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Chapter 2
Teaching: Natural or Cultural?

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An important part of the common lore of anthropology is that "other people have culture." That is, most people fail to recognize or appreciate how much of their lives are governed by habits, values, and expectations that are largely the product of history and culture. They fail to acknowledge that their own way of doing things is not necessarily universal or even widely shared. This ethnocentrism can have enormous consequences for the construction of child development theory and education. In fact, as Henrich, Heine, and Norenzayan (2010) have so brilliantly demonstrated, much of what we consider "human" psychology comes from facsimile, lab research carried out with US undergraduates—members of WEIRD (Western, Educated, Industrialized, Rich, Democratic) society. They question "whether researchers can reasonably generalize from WEIRD samples to humanity at large" (Henrich et al., 2010, p. 62). In fact, "WEIRD people are the outliers in so many key domains of the behavioral sciences; [they are] one of the worst subpopulations one could study for generalizing about Homo sapiens" (Henrich et al., 2010, p. 79).

While Henrich et al.'s (2010) identification of this problem—the tendency to overgeneralize results from WEIRD samples to the species—is quite thorough, theirs is only the latest in a very long history of such challenges. Anthropologists have been particularly critical of many "established" principles in human behavior studies. This happens so often that LeVine coined the expression the "anthropologists veto" (LeVine, 2007; see also Fouts, 2005). He has forcibly exercised this veto in his critique of the Bowlby and Ainsworth theory of infant attachment. LeVine's observations of agrarian, East African Gusii parents suggest the possibility of weak attachment and consequent blighted development. He found that while mothers respond promptly to their infant's distress signals, they ignore other vocalizations such as babbling. They rarely look at their infants or speak to them—even while breastfeeding. Later, when they do address their children, they use commands and

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threats rather than praise or interrogatives (LeVine, 2004, 2014). In spite of these obvious signs of "deficiency" on the part of Gusii mothers, LeVine and his colleagues—who have been studying Gusii villagers for decades—find no evidence of widespread emotional crippling.

Researchers in the behavioral sciences are often vulnerable to the anthropologist's veto. As noted earlier, we are largely unaware of our own culture unless we make it a practice to step outside our own ethnocentric biases. Generalizations about behavior observed in the dominant WEIRD society—especially when validated through lab research—are treated as "natural," the product of nature rather than nurture (Lancy, 2010a). This seems to be particularly true for infant studies where there is an assumption that the infant resides in a bubble that is as yet impervious to cultural influence (but see Bjorklund, 2007, for a critique). As Hunt notes: "Until the necessary cross-cultural research has been done, we have to admit the possibility that [observed patterns of behavior] are the result of experiences that are specific either to American and perhaps other post-industrial societies" (Hunt, 2007, p. 145). However, behavioral scientists rarely test the universality of their findings via a survey of the relevant ethnographic literature. For example, a recent lab study made the unqualified claim that "…early pretend play is…heavily scaffolded by adults (Rakoczy, Tomasello, & Striano, 2005, p. 70)"—in spite of a near total absence of any reference to parent–child pretend play in the ethnographic or historic records (Lancy, 2007).[1] In a representative cross-cultural study, the investigators invited rural village mothers and their educated, urban counterparts to "scaffold" their child's introduction to toys donated by the researchers.

> [Village] caregivers appeared to interpret activities such as exploring novel objects, as an appropriate context for children to play with the objects independently, not as a context for adult-child interaction or play. Thus, caregivers would let the child play independently when the novel objects were presented, while they returned to their chores. However, [WEIRD] parents…did not see the [request] for joint play with their toddlers as inappropriate (Göncü et al., 2000, p. 322).

Natural Pedagogy?

Parent–child teaching is another behavioral practice characteristic of WEIRD child-rearing that has recently been elevated to evolved, universal, or "natural" status. In the remainder of this chapter, I will interrogate this claim.

The lines in this debate are very clearly drawn (Bonawitz et al., 2011). On the one hand are scholars who argue that for successful child development and reliable transmission of culture from generation to generation, parents must teach their children skills and knowledge essential to survival and successful adaptation (Kline, 2015). A typical expression of this belief:

[1] In Peter Breughel's 1560 masterpiece "Children's Games" in the Kunsthistoriches Museum, Vienna, he portrays, in one canvas, 84 distinct children's "pass-times" or games. In none is an adult shown as a participant.

> Teaching is recognized as a universal human activity and has received much attention … reflecting … the centrality of adult teaching in educating children and in enhancing their cognitive development (Strauss & Ziv, 2004, p. 451) … teaching may be a natural cognition (Strauss & Ziv, 2004, p. 455) … all know how to teach (Strauss, Ziv, & Stein, 2002, p. 1477).

But anthropologists see a very different picture. "If selection favors teaching because it is necessary to promote learning of critical skills, it should be common within populations" (Thornton & McAuliffe, 2012, p. e8). On the contrary, cultural anthropologists and primatologists studying juveniles often draw marked attention in their ethnographic/field accounts to the almost total absence of teaching of juveniles by their parents or others.[2] Here is a sampling of anthropologists' and historians' view of the role of teaching:

> The ability to learn is older—as it is also more widespread—than is the ability to teach (Mead, 1964, p. 44).

> Everyday activity … is a more powerful source of socialization than intentional pedagogy (Lave, 1988, p. 14).

> The equation, implicit in Vygotsky's work, of culturally transmitted knowledge learned through instruction is ethnocentrically biased. In most human societies, children become competent adults without the help of … teaching … Most learning is achieved as a by-product, in the course of interactions that have other purposes (Atran & Sperber, 1991, p. 39).

> The specialized cognitive skills of children that underlie their innate ability to learn (as opposed to adults' more conscious and less reliable ability to teach) establishes the success of cultural reproduction as the child's achievement (Langdon, 2013, p. 174).

As Premack and Premack (1996) note: "The anthropology of pedagogy is largely nonexistent" (p. 315). I have conducted four successive reviews of this literature, each incorporating a greater number of cases (Lancy, 1996, 2008), the latest extending to the historic record (Lancy, 2010, 2010a, 2014a). In each review, the conclusions were that teaching was extremely rare and did not seem to map onto any inventory of critical survival skills. In parental ethnotheories of "proper" child-rearing, teaching was specifically proscribed—even deemed harmful. Table 2.1 represents a very small sample of the cases that illustrate these points.

In the model embraced by contemporary child psychologists, parents, and educators, the learning and development process is dominated by a top-down transfer of knowledge (teaching) from experts/teachers to novices/pupils. By contrast, the ethnographic record portrays the development of skill and knowledge as largely a bottom-up process where the eager, self-initiating learner takes advantage of social learning opportunities to replicate (often initially in play) the observed skills and behaviors practiced by members of his/her family (Bloch, Solomon, & Carey, 2001) and community (Lancy, in press a, in press b). Geary (2007) has developed an extremely useful theory that provides a firm evolutionary foundation for the top-down, bottom-up distinction. In his theory, evolution has afforded children apanoply of cognitive skills and the motivation to master "evolutionary-significant content

[2] In another paper (Lancy, in press a) I take up the question of why evolution might favor social learning over teaching in cultural transmission.

