A FIELD GUIDE TO CROSS-CULTURAL RESEARCH ON CHILDHOOD LEARNING

Theoretical, Methodological, Practical, and Ethical Considerations for an Interdisciplinary Field

EDITED BY SHEINA LEW-LEVY
AND STEPHEN ASATSA

https://www.openbookpublishers.com

ISBN Paperback: 978-1-80511-466-6
ISBN Hardback: 978-1-80511-467-3
ISBN Digital (PDF): 978-1-80511-468-0
ISBN Digital ebook (EPUB): 978-1-80511-469-7
ISBN HTML: 978-1-80511-470-3

DOI: 10.11647/OBP.0440

Cover image: Children playing in front of their home in Kafr Elsheikh, Egypt (2016). Photo by Mona Abo-Abda, https://commons.wikimedia.org/wiki/File:ART_and_KIDS.jpg. Cover design: Jeevanjot Kaur Nagpal

2. A history of cross-cultural research on childhood learning

Coordinated by Tanya MacGillivray

This chapter reviews the history of cross-cultural childhood learning by describing the traditions, perspectives, methods, and philosophies that have shaped our field of research. We cover a broad range of topics, from developmental psychology, the history and traditions of different approaches and perspectives, contributions from evolutionary theory and archaeology, as well as noting the narrow framework of the western lens. We highlight the ways in which disciplines have come together to deepen our understanding of the nature of childhood learning. While we recognize the limitations of each approach and method, we focus our chapter on their unique as well as complementary contributions and how they have shaped the field today. This chapter can be construed as a roadmap of research on childhood learning, charting the history of the field.

2.1. Introduction

Tanya MacGillivray

The human developmental period known as 'childhood' is unique in several aspects including the extent to which we learn from others. The study of childhood learning has evolved with different waves of thinking and perspectives over the years and through various discipline traditions, interests, and goals. In this chapter we focus on the unique contributions and limitations of each approach. First, MacGillivray and Halavani provide a brief

 https://doi.org/10.11647/OBP.0440.02

overview of the contributions of notable leaders in the field of developmental psychology. Until the early 20th century, there was very little interest in child learning outside of urban life. Then, Kroupin describes the realization within the field that culture matters, leading to an increasing interest in the context of everyday lives of children beyond western societies. Various theories and approaches are described, with Takada articulating the socialization approach to culture, noting the significance of personality theory, and Xu describing Chinese traditions. Oppong and Dutra highlight what is missing with western-biased theories and underscore the need to understand the majority cultures of the world. Hewlett defines and describes cultural evolution theory as an approach to understanding human childhood learning. To better understand our ancestral past and the role of cultural transmission and learning in childhood, Riede and Nowell detail the work of paleoanthropologists focused on the lives of past children. Lastly, Greenfield takes us on a personal journey through historical change within the field.

2.2. Contributions from developmental psychology

Tanya MacGillivray & Zahra Halavani

Since the early 1900s, beginning with the work of Piaget, we have had rich descriptions of the social context in which children learn from others as well as the limitations and remarkable developmental changes that enable children to engage with and learn information and skills from others. Piaget focused on how children engage with and make sense of the world around them by exploring, testing, and exercising their developing abilities. Although Piaget is less well known for his work on social interactions, he argued that children's interest in others drives their ability to engage with and gather information about social interactions (reviewed in Carpendale & Lewis, 2023). In turn, this enables children to learn from others. The primary focus of his work centered on examining how knowledge develops in children and how they progress through different 'stages'. Piaget describes

the process of the acquisition of knowledge as 'constructivism', whereby the child constructs or develops expectations about what will occur, based on their experiences. The child is an active engaged agent in the world and this begins at birth with an early developing preference for others (Broesch, 2024).

Since the work of Piaget, research has examined various aspects of social development and learning with a strong focus on the early interest in and preference for human faces, voices, and movements which enable dyadic interaction to develop into more complex forms of human interaction (Goldberg, 1977). Later, infants develop the ability to follow a gaze, and comprehend and produce communicative gestures such as pointing, which allow for complex forms of social learning. Although there are different explanations for this uniquely human ability, there is a consensus that the infant-caregiver system sets the stage for this ability (Broesch, 2024).

Piaget was often misrepresented as focusing on the individual child in isolation (see Carpendale & Lewis, 2004). Following in the steps of Piaget, Lev Vygotsky and his colleagues emphasized the primacy of social and cultural factors in child learning. Vygotsky's emphasis on this systems perspective in human development contrasts with reductionist approaches in science and encompasses both bio-social and bio-psychological aspects of development (Vasileva & Balyasnikova, 2019). Fernyhough (2008) pointed out that specific Vygotskian concepts, including internalization, zone of proximal development, and naïve participation, have become useful for studying the development of social understanding and learning. The concept of the zone of proximal development (ZPD) has become popular in different fields of psychology, including developmental, cognitive, and educational, due to its generalized and applicable nature. Vygotsky (1978) defined the ZPD as the gap between infants' current level of development and the potential level of development they can reach with the assistance of knowledgeable others.

In developmental psychology more recently, much of the work on social learning in early childhood focused on two features of the learning context: (1) the psychological mechanisms that

enable social learning (in both infant and caregiver), and (2) the caregiver-infant system that enables social learning. Both of these features focus on the infant or child as well as the knowledgeable other (caregiver) and, interestingly, one is rarely examined without the other but there are few descriptions of the learning mechanisms as dyadic-interactive-systems. Some work describes the dyadic learning system in which both parties are ready for learning and teaching (Csibra & Gergely, 2009). They describe the theory of natural pedagogy, and this has driven more work to examine possible mechanisms that may be supporting this system throughout ontogeny.

Until relatively recently, culture was largely ignored from the study of child development generally and human learning specifically. This reflects the very ethnocentric perspective of family life—many assume family life to reflect urban and western, Eurocentric, heteronormative values, leading to a description of child learning that may be specific to one homogenous cultural context. As a result, we are left with questions of generalizability and an awareness that we may be missing out on a deeper understanding of the range of human diversity (Kline et al., 2018).

2.3. Cross-cultural contributions

Ivan Kroupin

The history of at least one major branch of cross-cultural cognitive research reveals a complex relationship with an apparently opposing school of thought focusing on culture-free laws of cognition and development. In the early 1960s, two parallel trends emerged in developmental psychology. On the one hand, the 'cognitive revolution'—headed by the likes of Chomsky, Simon, and Newell (for a review, see Gardner, 1985)—brought in theories of cognition based in computation and information processing. At the same time, a major wave of cross-cultural psychological research was emerging, spearheaded by researchers such as Michael Cole and Patricia Greenfield (e.g., Gay & Cole, 1967; Greenfield & Bruner, 1966) and soon including a larger group, e.g., Sylvia Scribner, David

Lancy, and Barbara Rogoff (Scribner, 1974; Lancy, 1978; Rogoff, 1981). While the two movements initially shared an interest in exploring general forms of processing in thinking and learning such as memory and formal logic (some of which date back to earlier work by Piaget, e.g., Inhelder & Piaget, 1958), cross-cultural researchers quickly discovered that standardized experiments failed to capture the cognitive processes of populations outside of western, urban, formally schooled groups.

Concretely, the evolution of the cross-cultural school away from cognitivist approaches resulted in influential critiques of standardized experimental methods (e.g., Scribner, 1976; Lave, 1997; Greenfield, 1997). These typically resemble school tests and, consequently, are familiar to schooled participants but may limit the performance of non-schooled groups for whom explicit testing by unfamiliar adults is a strange situation with unfamiliar presuppositions (see Scribner, 1977; Dias et al., 2005 for a case study of differences in assumptions leading to 'failures' in non-schooled groups). Moving away from these standard approaches, cross-cultural researchers developed ethnographically informed experimental paradigms (see, e.g., Greenfield, 1974; Lave, 1977 for important early examples). These methods typically involved constructing experimental contexts in such a way as to avoid removing participants from their familiar cultural contexts.

This divergence culminated in a split between cognitivist and culturalist approaches, exemplified by a large study by Sharp, Cole, and Lave (1979). The authors pursued a multi-year study of the effects of schooling on cognition using standardized experiments, only to conclude, in the words of Cole, that "[D]evelopmental, cognitive research in the United States and other industrialized countries, where years of education and age go hand in glove, has been studying the consequences of education rather than culture-free developmental laws." (p. 85). Rogoff and Chavajay (1995) provide a historical review of this schism and how the culturalist school moved away from domain-general cognitive processing and towards culturally embedded approaches inspired by the Soviet school (e.g., Vygotsky, 1978; Luria, 1976; see also Cole, 1996 for a longer historical and theoretical treatment of this split).

In sum, cross-cultural work on learning and cognitive development and universalist approaches to cognitive science have been historically influenced by each other, but also structured as a reaction to the limitations of the other camp. While the inherent tension between these two camps has often led to a lack of dialogue, a recent wave of work (e.g., Henrich et al., 2010; Medin et al., 2010; Nielsen et al., 2017; Kline et al., 2018; Broesch, Crittenden, et al., 2020; Rad et al., 2018; Barrett, 2020; Kroupin et al., 2024) has once again begun to emphasize the inevitable importance of culture in the study of cognition and learning as a whole.

