

## Are We Losing It? Darwin's Moral Sense and the Importance of Early Experience

Darcia Narvaez

### THE MORAL SENSE

Charles Darwin was concerned to counter the now-pervasive views initially promulgated by Herbert Spencer—that self-interest was primary and morality did not emerge from the tree of life. He spent considerable effort in distinguishing between behaviors that might help an individual better survive in the short term and the characteristics that would help a group survive over generations. Along with natural selection, he emphasized moral evolution among humans through group selection as one of progressive increase (Darwin [1871] 1981; see also Loye 2000). As part of these efforts, Darwin proposed that humans have a “moral sense” that contributes to their evolution, beyond the role of natural selection (Gruber 1974). According to Darwin, humanity’s moral sense arose from the sexual, parental, and social instincts that evolved in mammals generally, but especially in humans, giving rise to the golden rule. Accordingly, “moral behavior was embodied in the nature of the species, and not imposed on the natural world as something foreign to it. . . . Humans are not sacrificing their natures when they act morally; they are responding to them” (Schwartz 2009: 11). Darwin even toyed with the idea that the moral sense was the main propellant of human evolution (Loye 2000).

Here are quotes with slight paraphrase (modernized language) of Darwin describing the components of the moral sense:

In the first place, the social instincts lead an animal to take *pleasure* in the society of its fellows, to feel a certain amount of *sympathy* for them, and to perform various services for them. . . . Secondly, as soon as the mental faculties had become highly developed, *images of all past actions and motives* would be incessantly passing through the brain of each individual. Out of a *comparison of past and present*, the feeling of dissatisfaction, or even misery, which invariably results from any unsatisfied instinct, would arise. Third, after the power of *language* had

been acquired, and the wishes of the community could be expressed, the *common opinion of how each member ought to act for the public good* would naturally become the guide to action . . . Lastly, *habit* in the individual could ultimately play a very important part in guiding the conduct of each member, for the social instinct together with sympathy, is, like any other instinct, greatly strengthened by habit, and so consequently would be *obedient to the wishes and judgment of the community*.  
(Loye 2000: 128–129 (emphasis added))

Rejecting the liberal notion of rational self-interest as a prime motivator of human beings, Darwin viewed morality to be born of social instincts, instincts that make morality satisfying in and of itself. In other words, “the consummate moral individual is not one who conquers his/her base inclinations at the moment of choice, but rather one who does not experience them. . . . Morality is judged by the heart, and not only by deed” (Schwartz 2009: 12–13). Rationality instead plays a role in negotiating among conflicting interests. Interestingly, while Darwin contrasted the selfish rivalry among his male compatriots with the morality of women in his society (women are less selfish, more “tender,” more intuitive, with greater perceptual capabilities), he noted that the members of “lower races” and those in “lower states of civilization” demonstrated the characteristics of “civilized women.” As described below, early experience may have a lot to do with which type of morality—more selfish or more tender—that one develops.

Components of the moral sense—social pleasure, empathy, social concern, and habit control—are reportedly apparent all over the world among (male and female) small-band hunter-gatherer communities (immediate-return societies; hereafter called “SBGH”), the type of society in which 99 percent of human genus history is presumed to have been spent. Although hunter-gatherer societies vary in many ways and emerged independently around the world, they share striking commonalities (for reviews, see Fry 2006; Ingold 1999, 2011; Martin 1999). Illustrations related to the components of Darwin’s moral sense are mentioned here and contrasts are drawn with trends in US culture (see Narvaez 2014 for fuller details and references).

Regarding desire and capacity for *social pleasure*, hunter-gatherers greatly enjoy one another’s company; individuals rarely spend any time alone and cannot conceive that anyone would want to be alone, despite the efforts of visiting anthropologists to strive for alone time. In the USA of 2011, over 50 percent of adults are single (compared with 22 percent in the 1950s), with single-adult households the most common and growing type of household (Klinenberg 2012). Although many US adults feel fine spending many hours alone each day, at the same time isolation and loneliness have been increasing (Cacioppo & Patrick 2008).