Table 2.1 Evidence of an anti-teaching philosophy

[On Truk Island, there is no] "'training' of children in our sense" (Bollig, 1927, p. 96)
During this period, there is no formal training [among the Mbuti Pygmies], but boys and girls alike learn all there is to be learned by simple emulation and by assisting their parents and elders in various tasks (Turnbull, 1965, p. 179)
No formal instruction is practiced among the [!Kung] … learning … comes from the children's observation of the more experienced (Marshall, 1958, p. 51)
[Among the reindeer-herding Saami of Norway], "the child … is not instructed before starting a project, nor does he solicit help" (Anderson, 1978, p. 194)
[There] "is remarkably little meddling by older [Inuit] people in the learning process. Parents do not presume to teach their children what they can as easily learn on their own" (Guemple, 1979, p. 50)
In contrast to American parents, who seem to feel that knowledge is something like medicine—it's good for the child and must be crammed down his throat even if he does not like it—Rotuman parents acted as if learning were inevitable because the child *wants* to learn (Howard, 1970, p. 37, emphasis added)
Nyaka [foragers from the Lake Nyassa region of Southern India] "parents do not feel the need to 'socialize' their children and do not believe that parents' activities greatly affect their children's development" (Hewlett & Lamb 2005, p. 10). "Young [Nyaka] people learn their skills from direct experience, in the company of other children or other adults" (Bird-David, 2005, p. 96)
Kenyan Gusii "mothers … expect … their infants and toddlers to comply with their wishes … they could be harsh [and] rarely praised their infants or asked them questions, but tended to issue commands and threats in communicating with them" (LeVine, 2004, p. 156)
[Manus] "children accompany their parents and participate in adult activities that involve little skill. No attempt is made to develop skills—the emphasis is rather on the easy, pleasant identification with the activities of adults" (Mead, 1964, p. 57)
"If one asks a Chaga [from Tanzania] where he got his knowledge, in nine cases out of ten, the reply is: 'From nobody; I taught it myself!'" (Raum, 1940, pp. 246–247)
The Chewong of Malaysia believe that "… a child will grow and develop without specific parental interference" (Howell, 1988, p. 162)
To say that [Matsigenka] children learn from their parents does not imply that they receive much in the way of instruction. Children are given freedom to watch and imitate parents with minimal interference. Orna and I, in trying to learn many elemental skills like cooking over an open fire or walking on mountain trails, received virtually no advice or instruction; people watched us flounder without showing us how it is done (Johnson, 2003, p. 111)
Copying, and trial and error, rather than explicit teaching, are certainly the methods by which Duna men learn about flaked stone (White, Modjeska, & Hipuya, 1977, p. 381)

areas." These culture acquisition tools (e.g. bottom-up) are adapted for mastering "biologically *primary* domains" such as language and the ability to decode and learn from the natural environment (see, for example, Zarger, 2002). On the other hand, "academic learning involves … a suite of culture-specific, biologically *secondary* domains, such as mathematics" (Geary, 2007, p. 5). To "survive" in post-industrial society, individuals must learn material that nature has not endowed them with the ability to learn on their own initiative. To learn mathematics you must be taught—in a top-down process. For example, the Roman philosopher Quintillian asserts "it is quite clear the young student lacks the judgment to understand … what is set for him." (Langdon, 2013, p. 457).

As leaders in the "teaching is essential" contingent, Csibra, Gergely and associates go well beyond the claim that teaching is universal and argue that it is part of an evolved psychology unique to humans: "… [teaching or] natural pedagogy is a basic cognitive hominin adaptation" (Csibra & Gergely, 2009, p. 149). "Natural pedagogy was an independently selected adaptive cognitive system [rather] than … a by-product of some other human-specific adaptation, such as language" (Csibra & Gergely, 2011, p. 1149). Tomasello and colleagues also claim that only humans have evolved the capacity for teaching because "… human beings, and only human beings, are biologically adapted for participating in collaborative activities involving shared goals and socially coordinated action plans" (Tomasello, Carpenter, Call, Behne, & Moll, 2005, p. 674). Those who do field studies with great apes, on the contrary, find ample evidence for collaborative activities (hunting, for example, Boesch, 2005). Matasuzawa and colleagues describe the process whereby chimpanzee mothers facilitate their child's persistent imitation of her skilled nut cracking, including providing free access to shelled nuts and the hammer and anvil stone tool kit (Matasuzawa et al., 2001). In fact, it is striking how similar human's facilitation of children's attempts to learn tool use is to chimpanzee practice (Humle & Newton-Fisher, 2013; Lancy, in press b). Hatano and Takahashi (2005) provide the following summation of this body of work:

> Our speculation is that there is only a small, quantitative difference in many basic aspects (including sharing, intentionality) between humans and great apes, but the aggregate of a number of these small differences produces the remarkable qualitative difference [between apes and humans] (Hatano & Takahashi, 2005, p. 703).

Ethnocentrism as an Impediment to Theory Construction

I have already noted the tendency to consider the practices of our own culture as "normal" or "natural." Two cases can be cited where an ethnocentric perspective seriously undermines claims for the ubiquity of teaching. In constructing an argument about the genesis of teaching in the (universal) parent–infant relationship, Tomasello and colleagues offer this exemplar: "suppose a child and adult are building a block tower together" (Tomasello et al., 2005, p. 682). Nowhere in the entire ethnographic record of childhood have I found any instance of a parent and child building a block tower (or anything else) together; the purpose being to entertain while also instructing the child in some critical-to-the-culture skill (see Callaghan et al., 2011). Such behavior would fly in the face of widespread, core beliefs about parent–child relationships. To take a typical case, Sisala "parents regard an interest in children's play as beneath their dignity" (Grindal, 1972, p. 25). Once this ethnocentrism has been recognized and the research group has incorporated cross-cultural material in their analysis, the contrast becomes obvious.

> … due to a child-rearing philosophy focused heavily on pedagogy—parents in many Western, industrialized societies quite naturally interact with their young children in these ways, whereas parents in more traditional, small-scale societies do so much less

> often. The comprehension and use of pretense and graphic symbols therefore, is something that would seem to be quite dependent—especially in terms of early emergence—on the ways that children in different cultural settings experience these symbols (Callaghan et al., 2011, p. 109; see also Kärtner et al., 2008).

> Schooling provides a powerful model of the way information can be transmitted via language … So, we can expect more-educated parents to engage in more conversation, especially pedagogic and explanatory conversation, with their children … (Harris, 2012, p. 34).

As noted above, WEIRD society places an extremely high premium on the early development of academic knowledge and a high degree of literacy. One example of this truly urgent imperative can be found in the enormous popularity of "Baby Signs," a system of using ASL (American Sign Language) to accelerate the infant's use of language (see also Bjorklund & Beers, this volume). A typical testimonial to this innovation cheers "Hurray for Baby Signs! … Considering how slowly babies learn even easy words like ball and doggy, let alone difficult words like scared or elephant, many months are lost that could be spent having rich and rewarding interactions, both for the child and the parent" (Acredolo & Goodwyn, 2002, p. 3).

Other examples come from a growing body of research in WEIRD society that reveals parents are "teaching" children skills that they can readily learn on their own and have always done so (Shneidman & Goldin-Meadow, 2012). Prominent examples include: teaching children to speak (Clark, 2005); teaching them how to do make-believe (Vandermaas-Peeler, Nelson, von der Heide, & Kelly, 2009); teaching them how play with peers (Schütze, Kreppner, & Paulsen, 1986; Waldfogel, 2006); and teaching them how to play with toys. In another line of research, middle class parents were asked to carry out a cooking exercise (making crispy treats) with their 4-, 6- and 8-year-old children. But WEIRD parents used the cooking activity as a pretext for teaching children about literacy and basic mathematical concepts and skills.[3] The parents' overly didactic focus undermined children's enthusiasm for the exercise (Finn & Vandermaas-Peeler, 2013).[4] Gergely and associates have developed one of the more elaborated arguments for the significance and evolved character of teaching. Their *natural pedagogy* theory derives from laboratory research on infant cognition and infant–parent interaction in middle-class Hungarian society.

> Humans are adapted to spontaneously transfer … fast and efficiently (Gergely, Egyed, & Király, 2007, p. 145) … relevant cultural knowledge to conspecifics and to fast-learn the contents of such teaching through a human-specific social learning system called "pedagogy." Pedagogical knowledge transfer is triggered by specific communicative cues (such as eye-contact, contingent reactivity, the prosodic pattern of 'motherese,' and being addressed by one's own name). Infants show special sensitivity to such 'ostensive' cues that signal the teacher's communicative intention to manifest new and relevant knowledge about

[3] In a large-scale longitudinal study, the authors found that children attending heavily academic pre-school programs, had lower test scores in 3rd and 4th grade than those who had attended a more child-initiated, play-centered programs (Marcon, 2002).

[4] Fortunately, there is a growing "popular" movement to give children space to learn on their own without the constant mediation and supervision of a parent/teacher/coach/child-minder (see, as examples, Gray, 2013; Honroe, 2009; Sampson, 2015; Skenazy, 2009; Tulley & Spiegler, 2011).

> a referent object. Pedagogy offers a novel functional perspective to interpret a variety of early emerging triadic communicative interactions between adults and infants about novel objects they are jointly attending to (Gergely et al., 2007, p. 139).

