in the scene). Native books were substantially more likely to employ over-the-shoulder shots or embodied shots (67% of the books versus 27%) than non-Native books, and they more commonly presented a nonhuman actor's view.

Do these differences make a difference? In this case, both prior theory and evidence suggest that they do. One important factor in observation and reasoning is what one might call psychological distance (Trope & Liberman, 2003). When things are psychologically close to people, they're more likely to pay attention to the context and more likely to take the perspective of actors in the scene. In contrast, psychological distance leads to paying more attention to dispositional (intrinsic) characteristics of actors, not taking their perspective, and not attending to the context (Liberman & Trope, 2008). Other studies show that perspective-taking devices such as over-the-shoulder shots indeed are successful in changing the viewer's perspective (Libby et al., 2007; Libby, Shaeffer, & Eibach, 2009; Lozano, Hard, & Tversky, 2008).

With respect to science education, we speculate that distance and a focus on dispositions — intrinsic properties — favor organizing knowledge in terms of categories — in other words a taxonomic orientation. In contrast, psychological closeness and attention to context favors organizing knowledge in terms of relationships within a particular place or ecosystem. So what might this look like in children's (or adult) reasoning? If the focus has been on intrinsic properties, we would expect to see children expressing things like "bears are mammals" or "eagles have talons." Whereas knowledge organized in terms of relationships might look more like "bears eat fish and eagles eat fish." In sum, we have collected a breadth of observations ranging from learning goals, orientations implicit in everyday practices, and responses to open-ended experimental probes that converge on a coherent picture of cultural differences in conceptions of nature (Medin & Bang, in press).

Relative to European-Americans, Native Americans (both Menominee and Native Americans who are part of an urban, intertribal community) see themselves as close to and a part of nature (Bang et al., 2007). Menominee adults are also more likely to organize biological knowledge ecologically and in a manner aligned with complex systems than their rural European-American counterparts (Medin et al., 2006), and Menominee children are more attuned to ecological relationships than their rural European-American peers (Unsworth et al., 2012). Rural Menominee fishers are also more likely than European-Americans to organize their knowledge of fish by habitat (e.g. fish found in cold, fast-moving water), whereas European-American fishers favor an organization in terms of species — the bass family, for example (Medin, Ross, & Cox, 2006). Overall, the Native American populations in our studies display an orientation that is psychologically close, attentive to context and relations, nature-centric, and ecologically organized.

These studies of cultural differences in cognition and behavior show close parallels with the differences we noted in Native versus non-Native children's books. One important implication of this observation is that children's books are not just artifacts; they are cultural artifacts. As cultural objects, they reflect cultural differences, and they also reinforce or support cultural orientations. Our analyses of the text in Native and non-Native children's books reveal the same pattern of differences in attention to context and relationships (Dehghani et al., 2013).

Differing perspectives on science

Let's now return to classrooms, viewing them through a cultural lens. Think again about the depictions of animals in the classroom. Are they physically (and psychologically) close or distant? Has

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their typical context and ecological setting been preserved or have they been isolated from it? In our work with early childhood education programs — the Little Ones program at the AIC or Head Start on the Menominee Reservation, for example — we have started to pay attention to these issues. We look for representations that preserve habitat information and give preference to large, close representations over smaller, more distant ones. For example, at the AIC, we constructed large habitat wall murals and used them in instruction. When children interact with representations larger than themselves, they may be less inclined to see humans as dominant over other animals. The murals invite children to think about ways that bring the worlds of the animals and their habitats alive. The murals serve to stimulate discussion and inquiry about relations of animals to each other and their environment, and reveal a complexity of inquiry that has been thought to characterize only older children (National Research Council, 2007).

Now let's look at how science itself is presented in classrooms. Is it detached and distant, or is it up close and relevant to people's lives? Is a low context, taxonomic perspective favored or is a more relational and ecological one? Many times in classrooms scientific phenomena are isolated and detached. For example, children often learn about the states of water and are less likely to be taught about them in context. These decisions, we suggest, are not about science per se, but rather about which cultural lens of science is favored. Do depictions of evolution have humans at the top or as one of millions of currently existent species (Tversky, 2011)? If you have handy access to the Internet or a science textbook, look for depictions of ecosystems. Our own explorations indicate that humans tend either to not be present at all or at the top of some food chain. Is the absence of humans an indication that humans aren't relevant to or have no effect on ecosystems? Or does the absence of humans reflect a cultural model where humans are apart from nature?

For educators, understanding that classrooms and the things in them are cultural is important. Artifacts not only reflect cultural assumptions, but they also may have effects on how students see themselves in relation to school, communities, and nature itself. This observation represents both a challenge and an opportunity. K

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