Regarding moral capacities such as *empathy*, anthropologists note remarkable SBHG empathic care of young children (Konner 2005), kindness in needed situations (Everett 2009), inclusionary communal care (Ingold 1999), and cognitive empathy (perspective-taking) (e.g., Wolff 2001). In the USA, college student empathy has significantly decreased in the last decade (Konrath et al. 2011), with parallel increases in narcissism (Twenge & Campbell 2009) and avoidant attachment. (Both are signs of poor emotion system development and characterized by low emotional connection; Konrath et al. 2014.)

Regarding concern for *socially responsible* behavior (conscience), hunter-gatherers are concerned with certain values-in-action, specifically egalitarianism, generosity, and sharing; they repel coercion and hierarchy, and expel cheaters. In the USA, an increasing number of families exhibit anti-social behavior (Mooney & Young 2006; H. Walker 1993); cheating to get ahead is widespread in all walks of life, and many institutions and policies are designed to promote sociopaths (Callahan 2004; Derber 2013).

Regarding developing appropriate habits, *self-control* is a vital value among SBHG and its lack is grounds for expulsion (Everett 2009). In the USA, a greater and increasing number of young children arrive in kindergarten with behavior dysregulation (e.g., Gilliam 2005; Powell et al. 2003) and two-thirds of American teens report having experienced an explosive outburst (intermittent explosive disorder) in the previous year (McLaughlin et al. 2012).

Noting the variable societal differences, one might wonder whether there is a larger post-natal component to the moral sense than Darwin anticipated. Intensive parenting emerged with social mammals more than 30 million years ago and intensified further as hominins became more and more helpless and needy at birth to accommodate bipedalism and other factors (Konner 2010; Trevathan 2011). In comparison to the development of other primates at birth, humans are born 9–18 months early in terms of mobility and bone development. Full-term human babies (40–42 weeks gestation) have 25 percent of adult brain volume at birth, resulting in the fact that early life caregiving co-constructs multiple brain and body systems, in a type of “*extero-gestation*,” or external womb (Montagu 1986). Like social mammals, the human child is a dynamic system whose initial and early experiences with caregivers shape biosocial systems and establish trajectories for multiple aspects of the brain and body (Dettmer et al. 2014; Meaney 2001). Epigenetic effects are ongoing, with a constant interaction among maturational state, prior experience, and environmental influence (Murgatroyd & Spengler 2011).

What specific intensive caregiving practices evolved for humans? Anthropologists have documented the caregiving commonalities among hunter-gatherers (Hewlett & Lamb 2005; Konner 2005, 2010). These practices comprise what my colleagues and I call “the Evolved Developmental Niche” (EDN), slightly altered from the early care that characterizes other catarrhine mammals. In what follows I shall discuss them briefly, mentioning a few of their benefits. (For reviews, see Narvaez 2014; Narvaez et al. 2013b, 2014, 2016.) Of course, for caregivers there can be costs to these practices, though adults in SBHG demonstrate pleasure in providing them (Hewlett & Lamb 2005).

*Natural childbirth*: this means vaginal birth, no separation of mother and newborn, and no induced pain. For example, mother–child separation after birth affects mother–child bonding, breastfeeding success, and child self-regulation (Ball & Russell 2013; Bystrova et al. 2009).

*Breastfeeding*: infants nurse at will and frequently (two to three times/hour initially). Nursing lasts for two to five years, with an average weaning age of age four. Breast milk provides thousands of ingredients to build a healthy brain and body (Goldman et al. 1990; M. Walker 1993). For example, breast milk provides “antimicrobial, prebiotic, and likely probiotic factors that function dually to promote the growth of beneficial gut bacteria and inhibit pathogenic bacteria from establishing and replicating in the infant” (Martin & Sela 2013: 239). In contrast, formula feeding introduces pathogenic bacteria that are related to various diseases (Rubaltelli et al. 1998).

*Affectionate touch:* in the first years of life, children are carried skin-to-skin, held, or kept near others constantly. Affectionate touch keeps the infant calm and growing, fostering, for example, important brain/body systems such as oxytocin function (Caldji et al. 1998; Champagne et al. 2006; Kramer et al. 2003).

*Responsivity:* caregivers respond promptly to the needs of babies, resulting in little distress. Responsiveness properly sets up multiple systems, including the vagus nerve which is critical for well-functioning digestion, cardiac, respiratory, stress, immune, and emotion systems (Calkins & Hill 2007; Donzella et al. 2000; Haley & Stansbury 2003; Propper et al. 2008; Siniatchkin et al. 2003; Stam et al. 1997).

