

Culture in the Classroom

Douglas Medin and Megan Bang
Northwestern University University of Washington

We've come a long way in the last forty 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.

In this column, however, we want to emphasize the cultural side of classrooms and what's in them and the fact that nearly all aspects of schooling reflect particular cultural orientations. We will describe some of the studies we have been conducting with Native American and European American children and adults that suggest significant variations in how human beings are conceptualized in relation to the rest of nature. These differences are reflected in everyday practices and in cultural artifacts. These practices and artifacts, in turn, serve to reinforce the very cultural differences that they reflect. After briefly summarizing our research we'll offer some suggestions for classroom practice.

The work we have conducted is 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 also have conducted summer science programs and weekend family science activities with Native youth both in Chicago and on the Menominee reservation (Bang and Medin, 2010). This research and these activities have been both community- and culturally-based.

About a year ago Medin attended a community meeting on the Menominee reservation that focused on the Menominee Head Start schools. We were discussing what kinds of things three- to five- 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 these community members have in mind? First and foremost, Menominee language should be present (the first language for virtually all Menominee children these days is English). Second, community members thought that children should learn about clan animals (bear and crane, not baboon and camel), Menominee legends and Menominee history. That was just the beginning, as other priorities and values merged. At the AIC a parallel story unfolded, where 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 what was missing from the programs was an emphasis on children's relationship with land and with each other. They began to think about what this might mean in practice. This leads us to our observations of children's books.

Children's books are cultural artifacts. In one line of research we have examined children's books that are authored and illustrated by Native Americans versus those by people who are not Native Americans (Medin and Bang, in press). We used multiple criteria to select the books. They had to target four- to eight- year-old children and 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. The first thing we looked at was the illustrations and the largest difference we noticed was the context in which the animals appeared. For the Native illustrations the animals almost always were in a natural habitat acting "normally." Typical Non-Native illustration had animals wearing clothing and interacting in settings rich in human artifacts (driving cars, sleeping in beds, and so on), much like characters in a Disney movie. Before presenting further results on illustrations we take a time out to describe why this particular difference might be important.

Studies of children's cognitive development suggest that young children come to school with a very human-centered understanding of biology. For example, consider a now classic study conducted by Susan Carey (1985). She taught different groups four-year-old children that bees or dogs or humans had some biological property (e.g., an "omentum") inside them and then a few days later tested to see whether they would generalize that knowledge to other biological organisms. The children taught that humans had an omentum judged that other animals similar to humans also had an omentum. But the four-year-olds who were taught 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 anthropocentric media such as movies, television, and children's books. One piece of evidence in favor of this idea is that neither rural European American nor (rural) Menominee four- to five-year-old children 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 do go through a stage with a human-centered biology but that because of their greater outdoors experiences, go through it sooner. To counter this argument, then graduate student, Patricia Herrmann, developed a procedure that allowed us to test children as young as three. Using this technique she demonstrated that three-year-old urban children show no evidence of an anthropocentric biology and generalize as readily from a dog base as from a human base (Herrmann, Waxman, and Medin, 2010). That is, a human-centered biology appears to be a cultural model. So animals wearing clothing in children's books isn't just cute--it also is teaching a particular orientation towards nature. In ongoing research we have been able to show that we can prime these different cultural models by exposing children to anthropocentric or non-anthropocentric media.

In Phi Delta Kappan (2013), 95(4): 64-67.

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. Two other illustration devices are important in our results. In an "over the shoulder" depiction the scene is presented as if one were literally looking over the shoulder of a character and in an "embodied" shot the viewer sees the scene through the eyes of a 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 percent of the books versus 27 percent) than non-Native books, and when they did so, they commonly presented a nonhuman actor's view.

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

With respect to science education, we speculate that distance and a focus on dispositions (intrinsic properties) favors a taxonomic orientation and the closeness and attention to context favor a more relational, ecological orientation. Making a long story short, we have collected a wide range 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 and Bang, in press). Relative to European Americans, Native Americans (both Menominee and Native Americans who are part of an urban, inter-tribal 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., 2006a) and Menominee children are more sensitive to ecological relationships than their rural European American peers (Unsworth et al., 2012). Rural Menominee hunters and fishers are also more likely than European Americans to evaluate fish and forest species from an ecosystem perspective (Medin et al., 2006b). Overall, the Native American populations in our studies display an orientation that is psychologically close, attentive to context and relations, nature-centric, and ecological.