Again, a thorough reading of the ethnographic record would undermine their arguments. This collection of parent–infant interaction patterns is rare beyond WEIRD or post-industrial society, particularly when applied to fathers (Brazelton, 1977). In the many societies where infants are not held *en face* as a rule, but attached to the mother's body or held facing away from the caretaker (e.g. Field & Widmayer, 1981; Jay, 1969; Ochs & Izquierdo, 2009), infants may be far "more attuned to their caregivers' postural positions than to their caregivers' gaze direction" (Akhtar & Gernsbacher, 2008, p. 61). Motherese and baby-talk are not found universally (Ochs, 1986; Pye, 1991; Solomon, 2012). Pointing and interactive communication by the infant and parent are, according to Tomasello et al. (2005), the nascent signs of later, full-blown teaching. But, like other components of "natural pedagogy," pointing by infants may be uncommon,[5] especially as others rarely respond to more than the child's basic needs. In a systematic and focused study:

> pointing (in Tzeltal and Rossel) … does not have the canonical result observed in postindustrial societies, with the adult labeling the object pointed at … On the basis of these observations, it is hard to believe that indexical pointing per se is playing a critical role in the infants' understanding that others have minds and communicative intentions of their own (Brown, 2011, p. 48).

In another recent study, middle and lower class mothers in Caracas and Chicago were recorded (90 min in total) during interaction with their 3-month-old infants. The amount of communication—verbal and gestural (e.g. pointing)—varied enormously from 0 (lower class Caracas) to 6000 (middle class Chicago) words directed at the infant. And this range was accounted for by the mother's and grandmother's education level. Those with more schooling showed greater awareness of "modern" socialization methods including the need to actively engage in "conversation" with the infant (Rowe, 2015).

Mothers with little schooling or exposure to teaching don't often engage *cognitively* with infants (Callaghan et al., 2011, p. 66; Kärtner et al., 2008). They respond quickly to their distress cues by nursing and soothing them. But they rarely gaze at them or engage in shared attention to novel objects (de León, 2011; Göncü, Mistry, & Mosier, 2000; LeVine, 2004). When Nso babies gaze at their mothers during nursing, the mother blows in their eyes so they avert their gaze and pay attention to others (Keller, 2013). Mazahua nursing mothers often display a "distracted air and pay almost no attention to the baby" (Paradise, 1996, p. 382). "Pashtu mothers rarely make eye-contact with their infants when nursing unless there's a problem" (Casimir, 2010, p. 22). In a comparative, quantitative analysis, "Euro-American adults were much more likely than Aka [foragers] or Ngandu [farmers] adults to stimulate (e.g., tickle) and vocalize to their infants (see also Whiten & Milner,

[5] Consider also that, in many societies, infants are swaddled or hidden away in cocoon-like containers, which restrict any sort of communication except distress.

1984). As a result, Euro-American infants were significantly more likely than Aka and Ngandu infants to smile, look at, and vocalize to their care providers" (Hewlett, Lamb, Leyendecker, & Schölmerich, 2000, p. 164). Akira Takada makes the point—based on his extensive observation of mother–infant interactions among Kalahari San—that the mother is engaged in a whirlwind of activity while holding or nursing her infant. This may include extensive verbal interactions with others. In short, she's much too busy to gaze at the infant or attempt to engage it in a mutual activity (Takada, 2012; see also Meehan, 2009).

The entire idea of stimulating infants cognitively and teaching them (*knowledge transfer*) is belied by practices like seclusion, swaddling, cradle-boards, and enveloping the child in a cloth attached to its mother's (or sister's) back. The most widely shared philosophy of infant care is to do everything possible to reduce stimulation so that the infant remains at rest (Howrigan, 1988). Chiga babies are kept quiet and not spoken to (Edel, 1957/1996), and traditional Chinese practice provides the infant "a tranquil and protective environment" (Bai, 2005, p. 11). Contemporary Dutch parents embrace a model of infancy in which plenty of sleep and restful, quiet waking periods are ideal. By contrast, US mothers are committed to keeping infants stimulated via physical contact, speech, and toys (Harkness & Super, 2006). Like the rest of Gergely et al.'s *communicative cues*, "being addressed by one's own name" (Gergely et al., 2007, p. 139) carries little theoretical weight because, in most societies, infants don't receive a distinctive name until their viability is assured and they are considered ready to "become persons" (Lancy, 2014). Keller and colleagues, based on extensive cross-cultural research, sum up the major difference in infant care between WEIRD society and others: "face-to-face contact is the most prominent system of parenting in urban educated middle-class families of Western societies," while elsewhere extensive bodily contact with little visual or verbal engagement is the rule (Keller, Borke, Lamm, Lohaus, & Dzeaye Yovsi, 2010, p. 234). The contrasting patterns are designed to develop the child's individuality and agency in the first case and self-regulation and conformity to group expectations, in the second.

Lastly, there is little evidence in the ethnographic literature that adults feel any urgency to transfer knowledge to children "fast and efficiently." In fact, the infant cognition studies which are the well-spring for Gergely and associates' (2007) theory are far more congenial to child-initiated acquisition of culture than adult-directed "transfer of cultural knowledge." For example, Gergely et al. conducted a study of 14-month-old infants ostensibly learning to execute a task from watching an adult model. But the infants don't faithfully copy the demonstrator, only those actions which seem relevant to completing the task. "Our results indicate that imitation of goal-directed action by preverbal infants is a selective, interpretative process, rather than a simple re-enactment of the means used by a demonstrator, as was previously thought" (Gergely, Bekkering, & Király, 2002, p. 755). Even at 14 months, infants are out in front of would-be teachers, taking the initiative to learn (Lancy, in press a).

Recent empirical studies by Rogoff and colleagues support this perspective. It would appear that children who must learn in and from the environment (as opposed

to learning from teachers and books) develop characteristically different attention patterns (Gaskins & Paradise, 2010; Rogoff, Correa-Chávez, & Cotuc, 2005). Village children, as well as immigrant children whose mothers have little schooling—invited to learn to make something (e.g. Origami figures)—rely on *observing* the task as it is carried out by an expert or attempted by other children. A sample of more "schooled" individuals, on the other hand, pay little attention to the demonstration, waiting for (or soliciting) a teacher's explanation and verbal guidance (Correa-Chavez & Rogoff, 2005).

Data and Definition Issues

Even those who claim that teaching is ubiquitous and universal acknowledge that "…teaching is a slippery concept" (Strauss & Ziv, 2012, p. 187). I will review two studies in non-WEIRD societies that purportedly show evidence of parent–child instruction to illustrate this slipperiness.

In an early study of the Aka—forest foragers from central Africa—using interview data, Hewlett and Cavalli-Sforza (1986) reported on the results of a survey ($n=72$, ages 7 to adult) asking who had taught respondents a list of 50 common skills. Eighty-one percent of respondents identified a parent as their teacher. However, the authors do not clearly differentiate between adult-directed, explicit, intentional *teaching* and more informal, learner-initiated *observation* of an older role model, or the kind of *interactive* skill learning that occurs during the participatory activity described by Lave, Rogoff, and colleagues (Lave & Wenger, 1991; Rogoff et al., 2005; Tehrani & Collard, 2009; Tehrani & Riede, 2008).

In more recent reports of the same Aka community surveyed by Hewlett and Cavalli-Sforza (1986), relying on ethnographic observation rather than interviews, Hewlett and colleagues (Hewlett et al., 2011; Hewlett, 2013; Hewlett & Hewlett, 2013) present evidence of how children learn, and from whom, that is more consistent with the ethnographic record as a whole. In a report drawing on two systematic *observational* studies, Boyette—using a very broad, inclusive definition of teaching—finds teaching to be quite rare among the Aka: "observed during about two percent of all minutes of observation in both 2008 and 2010" (Boyette, 2013, p. 91).