2.4. A history of socialization approach for cultural research of childhood learning

Akira Takada

The concern that research of childhood learning using standardized tasks reflects (sometimes unconsciously) the western view of development and human nature, and that this may hinder the proper discussion and understanding of childhood learning in non-western communities, is one of the main motivations for anthropologists interested in childhood learning to travel to faraway fields. Anthropologists value cultural diversity in childhood learning and often prefer the concept of socialization, which focuses on enabling children to behave in socially appropriate manners, to the concept of learning, which implies cognitive processes that occur within the individual child.

One of the most important early theoretical frameworks for the study of socialization was 'culture and personality theory'. It attempted to clarify how culturally distinctive personality is formed through the process of socialization. According to Benedict, "identity as a culture depends upon the selection of some segments" from among the potentially infinitely diverse set of segments. As a result, every human society "has made such selection in its cultural institutions" and "each from the point of view of another ignores fundamentals and exploits irrelevancies" (Benedict, 1934/2005, p. 24).

There was a tendency in culture and personality theory to consider individual cultures to be 'personality writ large' (Mead, 1959/2005), with individuals learning to imitate their own cultures through the process of socialization. Reflecting such thinking, analyses of child socialization emphasized the impact of child rearing practices on the formation of personality (e.g., Bateson & Mead, 1942; Mead, 1943; Mead & Wolfenstein, 1955).

The view that culture is the amalgam of segments that cannot be compared is readily linked to the skeptical view that there is no such thing as truth. Culture and personality theory, along with cultural relativism, has generated abundant criticism (e.g., Freeman, 1983; LeVine, 2007). As a response to such criticisms, a research group organized by John and Beatrice Whiting collected data using more standardized procedures and long-term fieldwork. Their 'Six Cultures Project' was an attempt to identify the unique characteristics of child socialization in six cultures (Orchard Town, US; Khalapur, India; Taira, Okinawa; Tarong, the Philippines; Uxtlahuaca, Mexico; Nyansongo, Kenya) (Whiting, 1963; Whiting & Whiting, 1975). According to the Whitings' analysis, social interactions in societies categorized as 'less complex' were more nurturant-responsible (offers help, offers support, suggests responsibly). In contrast, in 'more complex' societies, social interactions were more dependent-dominant (seeks help, seeks attention, seeks dominance). Based on these results, the Whitings proposed a holistic social model as a basis for thinking about the relationship between culture and the mind (Whiting & Whiting 1975, p. xi). In this model, the means of production and mode of subsistence determine the children's learning environment, which, coupled with innate factors, determines the characteristic behavior patterns of a given culture. However, there is likely much room for improvement in the two dimensions for comparing societies (the complexity of socio-economic institutions and household structures), the resulting categorization of societies, and the analyzed behavioral categories.

One promising approach to circumventing the difficulties in setting the standard dimensions of comparison across cultures is to focus on the local activities within which appropriate cultural

structures are situated (Goodenough, 1981), and study them thoroughly and empirically. By combining ethnographic methods in studying the local activities with a detailed analysis of face-to-face interactions, we have an opportunity to study language, social organization, and culture from an integrated perspective (Goodwin, 1990, p. 2). This is also a promising approach in that it avoids the aforementioned pitfalls of a relativist view. With this approach, studies of language socialization can examine—through detailed analysis of the use of various semiotic resources, including language—"how children and other cultural novices apprehend and enact the 'context of situation' in relation to the 'context of culture'" (Ochs & Schieffelin, 2012, p. 1).

As an example, Takada (2019) presents a detailed analysis of an emotional word *hazukashii* (lit. shaming, shy, embarrassing, or awkward) in Japanese caregiver-child interactions. After the publication of Benedict's (1946) seminal work, shame became associated with the ethos of East Asian cultures including Japanese culture. According to Takada (2019), a caregiver's *hazukashii* toward the child is likely to occur when the child fails to respond/behave appropriately to the context of the situation and thus caregivers often tease or give a more acceptable account for the inappropriate action performed by the child. His further analysis indicates that sources of *hazukashii* include disorderly appearances (e.g., dressing, eating manner), divergence from expectations in conversation (e.g., greeting to greeting, answer to question), and divergence from role expectations (e.g., as kindergartener, boy/girl, and older brother/sister). As children grow up, caregivers increasingly superimpose the context of culture over the context of the situation, and *hazukashii* is a useful emotional word for promoting this. This leads to the child's understanding of a broader context beyond the 'here and now', and thus to more advanced language socialization. *Hazukashii* thus works as an organizing force as well as a product of socialization practices in Japanese caregiver-child interactions.

2.5. Beyond western theories: Chinese thoughts on childhood learning

Jing Xu

Childhood learning has an important and evolving role in Chinese culture and history. It has assumed a unique significance in Chinese philosophical thoughts for more than 2,000 years (Cline, 2015). It is connected to educational desire, social anxiety, and political governance in larger society across various historical periods and social transitions (Bakken, 2000; Xu, 2022). Chinese traditional theories and thoughts have important insights to inform contemporary cross-cultural research on child development and learning: the relationship between biology and culture—or 'nature' and 'nurture'—remains one of the most important and contested scientific questions today. Instead of imposing a dichotomous and oppositional understanding of 'nature versus nurture', Chinese traditions envision this relationship as dynamic and mutually constitutive in the process of learning. Moreover, the nature of origins of human cooperation and morality is a central issue in the synergetic research across anthropology, psychology, and cognitive science. Since the Axial Age (eighth to third century BCE), Chinese traditions have emphasized the development of morality as the ultimate goal of learning (Li, 2012) and envisioned the process of learning morality as bringing our inborn nature to completion (Jiang, 2021).

Assumptions about human nature and its interaction with the environment constitute the foundations of Chinese thought on learning and human development. Even today, preschool children in metropolitan areas of China still learn to recite this precept from 'Three Character Classic' (*San Zi Jing*), a popular primer during imperial times (Xu, 2017):

> Men at their birth are naturally good.
> Their natures are much the same;
> their habits become widely different.
> If foolishly there is no teaching,
> the nature will deteriorate.[1]

1 English translation by Herbert Giles (https://ctext.org/three-character-classic).

Agricultural metaphors, especially those of plant cultivation, abound in Chinese educational culture. The most well-known metaphor was advocated by the ancient Confucian philosopher Mencius (fourth to third century BCE), that humans have innate but incipient tendencies, like sprouts or seeds, toward benevolence, righteousness, wisdom, and propriety, which will develop into full-fledged virtues if given the proper environment. The emphasis on teaching and learning in shaping children's moral personhood, which still finds its resonance in contemporary Chinese communities (Xu, 2017), also originates from classic Chinese philosophy. For example, the Confucian classic *Analects* begins with this sentence: "The Master [Confucius] said, 'Is it not pleasant to learn with a constant perseverance and application?'"[2] Two characters in this sentence constitute a basic theory of learning: First, '學' (*xue)* means 'to learn, to apprehend, to emulate'. The lower part of this character, '子', means 'offspring/child'. Second, '習' (*xi*) means 'to practice; to flap the wings/to flutter [birds practicing flying]'. To early Confucians in the Axial Age, the content of learning refers to repeatedly practicing proper rites and rituals that embody the ideal moral order. But this view of learning also implies and presumes a role of nature: a bird learning to fly is part of 'bird nature', and morality—exemplified in rituals—is part of human nature. The two characters combined together, 學習, became the modern Chinese word for 'learning'.

Building or restoring social order was an existential concern at a time when kingdoms were competing with each other, on the verge of the rise of the first Chinese empire. Intellectuals in early China were pondering fundamental questions about the relationships between self and other, between individual, family, and the larger society or government, formulating thoughts about justice, care, and freedom, and above all, exploring answers to the question of how individuals acquire these virtues—that is, the question of learning (Jiang, 2021). Ever since then, the idea of self-cultivation, or 'becoming human' (*zuoren*), has remained a

2 English translation by James Legge (https://ctext.org/analects/xue-er). Original text: 子曰:「學而時習之,不亦說乎?」

central concern in Chinese thought and is reflected in educational practices today (Li, 2012; Xu, 2017). Dominant theories of learning and child development today are mostly rooted in western thought, especially moral philosophy. But it is time for researchers to broaden our intellectual horizons and learn from diverse cultural traditions. Classical Chinese philosophy, with its organic view of nature and environment and its longstanding emphasis on moral cultivation, can still inform researchers today to reflect on the meaning and purpose of childhood learning.

2.6. Alternative perspectives on childhood learning – what have we missed with our 'western' lens?

Seth Oppong & Natália Dutra

Child development is a bio-cultural process, with culture playing a major role in defining the shape (developmental pathways and milestones) and content (transmitted skills) of development (Jukes et al., 2021; Keller, 2016, 2017, 2018; Keller et al., 2018; Morelli et al., 2018; Nsamenang, 1992, 2006; Oppong, 2015; Scheidecker et al., 2021, 2023b; Serpell & Nsamenang, 2014; Weisner, 2002). This implies that the context of human development matters as much as the biology of the person. Again, it is the culture that determines the developmental tasks that a person in a particular context must resolve and the types of human capacities that a person develops, in order to become a fully functional person in that particular society. However, the current science and interventions in global early childhood development (ECD) are heavily based on research done in wealthy countries using theories, concepts, methods, and tools informed by their cultural orientations and philosophies (Oppong, 2023a; Scheidecker et al., 2022, 2023).

