Evolution and the Parenting Ecology of Moral Development

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Narvaez, D. (2020). Evolution and the parenting ecology of moral development. In D. Laible, L. Padilla-Walker & G. Carlo (Eds.), *Oxford handbook of parenting and moral* development (pp. 91-106). New York: Oxford University Press.

Abstract

Evolutionary theory can enrich developmental theory but not just any evolutionary theory will do. Evolutionary systems theory is a developmentally friendly evolutionary theory unlike selfish gene theory because it identifies multiple inheritances beyond genes and takes into account the complex dynamism of development. One inheritance is the species-typical evolved nest, or evolved developmental niche, a set of community provisions that evolved to match up with the maturational schedule of the child. Ethogenesis describes the development of ethics across the life span. We can identify two primary moral inheritances that are fostered by the evolved nest. The first is engagement, or flexible relational attunement, which includes capacities for resonance, reciprocity, mutuality, sympathy, and egalitarian relations with face-to-face others. The second comes with the development abstracting capabilities that build on engagement capacities into an inclusive communal imagination. A species-typical nest provides what babies and young children need to develop a full human nature.

Why Integrate Evolution in Moral Developmental Theory?

Psychology as a discipline is moving into an era that is much more transdisciplinary as neurobiological sciences are providing greater insight into the interrelation of biology and psychology, including the links between childhood experience and later capacities (Nelson & Luciana, 2008). Transdisciplinary research that includes anthropology and ethology sheds new light on human nature and human development. For example, it is obvious that humans are *animals* with needs for warmth and nourishment suited for their species. But humans are also *mammals* who thrive with affection and play (Panksepp & Biven, 2011) and *social* mammals whose nature properly develops with responsive, deep bonding with mothers (and others) who in turn require community support to mother well (Hrdy, 2009).

Human development is often contextualized in larger frames like Urie Bronfenbrenner's (1979) ecological systems theory which identifies multiple layers of mutual influence in a child's development, from family to historical time period. Other broad frames have emerged in recent years, facilitating the understanding of human development as taking place in a dynamic, complex, interactive relational context. For example, Relational Developmental Systems Meta-theory, offers "a holistic approach that treats *endogenous activity, change, becoming, process, necessary organization* and *relations* as fundamental categories" for the construction of theory and methods in developmental research (Overton & Molenaar, 2015, pp. 3-4, emphasis in original). In this view, development occurs in a non-linear fashion with constant interaction among maturation, social-contextual experience and self-organization, leading to orthogenesis (normal development) or pathogenesis (development of psychopathology) (Overton, 2015). In the context of relational moral development, a second frame, evolutionary systems theory, points to the community provisions that have evolved with children's needs (Narvaez, 2016a). Evolutionary theory thus can provide a second, even larger, frame than developmental systems meta-theory. In this chapter, we focus primarily on *ethogenesis*, the development of moral capacities in light of evolution (Narvaez, in press). Ethogenetic theory emphasizes the dynamic construction of biosociality, especially in early life, and the neurobiological underpinnings of subsequent everyday moral functioning.

The Dangers and Promise of Evolutionary Theory

Evolutionary theory can enrich developmental theory but not just any evolutionary theory will do. Most of the time when people consider evolutionary theory it is the neo-Darwinian variety, which today presumes that the dominant evolutionary story features the inheritance and promulgation of competitive selfish genes (Dawkins, 1976). Apart from being unhelpful to developmentalists for ignoring developmental dynamism, there are a number of misleading frames here that bear on our understandings of humanity and its moral development.

First, about competition. In examining how new species evolved, Darwin (1859/1962) noted changes in species characteristics over time and how adaptive characteristics helped an individual's descendants survive better than others without those characteristics. One can sort winners and losers retrospectively and see patterns of change. But across all species, most characteristics are conserved from generation to generation, not randomly mutating and competing (only a miniscule amount of genetic material competes among us—we share over 99.999% with one another). Much of what is conserved generation to generation are cooperative, symbiotic processes (Margulis, 1998). Second, Darwin's focus was not on representing how life on the planet exists from day to day. In fact, the natural world turns on a gift economy of give and take among species, for example, one species' waste becomes food or home for another species (Worster, 1994). Increasingly, scholars document the deep cooperation of the natural. For example, the human

body itself is comprised of trillions of microorganisms that keep alive each individual who carries, as a result, 90-99% non-human genes. Deep cooperation characterizes ecological systems. In forests, for example, older members of a species nurture the young and even facilitate the flourishing of other species through vast underground communication networks (Wohlleben, 2016).[i] As noted below, humans, too, are much more cooperative than competitive in species-typical environments (Narvaez, 2013).