In a comparable recent interview study conducted with 72 Fijian adults, the authors found that, depending on how the query was posed, teaching was seen as critical in the transmission of valued skills, 18–43% of the time (Kline, Boyd, & Henrich, 2013). But interview data are particularly vulnerable to response compliance. The villagers Kline queried had had over 100 years' exposure to Western schooling and missionary influence (Kline et al., 2013). In my fieldwork with Kpelle children in the early 1970s, where teaching was conspicuously absent, the village inaugurated its first school during my fieldwork. The Christian congregation was tiny and Muslims even rarer (Lancy, 1996). Little conducted a child-focused ethnography among the Asabano, a remote and relatively unacculturated Papua New Guinea (PNG) Highlands tribe. Schools and churches had arrived within the previ-

ous 15–20 years. In his observation of children and parents, he saw no teaching. Parents displayed no obligation to encourage children's learning; to manage their activity; or even to acknowledge, let alone reward, children's efforts. However, when "asked how their children learn anything, [parents] unanimously answered that they explicitly 'show' children in a step-by-step process, even though they very clearly did no such thing" (Little, 2011, p. 152). Probing further, Little discovered that the resolution to this contradiction lay in the consistent and explicit sermonizing of village pastors regarding the Christian duty of parents to instruct their children. Although parents had not actually changed their parenting behavior, they could parrot the credo and apply it to their own culture (Little, 2011).

In summary, it is my recommendation that for a phenomenon as "slippery" as teaching, one would be on much firmer ground if the data were triangulated: ethnographic study to provide cultural *and* historical context and meaning (Odden, 2007; Little & Lancy, in press.); systematic observation (e.g. Boyette, 2013); and informed, open-ended interviews with both experts and learners (Lancy, 1996).

An equally challenging problem is the lack of consensus on a definition of what teaching (or pedagogy) is. Kline (2015, p. 1) notes "there is wide disagreement about how to define teaching, and how to interpret the empirical evidence for teaching across cultures and species." She defines "teaching as *behavior that evolved to facilitate learning in others*" (emphasis in original). But this definition presumes the acceptance of a hypothesis that has yet to be tested. To do so, Kline must identify behaviors that facilitate learning in others; then determine that those behaviors are uniquely associated with teaching and not some other purpose(s); and lastly, establish that the behaviors are ubiquitous and critically important among humans, but absent in close relatives such as apes. But such is clearly not the case: "If teaching is defined very broadly to include any behavior of one animal that serves to assist another animal's learning, teaching is relatively common in the animal kingdom" (Boesch & Tomasello, 1998, p. 602).

But Kline does not develop a stringent definition of teaching suitable for testing the theory that it has evolved separately from other behaviors that might assist learners. Instead, she offers a very catholic and inclusive catalog of behaviors that she would count as fitting her definition of "teaching." But, as other evolutionary scholars interested in teaching have noted: "We feel that moving away from a clearly delineated and testable definition risks creating confusion and eroding standards of evidence in this nascent field" (Thornton & McAuliffe, 2012, p. e7). I see enormous difficulties in unequivocally identifying the named behaviors as reflecting structures evolved to facilitate learning in others. For example, one type of teaching behavior is *opportunity provisioning* where the "teacher" provides the child access to objects or settings from which they can learn (Kline, 2015, p. 7). This would include the frequent accounts of the provision of knives to young children. For example, a Pirahã child:

> was playing with a sharp knife … swinging the knife blade around him, often coming close to his eyes, his chest, his arm … when he dropped the knife, his mother-talking to someone else—reached backward nonchalantly … picked up the knife and handed it back to the toddler (Everett, 2008, p. 89).

And from Taiwan:

> Parents were surprised and amused when questions such as 'How do you teach children … ' were put to them. 'We don't teach them; why they just learn themselves,' was the usual answer … A 2-year-old girl was seen imitating her mother by attempting to whittle off pieces of bamboo with a large 12-inch blade bushknife … Sickles and knives are used expertly by many 6-year-olds. Bandaged fingers and numerous little scars are evidences of learning and experimentation (Maretzki & Maretzki, 1963, pp. 510–511).

I would use these examples of "opportunity provisioning" as prima facie evidence of parents' *aversion* to teaching coupled with the widespread belief (Lancy, in press b) that learning how to use knives is children's business (e.g., Willerslev, 2007).

Evaluative feedback is another type of teaching discussed by Kline (2015, p. 8). A normative reading of the ethnographic record would stress the rarity of feedback—especially praise—from adults (Hilger, 1957; Metge, 1984). Even in the West, providing positive feedback or praise was, until fairly recently, rejected as a child-rearing or pedagogical technique because of the danger of "spoiling" the child (LeVine & Norman, 2001). Not surprisingly, in the bottom-up model of culture acquisition that predominated until very recently, evaluative feedback is provided to the learner automatically during the learning process (Paradise, 1998). The learner doesn't need an adult to tell them whether or not they're successful; the *results* of their efforts will provide all the feedback necessary. Indeed, one of the most important contemporary research programs in educational psychology has been the demythologizing of excessive teacher-donated praise (Mueller & Dweck, 1998). On the other hand, corporal punishment (Ember & Ember, 2005; Hsiung, 2005) and frightening the child are certainly common instances of "evaluative feedback" (these commonly employed elements of "natural pedagogy" are conspicuously absent from the major evolutionary-based theories, e.g. Kruger & Tomasello, 1996). But of course, it isn't clear that the intent is to *teach*. Verbal and corporal punishment or denial of food is usually aimed at a child who has failed to do a chore or run an errand—tasks she/he has already mastered. "Evaluative feedback" is largely used to manage the child's behavior, rather than to transmit the culture.

In crafting a broad, inclusive definition of teaching, in order to counter the argument that teaching is rare and unlikely to play a role in human evolution, Kline et al. (2013) make it near impossible to differentiate teaching from other behaviors. This quandary is easily illustrated (Köhler, 2012). When a mother tolerates the presence of her 4-year-old daughter while sitting in the shade of her house working clay into pots, is she teaching (yes, according to Kline)? Or, is she "child minding?" When she donates a ball of clay to the daughter (without any verbal instruction), is she teaching (also yes in Kline's theory)? Or, is she keeping the child occupied so she'll not be a bother? If she donates a ball of clay to her sister who drops by, is she teaching or displaying reciprocal altruism? Obviously, many behaviors displayed by one party can "facilitate learning" in another party. But crediting such behaviors as "teaching" is merely a hypothesis which is difficult, if not impossible, to support.

To take another "slippery" example, the Aka may take their 10–12-month old infants along on net-hunting expeditions. A mother will assemble, in a basket, a miniature or toy tool kit (axes, digging sticks, spears). When the hunting party stops

Table 2.2 Components of a definition of teaching

The teacher must incur costs (taking time away from their work or using non-recoverable materials) and these "costs to teachers of facilitating learning are outweighed by the long-term fitness benefits they accrue once pupils have learned" (Thornton & Raihani, 2008, p. 1823)
Teaching will not occur, or is unlikely, where the learner is able to acquire the requisite knowledge or skill in the absence of teaching (Thornton & Raihani, 2008)
Teaching involves the intent of the teacher to alter/enhance the knowledge or competence of the learner. The learner is aware of the teacher's intention and engages with or attends to the "lesson" (Olson, 2009)
Teachers explicitly monitor the progress of the learner and modify teaching activity accordingly (Kruger & Tomasello, 1996)

to rest, the mother empties the basket of tools whose contents keep the toddler happily chopping, cutting and, digging. This activity distracts the child, lessens the likelihood he'll wander off into the bush, and is patently entertaining for the adults. It reflects an understanding of children's deep interest in objects, their desire to achieve greater competence using them, and also reflects an Aka "core cultural value"—respect of the child's autonomy (Hewlett & Hewlett, 2013). Although this seems the most straightforward rationale for the mother's tool/toy basket, the authors claim a pedagogical intent on the part of parents. But these are 10–12-month-olds—hardly the most propitious age for beginning "training" in the use of tools. Further, they report no evidence that the occasional on-the-spot teaching is part of a program of systematic instruction in which the parent takes responsibility for developing the child's mastery of tool use (Hewlett et al. 2011).