There are several important human capacities, opportunities for early learning, social partners, and structural barriers that are often missed when western theories and perspectives are applied to persons in the Majority World. For instance, the current western understanding of child stimulation—a very important contributor to cognitive development—is based on the heavily criticized

attachment theory (Keller, 2021; Scheidecker et al., 2023a, 2023b). This view enables international bodies such as UNICEF, and proponents of the Nurturing Care Framework (NCF), to frame and measure child stimulation only in the context of primary caregiver/mother-child play (Scheidecker et al., 2021, 2022, 2023a, 2023b). This has been termed as responsive caregiving in the NCF.

This western bias, therefore, ignores other forms of play such as child-to-child play and adult non-primary caregiver-to-child play that equally provide stimulations for language and socio-emotional development of the child in the Majority World (Scheidecker et al., 2023b). Such focus on child stimulation tends to privilege books and manufactured toys and leads to ignorance of other learning materials such as naturally occurring cultural artifacts in the environment of the child (Scheidecker et al., 2022). Often, the focus on books corresponds to a view that a key desirable developmental outcome is school readiness, with particular emphasis on English Language or the development of other European Languages (adopted or forced upon people in the Majority World as a result of colonization or the global political economy). Though school readiness can be a desirable outcome, it should be seen as only one among varied desirable outcomes, with different contexts emphasizing different outcomes.

This is particularly important as the current educational content/curriculum in the Majority World tends to produce citizens alienated from their own cultures (Oppong, 2013). Given what are considered desirable forms of play, play materials, and the emphasis on certain human capacities, the natural outcome is that childhood assessment tools are also developed with them in mind. For instance, to determine if a child (three to four years) is developmentally on track or delayed, UNICEF (2018) created an Early Childhood Development Index (ECDI) which is used as part of its Multiple Indicator Cluster Surveys (MICS). Within the ECDI, items such as the following are asked: “can a child identify or name at least ten letters of the alphabet?” This question cannot be used to produce comparable data on aspects of literacy among young children across the world. This is because the unintended impact of this question is that children in the Majority World are often not

assessed in their native language but in a European Language. This further reinforces the colonial educational curriculum and tends to represent them and their parents as deficient (Scheidecker et al., 2022). The implications are that, when western theories and perspectives are used to understand child development in universalistic ways, there is always a possibility of missing key developmental outcomes in different contexts as well as producing biased evidence that portrays children from the Majority World as deficient and needing interventions (Oppong, 2015, 2019, 2023a). This does not in any way suggest that we should deny help to communities and children in need; rather, by understanding the problems and risks associated with using western theories and perspectives to frame child development in the Majority World, we can improve the basic ECD science that informs ECD policies and interventions. With such improvements in the basic ECD science, we can hope to 'do good' better!

Over the years, calls have been made to develop and present alternative theories and perspectives on child development (Nsamenang, 1992, 2006; Oppong, 2015, 2017, 2019, 2020, 2023a). As a result of these calls, theories and perspectives such as Oppong's (2017, 2023b) bio-cultural theory of becoming a person, Oppong's (2020) model of valued human cognitive abilities, Nsamenang's (1992, 2006) social ontogenesis, and Nwoye's (2017) Africentric theory of human personhood, to mention a few, have been proposed to provide alternative frameworks for understanding an African human person, for instance. Oppong's (2020) model of valued human cognitive abilities holds that cognitive abilities or general intelligence comprise of cognitive competence (demonstrating analytical abilities, good memory, etc.), wisdom (demonstrating thoughtfulness, the intellectual initiative to recognize a problem, and having the skill to solve the problem while displaying concern for one's community), and socio-emotional competence (demonstrating the ability to recognize the needs for social adaptation, obedience, trustworthiness, respectfulness, and cooperation). He shows that the type of cognitive abilities emphasized and their development in each cultural context depend on the currency and values each cognitive ability has in

a particular context (Oppong, 2020). Thus, the western models of cognitive abilities tend to emphasize cognitive competence (see how literacy is measured in the ECDI) for its emphasis on school readiness and ignore other cognitive abilities such as wisdom and socio-emotional competence. This implies that if we decide to frame the measurement of cognitive development in Oppong's (2020) model of valued human cognitive abilities, we will obtain different results from African children and may even show that western children are developmentally delayed in terms of wisdom and socio-emotional competence. Indeed, we get exactly what we measure!

2.7. History of cultural evolutionary studies

Barry Hewlett

Evolutionary scholars have been interested in social learning—i.e., learning skills and knowledge from others rather than on your own—for over 100 years. This brief overview and history of evolutionary approaches to the study of child learning examines contributions in the last fifty years. The review focuses on two cultural evolutionary perspectives: cultural transmission theory (CT) and dual transmission theory (DT). Other important evolutionary theories, such as embodied capital theory (Kaplan & Bock, 2001) and cultural attraction theory (Sperber, 1996), have also contributed to the study of childhood learning, but are not covered here because they have generated fewer studies of childhood learning than CT and DT and allocated space was limited.

Cultural Transmission Theory (CT)

Luca Cavalli-Sforza (geneticist) and Marc Feldman (biologist) were hired by Stanford University in the early 1970s and were concerned with racist rhetoric about links between genes and intelligence by Arthur Jensen, a psychologist at UC Berkeley, and

William Shockley, a Stanford faculty member (and Nobel prize winner for his work on semiconductors) who proposed that only intelligent people should have children and that black people were inferior. This motivated Cavalli-Sforza and Feldman to develop sophisticated mathematical models to demonstrate gene-culture coevolution and how modes of cultural transmission influence behavior and evolution. In 1972, they offered a class together, which led to their collaboration. Their first papers on cultural transmission were published in 1973 followed by their 1981 classic book, *Cultural Transmission and Evolution*. Their book identifies eleven different modes of transmission, but most scholars today are familiar with the five outlined in Table 2.1. The modes focus on from whom a child learns, e.g., parents or vertical transmission, and the number of transmitters to receivers. The mathematical models to support the characteristic features of the modes come from genetics (vertical) and disease transmission (horizontal and oblique).

Table 2.1. Modes of cultural transmission (from whom children learn) described by Cavalli-Sforza and Feldman (1981).

Type	**Vertical**	**Horizontal**	**Oblique**	**Many-to-One (Concerted)**	**One-to-Many**
Features	Learn from parents	Learn from members of same generation. Acquisition depends upon frequency of interaction	Learn from non-parental adults. Acquisition depends upon frequency of interaction	Cultural elements that members agree are important to transmit together, e.g., social norms	One individual to group, e.g., formal education, storytelling
Contribution to intracultural variability	High	Varies by frequency of contact	Varies by frequency of contact	Low	Low

Especially adaptive in these social and natural environments	Stable	Changing, parents less available	Changing, parents less available, others with more knowledge	Stable	Changing, high social stratification, population density
General rate of culture change with this transmission mode	Conservative	Can be rapid if frequency of contact is high	Can be rapid if frequency of contact is high	Conservative	Rapid
Age especially important	Infancy, Early Childhood	Middle Childhood	Adolescence	Early Childhood, Adolescence	Any

The first small-scale culture field test of CT models was conducted in the mid-1980s among Aka hunter-gatherers and found that vertical transmission was particularly common, and that transmission often occurred within the same gender (Hewlett & Cavalli-Sforza, 1986). Studies in the 1990s among the Cree (Ohmagari & Berkes, 1997) and other groups (Shennan & Steele, 1999) had similar results, but in the 2000s, observational studies (early studies were based on interviews with parents or children about how they learned particular skills and knowledge) of BaYaka, Tsimane, Hadza, and Baka children demonstrated that other children (horizontal) were regular transmitters in middle childhood and non-parental adults (oblique) were common transmitters in learning more complex skills in adolescence (Lew-Levy et al., 2019). Recent CT research continues to show that vertical transmission is important (Schniter et al., 2022), research methods can influence results (Dira et al., 2016), and that age and gender, skill complexity, size of camp/village, and degree of relatedness impact from whom a child learns. Few studies have been conducted on concerted and one-to-many transmission.

Dual Transmission Theory (DT)

Robert Boyd's (ecologist) and Peter Richerson's (zoologist) interests in cultural transmission developed in a similar way to those

of Cavalli-Sforza and Feldman; they were asked to co-teach an introduction to environmental studies course at UC Davis in 1974. Both wanted to understand how culture enabled humans to rapidly adapt to various environments, but they were not impressed with theories of adaptation used by cultural ecologists at the time. They started by making mathematical models found in evolutionary ecology, but then came across the work of Cavalli-Sforza and Feldman and took a class from them at Stanford in 1978. Eventually they published their own classic work on social learning, *Culture and the Evolutionary Process*, in 1985.

DT theorists are interested in identifying psychological mechanisms that influence child learning that have been selected for through natural selection. In their 1985 book, Boyd and Richerson originally used the terms direct and indirect bias to refer to some of the learning biases, but scholars had difficulty with the terminology and their anthropology students Joe Henrich and Richard McElreath (2003) provided alternative and more accessible terms and explanations of content and context biases. Table 2.2 outlines some of the DT biases. Context biases are learning cues that children use and suggest that children are more likely to learn from people who speak the same language or eat similar foods and from people who have more children, wealth, and prestige. Content biases indicate that children are more likely to pay attention to stories or conversations about things like fire, food, and dangerous animals because they could impact their survival. These learning biases generally emerge early in life, and are automatic and unconscious.