Second, about genes and traits. Among biologists, the behavioral genetics paradigm-- that nature can be separated from nurture (genes from environment)—has been unsteady ever since its methods have been questioned (e.g., no control group, researchers not blinded in twin studies). Most significantly, unless there is a significant mutation affecting physiological development (e.g., Down's syndrome), genes by themselves are unpredictive of human behavior. Single genes or even networks of genes are extremely rarely predictive of human physical disease, let alone psychological outcomes (Carey, 2011). The lack of a main effect for genes with the finding that all psychological outcomes are interactions has been called the 'gloomy prospect' (Turkheimer, 2000). Gens represent a blueprint that require instructions to be implemented, and those instructions come from experience. For example, even when an individual has a genetic allele correlated with aggression (the "violence gene") it does not guide behavior on its own. It is only *more likely* to cause aggressive behavior *under conditions of early abuse* (Kim-Cohen et al., 2006). Developmental contexts and experiences influence the activation, inactivation or degree of expression of genetic inheritance ("epigenetics"). Explaining development via genes or traits to any great degree is empirically unverifiable and misleading, even in twin studies (Ho, 2010).

Instead, what has been verified over and over in behavior genetics research is how genes are not predictive of personality (nor of most psychological outcomes) whereas environments are (Ho, 2010). But environments are not fully predictive of outcomes either as there are interactions based on individual differences, and on the timing, duration, and intensity of experience. "What makes development happen… is the relationship of the components, not the components themselves" (Hood, Tucker Halpern, Greenberg & Lerner, 2010a, p. 4). Development is always a dynamic interaction:

> "Development, as [Gilbert Gottlieb] so clearly recognized, is an immensely complex process that depends on ongoing interactions between whatever makes up the organism at any given time and its environment; and it simply cannot be understood in terms of separate (or separable) forces, elements or factors….A developmental point of view requires a "relational" ("coactive" and "bidirectional") view of causality; an appreciation of the continuity between prenatal and postnatal, innate and acquired; the recognition that epigenesis is ongoing, multifaceted, not predetermined but highly dependent on experience…and top-down as well as bottom-up" (Fox Keller, 2010, p. xi)

(The key question then is what *should* the experiences be of a human-being-in-the-making?—addressed below.)

Nevertheless, several theories that adopt the neo-Darwinian view (emphasizing genetic competition) are applied in developmental psychology. They fail to make critical distinctions. For example, the Adaptive Calibration Model (ACM; Del Giudice, Ellis, & Shirtcliff, 2011) extrapolates the plastic malleability of the individual to life context as an *evolutionary* adaptation. It is like saying that Harlow's mother-deprived baby monkeys showed an evolutionary adaptation when they exhibited aggressive or autistic self-comforting behaviors in social situations. Rather, it should be explained that they exhibited *functional* adaptation (trying to survive in any fashion) which is not the same as evolutionary success. Evolution by natural selection involves *outcompeting one's rivals over generations* (Lewontin, 2010). Such success requires better survival, thriving and reproduction histories over multiple generations of one's descendants, and can only be viewed retrospectively many generations later. There is no way to *predict* adaptation except to use commonsense. In the case of Harlow's monkeys, knowing that they were raised in a monkey-atypical way, one would expect that they might have difficulty getting along. Indeed, as it turns out they could hardly socialize let alone be intimate with others; those who became mothers were abusive and neglectful. Thus, in comparison to individuals from contexts that support thriving through appropriate care, individuals whose contexts do not promote thriving are less likely to have generations of descendants.

Life History Theory (LHT) also applies neo-Darwinian evolutionary theory to human development. It uses formal modeling to examine between and within-species tradeoffs between somatic effort and reproductive effort, as well as tradeoffs between mating and parenting (Del Guidice et al., 2011; Gettler, 2014; Hill & Kaplan, 1999). LHT examines the "individual's physical and behavioral responses to its ecological and social-relational world" but, again, "the range of potential phenotypes that *can emerge* (reaction norms) should not be conflated with more optimal outcomes in a host of body/brain systems that "expect" particular postnatal experiences as they mature" (Narvaez, Gettler, Braungart-Rieker, Miller-Graff & Hastings, 2016, p. 9, emphasis in original). One must distinguish between those who receive expected from those who receive unexpected care. But neither ACM nor LHT make this distinction.

