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Cultural Pathways in Cognitive Development: Introduction to the Special Issue

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Human cognition is not simply a product of the mind or brain that unfolds with biological and neurological maturation. Instead, it reflects a process and a result of strategic adaptation in response to the demands of the socio-ecological environment (e.g., Bruner, 1990; Cole, 1996; Hermans, 2001; Hong, Morris, Chiu, & Benet-Martinez, 2000; Tomasello, 1999; Uskul, Kitayama, & Nisbett, 2008). One environmental influence that has profound effects on human cognition is culture - the systems of shared meanings and shared practices that cohere social groups. Over the past two decades, extensive research has identified important cultural variations in a variety of fundamental cognitive processes including attention, perception, memory, reasoning and decision making, as well as in cognitive representations across knowledge domains (for reviews, see Heine, 2016; Kitayama & Cohen, 2007; Nisbett, Peng, Choi, & Norenzayan, 2001; Ojalehto & Medin, 2015; Wang & Senzaki, 2019).

A growing body of research in cognitive development has begun to uncover the early origins of the cultural variations as well as the developmental trajectory of culture-specific patterns of cognitive processes across age groups and overtime (e.g., Busch, Watson-Jones, & Legare, 2018; Chernyak, Kushnir, Sullivan, & Wang, 2013; Ji, 2008; Sternberg, 2014; Tsethlikai & Rogoff, 2013; Zeidler, Herrmann, Haun, & Tomasello, 2016). Culture poses affordances and constraints on the developing mind from the start; research has thus begun to see culture influences on cognition early and throughout childhood. Often times, although not always, early group differences in cognition become more prominent with age as children are exposed to further cultural influences. Research has further identified specific mechanisms of cultural influences on cognitive growth, and differences as well as similarities in the way humans transmit, learn, and develop in diverse cultural contexts. The consensus emerging from recent work supports, and meaningfully extends, theoretical notions that culture and development go hand-in-hand and that mechanisms of developmental change are best understood culturally (e.g. Bronfenbrenner, 1979; Bruner, 1990; Cole, 1996; Jablonka & Lamb, 2006; Rogoff, 2003; Shweder & LeVine, 1984; Tomasello, 1999, 2014; Vygotsky, 1978). This work has further contributed to the establishment of a *cultural developmental science* (see Wang, 2018a, for a collection of essays). While drawing inspirations from general cultural developmental theories, researchers continue to explore ways to operationalize culture in research, to go beyond mere between-group comparisons, and to delineate the pathways via which culture influences the developing mind.

In a recent attempt, Wang (2018b) discussed the theoretical and methodological challenges specific to cognitive developmental researchers and proposed a multi-level analysis approach to studying cognitive development in cultural context. She suggested that at the group level of analysis, researchers seek to identify meaningful cultural elements or dimensions that are responsible for group differences in the cognitive constructs of interest. At the dyadic level of analysis, the central task for researchers is to identify social practices, such as those engaged in by parents and caregivers, that are pertinent to developing cognitive skills, and to further test the relation of those practices to developmental outcomes across cultures. At the individual level of analysis, researchers recognize the active role of the child in cultural learning and examine individual levels of cultural identification, skill, or experience that give rise to group-level differences in cognitive functioning. At the situation level of analysis, researchers examine the dynamic interplay between culturally prescribed modes of thinking and situational demands, either in simulated (i.e. laboratory) environments or in response to daily experiences. Finally, at the temporal level of analysis, researchers attempt to situate development within historical time and place, in recognition that societal-historical factors can transform cultural beliefs and practices and further shape cognitive

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development. This multi-level approach provides an important means to capture the dynamic influence of culture on cognition and development (e.g., Chen, 2018; Greenfield, 2018; Wang, 2018b).

This special issue brings together ten papers that aim to advance our understanding of the pivotal role of culture in cognition as it develops in the early years. This impressive group of researchers represent diverse theoretical perspectives and methodological approaches, utilizing multiple levels of analysis to identify cultural pathways in cognitive development. They draw from samples of children across the world, in diverse cultural communities including the Wichi in the Chaco forest of Argentina (Baiocchi, Waxman, Pérez, Pérez, & Taverna, this volume), the Tsimané in the Bolivian Amazon (Davis & Cashdan, this volume), native born Jordanians (Elashi & Ameera, this volume), Israeli Jews (Essa, Sebanz, & Diesendruck, this volume), Hindus and Muslims in India (Shtulman, Foushee, Barner, Dunham, & Srinivasan, this volume), families in Iran and New Zealand (Taumoepeau, Sadeghi, & Nobilo, this volume), children from middle-class and working-class Turkish families (Unlutabak, Nicolopoulou, & Aksu-Koç, this volume), Chinese immigrant families in the U.S. (Wang, Koh, Stantacrose, Song, Klemfuss, & Doan, this volume), Japanese children and adults (Wice, Matsui, Tsudaka, Karasawa, & Miller, this volume), and Chinese in China (Zhao & Kushnir, this volume). The studies address a broad range of core cognitive developments, including memory and episodic thinking (Wang et al., this volume), spatial cognition (Davis & Cashdan, this volume), concepts and categories (Shtulman et al., this volume; Baiocchi et al., this volume), Theory of Mind (Elashi & Ameera, this volume; Taumoepeau et al., this volume), emotion understanding (Wice et al., this volume), intergroup cognition (Essa et al., this volume), moral reasoning (Zhao & Kushnir, this volume), and social mechanisms of learning and developmental change (Essa et al., this volume; Taumoepeau et al., this volume; Unlutabak et al., this volume; Wang et al., this volume). Together, by re-examining core cognitions with new samples and multi-level approaches, the studies provide us with a critical glimpse into cognitive development through a cultural lens.