*Play:* children of all ages enjoy free play in the natural world with multiage play-mates. Free play, especially rough-and-tumble play, fosters better brain development and maturation, mental health and social skills (Panksepp 2007; Pellis & Pellis 2009; Spinka et al. 2001).

*Alloparents and positive social support:* mother-child dyads experience high social embeddedness, with young children frequently cared for by community members, keeping positive emotions active and needs met (e.g., Morelli et al. 2014). Maternal social support is linked to greater maternal responsiveness (Hrdy 2009).

These EDN components might represent a necessary context for optimal development. Early experience influences the design of physiological and psychosocial systems such as the stress response, endocrine system, and emotion systems (Narvaez et al. 2013b; Schore 1996). Deficiencies in these systems can impair sociality. For example, proper function of the vagus nerve, which underlies capacities for social intimacy, relies on caregiver touch and positive responsiveness in early life (Porges 2011). Poor vagal tone and poor capacities for controlling anxiety lead to greater stress response in social situations, whereas a good vagal tone is linked to greater compassion (Keltner 2009). The stress response draws energy for survival fight-or-flight, impairing executive controls in the prefrontal cortex, and higher order thinking, undermining social and moral imagination (Arnsten 2009; Sapolsky 2004).

Could the evolved developmental niche play a significant role in the development of the moral sense? A large number of studies have examined caregiver supportive responsiveness in early life, showing that it is linked to multiple positive child outcomes. For example, a “mutually-responsive orientation” in the mother-child relationship builds secure attachment and leads over the years to greater empathy, self-regulation, conscience, openness, and social competence (Kochanska 2002; Eisenberg 2000). But how about the other aforementioned parenting practices that form part of our mammalian heritage?

My colleagues and I have been examining whether the EDN influences well-being and morality. In several studies we have measured parenting behaviors and attitudes about the EDN and their relation to early signs of moral development in young children (3 to 5 year olds). In one study with an existing longitudinal dataset (Narvaez et al. 2013a), we examined responsivity, positive touch, breastfeeding initiation, and maternal social support. After controlling for the effects of responsivity, education, and income, there were several significant results. For example, we found that those who were breastfed at all were less aggressive at age two. Those mothers who provided more positive touch had children with greater intelligence and social engagement at age three. Mothers who reported greater social support had children who demonstrated less aggression and more

social competence at 24 months, and greater cooperation at 18 and 30 months. These findings suggest that EDN-consistent care may have long-term effects in early life. We also developed a survey of attitudes and behaviors consistent with the evolved developmental niche (Family Life Attitude and Behavior Measure). Again, we controlled for the effects of education, income and responsivity. In a Chinese sample ( $n=383$ ; Narvaez et al. 2013c), we found that each parenting practice was related to one or more child moral outcomes (self-regulation, empathy, conscience). Across these and other studies, we are finding consistent patterns of links between EDN-consistent care and child well-being and morality.

How does early experience play a role in how an individual's moral orientations are shaped? When early care does not match the EDN, it presents a toxic environment for the development of prosocial morality. Toxic stress keeps active the stress response, which is a different brain state from one of social pleasure (MacLean 1990). A global brain state shifts perception, information processing, and affordances (action possibilities). Immersed in a stress-inducing environment, the child will adapt to that environment and learn to be sensitive to threat. When a brain state guides behavior and is acted upon socially, it represents an ethic (Narvaez 2008, 2012, 2014). Those from stressful early environments are more likely to develop dispositions for self-protective ethics (unless other significant support was experienced later). When early care matches the EDN, the capacities underlying the relationally-attuned engagement ethic and communal imagination ethic develop as a matter of course. In this way, adult moral orientations are shaped by early experience.

We have tested whether there are long-term effects of the EDN on adult moral orientations. In one study (Narvaez et al. 2016), over six hundred adults were asked about their childhood experiences. We found positive and negative pathways to moral orientation. The positive pathway moved from EDN-consistent childhood to secure attachment, then to mental health, then to perspective-taking capacities, and then to an engagement ethic. The negative pathways led from lower EDN-consistent childhood to lack of secure attachment, to psychopathology, then either to personal distress and a withdrawal (wall-flower) ethic or to lack of perspective taking and an oppositional (bunker) ethic. Thus, the evidence from young children and from adults suggests that the EDN matters not only for human physiological and mental health, but also for moral outcomes. Denying children their evolved needs may undermine not only the nature of their sociality but alienate them from themselves. The message received is that one's impulses are wrong and untrustworthy. This may be transferred to all of the natural world (human and non-human), building in a basic alienation to life.