Both ACM and LHT are missing a *baseline* for human development, specifically the critical distinction between *species-typical* and *species-atypical* developmental niches, described below. Note how important it is to make this distinction. Harry Harlow's monkeys were raised in a species-atypical manner with the result that their lives were forever shifted away from species-typical behaviors. Lumping together monkeys, collapsing across species-typical and -atypical niches,

would mislead us on what normal monkey development and behavior entails. We would assume that social aggression and social withdrawal were normal possibilities for monkey personality. But we know from broader ethological research on species typicality that they are not.

A more developmentally-friendly evolutionary theory is Evolutionary Systems Theory (EST; Oyama, Griffiths & Gray, 2001). It provides a broad framework much more amenable to developmental theory and research than strict gene-centric evolutionary theories. EST fits well with RDST, which emphasizes the ongoing dynamic interactionism of an individual's development, but takes a horizontal view across generations. Drawing on evolutionary developmental biology (evo-devo; Sansom & Brandon, 2007), EST emphasizes how humans inherit many things beyond genes that interact throughout the lifespan, including physiological systems like body and cell plans, ecology and culture, and the purposeful self-organization within the organism itself. Perhaps the most important inheritance for developmental research is the species-typical developmental system. Every animal has a niche or nest that is unique for that species, including humans.

Species Typicality and Baselines for Human Development

Most developmental theories have *not* distinguished between species-typical and species-atypical life experience. But to make judgments about human developmental outcomes we must establish a baseline for optimal development. To do so, we must understand what a human being is and how humans best develop. We know about the nature of race horses and how to help them develop optimally. What about human beings?

For humans, who are dynamically formed primarily postnatally, there is an indivisible and constant interaction between "nature" & "nurture," where timing, intensity and duration of experience matter. Through 'constructive interactionism' (Oyama, 2000), every system shows epigenetic or plasticity effects of early experience, even vision, which is fully developed by four months of age. The initial conditions and experiences of an individual's life influence not only neurobiologically-based capacities but the nature of a life trajectory (Cole, Michel & Teti, 1994). The young child is highly plastic but also expecting the intensive nest that evolved with the increasing immaturity of the neonate over the course of human evolution (as humans moved to bipedalism, among other changes; Trevathan, 2011).

The evolved developmental niche (EDN; aka hunter-gatherer childhood model, Konner 2005) is a set of community provisions that evolved to match up with the maturational schedule of the child. Though developmental research has found that maternal responsiveness is related consistently to positive child outcomes, there is much more to humanity's species-typical nest. Many of its characteristics emerged with social mammals more than 30 million years ago, and are evident among primates (Smith, 2005). But the nest became more intense for humans (Konner, 2005, 2010) because humans are born at least 18 months early compared to other hominids, with only about 25% of the brain developed at full term birth (Trevathan, 2011). In fact, human beings are unique in their biological construction in that it is highly social, deeply influential and lengthy. Humans turn out to be *biosocial* constructions shaped mostly after birth until maturation, which takes about three decades. Experiences with mothers and others affect the nature of human brain development. In fact, humans are much more epigenetically shaped than other hominids (Gomez-Robles, Hopkins, Schapiro & Sherwood, 2015).

Humanity's EDN has been described by anthropologists who summarize the components among contemporary small-band hunter-gatherers, the type of society in which the human genus spent 99% of its existence:

> "young children in foraging cultures are nursed frequently; held, touched, or kept near others almost constantly; frequently cared for by individuals other than their mothers (fathers and grandmothers, in particular) though seldom by older siblings; experience prompt responses to their fusses and cries; and enjoy multiage play groups in early childhood" (Hewlett & Lamb, 2005, p. 15).