At the group level of analysis, studies in this volume identified a range of important cultural elements that influence the developing mind. One of the elements is cultural ecology. Baiocchi and colleagues (this volume) used an ecological framework to understand categorization for the animal kingdom in adults and children from an indigenous Wichi community. In contrast to taxonomic systems of organization that is often observed in Western-educated populations, the Wichi, who have extensive experience in the natural world through their cultural practices of gathering, collecting fruits, fishing, and hunting, organized animals of the forest based primarily on ecological and social relations in alignment with Wichi native epistemology. Davis and Cashdan (this volume) studied Tsimané children and adolescents who lived in a forager-horticulturalist society where, in comparison with children in Western industrial societies, both girls and boys enjoy much freedom in spatial exploration from an early age. Similar environmental experiences between Tsimané boys and girls resulted in similar mobility, harm avoidance, and spatial abilities between genders, characteristics that often show drastic gender differences in Western societies. Findings of these studies suggest that theorization of basic cognitive processes should take into consideration the influence of cultural ecology and the associated views and practices that govern people's relation to the natural world.

A community's values and expectations about the social world represent another important cultural element influencing cognitive development, in particular children's social learning and developing social cognition. Elashi and Ameera (this volume) examined skepticism and the ability to reject distorted claims in Jordanian children and compared Jordanian children's performance with that of U.S. children. Given the values of relatedness and social conformity in Arab societies, Jordanian children are expected to show respect and obedience to those higher on the social hierarchy and to have absolute loyalty to in-group members; expressions of disagreement are discouraged in this cultural context. Accordingly, Elashi and Ameera found that Jordanian children had more difficulty than did US children in rejecting and explaining distorted claims, especially when it involved a best friend. Importantly, skepticism was not associated with theory of mind after controlling for age, suggesting that skepticism is not a mere result of developing social-cognitive skills but reflects the fulfillment of cultural expectations. Wice et al. (this volume) and Zhao & Kushnir (this volume) focused on cultural orientations of relatedness and autonomy in relation to the development of social and moral cognition. Wice and colleagues asked the question of how knowledge about emotion display rules develops in line with the dominant cultural orientation of a society. They found that both American and Japanese children, adolescents, and adults endorsed the use of masking display rules to avoid causing emotional harm to others. However, Japanese, but not Americans, showed a developmental increase in display rule endorsement to maintain social harmony in the context of conflicting opinions between peers. Zhao and Kushnir investigated the influence of cultural orientations on children's construal of choice in personal, moral, and conventional domains. They found that whereas Chinese and U.S. children held similar views of personal and moral choices, U.S. children emphasized personal desires and preferences and Chinese children emphasized evaluations of good and bad when viewing conventional choices. U.S. children also endorsed to a greater extent than did Chinese children the possibility to act in immoral or unconventional ways. Together, these findings reflect the East Asian cultural emphasis on relatedness and concern for others and the European American cultural emphasis on individuality and self-expression.

In addition to knowledge of the natural and social world, children in different cultures develop different beliefs about the supernatural world; beliefs that are transmitted through religious practices and the associated artifacts, images, and stories. Shtulman and colleagues (this volume) examined the influence of cultural representations of supernatural beings - anthropomorphic versus abstract representations - on the development of supernatural-being concepts in Hindu and Muslim children from a religiously-diverse community in India. The researchers found that children of both religious groups initially anthropomorphized supernatural beings and that they later formed more abstract concepts only for certain supernatural beings in line with the cultural representations (i.e., whether the supernatural beings are depicted as human-like in cultural artifacts). These findings challenge the theoretical view based on Judeo-Christian samples in the U.S. that ascribes a concrete-to-abstract trajectory of development in religious cognition. They suggest that the conceptualization of divine agents is not destined to become abstract with development but is in alignment with the cultural representations of the agents.

In addition to examining group-level influences, several studies examined the influence of culture on cognitive development at the dyadic level, in particular on social learning and social transmission. Essa and colleagues (this volume) examined the influence of group membership on Israeli Jewish adults' and children's imitation. Children, but not adults, exhibited automatic inter-group biases, responding to in-group models faster than out-group models when they observed two models performing an action. Unlutabak and colleagues (this volume) analyzed question-asking in Turkish preschoolers in response to informative and non-informative previous responses. Similar to prior findings with U.S. children, Turkish children asked more questions to gather information when they received informative rather than non-informative responses, and children from middle-SES families asked more information-seeking questions than did children from low-SES families. Cultural differences were apparent, however, in the content of children's questions: Turkish children's questions were more likely to be fact-seeking (what) and were less likely to be explanation-seeking (why and how) when compared with the questions of Western children. Together, these findings suggest that while young children in non-Western cultures, similar to their Western peers, are generally more inclined to learn from in-group members and knowledgeable others, cultural differences may be observed in specifics of the social learning processes.