A Working Definition of Teaching

I believe that a definition of teaching that is robust enough to survive the rigors of evolutionary theory must meet the criteria noted in Table 2.2. For most of the village curriculum, children are capable of learning socially or individually. They do not require the services of a teacher. Even when they seek the assistance of a teacher, they may well be rebuffed if the expert feels that this is unnecessary (they'll learn on their own) or a waste of his/her time (Lancy, in press b). That is, teaching incurs costs to the teacher. These costs must be offset by clear fitness gains for the teacher; most obviously that the lesson is critical to the child's (or other close kin) learning skills which are vital to survival and eventual reproduction. The teacher may also increase his/her fitness directly—a successful lesson will increase the child's work output, unburdening the parent/teacher—or indirectly, where the skills taught will lead to some future surplus output that can be donated to the teacher. We can imagine any number of hypothetical scenarios that would meet these criteria. However, in the real world, the necessity for teaching is mediated by the child's ability to learn without the aid of a teacher. We have overwhelming evidence from both field and laboratory studies that children are self-starters, getting about the business of

learning critical skills without the intervention of a teacher (Geary, 1995), *and* parallel evidence of deep-seated pro-social tendencies which compel them to apply their newly learned skills in the service of family (Haun, van Leeuwen, & Edelson, 2013). Why should an expert invest time, materials, and energy instructing a novice who will learn just fine on her own and likely enhance relative fitness in the long term? (Trivers, 1972)

Criterion three and four in Table 2.2 point to the necessity of finding signs that a "lesson" is underway. Without these indicators, as I've mentioned earlier, it is nigh impossible to distinguish a behavior or suite of behaviors as teaching, rather than altruism, punishment, child-minding, and so on (Thornton & Raihani, 2008). If you argue for the *survival* value of the skills or information being taught, and you argue that they are *opaque* and can't be learned without teaching (Csibra & Gergely, 2011), there should be *lessons*. That is, you should see/hear a parent say something like, "I will now teach Goma to make traps; he is ready to learn it." It should be obvious to an observer that a lesson is underway. One should see demonstration, verbal explanation, and correction. There should be decision rules, for example: when to change teaching tactics to get Goma over any obstacles, or when to stop and declare him trained. You can't claim that teaching is ephemeral, fleeting, and casual, that it is not matched up in any specific ways with the developing child and the local skill set, while also claiming that culture and individuals would not survive without it (Csibra & Gergely, 2011). If a baby isn't fed, it dies. Csibra and Gergely's assertions re: teaching MUST be supported by life or death examples.

Teaching in the Village

To this point, the reader may well assume that I am arguing that teaching does not exist outside WEIRD society. On the contrary, it certainly does exist and I will discuss these specific cases in this section. My argument rather is that the extreme rarity of teaching, its seemingly random variety and distribution, and the very evident aversion to and disapproval of teaching in most situations fatally weaken arguments for the ubiquity, importance, and evolutionarily shaped nature of teaching. In actuality, when we seek out instances of teaching, we see situations suggestive of Lévi-Strauss (1966) famed *bricoleur*.

In the ethnographic record, teaching tends to cluster around certain bodies of knowledge and skill. In a handful of societies infants are "taught" to sit and/or walk. The purpose is clearly not to ensure that children will master sitting and walking—they'll obviously learn on their own eventually. But, in high fertility societies, the infant's independence and separation from its mother is accelerated via early weaning from the breast and the back and accelerated walking to free up the mother to attend to the next birth. According to the definition outlined earlier, these examples can't be classified as teaching because the child can learn entirely on their own, so I have chosen to characterize these behaviors as "acceleration" rather than teaching (Lancy, 2014, 2015).

I have characterized a second cluster of behaviors as "learning manners." Extremely common in Oceania (Lancy, 2014, 2015)—but much rarer elsewhere—we find families systematically teaching the skills needed for full acceptance as a human being—a "true" Tongan, for example. That is, most societies differentiate between not-fully-human infants and children who are considered human (but still of little importance). In the Pacific Islands, issues of rank, speech, and etiquette are so important that families feel that their not-fully-human children are a source of embarrassment and loss of status (Fajans, 1997). To remedy these deficits, lessons are constructed (and administered by all family members from about age 5) to teach polite speech, appropriate terms of address, and social etiquette.

A limited number of societies intervene early to promote sharing (Lancy, 2014, 2015). For example, Papel infants are given something desirable, such as a snack, then immediately told to pass it on to another, particularly a sibling (Einarsdóttir, 2004). Generosity is demanded of even small Ngoni children both directly—forcing them to donate prized resources to peers—and indirectly, through proverbs lauding generosity and condemning meanness (Read, 1960). A !Kung grandmother most often takes on the task of teaching *hxaro*, their formal system of exchange and mutual support. The very young child is given beads and told which kinsmen to pass them on to (Bakeman, Adamson, Konner, & Barr, 1990).[6] It is certainly the case that sharing—especially of food—is a core value in most societies (Mauss, 1967) and children are hastened into compliance. But a related goal in "humanizing the child" is to make him/her as attractive as possible to alloparents or foster parents.

Once again this behavior falls short of the criteria I have outlined that define teaching. There's considerable evidence that children will learn the appropriate pro-social behaviors with time (d'Andrade, 1984; Fehr, Bernhard, & Rockenbach, 2008),[7] including proper kin terms (Beverly & Whittemore, 1993). For example, on Samoa (where rank and etiquette are important):

> Children as young as six … begin to pick up the distinctive features characterizing people of rank and authority without any explicit instruction. This was particularly the case for distinctive behavioral aspects of common ritual events associated with chiefs that children could readily witness (Odden & Rochat, 2004, p. 46).

So there's a cluster of teaching or quasi-teaching practices that are designed to accelerate the child's independence from mother's care and ensure that the child is tolerated and given alloparental care by other family and community members. A second cluster relates to a critical element in Gergely and associates' theory. Csibra & Gergely (2011) argue that there is a great deal of the culture that is opaque. They give the following example:

[6] Like other hunter-gatherers, the !Kung are "fierce egalitarians." They "consider refusal to share as the 'ultimate sin'" (Howell, 2010, p. 194).

[7] Recent laboratory studies underscore that human children exhibit pro-social behavior spontaneously from the age of three or earlier and are more readily pro-social than juvenile chimps (House, Henrich, Brosnan, & Silk, 2012).

> Imagine that you … observe a man as he turns a bottle upside down, twists its cap three times to the left and then another time to the right, turns it upside again, then opens it and drinks its content. (Csibra & Gergely, 2011, p. 1149).

They argue that social learning alone would be insufficient, or at least inefficient, in figuring out the bottle-opening sequence. But what can we learn from their example? First, Csibra & Gergely seem to be ignoring the work by Keil and colleagues (Keil, 2006; see also Ruiz & Santos, 2014) with WEIRD subjects that reveal the obvious fact that opacity per se is no obstacle to learning to *use* a myriad of common devices from locks to zippers. In the bottle opening example, all the learner must do is carefully observe the procedure then replicate it. No explicit, conscious instructional *demonstration* is required. Nor would a lecture on the procedure and its necessity unless the whole exercise is a case of "functionless pedantry" (Mead, 1964). Second, in the real world of the village, completely opaque processes that are essential for children to learn are almost nonexistent. In both ethnographic and historical accounts, we see children gaining virtually complete access to all aspects of the society. Children are not prohibited from "dangerous" situations. They may eavesdrop on adult conversation and interaction, including sex. In a butchering party, a 5-year-old has his hands buried in the guts of the animal. Children are ubiquitous as spectators at court, funerals, rituals, marital conflicts, etc. Further, when one inventories the tools and processes involved in each society's adaptation to their environment, this technology is inevitably quite uncomplicated and easily broken down into visible and comprehensible components (Oswalt, 1976; Whiten & Milner, 1984). After all, villagers don't use multi-part food processors in meal preparation, combines to harvest their crops, or magnetic resonance imaging to diagnose their illnesses. Far from being opaque, pre-modern societies are characterized by transparency. This is in stark contrast to post-industrial society where "Multiple surveys of children's understanding of work shows great naiveté and ignorance. Because they have little opportunity to observe different kinds of work, the whole subject is opaque" (Dunn, 1988, p. 309).

Lastly, the twist-off bottle cap is a modern, WEIRD artifact, hardly the sort of tool found in the Paleolithic tool kit and, hence a very poor example.