The neurobiological effects of each nest component on an individual's development are extensively discussed in detail elsewhere (Narvaez, Panksepp, Schore & Gleason, 2013; Narvaez, Valentino, Fuentes, McKenna & Gray, 2014). But here are the components (italicized) with a sampling of measured outcomes. The EDN provides *soothing perinatal experiences*, meaning naturalistic birth with no separation from mother and no painful procedures, experiences which facilitate normal bonding through, for example, reward-system sensitivity in both mother and child (Buckley, 2015). Young children benefit from *warm responsive reciprocal caregiving* which has significant neurobiological effects, such as training up the stress response system (Lupien, McEwen, Gunnar & Heim, 2009) and the vagus nerve, the 10th cranial nerve that runs through all major systems of the body (Porges, 2011). Children who receive *extensive affectionate touch* show proper development in physiological systems like the oxytocin system (Feldman, 2012). In comparison to formula fed infants, *breastfed* infants show greater myelination at a three-month comparison (Deoni et al., 2013). *Allomothers* support the mother and child in reducing stress and allowing the mother to be more responsive to her child and a positive climate of support leads to greater social cooperation in the child (Hrdy, 2009). *Self-directed social free play* in mammals fosters growth in self-control and social skills (van den berg et al., 1999).

My colleagues and I have been studying whether the components of the EDN matter for sociomoral development and wellbeing. Using **a** longitudinal (4 to 36 months) dataset examining the transition to parenting by at-risk mothers (Borkowski

et.al., 2001-2007), we examined whether EDN-consistent care led to improved child outcomes, specifically the effects of several EDN proxy variables including breastfeeding, positive touch, and maternal social support (Narvaez, Gleason et al, 2013). After controlling for maternal education and income, *breastfeeding initiation* was related to prosociality at 18 months and reduced aggressive behavior at 24 months, even after controlling for responsivity. *Positive touch* appeared to be established at 4 months and related positively to behavior regulation at 24 and 36 months but when controlling for responsivity, only the effect on behavior problems at 36 months remained significant. *Maternal social support* was related to fewer behavior problems at 24 months, after controlling for responsivity, though not to behavior problems at 36 months.

To better measure EDN-consistent care, we developed our own measure, the Family Life Attitudes and behavior Measure (FLAM). Behaviors measured include (1) birth experience (type: cesarean-section or not); (2) maternal responsivity; (3) positive touch in infancy and at time of survey; (4) negative touch in in infancy and at the time of survey; (5) breastfeeding initiation and length; (6) caregivers and allomothers (closeness, number, kin vs. non-kin); (7) family togetherness; (8) play with mom, adults, other children; and (9) maternal social support. We examined the relation of FLAM scores to sociomoral child outcomes, which included *behavior regulation, empathy, and conscience* (Kochanska, DeVet, Goldman, Murray, & Putnam, 1994). In a USA sample (n=626), mothers of 3-5-year-old children completed the measures finding significant correlations with EDN-consistent parenting practices, even after controlling for maternal education and income (Narvaez, Gleason, Lefever, Wang & Cheng, 2016). Among the findings, the most consistent was that affectionate touch behavior and attitudes were related to child empathy, inhibitory control, self-regulation and concern after wrongdoing. With the same measures and controls we examined a sample of 383 Chinese mothers with 3-5-year-olds (Narvaez, Wang et al., 2013). We found significant correlations for nearly all caregiving behaviors and attitudes (including maternal childbirth attitudes, touch attitudes, touch behavior, breastfeeding length, breastfeeding attitudes, alloparenting, family cohesion behavior, family cohesion attitudes, play behavior, play attitudes). Even after controlling for maternal responsivity, most effects remained. In a subsequent study of maternal attitudes and child outcomes, the findings were replicated (Gleason, Narvaez, Cheng, Wang & Brooks, 2016). These studies suggest that the EDN in early life may influence the development of moral capacities.

The Heritage of Relational Moral Development

Though reasoning has long been a focus in moral developmental research in part because it is easier to study and school populations are handy samples, more recently socioemotional aspects have been emphasized such as self-regulation, empathy, and conscience (Eisenberg, Fabes, Guthrie & Reiser, 2000; Kochanska, 2002). These involve early life family experience. Yet it is not clear that a species-typical frame is being used. What is species typical moral development? How do we judge what optimal human moral development looks like? First, we have to make some assumptions about optimality and then we have to examine evidence. The assumption here is that flexible cooperative capacities are best, in contrast to rigid, uncooperative stances, and that these capacities are guided by a concern for flourishing in the other, rather than concern only for self-flourishing.