Table 2.2. Examples of content and context biases from Dual Transmission theory.

Context Biases	Content Biases
(from whom to learn)	(cultural domains children have evolved to pay attention to)
Model-Based	Dangerous animals
Learn from individuals:	
With more skill, knowledge, competence than others	Fire

That are successful, e.g., greater wealth, high fertility, nice clothes	Explanations for illness
With more prestige, i.e., individuals that receive more attention and deference	Cultural norms
In good health, which is an indicator of adaptation	Social groups
That are older (children or adults) and have accumulated knowledge or skills	Living kinds (classification of animals and plants)
That look and sound like you, e.g., same gender, ethnicity, dialect, dress, foods	Sex
Frequency-Based	Food
Conformist transmission, copy the most common cultural features in the group as they are most likely to be adaptive	Artifacts
Non-conformist transmission, do what everyone else is not doing, e.g., when what most people are doing is not working	

Research in the late 1980s into the 1990s was primarily theoretical (Boyd & Richerson, 2005). In the 2000s, the number of experimental studies with children in western countries and field research in small-scale cultures increased dramatically. Much of the research focused on two major DT contributions: prestige-bias and conformist bias. Experimental studies, field research, and ethnographic descriptions indicate that children are more likely to use prestige bias cues in late, rather than early, childhood because children have easy access to family and friends when they are young but are willing later in life to spend more time to find and learn from successful or prestigious individuals (Henrich & Henrich, 2010). Data to support the assumption that if an individual acquires prestige in one domain, it can lead children to copy that individual across several cultural domains, is limited (Jiménez & Mesoudi, 2019). Cross-cultural data indicate that prestige bias is less common in hunter-gatherers than it is in other modes of production (Garfield et al., 2016).

Conformist transmission—i.e., copying frequently observed behaviors—has now been studied and found in several different

species, from fish to chimpanzees, because DT theoretical models indicate that it is favored by natural selection and creates differences between groups. A similar but slightly different evolutionary learning bias is called majority bias, which is "the tendency of an individual to preferentially adopt behaviors *demonstrated* by a majority" (italics added, Sibilsky et al., 2022, p. 1). Experimental studies with children from diverse cultures show that the frequency of copying many demonstrators is relatively low, cultural variability exists in how frequently children copy the demonstrators, and that younger and older children are more likely to copy the majority than middle aged children.

CT and DT approaches to childhood learning have increased substantially in the last fifty years. The approaches have been utilized by researchers in multiple disciplines including anthropology, psychology, economics, and biology, and have led to significant insights into how children learn in diverse cultures.

2.8. Children of the Ice Age: Apprenticeship, communities of practice and embodied cognition in deep-time hunter-gatherer archaeology

Felix Riede & April Nowell

Even before the formulation of the 'grandmothering hypothesis' explaining the extended post-reproductive lifespan that characterizes the *Homo* lineage (Hawkes et al., 1998), paleoanthropologists have been interested in the peculiarities of human life history, including our extended childhood period (Bogin, 1997). Archaeologists, too, had begun to develop an interest in the lives of past children (see Baxter, 2008), although this was most commonly focused on those cases where the fragile bones of children were preserved, and to recent periods. An emphasis on data from burial contexts led to a focus on the deaths of these children rather than on their lived experiences (Nowell, 2021). Over time, however, an interest in the children of deep time—and their relevance for understanding cultural change and adaptation—developed (Nowell & White, 2012; Nowell 2023a).

Detailed studies of material culture (i.e., stone tools), usually conducted at individual sites, have succeeded in making the activities of Stone Age youngsters clearly visible (e.g., Assaf, 2021; Finlay, 1997; Grimm, 2000; Karlin et al., 1993; Stapert, 2007). This catalyzed a greater appreciation for children's role in learning and cultural reproduction, mostly in relation to formal apprenticeships. Most recently, interest in the 'children of the ice age' has intensified. By merging together insights from cognitive archaeology—the notion of historically grounded embodied cognition shaped in interaction with artifacts (Johannsen, 2010; Malafouris, 2013)—with developmental psychology's emphasis on the adaptive importance of play (Gopnik, 2020; Pellegrini et al., 2007), as well as theories of cultural evolution that include the many ways in which humans modify the ontogenetic environs of their young (Laland et al., 2000; Riede, 2019), there now is a vastly improved appreciation of how exploratory play throughout childhood and into adolescence would have contributed to innovation, cultural reproduction, and adaptation (Nowell, 2016; Nowell & French, 2020; Riede et al., 2018). Paleolithic children—approached through their many material culture proxies (see Langley & Litster, 2018; Milks et al., 2021)—are now viewed as integral parts of past communities of practice, playfully acquiring know-how about appropriate technologies, ecologies, and cosmologies (Nowell, 2015, 2023b). Interestingly, play objects clearly recognizable as specifically fashioned for children remain rare until about 40,000 years ago—well after the emergence of *Homo sapiens*—and are also not present in equal measure from then on. While the play objects that are present in the archaeological record of the Paleolithic match those most commonly observed ethnographically (Lew-Levy et al., 2022; Riede et al., 2023), it is possible that play object provisioning with, in particular, functional miniatures was far from universal practice until relatively late in human biocultural evolution. Childhood object play in the domains given by play object provisioning in particular acts as the motor that generates technological variation on which subsequent selection may act. By this token, it is likely that not just the biologically conditioned length of childhood but also the culturally specific ways in which

these childhoods were part of wider societal constellations had an impact on the increasing rates of material culture change and innovation at this time (cf. Nowell, 2021; Riede et al., 2021).

Today, the archaeology of childhood is a well-established subfield with handbooks (Crawford et al., 2018) and a bespoke journal backed by a similarly focused scholarly community (https://sscip.org.uk/). The children of the Plio-Pleistocene have now come into quite a clear view (see Nowell, 2021), although much work remains to be done in terms of further qualifying the archaeological evidence for play and learning in relation to past socio-ecological change, and in terms of more robustly integrating changes in life history, early-life learning, and play object provisions into formal models of cultural change in hominin biocultural evolution.

2.9. A personal journey through historical changes

Patricia Greenfield

My contribution to this chapter on the historical development of optimal practices for the study of childhood learning, from a cultural and cross-cultural perspective, will focus on the development of my own research practices from my dissertation research in Senegal in 1963 and 1964 to present. These practices primarily integrate psychology and anthropology.

The first practice that I would like to highlight in comparative research on children's learning is the practice of comparing subgroups within a country rather than comparing child learning in different nations. This is a contribution from the discipline of psychology, which always seeks to isolate single variables as causal factors. When one compares samples in different countries, so many different elements vary that it is impossible to know which element or elements are causing any observed cross-cultural differences.

In line with this principle, my first experiments in cognitive development among the Wolof of Senegal, carried out in 1963 and 1964, compared bush children who went to school with children from the same village who did not attend school (Greenfield, 1966;

Greenfield, Reich, & Olver, 1966). This design enabled me to isolate the effect of schooling on cognitive development because all other potential factors were kept constant in the design. This design led to the discovery that the pattern of cognitive development described by Piaget was as much a function of school learning as it was of chronological age (Greenfield & Bruner, 1966). In other words, it highlighted the role of learning and the specific importance of school-based learning in cognitive development.

However, in my next cross-cultural research, in a Maya community in Mexico, I wanted to correct what I saw as an undesirable practice in my Wolof research—testing children on cognitive tasks that originated in the researcher's culture rather than in the culture of the participants. My Piagetian tasks were adapted in multiple ways to Wolof culture, but they were still cognitive tasks meaningful in Swiss and U.S. culture, not the culture of my Wolof participants who were not exposed to western schooling. An important implication of this design was that there was a fit between the task and the school-based environment in which Swiss, European, or American children received their cognitive socialization; Kroupin et al. (2024) call this the articulation between task and environment. But this was not the case for the Wolof children living in the bush and receiving informal education in very different environments.

Hence, in Nabenchauk—a Zinacantec Maya community in Highland Chiapas, Mexico—I based my learning tasks on the most complex skill acquired by all females and central to Maya culture: weaving on a backstrap loom. We started with a cognitive test of visual pattern representation (Greenfield & Childs, 1977). Since they were all weaving striped patterns at that time, our task required Zinacantec children to create striped patterns, first representing familiar woven patterns by inserting sticks of various colors and widths into a wooden frame, then representing striped patterns started by the researchers in the same wooden frame. The representation of striped patterns involved articulation between the cognitive features of our cognitive tests and the demands of the Zinacantec Maya environment of 1969, essentially a subsistence community. When we compared skilled Zinacantec

teenage weavers with U.S. college students, we found that each had their own cognitive style that fit or was articulated with the demands of their respective environments: the Zincantec Maya girls created detailed representations, using narrow sticks as representations of individual threads in the woven patterns. In contrast, the U.S. college students used broad sticks to represent groups of threads, a strategy that eliminated the detail and was therefore more abstract. The former strategy, which we called the thread-by-thread strategy, was adaptive for participants for whom weaving was a culturally central skill—individuals who actually had to weave patterns thread by thread. In other words, there was an articulation between the mode of representation and the cognitive demands of weaving. In contrast, the abstract strategy was adaptive for participants for whom school-based learning was culturally central—and abstraction was part and parcel of this cultural context. Abstract representation articulated with the cognitive demands of university education.

