

The Missing Mind: Contrasting Civilization with Non-Civilization Development and Functioning

Darcia Narvaez and Mary S. Tarsha

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Baselines

To assess the optimality of human functioning and development, one must select proper baselines. One must establish an understanding of human capabilities and how humans develop them. This chapter examines several lines of research that come together in providing such baselines.

Civilization began perhaps around 10,000 years ago and represents a fraction of the total kinds of societies that have existed. Considered timewise, civilized societies make up less than one percent of humanity's presence on the planet. Prior to the gradual emergence of herding and farming communities, over 95% of humanity's existence was spent as small-band hunter gatherers (SBHG), which are still present (Lee & Daly, 2005). These societies are matrifocal, where motherhood and the feminine principle of life were respected (Goettner-Abendroth, 2013). The focus is on meeting basic needs and living well within the cycles of the natural landscape, with high *social* wealth, rather than emphasizing hierarchical power and competition which may have first started to appear with the practices of herding animals (Holden & Mace, 2004) and deep tilling of the soil (Bram, 2018). In fact, after holding an initial bias toward patriarchy as a baseline for what is species typical, anthropologists are coming to realize the centrality of mothering and child raising in our ancestral environments (e.g., Lee, 2018), and science is increasingly noticing the matrifocal egalitarian nature of ancient societies, not only among First Nations (Mann, 2006) but civilizations such as the early Egyptian and Minoan (Bram, 2018). We briefly describe SBHG societies, focusing on one aspect which contrasts greatly with current civilization's practices, the evolved developmental niche (EDN). Emerging from the social mammalian line tens of millions of years ago, the EDN supports the longstanding cooperative nature of our species which is apparent in SBHG (Ingold, 2005), but not so much in countries like the USA. Contrasting EDN effects with what civilized children usually experience, we present a sampling of capacities that have diminished or are overlooked in civilized persons as a result of these societal alterations.

The Evolved Developmental Niche

Every animal has a developmental system that evolved to match the maturational schedule of the young, optimizing species-typical development for that particular species (Gottlieb, 2002). Similar to other apes, human infants require extensive nurturing, though to a greater degree as a result of their vast immaturity at birth and lengthy maturational schedule (Konner, 2005; Montagu, 1968). Humanity's developmental system, the evolved developmental niche (EDN; Narvaez, 2014; Narvaez, Panksepp et al., 2013) is provisioned by a community, not solely by mothers and/or fathers (Hewlett & Lamb, 2005). The EDN for young children includes: (1) soothing perinatal experiences; (2) extensive breastfeeding on request; (3) positive touch; (4) responsive attention—prompt and appropriate responses to needs, keeping the young child optimally aroused; (5) multiple allomothers, that is, frequent care by responsive individuals other than mothers (fathers and grandmothers, typically); and (6) self-directed multiage, free play in nature. Converging evidence from developmental psychology (Kim et al., 2011), neuroscience (Schore, 2003), evolutionary biology (Carter, 2004) and epigenetics (Champagne, 2018) suggests that the components of the EDN are vital for shaping neurobiological processes. Next, we describe some of those findings, contrasting humanity's ancestral context of EDN provision (SBHG) with the modern USA.

Soothing Perinatal Experiences

In our ancestral environment, based on what is documented among SBHG studied in recent times, social stress was minimal, which ensured a relatively peaceful gestation for the child (e.g., Hrdy, 2009; Sorenson, 1998). Stress during pregnancy causes child irritability, making postnatal care more challenging (Davis et al., 2007). Within pregnancy and parturition, mothers, fathers and other caregivers followed the natural rhythms of the mother and infant, avoiding any type of painful procedures or separation of the mother-infant dyad, facilitating healthy bonding between the mother and infant and breastfeeding success (Klaus & Kennel, 1976; Trevarthen, 2011). In contrast, many if not most civilized mothers experience medicalized birth, which can disrupt natural biological functioning in mother and child (e.g., through induction, labor drugs, separation), affecting postnatal bonding, breastfeeding success and maternal care (Buckley, 2015).

Breastfeeding

After gestation and birth, the next critical aspect of development consists in the successful intake of nutrients with breastmilk being the only nutrient infant bodies are prepared to digest for several months (Power & Schulkin, 2016). More than 80% alive and containing numerous molecules, hormones and enzymes needed for healthy maturation, breastmilk facilitates brain development, significantly reducing such things such as the risk of infant meningitis, and later diabetes, hyperactivity and aggression (Girard, Doyle & Tremblay, 2018; Stuebe & Schwarz, 2010). In humanity's ancestral context, breastfeeding took place on request from birth to 2 to 8 years with the average age of weaning around four years of age (Hrdy, 2009). In the United States, only one in four women exclusively breastfeed at six months of age and only 34% continue breastfeeding until twelve months (Louis-Jacques & Stuebe, 2018), with most children offered artificial formula made from a few nonhuman ingredients. In brief comparisons (three months) of formula versus breastfed infants, clear brain development differences are apparent—e.g., greater myelination in the latter, which is related to intelligence (Deoni et al., 2013).