Although we have not studied this empirically directly, it appears that the punishment and coercion that characterizes most childhoods in the West, but not hunter-gatherer childhoods, may lead to the pre-conventional moral thinking that Lawrence Kohlberg found in children (stage 1: obey to avoid punishment; stage 2: instrumental hedonism or one-time bargaining) as well as deception. These stages of thinking are not apparent in hunter-gatherers or in groups where children are not coerced or punished but where generous sharing is the group norm. Children from societies where the EDN is provided appear to display stage 3 (interpersonal concordance) from a young age (Bolin 2010). In fact, babies from (natural) birth display expectation and readiness for the social life (Trevarthen 2005). The story of socio-moral development then should be flipped. It is

not how a selfish being becomes social but how a deeply social being becomes selfish. Thus, even Western-derived theory may be misleading us on what is truly part of evolved human nature.

### SPECIES-ATYPICAL OUTCOMES?

There are several common reactions when one points out species-atypical parenting in societies like the USA. One reaction is to argue that humans have continued to evolve and so it cannot be expected that today's humans would need the same things as our ancestors (and, besides, who really knows how our ancestors behaved?). The response of course is to describe how humans are still in the line of 30-million-year-old social mammals; humans still emerge from the womb at a remarkably early point in development, with many systems shaped by the post-natal environment and with the longest maturation schedule of any animal. Hence, post-natal life is critical for shaping the physiology that underlies health and well-being. Moreover, we can document the social mammalian parenting practices and their cultural correlations among hunter-gatherers (99 percent of human genus history). And, as briefly noted above, there is an increasing amount of neurobiological research demonstrating the importance of the evolved caregiving practices.

Another counterargument notes that the brain is plastic and malleable throughout life, so early life cannot matter that much. Yes, but plasticity decreases with age and it is still unclear how much one can alter some epigenetic effects that occur during early sensitive periods. For example, the glucocorticoid receptor protein well studied in rats by Michael Meaney and colleagues (2010) has a critical window for shaping its expression (first ten days of life). If a rat pup has a low-nurturing mother during that time, the gene is never properly expressed, leaving the individual anxious in new situations throughout life. Certainly, it is possible to control the subsequent anxiety with drug intervention later, as Meaney and colleagues have shown, but the gene is one of hundreds of genes affected by maternal care. Similar methylation patterns have been identified in human brains.

Another response is to argue that parenting varies because parents prepare their children for a particular culture (Harkness & Super 1995). Of course, even among SBHG there is cultural variability in child-raising, but the variability is relatively narrow and fits within humanity's social mammalian heritage and the EDN. In contrast, nations like the USA deny young children most of the EDN components, especially since the mid-20th century when mother-child alienating hospital births and practices became predominant, along with infant formula, prescriptions to let babies cry, and the isolation of babies and mothers from the community. The shift away from the EDN has continued with increased physical isolation (in carriers, strollers, car seats) and placement of young children in daycare centers where touch and free play are increasingly absent. The data are suggesting that EDN-inconsistent care may not be adaptive in any long-term sense.<sup>1</sup> When adults do not provide young children with what they evolved to need for healthy brain and body development, thriving is undermined, which, along with reproduction and survival, is critical for multigenerational adaptation. Though of course there are likely multiple causes of adult ill health beyond early life experience, the links between early life experience and well-being bear closer examination due to the deterioration

of US children's and adult's health over the last half of the 20th century (e.g., National Research Council 2013; OECD 2009).

### CHALLENGING IMPLICATIONS

There are several potential implications of the epigenetic nature of moral development. First, we must understand that brains and bodies raised outside the EDN are unlikely to exhibit full human capacities and instead are species atypical. It is then unwise and inaccurate to draw any conclusions about evolved human characteristics without contextualizing an individual's development niche. Early toxic stress undermines optimal development and there is no evidence that optimality can be recovered (Shonkoff et al. 2012). Therefore, we should not be generalizing about human morality or human nature from research on participants raised outside the EDN. In comparison with those raised with a full EDN, they are likely to have impaired sociality and be more self-centered. As noted above, the USA seems to display these species-atypical outcomes.