However, after completing the study, I felt that the whole idea of a cognitive test came from my culture and was not familiar to my Zinacantec Maya participants. We therefore progressed methodologically to studying the acquisition of backstrap weaving itself—a skill that was central to their culture, but rare in ours (Childs & Greenfield, 1980). This brings me to an important point relating to the best practices for studying child learning processes across cultures: it is not possible to study the learning process for a skill that the researchers lack. This is one central reason why the use of cognitive tests across cultures usually involves tests that are familiar to the researchers, because they originate in and are central to the researchers' culture. I was therefore very fortunate to have two collaborators, Carla Childs and Ashley Maynard, who were willing to learn how to do backstrap-loom weaving before analyzing our video data on the development of weaving apprenticeship from beginner to skilled weaver. In fact, they were taught how to weave in our study community of Nabenchauk (Maynard & Greenfield, 2005). Their learning how to weave enabled the microanalysis of weaving apprenticeship, allowing us to study how weaving was taught and learned.

Knowing how to weave also enabled a cross-cultural study of Piaget's concrete operations in two contexts—one being the Zinacantec weaving context, the other using the type of objects Piaget had used to study the development of topological concepts (Maynard & Greenfield, 2003). This cross-cultural study of children's learning was carried out in both Los Angeles and Nabenchauk. The prediction was that an understanding of topological concepts in the weaving context would occur earlier in Nabenchauk than in Los Angeles, but that topological concepts using materials similar to Piaget's would develop earlier in Los Angeles where the materials would be more familiar. This type of design and predictions is called the cross-over design. Our prediction of 'cross-over' results was that the learning of topological concepts would occur more precociously in the weaving context in Nabenchauk and more precociously with the Piagetian-style materials in Los Angeles; this hypothesis was in fact confirmed. This method and its results indicate that the same basic patterns of cognitive development are acquired in very different cultural settings and that these settings provide a foundation for particular instantiations of cognitive skills that can subsequently be generalized to new contexts. In other words, culture-general cognitive stages are first learned in culture-specific situations.

The continuity of this research team, their knowledge of weaving as a cultural practice, and the relationships that were made in the study community eventually permitted us to study the cultural evolution of weaving apprenticeship and weaving-related cognition over a period of forty-three years (Greenfield et al., 2003; Maynard et al., 2015; Maynard et al., 2023). This long-term study illustrates my next point about the best research practices: follow a study community over extended periods of chronological time in order to identify historical shifts in cultural learning. Longitudinal study of individuals is central to the discipline of developmental psychology, but longitudinal study is rarely applied at the community level. This design allows the study of cultural evolution over historical time and permits conclusions concerning the relationship between intergenerational shifts in child development and shifts in the ecological surroundings—it

is therefore a direct method for articulating child learning with cultural evolution.

However, it takes many years to be able to study cultural evolution directly by testing multiple generations in the same community. Especially for young researchers, a shorter data-collection time window is necessary (but keep your data as a baseline for the long-term study of cultural evolution later in your career!). In order to study the evolution of children's learning processes more quickly, we have developed several research designs that use generation as a stand-in for the passage of time.

One research design is a cross-sectional comparison of three generations (adolescent, parent, and grandparent), where participants in each generation respond to the same scenarios exploring value choices. This technique has been used with the Maya in Chiapas, Mexico (Manago, 2014), and with three ethnocultural groups in Israel: Northern Arabs (Weinstock et al., 2014), Bedouins (El-sana et al., 2023), and Ethiopian immigrants (Rotem et al., in revision).

In another design, Chinese grandmothers who had experienced childhood themselves and subsequently taken care of their children and grandchildren were asked to compare their experience of parenting practices and early childhood behavior in each of three generations (Zhou et al., 2017). In a related design focusing on middle childhood, participating mothers were asked to compare their experiences of being parented and their own child behavior with their own parenting and their children's behavior at the same age (Bian et al., 2022). A valuable methodological feature of these studies was to relate shifting features of the parenting environment to shifting features of child behavior during the sociodemographic evolution of the macroenvironment from the earliest to the most recent generation.

In neither Senegalese nor Maya villages did I find collaborators; that was the case because education was basically at home and in the community, rather than at school. With movement in the world in the WEIRD (Western, Educated, Industrialized, Rich, and Democratic) (Henrich et al., 2010) or Gesellschaft direction (Greenfield, 2009), this situation has changed. In my studies in

China, I was able to collaborate with Chinese PhD students and researchers. This research shows the methodological value of having both an insider and outsider perspective: the insider understands the culture but also takes it for granted. Through contrast with their own culture, the outsider is conscious of cultural features and can make them explicit.

My last point is that an optimal practice for studying children's social learning across cultures is to employ narratives—little stories—as stimuli (Greenfield, 2018). We have been successful in using this method to identify the cultural evolution of values in Mexican and Korean immigrant groups in the United States (Greenfield & Quiroz, 2013; Park et al., 2015; Raeff et al., 2000); Maya adolescents in Mexico (Manago, 2014); Bedouin, Arab, and Ethiopian-origin adolescents in Israel (Abu Aleon et al., 2019; El-sana et al., 2023; Rotem et al., in revision; Weinstock et al., 2014), and adolescents and emerging adults in Romania (Ionescu et al., 2023). Narrative and stories are universal genres. Therefore, they can function as stimuli to compare responses in groups with any level of formal education.

References

Abu Aleon, T., Weinstock, M., Manago, A. M., & Greenfield, P. M. (2019). Social change and intergenerational value differences in a Bedouin community in Israel. *Journal of Cross-Cultural Psychology, 50*, 708–727. https://doi.org/10.1177/0022022119839148

Assaf, E. (2021). Dawn of a new day: The role of children in the assimilation of new technologies throughout the Lower Paleolithic. *L'Anthropologie, 125*(1), 102836. https://doi.org/10.1016/j.anthro.2021.102836

Bakken, B. (2000). *The Exemplary Society: Human Improvement, Social Control, and the Dangers of Modernity*. Oxford University Press.

Barrett, H. C. (2020). Towards a Cognitive Science of the Human: Cross-Cultural Approaches and Their Urgency. *Trends in Cognitive Sciences, 24*(8), 620–638. https://doi.org/10.1016/j.tics.2020.05.007

Bateson, G., & Mead, M. (1942). *Balinese character: A photographic analysis*. The New York Academy of Science.

Baxter, J. E. (2008). The Archaeology of Childhood. *Annual Review of Anthropology, 37*(1), 159–175. https://doi.org/doi:10.1146/annurev.anthro.37.081407.085129

Benedict, R. (2005). *Patterns of culture* (Kindle ed.). Houghton Mifflin. (Original work published 1934)

Benedict, R. (1946). *The chrysanthemum and the sword: Patterns of Japanese culture*. Houghton Mifflin.

Bian, Q., Chen, Y., Greenfield, P. M., & Yuan, Q. (2022). Mothers' experience of social change and individualistic parenting goals over two generations in urban China. *Frontiers in Psychology*, *12*, 487039. https://doi.org/10.3389/fpsyg.2021.487039

Bogin, B. (1997). Evolutionary Hypotheses for Human Childhood. *American Journal of Physical Anthropology*, 104(S25), 63–89. https://doi.org/10.1002/(SICI)1096-8644(1997)25+<63::AID-AJPA3>3.0.CO;2-8

Boyd, R., & Richerson, P. J. (1985). *Culture and the evolutionary process*. University of Chicago Press.

Boyd, R., & Richerson, P.J. (2005). *The origin and evolution of cultures*. Oxford University Press.

Boyd, R., Richerson, P. J., & Henrich, J. (2011). The cultural niche: Why social learning is essential for human adaptation. *Proceedings of the National Academy of Sciences, 108*, 10918–10925 https://doi.org/10.1073/pnas.1100290108

Broesch, T., Crittenden, A. N., Beheim, B., Blackwell, A. D., Bunce, J., Colleran, H., Hagel, K., Kline, M., McElreath, R., Nelson, R. G., Pisor, A. C., Prall, S., Pretelli, I., Purzycki, B., Quinn, E. A., Ross, C.; Scelza, B., Starkweather, K., Stieglitz, J., & Borgerhoff Mulder, M. (2020). Navigating cross-cultural research: methodological and ethical considerations. *Proceedings of the Royal Society B*, 287(1935). https://doi:10.1098/rspb.2020.1245

Broesch, T. (2024). Mutual joy and social development. In *WAIMH Handbook of Infant and Early Childhood Mental Health: Biopsychosocial Factors* (vol. 1, pp. 407–420). Springer.

Carpendale, J. I., & Lewis, C. (2004). Constructing an understanding of mind: The development of children's social understanding within social interaction. *Behavioral and Brain Sciences, 27*(01), 79–96. https://doi.org/10.1017/s0140525x04000032

Carpendale, J., & Lewis, C. (2023). Piaget's Theory and Stages of Development: A Foundation for Current Understanding of Children. *Child and Family Blog*. https://childandfamilyblog.com/piaget-stages-cognitive-development/

Cavalli Sforza, L. L., & Feldman, M. (1981). *Cultural transmission and evolution: a quantitative approach*. Princeton University Press.

Childs, C. P., & Greenfield, P. M. (1980). Informal modes of learning and teaching: The case of Zinacanteco weaving. In N. Warren (Ed.). *Studies in cross-cultural psychology* (vol. 2, pp. 269–316). Academic Press.