Positive Touch

A central part of EDN-consistent nurturing is affectionate touch, being held or kept near others constantly and never receiving any form of negative or harsh touch. Among SBHG, coercion is not allowed in relationships, even by parents towards children (Ingold, 2005). In the EDN context, such as among the !Kung, infants are held almost 90% of the time and in the second year are carried or held almost half the time by caregivers other than the mother (Konner, 2005). The effects of affectionate touch have been studied for many years, bolstering the understanding for how necessary touch is for normal development (Barnett, 2005). The lack or deprivation of physical contact is equally as harmful, especially in the early years, causing anxiety and other forms of psychopathology later in life (Casco, Moore, & McGlone, 2019; Fish et al., 2004; Franklin et al., 2014; Harlow, 1958). Further, negative touch (e.g., spanking, pinching, hitting, or life-threatening physical abuse) is associated with long term deleterious effects including internalizing (depression) and externalizing (aggression) disorders (Gershoff, 2013). Half the parents in the USA report spanking their one-year-old children (Lee, Grogan-Kaylor, Berger, 2014).

Responsive Attention

High levels of positive touch in conjunction with an absence of negative touch is also integral to sensitive responsiveness: mothers and other adult caregivers respond to infant and toddler distress with immediate physical and emotional nurturing. As a result, among SBHG it is

rare to hear an infant cry, as adults are rapidly responsive to needs and the infant freely suckles when needed (Hrdy, 2005; Hewlett & Lamb, 2005). Providing responsive care means meeting the needs of the infant or child in the present moment, keeping infants in an optimal state of arousal—not stressed and not under aroused. When caregivers provide warm, responsive care, they act as external emotional and psychological regulators, stabilizing the numerous developing neurobiological systems of a growing child (McEwen, 2019) who needs to learn to adjust to the constant fluctuations of the environment (Schore, 1994). Too many infants are not offered such continuous support, due in part to cultural myths about spoiling babies and the need to build their independence.

Alloparents

Humanity evolved to raise children as a community—with “other mothers” or allomothers (Hrdy, 2009). Allomothers or alloparents refers to multiple, consistently present, responsive caregivers. A greater number of alloparents increases the likelihood that children will receive consistent, responsive care moment-to-moment. When parents are surrounded by a supportive community of alloparents, their knowledge and expectations about parenting increase and their stress surrounding parenting decreases, allowing for more positive rather than negative interactions (Serrano-Villar et al., 2017). Because alloparents increase wellbeing, they are understood to be a protective factor for both parents and the developing child (Hrdy, 2009). In the USA today, many parents do not have extended familial help in raising their children and many children are sent to under-resourced daycare centers with rotating staff, most of which are of poor quality and harm young children’s social development (NICHD Early Child Care Research Network, 2003).

Self-Directed Play in Nature

Social mammals play as part of self-development and self-organization; humans are no different (Panksepp, 2018). Whole-body, self-directed free play promotes brain development, fostering emotion regulation, prosocial behavior, and resilience to stress; and it may be an effective treatment of attention-deficit-hyperactivity disorder symptoms (Burgdorf, Kroes & Moskal, 2017). Social free play gives young mammals the practice they need to learn how to shift, change and adapt to unexpected actions and reactions of playmates, building emotional and relational flexibility (Spinka, Newberry & Bekoff, 2001). Lack of self-directed social play in childhood is associated with altered social, sexual and conflict interactions with peers (van den Berg et al., 1999). When situated in nature, children’s play increases cognitive functioning (Wells, 2000). Children in the USA have decreased opportunities for free play outside due to parental anxieties (Skenazy, 2010) and a focus on scheduled activities, schoolwork and screens (Turkle, 2017).