Second, culture matters. As Douglas Fry (2006) notes, theorists apply their own cultural lenses to the data they select to interpret. It will "make sense" to adults raised outside the EDN, who likely display stress reactivity and self-protective ethics, to describe universal human nature as selfish. But, as Marshall Sahlins has pointed out:

For the greater part of humanity, self interest as we know it is unnatural in the normative sense; it is considered madness, witchcraft or some such grounds for ostracism, execution or at least therapy. Rather than expressing a pre-social human nature, such avarice is generally taken for a loss of humanity.

(Sahlins 2008: 51)

In other words, ascribing selfishness to human nature may be a sign of a particular cultural niche—in terms of both perceptions but outcomes that are brought about by the attitudes and behaviors that correspond to those cultural beliefs—and not a matter of human nature, *per se*. The shaping of worldview may start very early in life and have much to do with parent attitudes and childrearing behaviors (Tomkins 1965).

### CONCLUSION

Margaret Mead's (1939) studies among South Pacific groups were guided by questions regarding human nature, its limits and potentialities, with the aim to "present evidence that human character is built upon a biological base which is capable of enormous diversification in terms of social standards" (Mead 1939: x). Neurobiological studies are proving her intuitions to be correct. From her studies she concluded that "human nature is flexible, but it is also elastic—it will tend to return to the form that was impressed upon it in earliest years" (xiii). Again, her conclusions are being supported by studies of attachment, sociality, and well-being in adulthood.

Childrearing baselines have shifted away from our mammalian heritage, at least in the USA. Undermining species-typical development will influence capacities of all sorts, including the moral sense. Dismissing inherited mammalian needs in early life may

actually create the *wrong kind* of moral sense: one that is self-protective, mindless, and ultimately destructive of the species and life on the planet (Naess & Rothenberg 1989). With climate and ecological devastation close by, it seems that we are now staring our self-destruction in the face.

#### NOTE

1. Of course we must be careful with the term “adaptive.” In developmental psychology, sometimes it is misused such as labeling early reproduction an evolved phenotype. Those who like to argue that reaching reproduction is a sufficient sign for fitness adaptation are too easy on themselves. To determine whether something is adaptive in the fitness sense can only be known after several generations and only in comparison to rivals (Lewontin 2010).

#### REFERENCES

- Arnsten, A. 2009. “Stress signalling pathways that impair prefrontal cortex structure and function.” *Nature Reviews Neuroscience* 10: 410–422.
- Ball, H. & Russell, C. 2013. “Night-time nurturing: An evolutionary perspective on breastfeeding and sleep.” In D. Narvaez, J. Panksepp, A. Schore, & T. Gleason (eds.), *Evolution, Early Experience and Human Development: From Research to Practice and Policy* (Oxford University Press) 241–261.
- Bolin, I. 2010. “Chillihuaní’s culture of respect and the circle of courage.” *Reclaiming Children and Youth Worldwide* 18: 12–17.
- Bystrova, K., Ivanova, V., Edhborg, M., Matthiesen, A., Ransjö-Arvidson, A., Mukhamedrakhimov, R., Uvnäs-Moberg, K., & Widström, A. 2009. “Early contact versus separation: Effects on mother-infant interaction one year later.” *Birth* 36: 97–109.
- Cacioppo, J. & Patrick, W. 2008. *Loneliness: Human Nature and the Need for Social Connection* (W.W. Norton & Co.).
- Caldji, C., Tannenbaum, B., Sharma, S., Francis, D., Plotsky, P., & Meaney, M. 1998. “Maternal care during infancy regulates the development of neural systems mediating the expression of fearfulness in the rat.” *Proceedings of the National Academy of Sciences* 95: 5335–5340.
- Calkins, S. & Hill, A. 2007. “Caregiver influences on emerging emotion regulation: Biological and environmental transactions in early development.” In J. Gross (ed.), *Handbook of Emotion Regulation* (Guilford Press) 229–248.
- Callahan, D. 2004. *The Cheating Culture: Why More Americans are Doing Wrong to Get Ahead* (Harcourt Harvest).
- Champagne, F., Weaver, I., Diorio, J., Dymov, S., Szyf, M., & Meaney, M. 2006. “Maternal care associated with methylation of the estrogen receptor-alpha1b promoter and estrogen receptor-alpha expression in the medial preoptic area of female offspring.” *Endocrinology* 147: 2909–2915.
- Darwin, C. [1871] 1981. *The Descent of Man* (Princeton University Press).
- Derber, C. 2013. *Sociopathic Society: A People’s Sociology of the United States* (Paradigm Publishers).
- Dettmer, A., Suomi, S., & Hinde, K. 2014. “Nonhuman primate models of mental health: Early life experiences affect developmental trajectories.” In D. Narvaez, K. Valentino, A. Fuentes, J. McKenna, & P. Gray (eds.), *Ancestral Landscapes in Human Evolution: Culture, Childrearing and Social Wellbeing* (Oxford University Press) 42–58.
- Donzella, B., Gunnar, M., Krueger, W., & Alwin, J. 2000. “Cortisol and vagal tone responses to competitive challenge in preschoolers: Associations with temperament.” *Development Psychobiology* 37: 209–220.
- Eisenberg, N. 2000. “Emotion, regulation, and moral development.” *Annual Review of Psychology* 51: 665–697.
- Everett, D. 2009. *Don’t Sleep, There are Snakes: Life and Language in the Amazonian Jungle* (Vintage).
- Fry, D. 2006. *The Human Potential for Peace: An Anthropological Challenge to Assumptions about War and Violence* (Oxford University Press).
- Gilliam, W. 2005. *Prekindergartners Left Behind: Expulsion Rates in State Prekindergarten Systems* (Yale University Child Study Center).