On the other hand, Gergely and associates are certainly correct in linking opacity to instruction. I have found only a few cases in the ethnographic literature of this necessity. The best known is the explicit, lesson-based instruction necessary to train a long-distance navigator in the Puluwat Islands. So complex and opaque is their navigation system that it must be explicitly taught to the novice by an expert. But note that on the entire island there are only a very few expert navigators, so an outsider might well live on Puluwat several years without actually witnessing such training. Further, on Puluwat, short-distance navigation and outrigger canoe construction are so completely transparent, no instruction is necessary (Gladwin, 1970). Among the Yoruba, and undoubtedly many other societies, the skills and knowledge of ritual practitioners, such as Ifá diviners, are hidden and only taught to a *select*, gifted few (Bascom, 1969; see also the Kogi priesthood, cf. Reichel-Dolmatoff, 1976). This is a pretty paltry sample to build a case for the evolutionary imperative

of teaching. These few cases of teaching certainly illustrate the human capacity to create lessons, but they leave open the following critical questions:

Is it possible to analytically extract some "teaching essence" that is only deployed during a lesson? Or to put it differently, is the conduct of lessons dependent on some key skill or behavior that is not used in other interactional settings (e.g. speech, shared intentionality) nor routinely displayed in non-human primates. If this challenge proves impossible, then we're left without the empirical tools (e.g. operational definition) to even begin a test of teaching as an evolved suite of unique skills.

Another essential set of components implied by a proposed evolutionary theory would relate to fitness. We should expect to see teaching occurring where there is a body of knowledge and/or specific skills which children cannot acquire on their own and where, lacking them, their fitness (survivorship, reproduction) is severely impaired. No proponent of teaching as the engine of culture transmission has even raised this question, let alone tested it. From my extensive survey of the literature, this hypothesis cannot be sustained. I have found only one prototypical case. The Fort Norman Slave band of Inuit hunts during severe winter weather and must traverse ice-fields. Fathers "instruct" sons about this dangerous environment (which comprises 13 kinds of ice and multiple modes of travel) via a game-like quiz (Basso, 1972). But one can find similar examples of apparently opaque knowledge—Siberian hunters' mastery of their challenging environment—where teaching is not considered useful because "to be a hunter you must know everything yourself" (Willerslev, 2007, p. 160). In other words, despite the challenges of navigating the arctic landscape, not all societies that must do so consider it essential to teach (Geary, 2000) their novices such as hunters and reindeer herders (Istomin & Dwyer, 2009).

Given the theory, one can speculate on where we might find critical skills that are, because of complexity and opaqueness, candidates for deliberate instruction. Prime candidates would be hunting and fishing. Here is a suite of skills that improve both individual fitness and that of one's family and community. A "good" hunter/fisher who shares his bounty of scarce protein is considered an excellent "mate," and empirical studies have demonstrated that more successful hunters have increased opportunities for extra-marital mating, thereby increasing their inclusive fitness (Hawkes, 1991). From the theory ("a basic cognitive *hominin* adaptation," Csibra & Gergely, 2009, p. 149), one might expect that virtually all boys in a society where hunting or fishing contributed to the diet would be "taught" to hunt and/or fish.

A very thorough review of the ethnographic record shows the near total absence of "lessons" in which fathers/adults teach young boys to hunt. "Much of the [young Penan's] expertise will be gained through trial and error experience in play or while actually hunting, not by direct instruction" (Puri, 2005, p. 281). "Ju/wasi hunters maintain that hunting is not something that one teaches … You have to teach yourself" (Liebenberg, 1990, p. 70). In fact, unlike other forms of work where social learning from adults is the norm, with hunting (and fishing in some cases as well, e.g., Lancy, 2014, 2015), boys are prevented from accompanying hunters, so opportunities to observe experts' hunting skills and acquire knowledge of prey are limited. Children are left behind on the hunt because they are noisy, slow, and impa-

tient (Martu—Bird & Bliege Bird, 2005; !Kung—Howell, 2010; Penan—Puri, 2005; Yora—Sugiyama & Chacon, 2005). Aka boys rarely are in the company of men hunting (their primary contribution to subsistence) because hunting is best done solo (Boyette, 2013). Among the Huaorani, "hunting is performed more efficiently alone" (Rival, 2002, p. 102).

Nevertheless, on their own or with peers, boys can begin to learn hunting/trapping quite early—targeting small creatures (which would be spurned by adult hunters) and practicing their tracking and capture skills for hours each day (Apache—Goodwin & Goodwin, 1942; Baka—Higgens, 1985; Hadza—Crittenden, Conklin-Brittain, Zes, Schoeninger, & Marlowe, 2013; !Kung—Shostak, 1981; Asbano—Little, 2011). While adult role models may not be available, older brothers seem quite happy to show off their skills to impress their juniors (Little, 2011; Biyaka—Neuwelt-Truntzer, 1981; Puri, 2005). There is an extremely relevant body of research that supports the notion that children are "natural" foragers and do not need to be taught or even shown how it's done (Chipeniuk, 1995; Heth & Cornell, 1985; Hunn, 2002; Piel, 2012; Zarger, 2002). And boys are free to listen and learn as "real" hunters recount their experiences back in the village after the hunt (Liebenberg, 1990; Tayanin & Lindell, 1991). Nevertheless, the hunters have no pedantic intent and make no adjustment for the rudimentary knowledge of the aspirant hunters (Yukaghir—Willerslev, 2007).

A parallel could easily be drawn between girls and craftwork. If certain crafts (weaving, pottery, basketry) provide essential community needs, and if competence in those crafts marks a young woman as "ready" to assume the responsibilities of wife and mother, then teaching should be essential to ensure that all achieve the necessary level of competence. But again we find many more cases of children becoming competent crafts-persons without the aid of instruction than the reverse (Lancy, 2015; Crown, 2002). Perhaps even more common are societies where "pathways to learning vary significantly"—some less expert crafts-persons seeking and getting assistance from those more expert while others progress without seeking assistance (Puri, 2013, p. 293). The Shipbo-Conibo people of the Amazon Basin are a good case in point. The socialization (including teaching) of young potters leads to a "bewildering variety of … designs" (DeBoer, 1990, p. 88). So, contrary to the assertion made by Kline (2015) and others that teaching is essential to the "faithful" transmission of culture, clear evidence of teaching of Shipbo-Conibo novice potters does not result in the faithful and conservative transmission of culture. In addition to stylistic variation, skill levels vary widely, suggesting that mothers do not carry out lessons designed reliably to bring the novice to a state of mastery or at least clear competence. Indeed, "there are scandalous cases of Shipbo-Conibo women who never become good, or even adequate artists" (DeBoer, 1990, p. 88).

In short, proponents have argued that teaching evolved as a unique cognitive adaptation to ensure that critical, fitness-enhancing skills—which could not be acquired solely through social learning—would be learned by aspirant practitioners. Proponents must, therefore, be able to identify prototypical domains or a suite of skills that would be very likely to provoke a teaching response. I have supplied two prototypes for them—hunting and craftwork—and showed (see also Lancy, 2015, in

press b) that, by and large, boys learn to hunt without the benefit of a teacher or even an adult role model, and boys and girls typically master critical craft production without direct instruction. This scattered and scarce distribution of culturally sanctioned and routinized applications of instruction in the rearing of children fatally undermines any claim that there is an evolutionary imperative for "natural pedagogy."

"Good" Teachers, "Good" Pupils?

If teaching is vital and universal, we should find the majority of adults considered "good" teachers and children "good" pupils. Assuming, for the sake of argument, that everyone is born with a suite of cognitive traits and the explicit motivation and determination "*to facilitate learning in others*" (Kline, 2015, p. 6, emphasis in original), we might expect to see the majority of the adult population acting eagerly and willingly as teachers.[8] On average, they should be "good at it." By the same token, children should gravitate readily to the role of pupil and automatically display appropriate behaviors in order to benefit from the lessons. Again, the majority should exhibit considerable native ability to learn from an instructor.

On the subject of "natural teachers," cases that illustrate careful, informed, systematic Vygotskian-style scaffolded instruction are virtually nonexistent before the modern era. Even in formal apprenticeship, one isn't likely to see much teaching—by anyone's definition (Lancy, 2012). In fact, there are probably more descriptions in the ethnographic record of experts spurning overtures from would-be novices/pupils than of the reverse (Edwards, 2005; Gladwin & Sarason, 1953; Hill & Plath, 1998; Krause, 1985; Lancy, 1996; Reichard, 1934). Even more common in the ethnographic record are broader, normative statements made by both adults and children that assert the absence of teaching in cultural transmission; its superfluity; even its capacity to harm and undermine a child's self-initiated learning—a finding affirmed in recent experimental psychological research (Bonawitz et al., 2011). A sample of such statements can be found in Table 2.1.