Cline, E. M. (2015). *Families of Virtue: Confucian and Western Views on Childhood Development*. Columbia University Press.

Cole, M. (1996). *Cultural psychology: A once and future discipline*. Harvard University Press.

Crawford, S., Hadley, D. M., & Shepherd, G. (2018). *The Oxford Handbook of the Archaeology of Childhood*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199670697.001.0001

Csibra, G., & Gergely, G. (2009). Natural pedagogy. *Trends in Cognitive Sciences, 13*(4), 148–153. https://doi.org/10.1016/j.tics.2009.01.005

Dias, M., Roazzi, A., & Harris, P. L. (2005). Reasoning From Unfamiliar Premises: A Study With Unschooled Adults. *Psychological Science, 16*(7), 550–554. https://doi.org/10.1111/j.0956-7976.2005.01573.x

Dira, S. J., & Hewlett, B.S. (2016). Learning to spear hunt among Chabu adolescent hunter-gatherers. In H. Terashima & B. Hewlett (Eds). *Social learning and innovation among contemporary hunter-gatherers* (pp. 71–82). Springer.

El-sana, S., Greenfield, P. M., & Weinstock, M. (2023). Ecological change, psychological mindedness, and attitudes toward school psychology: a three-generation study of Bedouin women in Israel. *Applied Developmental Science,* 1–17. https://doi.org/10.1080/10888691.2023.2192498

Fernyhough, C. (2008). Getting Vygotskian about theory of mind: Mediation, dialogue, and the development of social understanding. *Developmental Review*, *28*(2), 225–262. https://doi.org/10.1016/j.dr.2007.03.001

Finlay, N. (1997). Kid knapping: The missing children in lithic analysis. In J. Moore & E. Scott (Eds). I*nvisible People and Processes: Writing Gender and Childhood into European Archaeology* (pp. 203–213). Leicester University Press.

Freeman, D. (1983). *Margaret Mead and Samoa: The making and unmaking of an anthropological myth*. Harvard University Press.

Gardner, H. (1985). *The mind's new science: A history of the cognitive revolution* (Paperback ed.). Basic Books.

Garfield, Z. H., Garfield, M. J., & Hewlett, B. S. (2016). In H. Terashima & B. Hewlett (Eds). *Social learning and innovation among contemporary hunter-gatherers* (pp. 19–34). Springer.

Gay, J., & Cole, M. (1967). *The new mathematics and an old culture: A study of learning among the Kpelle of Liberia.* Holt, Rinehart and Winston.

Gergely, G., & Csibra, G. (2020). Sylvia's recipe: The role of imitation and pedagogy in the transmission of cultural knowledge. In *Roots of human sociality* (pp. 229–255). Routledge.

Goldberg, S. (1977). Social competence in infancy: A model of parent-infant interaction. *Merrill-Palmer Quarterly of Behavior and Development*, *23*(3), 163–177. https://www.jstor.org/stable/23084549

Goodenough, W. (1981). *Culture, language and society*. Benjamin Cummings.

Goodwin, M. H. (1990). *He-said-she-said: Talk as social organization among Black Children*. Indiana University Press.

Gopnik, A. (2020). Childhood as a solution to explore–exploit tensions. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 375(1803), 20190502. https://doi.org/10.1098/rstb.2019.0502

Greenfield, P. M. (1966). On culture and conservation. In J. S. Bruner, R. R. Olver, & P. M. Greenfield. *Studies in cognitive growth* (pp. 225–256). Wiley.

Greenfield, P. M., Reich, L. C., & Olver, R. R. (1966). On culture and equivalence-II. In J. S. Bruner, R. R. Olver, & P. M. Greenfield. *Studies in cognitive growth* (pp. 270–318). Wiley.

Greenfield, P. M., & Bruner, J. S. (1971). Language and learning. *Psychology Today*, *5*, 40–43, 74–79. (Original work published 1966).

Greenfield, P. M. (1974). Comparing Dimensional Categorization in Natural and Artificial Contexts: A Developmental Study among the Zinacantecos of Mexico. *The Journal of Social Psychology, 93*(2), 157–171. https://doi.org/10/chz4s2

Greenfield, P. M., & Childs, C. P. (1977). Weaving, color terms and pattern representation: Cultural influences and cognitive development among the Zinacantecos of Southern Mexico. *Inter-American Journal of Psychology*, *11*, 23–48. http://dx.doi.org/10.1016/j.cogdev.2003.09.004

Greenfield, P. M. (1997). You can't take it with you: Why ability assessments don't cross cultures. American Psychologist, 52(10), 1115–1124. https://doi.org/10.1037/0003-066X.52.10.1115

Greenfield, P. M., Quiroz, B., & Raeff, C. (2000). Cross-cultural conflict and harmony in the social construction of the child. In S. Harkness,

C. Raeff, & C. M. Super (Eds). *New Directions for Child and Adolescent Development, 87*, 93–108.

Greenfield, P. M., Maynard, A. E., & Childs, C. P. (2003). Historical change, cultural learning, and cognitive representation in Zinacantec Maya children. *Cognitive Development*, 18, 455–487. https://doi.org/10.1016/j.cogdev.2003.09.004

Greenfield, P. M. (2009). Linking social change and developmental change: Shifting pathways of human development. *Developmental Psychology, 45,* 401–418. https://doi.org/10.1037/a0014726

Greenfield, P. M., & Quiroz, B. (2013). Context and culture in the socialization and development of personal achievement values: Comparing Latino immigrant families, European American families, and elementary school teachers. *Journal of Applied Developmental Psychology, 34,* 108–118. http://dx.doi.org/10.1016/j.appdev.2012.11.002

Greenfield, P. M. (2018). Studying social change, culture, and human development: A theoretical framework and methodological guidelines. *Developmental Review, 50A,* 16–30. http://dx.doi.org/10.1016/j.dr.2018.05.003

Grimm, L. (2000). Apprentice flintknapping. Relating material culture and social practice in the Upper Palaeolithic. In J. S. Derevenski (Ed.). *Children and Material Culture* (pp. 53–71). Routledge.

Hawkes, K., O'Connell, J. F., Jones, N. G., Alvarez, H., & Charnov, E. L. (1998). Grandmothering, menopause, and the evolution of human life histories. *Proceedings of the National Academy of Sciences*, *95*(3), 1336–1339. https://doi.org/10.1073/pnas.95.3.1336

Henrich, J., & McElreath, R. (2003). The evolution of cultural evolution. *Evolutionary Anthropology*, *12,* 123–135. doi.org/10.1002/evan.10110

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, *33*, 61–135. https://doi.org/10.1017/s0140525x0999152x

Henrich, J., & Henrich, N. (2010). The evolution of cultural adaptations: Fijian food taboos protect against dangerous marine toxins. *Proceedings of the Royal Society B: Biological Sciences*, *277*(1701), 3715–3724. https://doi.org/10.1098/rspb.2010.1191

Henrich, J. (2016). *The secret of our success.* Princeton.

Hewlett, B. S., & Cavalli Sforza, L. L. (1986). Cultural transmission among Aka pygmies. *American Anthropologist, 88*, 922–934. doi.org/10.1525/aa.1986.88.4.02a00100

Inhelder, B., & Piaget, J. (1958). An essay on the construction of formal operational structures. The growth of logical thinking: From

childhood to adolescence (A. Parsons & S. Milgram, Trans.). Basic Books.

Ionescu, A., Ferdui, R., Gavreliuc, A., Greenfield, P. M., & Weinstock, M. (2023). The effects of social changes on epistemic thinking across three generations in Romania. *PLoS ONE, 18*(3), e0281785. https://doi.org/10.1371/journal.pone.0281785

Jiang, T. (2021). *Origins of Moral-Political Philosophy in Early China: Contestation of Humaneness, Justice, and Personal Freedom*. Oxford University Press.

Jiménez, A., & Mesoudi, A. (2019). Prestige-biased social learning: current evidence and outstanding questions. *Palgrave Communications, 5*, 1–12. doi.org/10.1057/s41599-019-0228-7

Johannsen, N. N. (2010). Technological Conceptualization: Cognition on the Shoulders of History. In L. Malafouris & C. Renfrew (Eds). *The Cognitive Life of Things* (pp. 59–69). McDondald Institute for Archaeological Research.

Jukes, M. C. H., Sitabkhan, Y., & Tibenda, J. J. (2021). *Adapting pedagogy to cultural context.* RTI Press. https://doi.org/10.3768/rtipress.2021.op.0070.2109

Karlin, C., Ploux, S., Bodu, P., & Pigeot, N. (1993). Some socio-economic aspects of the knapping process among groups of hunter-gatherers in the Paris Basin area. In A. Berthelet & J. Chavaillon (Eds). *The Use of Tools by Human and Non-human Primates* (pp. 318–340). Blackwell.

Kaplan, H., & Bock J. A. (2001). Fertility theory: The embodied capital theory of human life history evolution. In N. J. Smelser & P. B. Baltes (Eds). *The international encyclopedia of the social and behavior sciences* (pp. 5561–68). Pergamon.