- Goldman, A., Goldblum, R., & Hanson, L. 1990. "Anti-inflammatory systems in human milk." *Advances in Experimental Medicine and Biology* 262: 69–76.
- Gruber, H. 1974. *Darwin on Man: A Psychological Study of Scientific Creativity* (University of Chicago Press).
- Haley, D. & Stansbury, K. 2003. "Infant stress and parent responsiveness: Regulation of physiology and behavior during still-face and reunion." *Child Development* 74: 1534–1546.
- Harkness, S. & Super, C. 1995. *Parents' Cultural Belief Systems: Their Origins, Expression, and Consequences* (Guilford).
- Hewlett, B. & Lamb, M. (eds.). 2005. *Hunter-gatherer Childhoods: Evolutionary, Developmental and Cultural Perspectives* (Transaction).
- Hrdy, S. 2009. *Mothers and Others: The Evolutionary Origins of Mutual Understanding* (Belknap Press).
- Ingold, T. 1999. "On the social relations of the hunter-gatherer band." In R. Lee & R. Daly (eds.), *The Cambridge Encyclopedia of Hunters and Gatherers* (Cambridge University Press) 399–410.
- Ingold, T. 2011. *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill* (Routledge).
- Keltner, D. 2009. *Born to be Good: The Science of a Meaningful Life* (Norton).
- Klinenberg, E. 2012. *Going Solo: The Extraordinary Rise and Surprising Appeal of Living Alone* (Penguin).
- Kochanska, G. 2002. "Mutually responsive orientation between mothers and their young children: A context for the early development of conscience." *Current Directions in Psychological Science* 11: 191–195.
- Konner, M. 2005. "Hunter-gatherer infancy and childhood: The !Kung and others." In B. Hewlett & M. Lamb (eds.), *Hunter-gatherer Childhoods: Evolutionary, Developmental and Cultural Perspectives* (Transaction) 19–64.
- Konner, M. 2010. *The Evolution of Childhood* (Belknap Press).
- Konrath, S., O'Brien, E., & Hsing, C. 2011. "Changes in dispositional empathy over time in college students: A meta-analysis." *Personality and Social Psychology Review* 15: 180–198.
- Konrath, S., Chopik, W., Hsing, C., & O'Brien, E. 2014. "Changes in adult attachment styles in American college students over time: A meta-analysis." *Personality and Social Psychology Review* 18: 326–348.
- Kramer, K., Cushing, B., & Carter, C. 2003. "Developmental effects of oxytocin on stress response: Single versus repeated exposure." *Physiology & Behavior* 79: 775–782.
- Lewontin, R. 2010. "Reply to comment on 'Not So Natural Selection.'" *New York Review of Books* September 30.
- Loye, D. 2000. *Darwin's Lost Theory of Love* (Writer's Press).
- MacLean, P. 1990. *The Triune Brain in Evolution: Role in Paleocerebral Functions* (Plenum Press).
- Martin, C. 1999. *The Way of the Human Being* (Yale University Press).
- Martin, M. & Sela, D. 2013. "Infant gut microbiota: Developmental influences and health outcomes." In K. Clancy, K. Hinde, & J. Rutherford (eds.), *Building Babies: Primate Development in Proximate and Ultimate Perspective* (Springer) 233–258.
- McLaughlin, K., Green, J., Hwang, I., Sampson, N., Zaslavsky, A., & Kessler, R. 2012. "Intermittent explosive disorder in the national comorbidity survey replication adolescent supplement." *Archives of General Psychiatry* 69: 1131–1139.
- Mead, M. 1939. *From the South Seas: Studies of Adolescence and Sex in Primitive Societies* (William Morrow & Co.).
- Meaney, M. 2001. "Maternal care, gene expression, and the transmission of individual differences in stress reactivity across generations." *Annual Review of Neuroscience* 24: 1161–1192.
- Meaney, M. 2010. "Epigenetics and the biological definition of gene x environment interactions." *Child Development* 81: 41–79.
- Montagu, A. 1986. *Touching*, 3rd ed. (Harper & Row).
- Mooney, J. & Young, J. 2006. "The decline in crime and the rise of anti-social behaviour." *Probation Journal* 53: 397–407.
- Morelli, G., Ivey Henry, P., & Foerster, S. 2014. "Relationships and resource uncertainty: Cooperative development of Efe hunter-gatherer infants and toddlers." In D. Narvaez, K. Valentino, A. Fuentes, J. McKenna, & P. Gray (eds.), *Ancestral Landscapes in Human Evolution: Culture, Childrearing and Social Wellbeing* (Oxford University Press) 69–103.
- Murgatroyd, C. & Spengler, D. 2011. "Epigenetics of early child development." *Frontiers in Psychiatry* 16: 1–15.
- Naess, A. & Rothenberg, D. 1989. *Ecology, Community and Lifestyle* (Cambridge University Press).
- Narvaez, D. 2008. "Triune ethics: The neurobiological roots of our multiple moralities." *New Ideas in Psychology* 26: 95–119.