When observing the junior member of the teacher/pupil partnership, the picture is similar. Camilla Morelli (2011, 2012) has been a recent participant observer—with a focus on children—in a transitional community of Matses Indians in the Peruvian Amazon. She marvels at how facile and active the Matses children are in the natural environment compared to her own feelings of ineptitude. She is cowed by 3- and 4-year-olds who competently paddle and maneuver canoes on the wide river. She observes young boys nimbly catching and handling enormous catfish. And then she is struck by the painful contrast between the children's mastery of their natural surroundings while displaying great discomfort and incompetence in

[8] One piece of contrafactual evidence for this statement is the frequency with which ethnographers complain about their informants' unwillingness to assist them in learning the culture–subsistence skills in particular. Indeed, villagers see the inept attempts of the ethnographer and his/her social faux pas as occasions for hilarity and entertainment, not instruction (Henze, 1992; Nicolaisen, 1988).

the classroom. She summarizes the dilemma as "learning to sit still." Somehow, Matses children must suppress their spontaneous inclinations, which serve them well in learning their culture, and adopt a pattern of behavior and cognitive engagement that is completely novel. Matses children are active, hands-on learners; their role models are other children, not their parents. The learning process is profoundly physical rather than verbal. When free to learn on their own, they are contented; constrained to learn from a teacher, they are restless and frustrated.

Natural Pedagogy in the Classroom

"Natural pedagogy" should also have been in full view as schools were introduced to rural communities that had never encountered formal education—assuming of course that Gergely and associates acknowledge that natural pedagogy should apply in the school as well as in the home. But, in a well-known series of monographs sponsored by the anthropology of education program at Stanford (Spindler & Spindler, 1983), ethnographers portrayed village classroom scenes that were painful to observe. Children were treated cruelly. For instance, in the schools in the Chiapas Highlands of Mexico, students were beaten and made to kneel on pebbles or fruit pits to drive lessons home. It is no wonder that "Indian parents did all they could to save their children from the terrible fate of attending school" (Modiano, 1973, p. 87). In the 1960s, John Gay, Michael Cole (Gay & Cole, 1967), and I (Lancy, 1975) observed Kpelle village classrooms where teachers behaved like automatons, completely unable to adapt the to-be-learned material to the skill level, language, prior knowledge, or comprehension of the students. The most frequently used "instructional aide" was some form of physical punishment or verbal chastisement (Rival, 2002) [9] and these pedagogical tactics may be endorsed by parents in some societies (Wolf, 1972). Students weren't learning much from the constant rounds of rote memorization and repetition of the teacher's words and ended up leaving school long before they'd learned enough to use schooling as a passport into salaried employment. Mead refers to "functionless pedantry" (Mead, 1964) where the learner is subjected to teaching not for the content or skill transmitted, but to assert the "teacher's" dominant status.[10] Rural schools have been a colossal failure on a world-wide scale, at least in part because the principal players don't know how to enact the roles of teacher and student.

Aside from seeking evidence of natural pedagogy in the behavior of classroom teachers, the theory should predict that children or novices will take on the role of pupil easily. They should demonstrate a willingness to comply with the teacher and

[9] In rural Morocco, beating as a form of "instruction" is still accepted at home and in school (Nutter-El Ouardani, 2013, p. 115).

[10] For a review of "functionless pedantry" in adolescent initiation rites, see (Lancy, 2014, pp. 334–336). Similarly, "the Romans used education … to reproduce social hierarchies within their own society … the political function of pedagogy is … easily disguised … " (Corbeill, 2001: 282).

Table 2.3 How novices are expected to behave

In a Mayan community … children are taught to avoid challenging an adult with a display of greater knowledge by telling them something (Rogoff, 1990, p. 60)
On an Indian Reservation in the US, children are viewed as being inattentive because they don't gaze at the teacher when she is speaking; yet averting one's gaze in the presence of adults is "proper" behavior in the village (Phillips, 1983)
West African Wolof parents never quiz their kids by asking known-answer questions (Irvine, 1978)
Fijian children are never encouraged to address adults or even to make eye contact. Rather, their demeanor should express timidity and self-effacement (Toren, 1990)
Were the Mazahua children to ask questions it would be considered immature and rude (Paradise & Rogoff, 2009; see also Penn, 2001)
Because Inuit children are present in many multi-age situations, they are exposed to a great deal of talk by older people. Yet, it became apparent in this study that they were neither expected to participate nor to ask questions of adults who were speaking together. If they did ask questions, the adults ignored them, leaving their questions unanswered (Crago, 1992, p. 494)
In a Tongan classroom, teachers may well expect students to volunteer information, ask questions, or eagerly answer the teacher's academic questions. This doesn't happen though because, in a Tongan village, children are to learn through observation alone (Morton, 1996)
In a four-culture (Samoa, Caribbean, Nepal, Kenya) comparative study, children very rarely asked information-seeking questions. Parents did not engage in dialog with their children to exchange information. They were to be obedient, respectful, and responsible (Gauvain & Munroe, 2013)
Tizard and Hughes (1984) showed that middle class preschoolers asked more questions than lower class. Middle class parents consistently asked and received more questions/answers than lower class. Middle class parents are more likely to take up, repeat, or expand what the child has just said. Parents who didn't pose or solicit questions were much more likely to use commands or directives with children

collaborate to the extent, for example, of asking questions of the teacher when they can't understand the lesson. But we see precisely the opposite. We see "pupils" in classrooms fretting at the inactivity (Morelli, 2011) and at having to focus on listening to a teacher (Paradise & de Haan, 2009) when they're accustomed to learning through doing. "The child keeps on doing and doing, and then gets used to it [is an expression] very often used [by Tapajós Indians] to talk about the learning process" (Medaets, 2011, p. 4). Yukaghir (Siberian foragers) model of knowledge transferal could be described as "doing is learning and learning is doing" (Willerslev, 2007, p. 162). With respect to the pupil asking questions of the teacher, the descriptions in Table 2.3 are representative[11]:

These village norms have real consequences in terms of the mindset children bring to the classroom, as demonstrated in an ingenious experiment. Mayan children were compared with middle-class American counterparts in an origami-folding task. The village-reared children were much more attentive to the demonstration

[11] In my study of Kpelle childhood (Lancy, 1996), my best informant was a child who was not at all intimidated by me, was very talkative and articulate, and quite perceptive. I was repeatedly warned by adults to keep my distance from this child as he was a rascal and "not a proper Kpelle child."

and to the activities of others in the setting, especially adults. Unlike the Anglo children, they did not seek additional information to aid them in completing the task (Correa-Chavez & Rogoff, 2005).[12] Parallel results were observed in a study comparing native Hawaiian and Haole (Anglo) students where the latter were much more likely to request adult assistance, and consequently, were more successful at the task (Gallimore, Howard, & Jordan, 1969).

The First Schools

There is little evidence that schooling in the village has changed a great deal in the intervening 50 years since the anthropology of education field was launched (Shepler, 2014). In fact, when West African education authorities attempt to "modernize" (e.g., to abandon "natural" pedagogy) teaching methods in village classrooms, they are met with resistance on the part of teachers and parents (Anderson-Levitt & Diallo, 2003; Moore, 2006). Specifically with respect to corporal punishment, teachers in Guinea echo a widely expressed view: "*Il faut suffrir pour apprendre*" = "to learn one must suffer" (Anderson-Levitt, 2005, p. 988).

To check any tendency the reader might have to find some bias or inaccuracy in this portrait of teaching, a review of the historical record will readily show that what is today considered effective pedagogy was also absent from the first few millennia of formal education.