Each component of the EDN supports healthy development, shaping multiple systems in early life as they establish parameters and thresholds for a lifetime of functioning. For example, a well-developed stress response system consists of a hypothalamic-pituitary-axis (HPA) capable of adjusting to stressors in social and solo situations (Liu et al., 1997; Schore, 2003; Haley & Stansbury, 2003). When the HPA system is well-regulated, it forms the foundation for self-calming, self-soothing and restoration of emotional and psychological homeostasis after stressors, and undergirds capacities for compassion, openheartedness and prosociality (Goetz, Keltner & Simon-Thomas, 2010; Carter, Harris, & Porges, 2009). In early life, routine stress fosters an over or under reactive HPA, potentially altering mental and physical health for a lifetime. For example, Murgatroyd et al. (2009) found that a 3-hour daily separation caused enough early life stress to induce epigenetic effects that altered the HPA to hyperactivity,

accompanied by significant deficits in memory function in adulthood. Children left unattended in distress can also learn to externally shut down, a behavioral characteristic that can appear to insensitive adults as healthy “self-soothing;” the result is an upregulation of panicked stress responses focused on survival and a downregulation of biochemicals that promote growth (Hofer, 1994; Ladd et al., 2000). In this case, self-regulatory capacities are impaired.

In sum, the EDN significantly shapes children’s development, influencing the adults they become. As we have indicated, when children receive the care they need, that is, when they are provided the EDN through parental and communal support, they develop neurobiologically well-regulated stress response systems, the foundation of physical, emotional and psychological health including self-regulation. Deprivation of the EDN is stressful to babies and young children and impairs species-typical development.

Connections between Early Life Experience and Brain Development

Early life caregiving influences a child’s development in multiple ways. In addition to shaping the stress response system, early life experience shapes right hemisphere brain development, which is scheduled to develop more rapidly than the left hemisphere in the first years of life. Several decades of research illuminate how the right brain gives rise to the implicit self, otherwise known as the structural system of the human unconscious (Schoore 1994, 2000, 2009). The right hemisphere is responsible for multiple implicit systems integral to cognition, affect, communication and self-regulation. The right hemisphere gathers and processes information from the outer world (exteroceptive information) as well as from within the self (interoceptive information), generating emotions and communications, all without conscious direction. Further, the right hemisphere has a vast role—even more so than the left hemisphere—in regulating psychobiological states and processing emotions generally, including non-verbal affect, facial expression and gestures. It is operative in broad, generalized thinking, self-regulation, emotion regulation, attention, motivation, arousal and controls pain systems and processing (Schoore, 2011).

Considering its numerous roles, it is not surprising that there is a consensus in psychological science that the subconscious, right hemispheric functions guide most decisions and actions (Bargh & Chartrand, 1999). Supporting its proper development, then, is of critical concern. Right hemisphere development is best developed through EDN-consistent care: psychobiologically-attuned, sensitive, reciprocal attachment interactions that are made up of perceiving, assessing and regulating the infant’s verbal and nonverbal expressions (Schoore 1994, 2009, 2011, 2013). EDN-consistent care provides right-brain-to-right-brain interaction: mother’s sensitive, attunement is grounded in her right brain which fosters growth and development of her infant’s right brain; both are critical components of the attachment system (Bowlby, 2008; Minagawa-Kawai et al, 2009). Such care co-constructs the infant’s bodily-based emotional states and fosters a sense of security that enables the development of multiple forms of self-regulation, which initially are right-hemisphere lateralized (Schoore, 2019b).

When EDN provision is not provided in the early years of life—the time period when the right hemisphere is scheduled to develop most rapidly—right hemisphere development can be disrupted. Impaired right hemisphere development is associated with developmental disorders and adult-onset psychopathologies, including but not limited to: conduct disorder, aggression, dissociative disengagement, deficits in theory of mind, attention-deficit-hyperactivity disorder, Asperger’s syndrome, schizophrenia, and depression (Brüne & Brüne-Cohrs, 2006; Wasserstein & Stefanatos, 2000). Right hemisphere underdevelopment can impair abilities for broad, generalized thinking and perceiving, including perspective taking and receptive intelligence

(Narvaez, 2014).

The Impact of Western Civilization's Shift Away from the EDN

Recall that humanity spent most of its existence in small-band hunter-gatherer communities (SBHG), providing the EDN until a fraction of time ago when some social groups moved into agricultural settlements and city-states. Persons raised in SBHG can be presumed to better represent humanity's propensities and capacities because all ages live a socially-supportive life, inclusive of species-typical child rearing. Consequently, we will use SBHG as a baseline for human social functioning along with historical and neuroscientific evidence, including a closer look at their EDN provision.

Several differences are apparent in social function between SBHG and modern civilized persons. The diminishing psychological capacities that resulted over the course of western civilization have been described by Marvin Bram (2018), Iain McGilchrist (2009) and E. Richard Sorenson (1998) and they contrast with the presumed capacities of our ancestors which are operative in present-day SBHG communities. In fact, most anthropologists who first encountered SBHG did not understand them because their consciousness was so alien (Sorenson, 1998).