- Narvaez, D. 2012. "Moral neuroeducation from early life through the lifespan." *Neuroethics* 5: 145–157.
- Narvaez, D. 2014. *The Neurobiology and Development of Human Morality: Evolution, Culture and Wisdom* (W. W. Norton).
- Narvaez, D., Gleason, T., Wang, L., Brooks, J., Lefever, J., Cheng, A., & Centers for the Prevention of Child Neglect. 2013a. "The evolved development niche: Longitudinal effects of caregiving practices on early childhood psychosocial development." *Early Childhood Research Quarterly* 28: 759–773.
- Narvaez, D., Panksepp, J., Schore, A., & Gleason, T. (eds.). 2013b. *Evolution, Early Experience and Human Development: From Research to Practice and Policy* (Oxford University Press).
- Narvaez, D., Wang, L., Gleason, T., Cheng, Y., Lefever, J., & Deng, L. 2013c. "The evolved developmental niche and child sociomoral outcomes in Chinese 3-year-olds." *European Journal of Developmental Psychology* 10: 106–127.
- Narvaez, D., Valentino, K., Fuentes, A., McKenna, J., & Gray, P. (eds.). 2014. *Ancestral Landscapes in Human Evolution: Culture, Childrearing and Social Wellbeing* (Oxford University Press).
- Narvaez, D., Wang, L., & Cheng, A. 2016. "Evolved developmental niche history: Relation to adult psychopathology and morality." *Applied Developmental Science*. doi.org/10.1080/10888691.2015.1128835.
- National Research Council. 2013. *U.S. Health in International Perspective: Shorter Lives, Poorer Health* (The National Academies Press).
- Organization for Economic Cooperation and Development (OECD). 2009. *Doing Better For Children* (OECD Publishing).
- Panksepp, J. 2007. "Can PLAY diminish ADHD and facilitate the construction of the social brain?" *Journal of the Canadian Academy of Child and Adolescent Psychiatry* 10: 57–66.
- Pellis, S. & Pellis, V. 2009. *The Playful Brain: Venturing to the Limits of Neuroscience* (Oneworld).
- Porges, S. 2011. *Polyvagal Theory* (W. W. Norton).
- Powell, D., Fixen, D., & Dunlop, G. 2003. *Pathways to Service Utilization: A Synthesis of Evidence Relevant to Young Children with Challenging Behavior*. University of South Florida: Center for Evidence-based Practice: Young Children with Challenging Behaviors.
- Propper, C., Moore, G., Mills-Koonce, W., Halpern, C., Hill-Soderlund, A., Calkins, S., Carbone, M., & Cox, M. 2008. "Gene-environment contributions to the development of infant vagal reactivity: The interaction of dopamine and maternal sensitivity." *Child Development* 79: 1377–1394.
- Rubaltelli, F., Biadaoli, R., Pecile, P., & Nicoletti, P. 1998. "Intestinal flora in breast and bottle-fed infants." *Journal Perinatal Medicine* 26: 186–191.
- Sahlins, M. 2008. *The Western Illusion of Human Nature* (Prickly Paradigm Press).