Is there evidence that humans can routinely reach such heights of moral functioning? Yes, we can use as a baseline small-band hunter-gatherers (SBHG), the type of society that emerged independently all over the world, in which humanity spent 99% of its genus history (Fry, 2006). T

here are two reasons to use SBHG as a baseline. First, they provide the EDN to their young—all over the world, wherever they have been studied. Second, it appears that EDN provision builds a cultural commons for human nature (Narvaez, 2014). The adults in these societies, wherever they are found around the world have similar adult personalities (Ingold, 1999): content, calm, generous, socially attuned. Moreover, they demonstrate Darwin's "moral sense." To counter views that evolution promoted selfishness, Darwin (1871) pointed out components of humanity's moral sense evolved through the tree of life, reaching their pinnacle in human nature—social pleasure, empathy, concern for the opinion of others, habit control for the sake of the community. Interestingly, Darwin noted how indigenous peoples demonstrated these characteristics but that they were unevenly distributed and sometimes rare in his homeland of England. This is not a surprise if one understands British child upbringing practices in the 19th and into the 20th century, which often included harsh nannies and brutal boarding school. Anthropologist Colin Turnbull (1984) contrasted his British upbringing with that of the Mbuti, whom he studied, demonstrating in essence the contrast between the provision of the EDN in the latter with the toxic nest of the former.

Examining the SBHG as a species-typical baseline, we can identify two primary moral inheritances (Narvaez, 2014). Engagement or flexible relational attunement includes capacities for resonance, reciprocity, mutuality, sympathy and egalitarian relations with face-to-face others. With cognitive development, abstracting capabilities build on these capacities by allowing for imagining possibility with an inclusive communal imagination (in contrast to a vicious or emotionally-detached imagination). The strength of these two prepared inheritances appear to depend on particular experiences at critical times of development. Just like genes are impotent without timely experience "turning them on" (gene expression or epigenetics), the development of inherited moral capacities may depend on particular types of social

support.

Sociomoral learning, like all learning, is biosocial—that is, we co-construct ourselves, including our biological and genetic functions, *within relationships* (Ingold, 2013). We are socially knitted all the way up. Moreover, as complex dynamic systems, our sociomoral capacities rely on layers and layers of well-functioning subsystems. Miss a stich here or there and gaps develop that undermine optimal functioning at higher levels (Knudsen, 2004).

We learn bottom-up, from relational engagement in early life (Kochanska, 2002). We develop real-world knowledge from routines and procedures first—nonverbal ways of being—from immersion in experience. Implicit social procedural knowledge that underlies conscious thought is shaped by supportive environments with mutually-responsive caregiver relations where cognitive and emotional capacities develop together (Ammanti & Gallese, 2014; Greenspan & Shanker, 2004; Narvaez, 2014). When infants receive the care they evolved to need, they practice coordinating emotions, actions, and expectations with others, and start on a trajectory toward flourishing and cooperation. When nests are atypical, as in for example the case of Harlow's monkeys, the result is an atypical individual—from neurobiological structures like endocrinological and other basic systems on up to more sophisticated processes like emotion reading. Developmental neuroscience is demonstrating that everyday human functioning relies on the nature of one's embodiment—how well the body/brain works in response to life events.

Species-Atypical Moral Development

What kinds of mechanisms are identifiable in the nest a child experiences? The foundations for socio-emotional intelligence include well-functioning neurotransmitters and stress response systems that are forming in the early months and years. Early childhood experiences set up the neuroendocrine systems vital for managing stressful situations and bonding to others throughout life, such as peptidergic systems that involve oxytocin and vasopressin, which may inhibit defensive behaviors that are associated with anxiety, stress, and fear (Carter, 1998). This inhibition may allow for positive social interactions and the development of social bonds (ibid). In fact, oxytocin promotes caring relationships and bonding (Ferguson, Young, Hearn, Matzuk, Insel, & Winslow, 2000; Kirsch et al., 2005), and inhibits fight or flight and dissociative responses (Perry, Pollard, Blakely, Baker, & Vigilante, 1995). Oxytocin also counteracts the effects of stress by decreasing blood pressure and reducing activity in the sympathetic autonomic system (Uvnas-Moberg, 1996, 1997, 1998).