For example, SBHG spend much of their mindspace in *polysemy*. Polysemy, in this context, is where consciousness swims in a shape-shifting world--there is no solid identity of a thing (Bram, 2018). Polysemy reflects the ability to merge with multiple others, human and non-human and is the product of *de-differentiation*, finding oneness with others rather than difference and separation. Many non-civilized cultures de-differentiate and creatively respond to the present moment, which is heavy with connection to others, including the other-than-human, to ancestors and other spiritual aspects of a dynamic, fluctuating universe. This inclusive creative space is where they spend/spent most of their lives. When needed, SBHG move into the problem-solving mindspace of *univocity*—linear logical thinking helpful for solving a particular problem. Though SBHG use both mindspaces, polysemy and univocity, with the rise of the Sumerian and subsequent civilizations, there was a shift toward spending more time in univocity, the problem-solving space brought on by stress.

Bram (2018) describes the gradual shift away from polysemy across the history of western civilization due to multiple factors including settled agriculture, forced labor imposed by elites, which led to increased hierarchy, writing, measurement and control of people and things, including war and slavery. Univocity depends on differentiation: sorting, categorizing, and abstracting. Differentiation makes distinctions, defining each thing as one thing only. Univocity relies on dualistic, dichotomous logic (something is or isn't), emphasizing causes and effects which rely on linear thinking. The sense of the present is minimal as people are caught in trying to predict the future based on what was noticed from the past. Obsession with order, precision and prediction becomes normalized—all left hemisphere concerns (McGilchrist, 2009). These skills are valuable and necessary for both an individual and community to solve problems but according to McGilchrist and others (e.g., Tweedy, 2021) become distorted without the help of the right hemisphere's global integration. As a result of obsessive differentiation (sorting and naming separate objects), civilization creates a singular world with a hierarchical shape, a pyramid of order based on linguistic structure (subject-predicate-object) that becomes the model for logic (universal statement → particular statement → conclusion) and is transformed into social law. For Bram, hypotactic (hierarchically-arranged) societies are made up of bits, separate entities, whether people, offices, assembly lines, or power structures. Persistent differentiation, encouraged by (noun-based Indo-European) language and law, leads to a hierarchical society that uses contests to determine who reaches the top of the pyramid. Contest winners take the top

position—or top abstraction in fields of study like science, or in realms of life like religion or schooling. Univocity plays a significant role in keeping the domination hierarchy in place to benefit those with more privilege. As ecological feminists have documented about Western domination culture (e.g., Warren, 2000), people get categorized, abstracted and coerced into their place. Punishments become part of life and orderliness becomes paramount. Life becomes about staying in your place and carrying your load.

The clash of these vastly different consciousnesses was apparent when Europeans explorers, settlers and anthropologists encountered societies existing primarily in polysemy, but also in *paradox* – that is, a combination of diffuse or peripheral awareness in combination with focused attention or mental alertness (Berman, 2000). The Europeans were confused by community members’ lack of precise definitions, shifting stories and social configurations, and their lack of leaders. They were not “logical” in the linear, univocal sense. At the same time, First Nation peoples remarked on the soullessness of European invaders, their inflexibility and lack of openness and awareness of a sentient Earth (Narvaez, 2019). Showing similarities to Bram’s analysis, anthropologist E. Richard Sorenson (1998) noted a “preconquest consciousness” (versus postconquest consciousness in westernized nations) among the different Indigenous Peoples with whom he lived around the world over decades.¹ Among those with preconquest consciousness, Sorenson documented the shifting descriptions of self, others and places, based on context. There were no fixed identities. So, for example, a person could have multiple names that came or went, whose use shifted with the desire of mates or context. With the lack of fixed or rigid identities, the overall sense of the world was not static but dynamic, with actions changing and dependent on foregrounding, activity, season and mood, rather than on fixed cognitive thought.

The difference between univocity and polysemic consciousnesses appears to align with left hemisphere-dominated and integrated modes of being, respectively. Also similar to Bram’s analysis, McGilchrist (2009) reviewed empirical research on left and right brain functioning and then concluded that a lack of hemispheric integration (minimal right hemisphere involvement) and left-brain dominance has characterized most of Western civilization. Left-brain dominated thought is governed by the explicit and the disembodied, oriented to static, categorizable things, interested only in what is preconceived or has a defined purpose. It focuses on detail, mechanistic processes, perfectionistic thinking and is largely more comfortable with impersonal interactions. The left brain contains more myelination *within itself*, indicating its function to refer to information that is known (self-referring), unlike the right brain whose expanded myelination and connectivity to the whole brain allows for perception and intake of new information outside itself, playing an integrative role in broad, generalized thinking (Tucker, Roth & Blair, 1986).