Keller, H. (2016). Psychological autonomy and hierarchical relatedness as organizers of developmental pathways. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences, 371*(1686), 20150070. https://doi.org/10.1098/rstb.2015.0070

Keller, H. (2017). Culture and development: A systematic relationship. *Perspectives on Psychological Science, 12*(5), 833–840. https://doi.org/10.1177/1745691617704097

Keller, H. (2018). Universality claim of attachment theory: Children's socioemotional development across cultures. *Proceedings of the National Academy of Sciences of USA, 115,* 11414–11419. https://doi.org/10.1073/pnas.1720325115

Keller, H., Bard, K., Morelli, G., Chaudhary, N., Vicedo, M., Rosabal-Coto, M., Scheidecker, G., Murray, M., & Gottlieb, A. (2018). The myth of universal sensitive responsiveness: Comment on Mesman et al.

(2017). *Child Development, 89*(5), 1921–1928. https://doi.org/10.1111/cdev.13031

Keller, H. (2021). *The Myth of Attachment Theory*. Routledge

Kline, M. A., Shamsudheen, R., & Broesch, T. (2018). Variation is the universal: Making cultural evolution work in developmental psychology. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, *373*(1743), 20170059. https://doi.org/10.1098/rstb.2017.0059

Kroupin, I., Davis, H. E., & Henrich, J. (2024). Beyond Newton: Why Assumptions of Universality are Critical to Cognitive Science, and How to Finally Move Past Them. *Psychological Review*.

Laland, K. N., Odling-Smee, J. F., & Feldman, M. W. (2000). Niche construction, biological evolution, and cultural change. *Behavioral and Brain Sciences*, *23*, 131–175. DOI: 10.1017/s0140525x00002417

Langley, M. C., & Litster, M. (2018). Is It Ritual? Or Is It Children?: Distinguishing Consequences of Play from Ritual Actions in the Prehistoric Archaeological Record. *Current Anthropology*, 59(5), 616–643. https://doi.org/10.1086/699837

Lancy, D. F. (1978). Cognitive testing in the indigenous mathematics project. *Papua New Guinea Journal of Education*, *14*, 114–142. https://doi.org/10.1007/BF00308142

Lave, J. (1977). Tailor-made experiments and evaluating the intellectual consequences of apprenticeship training. *The Quarterly Newsletter of the Institute for Comparative Human Development, 1*(2), 1–3.

Lave, J. (1997). What's special about experiments as contexts for thinking? In *Mind, culture, and activity: Seminal papers from the Laboratory of Comparative Human Cognition* (pp. 57–69).

Lew-Levy, S., Kissler, S. M., Boyette, A.H., Crittenden, A. N., Mabulla, I. A., & Hewlett, B. S. (2019). Who teaches children to forage? Exploring the primacy of child-to-child teaching among Hadza and BaYaka hunter-gatherers of Tanzania and Congo. Evolution and Human Behavior 41(1), 12–22. doi.org/10.1016/j.evolhumbehav.2019.07.003

Lew-Levy, S., Andersen, M. M., Lavi, N., & Riede, F. (2022). Hunter-Gatherer Children's Object Play and Tool Use: An Ethnohistorical Analysis. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.824983

LeVine R. A. (2007). Ethnographic studies of childhood: A historical overview. *American Anthropologist*, *109*(2), 247–260. https://doi.org/10.1525/aa.2007.109.2.247

Li, J. (2012). *Cultural Foundations of Learning: East and West* (1st ed.). Cambridge University Press.

Luria, A. R. (1976). *Cognitive development: Its cultural and social foundations*. Harvard University Press.

Malafouris, L. (2013). *How Things Shape the Mind*. MIT Press.

Manago, A. M. (2014). Connecting Societal Change to Value Differences Across Generations: Adolescents, Mothers, and Grandmothers in a Maya Community in Southern Mexico. *Journal of Cross-Cultural Psychology, 45*(6), 868–887. https://doi.org/10.1177/0022022114527346

Maynard, A. E., & Greenfield, P. M. (2003). Implicit cognitive development in cultural tools and children. *Cognitive Development, 18,* 489-510. https://doi.org/10.1016/j.cogdev.2003.09.005

Maynard, A. E., & Greenfield, P. M. (2005). An ethnomodel of teaching and learning: Apprenticeship of Maya women's tasks. In A. E. Maynard & M. I. Martini (Eds). *Cultural models of learning in context: Families, peers, and schools* (pp. 75–103). Kluwer Academic/Plenum Press.

Maynard, A. E., Greenfield, P. M., & Childs, C. P. (2015). Developmental effects of economic and educational change: Cognitive representation across 43 years in a Maya community. *International Journal of Psychology, 50,* 12–19. https://doi.org/10.1002/ijop.12129

Maynard, A. E., Greenfield, P. M., Childs, C. P., & Weinstock, M. (2023). Social change, cultural evolution, weaving apprenticeship, and development: informal education across three generations and 42 years in a Maya community. *Applied Developmental Science.* https://doi.org/10.1080/10888691.2022.2151445

Mead, M. (1943). *Coming of age in Samoa: A study of adolescence and sex in primitive societies*. Penguin.

Mead, M., & Wolfenstein, M. (1955). *Childhood in contemporary cultures*. University of Chicago Press.Mead, M. (2005). Preface. In R. Benedict. *Patterns of culture*. Houghton Mifflin. (Original work published 1959)

Medin, D., Bennis, W., & Chandler, M. (2010). Culture and the Home-Field Disadvantage. *Perspectives on Psychological Science: A Journal of the Association for Psychological Science,* 5(6), 708–713. https://doi.org/10.1177/1745691610388772

Milks, A., Lew-Levy, S., Lavi, N., Friesem, D. E., & Reckin, R. (2021). Hunter-gatherer children in the past: An archaeological review. *Journal of Anthropological Archaeology*, *64*, 101369. https://doi.org/10.1016/j.jaa.2021.101369

Morelli, G., Bard, K., Chaudhary, N., Gottlieb, A., Keller, H., Murray, M., Quinn, N., Rosabal-Coto, M., Scheidecker, G., Takada, A., & Vicedo, M. (2018). Bringing the real world into developmental science: A commentary on Weber, Fernald, and Diop (2017). *Child Development, 89*(6), e594–e603. https://doi.org/10.1111/cdev.13115

Nielsen, M., Haun, D., Kärtner, J., & Legare, C. H. (2017). The persistent sampling bias in developmental psychology: A call to action. *Journal of Experimental Child Psychology*, *162*, 31–38. https://doi.org/10.1016/j.jecp.2017.04.017

Nowell, A., & White, M. J. (2012). Growing up in the Middle Pleistocene: Life history strategies and their relationship to Acheulian Industries. In A. Nowell & I. Davidson (Eds). *Stone tools and the evolution of human cognition* (pp. 67–82). University Press of Colorado.

Nowell, A. (2015). Learning to See and Seeing to Learn: Children, Communities of Practice and Pleistocene Visual Cultures. *Cambridge Archaeological Journal*, *25*(04), 889–899. https://doi.org/doi:10.1017/S0959774315000360

Nowell, A. (2016). Childhood, Play and the Evolution of Cultural Capacity in Neanderthals and Modern Humans. In M. N. Haidle, N. J. Conard, & M. Bolus (Eds). *The Nature of Culture: Based on an Interdisciplinary Symposium 'The Nature of Culture'*, Tübingen, Germany (pp. 87–97). Springer.

Nowell, A., & French, J. C. (2020). Adolescence and innovation in the European Upper Palaeolithic. *Evolutionary Human Sciences*, *2*, e36. https://doi.org/10.1017/ehs.2020.37

Nowell, A. (2021). *Growing Up in the Ice Age: Fossil and Archaeological Evidence of the Lived Lives of Plio-Pleistocene Children*. Oxbow Books.

Nowell, A. (2023a). Paleolithic children come of age. *Childhood in the Past,* 16(1): 3-12. https://doi.org/10.1080/17585716.2023.2191483

Nowell, A. (2023b). Oral Storytelling and Knowledge Transmission in Upper Paleolithic Children and Adolescents. *Journal of Archaeological Method and Theory*, *30*(1), 9–31. https://doi.org/10.1007/s10816-022-09591-5

Nsamenang, A. B. (1992). *Human development in a cultural context: A third world perspective.* Sage Publications.

Nsamenang, A. B. (2006). Human ontogenesis: An indigenous African view on development and intelligence. *International Journal of Psychology, 41*(4), 293–297. https://doi.org/10.1080/00207590544000077

Nwoye, A. (2017). An Africentric theory of human personhood. *Psychology in Society, 54*, 42–66. http://dx.doi.org/10.17159/2309-8708/2017/n54a4

Ohmagari, K., & Berkes, F. (1997). Transmission of indigenous knowledge and bush skills among the western James Bay Cree women of subarctic Canada. *Human Ecol*ogy, *25*, 197–222. http://dx.doi.org/10.1023/A:1021922105740

Oppong, S. (2013). Indigenizing knowledge for development: Epistemological and pedagogical approaches. *Africanus, 4*(2), 34–50. https://doi.org/10.25159/0304-615X/2300

Oppong, S. (2015). A critique of early childhood development research and practice in Africa. *Africanus, 45*(1), 23–41. https://doi.org/10.25159/0304-615X/252

Oppong, S. (2017). History of psychology in Ghana since 989AD. *Psychological Thought, 10*(1), 7–48. https://psyct.swu.bg/index.php/psyct/article/view/195/htm

Oppong, S. (2019). Overcoming obstacles to a truly global psychological theory, research and praxis in Africa. *Journal of Psychology in Africa, 29*(4), 292–300. https://doi.org/10.1080/14330237.2019.1647497

Oppong, S. (2020). Towards a model of valued human cognitive abilities: An African perspective based on a systematic review. *Frontiers in Psychology, 11*, 538072. https://doi.org/10.3389/fpsyg.2020.538072

Oppong, S. (2023a). Promoting global ECD top-down and bottom-up. *Ethos,* 1–5. https://doi.org/10.1111/etho.12393

Oppong, S. (2023b). An indigenous representation of personhood for citizenship behaviours. In J. Osafo & C. S. Akotia (Eds.), *Personhood, Community and the Human Condition: Reflections and Applications in the African Experience* (pp. 27–47). Ayebia Clarke Publishing Limited.