- Sapolsky, R. 2004. *Why Zebras Don't Get Ulcers* (Holt).
- Schore, A. 1996. "The experience-dependent maturation of a regulatory system in the orbital prefrontal cortex and the origin of developmental psychopathology." *Developmental Psychopathology* 8: 59–87.
- Schwartz, E. 2009. *Human Nature, Ecological Thought and Education after Darwin* (SUNY Press).
- Shonkoff, J., Garner, A., The Committee on Psychosocial Aspects of Child and Family Health, Committee on Early Childhood, Adoption, and Dependent Care, and Section on Developmental and Behavioral Pediatrics, Siegel, B., Dobbins, M., Earls, M., McGuinn, L., Pascoe, J., & Wood, D. 2012. "The lifelong effects of early childhood adversity and toxic stress." *Pediatrics* 129: doi:10.1542/peds.2011–2663.
- Siniatchkin, M., Kirsch, E., Arslan, S., Stegemann, S., Gerber, W., & Stephani, U. 2003. "Migraine and asthma in childhood: Evidence for specific asymmetric parent-child interactions in migraine and asthma families." *Cephalalgia* 23: 790–802.
- Spinka, M., Newberry, R., & Bekoff, M. 2001. "Mammalian play: Training for the unexpected." *Quarterly Review of Biology* 76: 141–168.
- Stam, R., Akkermans, L., & Wiegant, V. 1997. "Trauma and the gut: Interactions between stressful experience and intestinal function." *Gut* 40: 704–709.
- Tomkins, S. 1965. "Affect and the psychology of knowledge." In S. Tomkins & C. Izard (eds.), *Affect, Cognition, and Personality* (Springer) 72–97.
- Trevarthen, C. 2005. "Stepping away from the mirror: Pride and shame in adventures of companionship." In C. Carter, L. Ahnert, K. Grossmann, S. Hrdy, M. Lamb, S. Porges, & N. Sachser (eds.), *Attachment and Bonding: A New Synthesis* (MIT Press) 55–84.
- Trevathan, W. 2011. *Human Birth: An Evolutionary Perspective* (Aldine de Gruyter).
- Twenge, J. & Campbell, R. 2009. *The Narcissism Epidemic: Living in the Age of Entitlement* (Free Press).

- U.S. Department of Health and Human Services. 2011. *The Surgeon General's Call to Action to Support Breast-feeding* (U.S. Department of Health and Human Services, Office of the Surgeon General).
- Walker, H. 1993. "Antisocial behavior in school." *Journal of Emotional and Behavioral Problems* 2: 20–24.
- Walker, M. 1993. "A fresh look at the risks of artificial infant feeding." *Journal of Human Lactation* 9: 97–107.
- Watson, D., O'Hara, M., Simms, L., Kotov, R., Chmielewski, M., McDade-Montez, E., Gamez, W., & Stuart, S. 2007. "Development and validation of the Inventory of Depression and Anxiety Symptoms (IDAS)." *Psychological Assessment* 19: 253–268.
- Wolff, R. 2001. *Original Wisdom* (Inner Traditions).

Taylor & Francis  
Not for distribution