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

In Phi Delta Kappan (2013), 95(4): 64-67.

cultural artifacts. As cultural objects they reflect cultural differences and increasingly there is evidence that they also serve to reinforce or support cultural orientations. We have performed related analyses of the text of Native versus Non-Native children's books and they show the same patterning of differences in attention to context and relationships (Dehghani et al., in press).

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 their typical context and ecological setting been preserved or have they been isolated from it? In our work with early childhood education programs (e.g., Little Ones program at the AIC or Head Start on the Menominee Reservation) 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 use them in instruction. Children interacting with representations larger than themselves may undermine the implicit notion that humans are dominant over other animals. The murals invite children to engage in sense-making in ways that bring the worlds of the animals and their habitats alive. Because the murals serve to scaffold extended discussion and inquiry, they may support the complexity of inquiry that has been thought to characterize only older children (NRC, 2007).

Now let's look at how science itself is presented. Is it detached and distant or is it up close and relevant to people's lives? Is a low context, taxonomic perspective favored or a more relational and ecological one? 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 (see Tversky, 2011) or as one of millions of currently existent species? 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 not to be present at all or at the top of some food chain. Is the absence of humans an indication that humans are not relevant to or have no impact on ecosystems? Or does the absence of humans reflect a cultural model where humans are apart from nature?

For educators it may be important to realize that classrooms and the things in them are cultural things, things that not only reflect cultural assumptions but 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.

Bang, M., and Medin, D. 2010. Cultural processes in science education: Supporting the navigation of multiple epistemologies. *Science Education*, 94(6), 1008–1026.

Bang, M., Medin, D. L., and Atran, S. 2007. Cultural mosaics and mental models of nature. *Proceedings of the National Academy of Sciences of the United States of America*, 104(35), 13868–13874.

Bang, M., Medin, D., Washinawatok, K., and Chapman, S. 2010. Innovations in culturally-based science education through partnerships and community. In *New science of learning: Cognition, computers and collaboration in education*. New York: Springer.

In Phi Delta Kappan (2013), 95(4): 64-67.

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

Dehghani, M., Bang, M., Medin, D.L., Marin, A., Leddon, E., & Waxman, S. R. in press. Epistemologies in text in children's books: Native and non-native authored books. International Journal of Science Education.

Herrmann, P., Waxman, S. R., and Medin, D. L. 2010. Anthropocentrism is not the first step in children's reasoning about the natural world. Proceedings of the National Academy of Sciences, 107(22), 9979–9984.

Libby, L.K., Shaeffer, E.M., Eibach, R.P., & Slemmer, J.A. (2007). Picture yourself at the polls: Visual perspective in mental imagery affects self-perception and behavior. Psychological Science, 18, 199 – 203.

Libby, L. K., Shaeffer, E. M., & Eibach, R. P. (2009). Seeing meaning in action: A bidirectional link between visual perspective and action identification level. Journal of Experimental Psychology: General, 138, 503-516.

Lieberman, N. & Trope, Y. (2008) The Psychology of Transcending the Here and Now. Science, 322, 1201-1205.

Lozano, S. C., Hard, B. M., & Tversky, B. (2008). Putting motor resonance in perspective. Cognition, 106(3), 1195-1220.

Medin, D.L. & Bang, M., in press. Who's asking? Native Science, Western Science and Science Education. Cambridge, MA: The MIT Press.

Medin, D. L., Ross, N. O., Atran, S., Cox, D., Coley, J., Proffitt, J. B., et al. 2006a. Folkbiology of freshwater fish. Cognition, 99(3), 237–273.

Medin, D., Ross, N.O., & Cox, D. 2006b. Culture and Resource Conflict: Why Meanings Matter. New York: Russell Sage Foundation.

Medin, D., Waxman, S., Woodring, J., & Washinawatok, K. 2010. Human-centeredness is not a universal feature of young children's reasoning: Culture and experience matter when reasoning about biological entities. Cognitive Development. 25(3), 197-207.

National Research Council. 2007. Taking science to school: Learning and teaching science in grades K-8. Washington, DC: National Academies Press.

Trope, Y., and Liberman, N. 2003. Temporal construal. Psychological Review, 110(3), 403–420.

Tversky, B. 2011. Visualizing thought. Topics in Cognitive Science, 3(3), 499-535.

Unsworth, S. J., Levin, W., Bang, M., Washinawatok, K., Waxman, S. R., & Medin, D. L. 2012. Cultural differences in children's ecological reasoning and psychological closeness to nature: Evidence from Menominee and European-American children. Journal of Cognition and Culture. 12(1-2),17-29.