When development does not follow a species typical pathway, the continuum of care from internal to external womb is broken, stressing a child's developing systems, throwing off delicate sequences for learning (e.g., breastfeeding; Buckley, 2015). Toxic stress changes gene expression in multiple systems (Murgatroyd et al., 2009; Murgatroyd & Spengler, 2011). Excessive cortisol release changes gene expression and can melt neural connections, programming the brain for depression (Kang et al., 2012; Murgatroyd, Wu, Bockmühl & Spengler, 2010; Thomas, Hotsenpiller & Peterson, 2007). Murgatroyd & Spengler (2009) found that a 3-hour daily separation in infant mice caused enough early life stress to induce epigenetic effects that heightened stress reactivity with significant deficits in memory function in adulthood --and mice are not as socially needy or bonded as humans. These are complex matters within the development of a dynamic (human) system which have only recently been given significant attention (Shonkoff et al., 2012; Shonkoff & Phillips, 2000).

In terms of moral development, caregiving inconsistent with the EDN detaches moral emotions from their species-typical moorings in empathy and social attunement that are scheduled to develop after birth. Not providing the EDN becomes a type of toxic stress where layers of regulatory and socio-emotional systems never develop properly. As a result of early toxic stress, the individual's "neuroception" (implicit assessment of situations) becomes stress- and threat-reactive (Porges, 2011). Inborn survival systems are enhanced and conditioned to predominate—emotion systems related to staying alive (fear, rage, panic, seeking, lust) (Panksepp, 1998).[ii] The stress response is related to the functioning of these systems so much so that the stress response becomes habitually on alert. One or more primitive systems will dominate personality because energy was drawn away from the normal postnatal development of neural networks vital for sociality, including right hemisphere lateralized self-regulatory systems and initial prefrontal cortical controls (Schore, 2003a, 2003b).

When primitive survival systems take over the mind, the individual is oriented to threat and dominance and is less sensitive to the needs or communications of others except on those terms. Attention is preoccupied with *self-protective* routines and ideologies. Individuals are less sensitive when they are anxious, depressed or nursing a sense of injustice. In other words, one is *less* perceptive and attentive to reality and less sensitive to the needs or interests of others. Such insecurity and self-protective procedural memory undermine moral sensitivity, reasoning, focus and action (Narvaez & Bock, 2014). Self-protectionist ethics become ingrained in the neurobiological underpinnings of sociality. When the EDN is missing, individual development necessarily will be suboptimal—i.e., not reach human potential. Correlational studies with adults have demonstrated this to be the case.

In a study of over 600 adults, retrospective reports of childhood EDN experience were correlated with attachment, mental health, social capacities and

moral orientations (Narvaez, Cheng, & Wang, 2016). We made a composite score of *responsivity* (combination of happiness, support, responsiveness to needs), *touch* (affection, corporal punishment—reversed), *play* (adult-organized, free inside, free outside), and *social support* (family togetherness) and climate (positive, negative—reversed). We found significant effects for ethical orientations (correlated at $p < .05$). A *social-opposition ethical orientation* was related to less family togetherness and less play inside and outside. A *social-withdrawal ethical orientation* was related to less family togetherness, less affection, less organized play and less free play inside and out. On the positive side, an *engagement ethical orientation* was related to having experienced in childhood longer breastfeeding, greater responsivity, greater affectionate touch, less corporal punishment, more free play inside and outside, and greater family togetherness. In addition, anxiety and depression were positively correlated with protectionist ethics and negatively correlated with engagement. We performed theoretical mediation analyses and found several significant pathways: a positive pathway (EDN-consistent childhood→secure attachment→better mental health→perspective taking→engagement ethical orientation) and two negative pathways (EDN-inconsistent childhood→less secure attachment→worse mental health→lower perspective taking→social-oppositional ethical orientation; EDN-inconsistent childhood→less secure attachment→worse mental health→higher personal distress→social-withdrawal ethical orientation).

To examine the childhood precursors of these same orientations, parental ratings of their child's behavior in social situations were collected: self-protectionist behaviors (e.g., vigilance, distrust) and social engagement (e.g., social attunement, social consideration) (Gleason et al., 2016). In a sample of 166 mothers, scores on this child triune ethics measure were also related to EDN-consistent parenting attitudes in expected directions. Subsequent studies are showing that EDN-consistent experience is also related in the same directions (Narvaez, Woodbury, Gleason, Kurth, Cheng & Wang, in preparation).