"Literate and numerate education, characteristic of the Eastern Palace cultures [dating] to 3200 BCE [was] developed to train a scribal class in service to a centralized monarchy" (Langdon, 2013, p. 446). The oldest known classroom and pedagogical material were found in Mesopotamia. The *edduba* (Tablet House) from the third millennium BCE, excavated at Mari, had two rows of benches for the students and many discarded clay tablets. The clay tablet facilitated instruction because it could be easily erased and reused and was much less costly than the writing media used elsewhere in antiquity. Sumerian scholar Samuel Kramer notes—from a reading of the ancient texts—that the schools were "uninviting," the lessons were dull, and discipline was harsh (1963, p. 243). One poor novice describes his experience: "My headmaster read my tablet, said: 'There is something missing,' caned[13] me. 'Why didn't you speak Sumerian,' caned me. My teacher said: 'Your hand is unsatisfactory,' caned me. And so I began to hate the scribal art" (Kramer, 1963, pp. 238–239).

[12] In a parallel study in the US, groups of children whose immigrant mothers were relatively well or poorly educated, behaved differently when shown how to make origami figures. The latter group relied solely on observation whereas the former sought additional information through questioning the teacher (Mejia-Arauz et al., 2005).

[13] The specific cuneiform sign for "caned" is an amalgam of the signs for stick and flesh (Kramer, 1963, p. 237).

This unpromising regimen changes little through the ages (Chiappetta, 1953). And evidence of the conflict between top-down teaching and bottom-up learners is not hard to find. "Graffiti at Pompeii reveals the children … mocking their school learning" (Bloomer, 2013, p. 453). And, "a common writing exercise had the student write 'work hard lest you be beaten'" (Bloomer, 2013, p. 455). In Britain, the master is depicted perched at his elevated desk "grasping the birch—a bundle of twigs—that formed his badge of office" and used "to punish indiscipline and inability to answer" (Orme, 2006, p. 144). A teacher in the 1590s "laments that children are afraid to come to school and wish to leave as soon as possible because of the severity and frequency of the whippings" (Durantini, 1983, p. 125). These practices grew out of the belief that children would not naturally accept the role of pupil. In Holland in the seventeenth century, children's resistance to pedagogical practices was so widely acknowledged that it spawned an entire genre of painting—"unruly school scenes" (Durantini, 1983, pp. 152–154).

Teaching in the Present and Future

Ironically, even in WEIRD society, where parental teaching is practically a sacred duty, parents and professionally trained teachers aren't necessarily very good at it. In a study of WEIRD parents teaching their children the game Chutes and Ladders, some parents used effective techniques, other were quite ineffective (Bjorklund, 2007; see also Bergin, Lancy, & Draper, 1994). In a recent massive study in the US (Robinson & Harris, 2014), the level of parents' academic involvement did not predict children's grades. In fact, "helping with homework" had a negative impact because parents lacked appropriate knowledge and/or teaching skills and students were more successful on their own. The main thrust of this study is that the "parent involvement" mantra is based on the myth that all parents are effective teachers. But in fact, from the earliest teachers in the first schools to the unhelpful homework tutors, a common element is the employment of controlling teaching techniques, such as commands and corrections—shown to negatively affect a number of child learning outcomes including conceptual understanding and task performance.

The parent involvement campaign has, as a primary goal, the recruiting of parents—typically lower or working class—as auxiliary teachers. But these parents, historically, disavow any interest in teaching their children or taking responsibility for their successful schooling. These aren't neglectful parents, but modern adherents of the village-based socialization model. For example, Lareau (see also Kusserow, 2004) found that working class children "have more autonomy from adults than their middle-class counterparts" (Lareau, 2003, p. 151).

The linguistic anthropologist Shirley Brice Heath conducted a long-term ethnographic project with families in the Piedmont region of the US in the 1970s. Her goal was to understand how different communities interact with literacy, especially where children were concerned. In a poor, African-American community, "Tracton,"

use of books (other than the Bible) and printed material was limited, and parents did not engage in elaborate conversations or other "joint activity" with their young children, nor did they see it as their responsibility to act as the child's first teacher. She recorded sentiments that echo those recorded by anthropologists in villages throughout the world.

> He [her grandson] gotta learn to know 'bout dis world, can't nobody tell 'im. Now just how crazy is dat? White folks uh hear dey kids say sump'n, dey say it back to 'em, dey aks 'em 'gain 'n 'gain 'bout things … He just gotta be keen, keep his eyes open … Gotta watch hisself by watchin' other folks. Ain't no use me tellin' 'im: "learn dis, learn dat" … He just gotta learn … he see one thing one place one time, he know how it go, see sump'n like it again, maybe it be same, maybe it won't. He hafta try it out (Heath, 1983, p. 84).

The very same philosophy was displayed in Dickens' (1836) classic The Pickwick Papers. The Pickwickians had taken on Sam Weller as general manager and all-around assistant to support their peregrinations through England. When Pickwick meets Sam's father, they have this interchange:

> Beg your pardon, sir," said Mr. Weller senior, taking off his hat, "I hope you're no fault to find with Sammy sir?" "None whatsoever," said Mr. Pickwick. "Why very glad to hear it, sir," replied the old man; "I took a good deal o' pains with his eddication, sir; let him run in the streets when he was very young, and shift for hisself. It's the only way to make a boy sharp, sir. (p. 306 in 1964 edition).

Lareau's cross-class comparative ethnography identifies similar attitudes in a typical US working-class community. For instance, Mrs. Morris, a mother from Colton, saw her son Tommy's education beginning when she "turned over responsibility" for him to the school. Afterwards, she remained largely in ignorance of his progress and was surprised to be called to the school and informed that he was doing poorly (Lareau, 1989). Each of these studies of contemporary parenting practices outside WEIRD society reinforces my argument that teaching by parents is cultural, not natural. And further, the skills involved are not learned easily (Geary, 1995).

If teaching was rare and patchy in the past and across cultures, then what has led to the unquestioned dominance of teaching as the essential means of child rearing and cultural transmission?

> The requirement of out-of-context, or context-independent, learning makes formal schooling an evolutionarily novel and "unnatural" experience … Children did not evolve to sit quietly at desks in age-segregated classrooms being instructed by unrelated and unfamiliar adults. Yet such procedures, to varying degrees, are necessary. They are necessary because the demands of modern culture required that children master basic technological skills, the most important of which are reading and writing, and mathematics, as well as knowledge in a broad realm of domains (Bjorklund, 2007, p. 120).

In pre-modern, face-to-face communities, skills and knowledge that are both critical and opaque are rare to nonexistent. In post-industrial societies, opaque material that is essential for young learners to acquire fills entire libraries. The sheer volume is enormous and growing exponentially. An entire system of instruction has been invented over years to handle this massive challenge in cultural transmission

Berch (2013). In WEIRD society, infants are subject to early lessons from conscientious and attendant parents and, not surprisingly, they become precocious teachers themselves[14] (Strauss & Ziv, 2012). Nevertheless, despite spending billions on developing curricula, methods, and teacher training, the schooling process, at least across much of the US, seems, by many measures, seriously deficient. There seems to be very little that is "natural" about effective pedagogy. On the contrary, promoting successful pedagogy seems like an engineering challenge comparable to sending humans to the moon.

Conclusion

I would propose that the arguments which attempt to elevate teaching to a privileged place in human evolutionary theory are doomed to fail. I believe that a far more fruitful discussion might center on reconsidering the degree to which childhood should be considered a period of dependency (Kramer, 2014). I believe that contemporary thinking across the social sciences and biology may over-estimate the degree of dependency during the subadult period. Thinking is colored by three factors. First: the pervasive effects of living in a Neontocracy (Lancy, 1996, 2014a, 2014b) where youth are almost totally dependent on others well into adolescence. Second: the early !Kung reports which initially defined the "ancestral" analog. But !Kung children are unable to contribute much to subsistence—which is highly unusual. And third: the very evident dependency of infants who are truly helpless. Once we open this debate, we might begin to entertain the idea that, while children do learn from others, especially parents, they are the active and leading partners in this enterprise; and that parents are passive and even reluctant partners (see Gray, this volume; Toub et al., this volume). If this view prevails, "teaching" might be placed in the marginal position in theory that it occupies in reality.

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[14] My daughter Nadia is nearly 2-years older than her younger sibling Sonia. For years, but especially before they started school, there was a constant running conflict between Nadia's felt "need" to "teach" her sister and Sonia's personal imperative to learn on her own.

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