Park, H., Joo, J., Quiroz, B., & Greenfield, P. M. (2015). Sociodemographic factors influence cultural values: Comparing European American with Korean mothers and children in three settings - Rural Korea, urban Korea, and Los Angeles*. Journal of Cross-Cultural Psychology, 46,* 1131–1149. https://doi.org/10.1177/0022022115600258

Pellegrini, A. D., Dupuis, D., & Smith, P. K. (2007). Play in evolution and development. *Developmental Review*, 27(2), 261–276. http://dx.doi.org/10.1016/j.dr.2006.09.001

Rad, M. S., Martingano, A. J., & Ginges, J. (2018). Toward a psychology of Homo sapiens: Making psychological science more representative of the human population. *Proceedings of the National Academy of Sciences*, 115(45), 11401–11405. https://doi.org/10/gfnv94

Raeff, C., Greenfield, P. M., & B. Quiroz (2000). Developing interpersonal relationships in the cultural contexts of individualism and collectivism. In S. Harkness, C. Raeff, & C.R. Super (Eds). *Variability in* th*e social construction of the child, New Directions in Child and Adolescent Development* (pp. 59–74). Jossey-Bass.

Richerson, P. J., & Boyd, R. (2005). *Not by genes alone: how culture transformed human evolution.* University of Chicago Press.

Riede, F. (2019). Niche Construction Theory and Human Biocultural Evolution. In A. M. Prentiss (Ed.). *Handbook of Evolutionary Research in Archaeology* (pp. 337–358). Springer. https://doi.org/10.1007/978-3-030-11117-5_17

Riede, F., Johannsen, N. N., Högberg, A., Nowell, A., & Lombard, M. (2018). The role of play objects and object play in human cognitive evolution and innovation. *Evolutionary Anthropology: Issues, News, and Reviews*, *27*(1), 46–59. https://doi.org/10.1002/evan.21555

Riede, F., Lew-Levy, S., Johannsen, N. N., Lavi, N., & Andersen, M. M. (2023). Toys as Teachers: A Cross-Cultural Analysis of Object Use and Enskillment in Hunter–Gatherer Societies. *Journal of Archaeological Method and Theory*, *30*(1), 32–63. https://doi.org/10.1007/s10816-022-09593-3

Riede, F., Walsh, M. J., Nowell, A., Langley, M. C., & Johannsen, N. N. (2021). Children and innovation: Play, play objects and object play in cultural evolution. *Evolutionary Human Sciences*, *3*, e11. https://doi.org/10.1017/ehs.2021.7

Rogoff, B. (1981). Schooling's Influence on Memory Test Performance. *Child Development*, *52*(1), 260–267. https://doi.org/10.2307/1129239

Rogoff, B., & Chavajay, P. (1995). What's Become of Research on the Cultural Basis of Cognitive Development? *American Psychologist*, *50*(10), 859–877. https://doi.org/10.1037/0003-066X.50.10.859

Rotem, O. S., Greenfield, P. M., & Weinstock (in revision). Changes in values and ways of knowing among three generations of Israeli women of Ethiopian origin. *Applied Developmental Science.*

Scheidecker, G., Nandita C., Heidi K., Francesca M., & Lancy, D. F. (2023a). 'Poor Brain Development' in the Global South? Challenging the Science of Early Childhood Interventions. *Ethos, 51*(1), 1–24. https://doi.org/10.1111/etho.12379.

Scheidecker, G., Boyette, A., Chaudhary, N., Fay, F., Keller, H., Lancy, D., Mezzenzana, F., Ng'asike, J. T., Oppong, S., Serpell, R., Spray, J., Takada, A. S., & Weisner, T. (2023). Parents, Caregivers, and Peers: Patterns of Complementarity in the Social World of Children in Rural Madagascar. *Current Anthropology, 64*(3), 286–320. https://www.journals.uchicago.edu/doi/10.1086/725037

Scheidecker, G., Chaudhary, N., Oppong, S., Röttger-Rössler, B., & Keller, H. (2022). Different is not deficient: Respecting diversity in early childhood development. *The Lancet. Child & Adolescent Health, 6*(12), e24–e25. https://doi.org/10.1016/S2352-4642(22)00277-2

Scheidecker, G., Oppong, S., Chaudhary, N., & Keller, H. (2021). How overstated scientific claims undermine ethical principles in parenting

interventions. *BMJ Global Health, 6*(9). http://dx.doi.org/10.1136/bmjgh-2021-007323

Schniter, E., Kaplan, H. S., & Gurven, M. (2022). Cultural transmission vectors of essential knowledge and skills among Tsimane forager-farmers. *Evolution and Human Behavior*. doi.org/10.1016/j.evolhumbehav.2022.08.00

Scribner, S. (1974). Developmental aspects of categorized recall in a West African Society. *Cognitive Psychology, 6*(4), 475–494. https://doi.org/10/d5c9kq

Scribner, S. (Ed.). (1976). Situating the experiment in cross-cultural research. In K. F. Riegel & J. A. Meacham (Eds). *The developing individual in a changing world* (pp. 310–345). Routledge.

Scribner, S. (1977). Modes of Thinking and Ways of Speaking. In P. N. Johnson-Laird & P. C. Wason (Eds.), *Thinking: Readings in Cognitive Science* (pp. 483–500). Cambridge University Press.

Serpell, R., & Nsamenang. A. B. (2014). *Locally relevant and quality ECCE programmes: Implications of research on indigenous African child development and socialization*. Early Childhood Care and Education Working Papers Series, 3. United Nations Educational, Scientific and Cultural Organization (UNESCO).

Sharp, D., Cole, M., Lave, C., Ginsburg, H. P., Brown, A. L., & French, L. A. (1979). Education and Cognitive Development: The Evidence from Experimental Research. *Monographs of the Society for Research in Child Development, 44*(1/2), 1–112. https://doi.org/10.2307/3181586

Shennan, S. J., & Steele, J. (1999). Cultural learning in hominids: a behavioural ecological approach. In H. O. Box & K. R. Gibson (Eds). *Mammalian social learning: comparative and ecological perspectives* (pp. 367–388). Cambridge University Press.

Sibilsky, A., Colleran, H., McElreath, R., & Haun, D. B. M. (2022). Expanding the understanding of majority-bias in children's social learning. *Scientific Reports, 12*, 6723. doi.org/10.1038/s41598-022-10576-3

Stapert, D. (2007). Youngsters knapping flint near the campfire: An alternative view of Site K at Maastricht-Belvédère (the Netherlands). *Archäologisches Korrespondenzblatt*, *37*(1), 19–35.

Sperber, D. (1996). *Explaining culture: a naturalistic approach*. Wiley.

Takada, A. (2019). Socialization practices regarding shame in Japanese caregiver-child interactions. *Frontiers in Psychology, 10*, 1545. https://doi.org/10.3389/fpsyg.2019.01545

UNICEF (2018). *Multiple Indicator Cluster Surveys 6 (MICS6) questionnaires and indicators*. http://mics.unicef.org/

Vasileva, O., & Balyasnikova, N. (2019). (Re) Introducing Vygotsky's thought: from historical overview to contemporary psychology. *Frontiers in psychology*, *10*, 1515. https://doi.org/10.3389/fpsyg.2019.01515

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds). Harvard University Press.

Whiting, B. B. (Ed.). (1963). *Six cultures: Studies of child rearing*. Wiley.

Whiting, B. B., & Whiting, J. W. M. (1975). *Children of six cultures: A psycho-cultural analysis.* Harvard University Press.

Weinstock, M., Ganayiem, M., Igbaryia, R., Manago, A. M., & Greenfield, P. M. (2015). Societal Change and Values in Arab Communities in Israel: Intergenerational and Rural–Urban Comparisons. *Journal of Cross-Cultural Psychology*, *46*(1), 19–38. https://doi.org/10.1177/0022022114551792

Weisner, T. S. (2002). Ecocultural understanding of children's developmental pathways. *Human Development, 45*(4), 275–281. https://www.jstor.org/stable/2676368

Xu, J. (2017). *The Good Child: Moral Development in a Chinese Preschool*. Stanford University Press. http://ww.sup.org/books/title/?id=26737

Xu, J. (2022). "The Moral Child": Anthropological Perspectives on Moral Development in China. In R. Nichols (Ed.). *The Routledge International Handbook of Morality, Cognition, and Emotion in China* (pp. 193–214). Routledge.

Zhou, C., Yiu, W. Y. V., Wu, M. S., & Greenfield, P. M. (2017). Perception of cross-generational differences in child behavior and parent socialization: A mixed-method interview study with grandmothers in China. *Journal of Cross-Cultural Psychology, 49,* 62–81.https://doi.org/10.1177/0022022117736029