Evolving Minds: Children's Learning of Natural Selection

Prior research in our lab has shown that young children have a broad tendency to explain the existence and properties of living and non-living natural phenomena by reference to putative purposes. For example, children are more likely to teleologically explain that rivers exist in order to provide homes for animals than to causally explain that rivers exist because of melting snow or heavy rain. They are also more likely to explain that animals have long necks so that they can carry their babies than because their neck bones and muscles changed over time. During elementary school, children's tendency to assume purpose and function in nature becomes increasingly connected to ideas that somebody causes nature. This is true even in cultures that are not markedly religious. In short, by around 7- to 8-years of age, if not earlier, children are already naturally constructing the kinds of untutored theories that become enduring impediments to a scientifically accurate understanding of functionality in nature. In this research, we are exploring very young children's abilities to learn a scientifically accurate population-based mechanism of biological functionality: natural selection. Using simple, custom-made curricular materials, we are examining whether 5- to 8-year-olds can learn and generalize this foundational evolutionary mechanism, which is misunderstood by most adults, but which is central to understanding the diversity, complexity and functional specialization of living things. We are also examining what impact children's learning of this mechanism has on their explanations of nature more generally. Our federally-funded research is supported by a multi-year award from the National Science Foundation (NSF).

Is Religion Natural?
Teleological and Intentional Reasoning about the Natural World in China

Prior research has found that 3- to 9-year-old American and British children, scientifically unschooled Romanian Roma adults, American adults with Alzheimer's disease, and American undergraduates judging explanations at speed display a broad tendency to teleologically explain both living and non-living natural phenomena by reference to a putative purpose. Indeed, recent studies have also revealed that even atheistic American-based professional physical scientists automatically fall back on teleological explanations of nature (e.g. the earth has an ozone layer to protect it from ultraviolet light) when deprived of time to think reflectively. Taken together, these findings suggest that purpose-based explanation–a universal feature of religious cognition–represents a natural mode of reasoning that operates as a cognitive default throughout development even among non-religious adults who have substantial countervailing knowledge and habitually think in causal, mechanistic terms. By supporting a dual processing view, such results have implications for our understanding of underlying cognitive architecture, and the process of conceptual change over development. However, to date, the research has only taken place in Western, historically Judeo-Christian countries where religious representations suggestive of divine design can be culturally salient and ubiquitous, where some level of explicit religious affiliation is typical, and where religious "ways of knowing" are both generally respected and highly tolerated as valid. The current proposed work therefore seeks to explore whether life-long patterns of teleological bias found in these Western cultural environments extend to China–a country that is officially secular and where the cultural generalizations, noted above, do not hold. In collaboration with our colleagues at the Chinese Academy of Sciences, we are therefore conducting culturally appropriate studies of teleological and intentional reasoning with Chinese elementary school children and adults. Our findings will bear on questions concerning the universal underpinnings of religious cognition. This research is supported by an award from the Templeton World Charities Foundation (TWCF).