Counterpoints

It is hard to believe we have been raising our children in species-atypical ways. The common reactions to hearing about the EDN or evolved nest and the need for it include the following. Brief responses are also provided.

- *We are different from past humans. Humans have evolved. Genes have changed in the last 10,000 years (for lactose tolerance).*
    - Actually, humans are still mammals, and babies still have built in needs for our species' nest. The SBHG studied are contemporaries. Societies are more or less peaceful and components of the nest are related to such outcomes (Prescott, 1996).
- *Humans without the EDN have taken over the world—a sign of evolutionary success.*
    - This is a shifted baseline. Balanced ecological communities are the baseline for planetary ecological life. Invasive or weed species last for a short while until a more cooperative species emerges to rebalance the biocommunity (Naess & Rothenberg, 1989).
- *Children today face a harsh world so we should prepare them for it early.*
    - This is like saying we should bully our children to prepare them for bullying they will face later. It doesn't make sense to stress a child when her neurobiological systems are otherwise setting themselves up for optimal functioning, health and intelligence.
- *Human beings are naturally violent and were worse in the past (Pinker, 2011). Life was 'nasty, brutish and short.'*
    - These views are based on incorrect analyses of data and are promoted by cultural misunderstandings and incorrect baselines (see Fry, 2006, 2013).
- *It's impossible to go back to gathering and hunting.*
    - Of course. But we can set up society to meet children's basic needs. Some advanced nations provide supports for provision of the evolved nest, such as soothing birthing practices, paid maternal and paternal leave, breastfeeding assistance and controls over formula advertising, and play-filled childhoods.
- *"I did not experience the EDN and I'm fine."*
    - It's not clear that anyone in modern societies is "fine," especially in the USA which has the lowest provision of the EDN among advanced nations. For example, wellbeing in the USA is worsening in terms of health comparisons with other advanced nations—for

example, everyone under age 50 is at a health disadvantage compared to those in 16 other advanced nations (National Research Council, 2013).

- *Every culture is different. Parents prepare their children for their culture. For example, some cultures raise people with insecure attachment.*

    - From a planetary perspective, it is not okay to have human beings who do not have full capacities for living with others or respectfully on the planet.

Conclusion

A transdisciplinary approach that takes into account ethology and anthropology as well as neurobiological sciences allows us to more fully understand human moral development. Only then can we determine various forms of ethogenesis and their predictors. Precursors to species-typical adult moral capacities are shaped by community provisions of the evolved nest, practices that evolved to match the maturational schedule of the child. A species-typical nest provides what babies and young children need to develop a full human nature, including humanity's species-typical morality of engagement and communal imagination.

Providing the evolved nest may be a matter of justice for babies because of its lifelong epigenetic and plasticity effects. We may need a bill of rights specifically for babies because of the greater sensitivity of early life and the differential needs of babies from older children. But to go along with such a bill of rights, one for mothers may also be required, as patriarchal societies often undermine capacities for mothering. However, it bears repeating that the provision of the evolved nest is a community responsibility, not only that of parents.

Though the focus here has been early life, the evolved developmental nest or system for humans lasts until adulthood (now presumed to take three decades in terms of brain development). In traditional societies, rather than isolating same-aged children with one another (promoting competition), children spend their lives in multi-aged groups (promoting cooperation). Adolescents transition to adulthood with a ceremony (e.g., vision quest) that draws them into their self-authorship. Young adults continue to be mentored as they learn the roles of adulthood. At every age, older and wiser mentors guide the younger set on how to live cooperatively and wisely. It is not too late to return to a community lifestyle that fosters and supports our optimal moral capacities.

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[i]Unfortunately, it is only lately that Western scientists have been noticing the deep cooperation among species—after the competitive assumption has led Western human enterprises to compete many species out of existence in the last hundreds of years and especially in recent decades (Turner, 1994; World Wildlife Fund, 2014).

[ii] These are systems that are difficult to influence once they are molded in early childhood. Parents encourage the dominance of this ethic through undercare as well as trauma, abuse or neglect. Although there may be brain plasticity after initial groundwork is laid in early life, flexibility to change brain architecture may require extensive therapy to recondition the mind/brain (e.g., re-parenting, mindfulness meditation). Without intervention, the individual likely will be left with the phylogenetically older protectionist ethic as a dominant mode for the moral life, with a certain stiffness of morality (e.g., rigid rule following) (Goldberg, 2009).