On the other side of the dyadic process, Taumoepeau et al. (this volume) and Wang et al. (this volume) examined social transmission, showing in detail how the content and style of mother-child conversations explain cultural differences in children's theory of mind and episodic thinking. Taumoepeau and colleagues observed that during a picture description task, Iranian mothers discussed more frequently morals and norms and the mental states of others, whereas New Zealand mothers referred more frequently to the mental states of the child. More important, maternal use of child-directed mental state talk explained the cultural difference whereby New Zealand children scored higher on the overall theory of mind performance than did Iranian children. Wang and colleagues trained European American and Chinese immigrant mothers to have child-centered memory conversations with their children that focused on the child's thoughts, desires, and feelings - conversations that are typically observed in Western families and may facilitate detailed episodic representation of one's experiences. A year later, children of training group mothers came to represent their personal past and future events in greater detail than those of control group mothers, and the memory conversations seemed to be particularly facilitative for the Chinese immigrant children's episodic thinking skills. These findings reveal specific parenting practices that shape the developing mind and highlight the critical role of parents and other socialization agents in mediating cultural influences on developmental outcomes.

At the individual level of analysis, researchers measure "cultural elements" across individuals and further test how the individual-level cultural learning gives rise to group-level differences in cognitive functioning. Exercised within-group, this approach may further reveal culture-specific developmental mechanisms. It is therefore an important task for cultural psychological scientists (Matsumoto & Yoo, 2006; Wang, 2016), one that is exemplified in several of the studies in this issue. For example, Taumoepeau and colleagues (this volume) found that whereas maternal use of child-directed mental state talk was associated with theory of mind performance in New Zealand children, maternal use of other-directed mental state talk was correlated with theory of mind performance in Iranian children. They further found a relation between mother-directed mental state talk and the sequence of theory of mind acquisition across individual children. Elashi and Ameera (this volume) examined the potential contribution of theory of mind to Jordanian children's skepticism skills of detecting and doubting distorted claims above and beyond age. Davis and Cashdan (this volume) found that Tsimané children who engaged in more complex navigation activities exhibited greater spatial abilities. Baiocchi and colleagues (this volume) noted individual and sub-group variations in the ecological models of animal concepts within the Wichi community. The results of these studies underscore the need to include measures of individual-level variability in future research, measuring, for example, levels of exposure to cultural ecology or degrees of identification with cultural values across individuals and further relating individual differences to cultural variability in relevant cognitive developments.

The situation level of analysis was also touched upon in the special issue. Wang and colleagues (this volume) experimentally manipulated how parents conversed with their children about past experiences – creating a "situation" resembling Western family narrative interactions – and then observed long-term consequences of the manipulation on children's developing episodic thinking. Shtulman et al. (this volume), Wice et al. (this volume), and Zhao & Kushnir (this volume) showed that cultural patterns of cognitive growth are specific to situations, contexts, or domains of experience. Unlutabak and colleagues (this volume) showed that young children adjusted the questions they asked based on whether the answers they received earlier were informative or non-informative. The situation level of analysis reveals cultural influence on cognitive development as a dynamic, constructive process where culturally prescribed modes of thinking interacts with situational characteristics (e.g., with whom one is interacting, the style and ambience of the interaction) in shaping individuals' thoughts and actions (Hong & Mallorie, 2004; Hong et al., 2000). More cognitive developmental studies using this approach are called for.

In our fast-changing world, a historical perspective is critical to understand human development in relation to the drastic cultural changes taking place across generations and across an individual's lifespan (Greenfield, 2018; Varnum & Grossmann, 2017). One important task at the temporal level of analysis is for researchers to identify pertinent societal-historical factors that transform cultural beliefs and practices, which, in turn, shape cognitive development in a manner specific to a historical moment in time and place (Wang, 2018b). Davis and Cashdan (this volume)'s examination of the effect of schooling, which presumably limits environmental exploration, on Tsimané children's spatial cognition directly speaks to this approach.

Clearly, there is more work to be done. All of the authors in this volume acknowledged open questions raised by, and ways to improve upon, their work. In our view, however, the limitations of the work presented are also its strengths. The studies in this special issue tackle the hardest practical challenges in how to operationalize and measure cultural pathways in cognitive development inside and outside the laboratory. They move beyond theoretical discussions into the empirical realities, and thus highlight the gaps between what is known and what we wish we knew. In addition to studying cultural communities, the studies take a broadened view of culture to include factors such as social economic status, gender, and religion (Cohen, 2009). Methodologically, the studies

are diverse, using methods from structured and semi-structured observations and interviews to controlled experiments and to longitudinal follow-ups. In spite of the limited space and thus limited scope, the ten papers together reveal cognitive development as a dynamic process unfolding in layers of interactive cultural influences. It is our hope that the research presented here sparks interest in the growing field of cultural developmental science, and encourages further research.

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