The left-hemisphere’s skills are not in and of themselves deleterious. Rather, they are enhanced and balanced only when in dialogue with the right hemisphere (Tweedy, 2021). The right hemisphere is able to ground and make sense of the detailed, perfectionistic and impersonal insights provided by the left. When a bi-hemisphere collaboration occurs, one maintains the ‘big picture,’ responds to an evolving, dynamic, interconnected, world and is comfortable with obscurity (vagueness or mystery) and the personal, maintaining connections with the natural world and other systems (McGilchrist, 2009).

¹ Sorenson used film to discover what he experienced rather than his notes from contemporaneous experience because the latter were biased by his postconquest consciousness. He is credited with starting anthropological filmography and the Human Studies Film Archives at the Smithsonian.

According to McGilchrist, capacities for the diffuse, wide-open attention especially declined with the ascent of the Enlightenment and the Western. The lack of hemispheric integration coupled with lopsided hemisphere leadership (left over right), led to an emphasis on materialism at the expense of social cohesion and respect for individuality—the unique nature of each person was replaced with categorical descriptions, such as race or socioeconomic status. McGilchrist points out that the common modern condition—feeling fragmented, devitalized, depersonalized, depressed, or dissociated, along with lost emotional depth and empathy—correspond to an overbearing left hemisphere and underactive right hemisphere—what psychotherapy seeks to rebalance (Tweedy, 2021).

Berman (2000) suggests that a large part of western civilization reflects disconnection from nature and from flexible coordination with others, including the other than human. In our view, the lack of connection to others, including to the natural world, generates further disconnections within the individual as well as the individual's understanding of present and future life. According to Bram (2018), persistent differentiation leads to deep anxiety and death terror as the sense of the present is thin and emptied out of creative polysemy and the focus is on the future which will bring about certain death.

In contrast, integration of hemispheric functioning, the right-brain leading, results in thinking that is open and receptive, attuned to the energies of the moment, dominated by a feeling of relation and multiperspectivalism, interested in penetrating mysteries and that which is beyond apparent perception or comprehension; such integration is apparent in noncivilized communities the world over (Berman, 2000; Descola, 2013; Wolff, 2000). This type of hemisphere integration is able to drink deeply of the realities of the present moment, participatory consciousness, as well as conceive, creatively and realistically, the future. Moreover, brains that are integrated across hemispheres are associated with compassionate and kind action (Tweedy, 2021).

Like Sorenson, McGilchrist, Berman and Bram, physicist David Bohm (1994) also described two types of awareness. The first, insight-intelligence, the source of creativity, is open to the flow of shared being with others outside the self. It taps into transrational reality where participation is entwined with observation, instilling a sense of awe. For westernized minds, it appears in eureka moments. Among First Nation societies, it is routinely experienced in dreams, visions and intuitions (Wolff, 2001). For others, in participatory ceremonies, rituals and dances, sometimes with mind-altering practices. Bohm's second form of awareness is thought-in-the-mind, a dualistic, subject-object worldview familiar to westerners. It consists of static habits of mind, a fossilized consciousness, such as beliefs and other self-referential or cultural loops. It is the self-looping of the left hemisphere. Cognitively speaking, we can see a lining up of polysemy with insight-intelligence and the right hemisphere, and a lining up of univocity with left hemisphere self-referential thought.

Taken together, we suggest a correspondence between the socio-cultural transformation and the biopsychosocial. That is, diminishing polysemy with the rise of patriarchy and the devaluing of women and natural cycles may be caused by the devaluation and degradation of nurturing child formation. We propose that a significant causal factor in bringing about the emphasis on univocity is the “misraising of the species' brain,” that is, the lack of EDN provision, leading to an underdevelopment of coordinated connection to others and right-hemispheric functions generally. Specifically, it is our hypothesis that civilizations' concern for controlling nature and non-elites led to a diminishment of EDN provision which became culturally sanctioned, leading to an enhancement of left-hemisphere functions at the expense of

right hemisphere functions.

The shift away from the EDN is particularly hard on males. Lack of EDN provision impairs healthy development of all people but critically impacts developing males because neurobiologically and psychologically they develop more slowly, have less built-in resilience and need more nurturing than girls (Schoore, 2017). Without appropriate nurturing boys more easily develop dysregulation in multiple ways, including an easy downshifting to primitive survival systems of territoriality and dominance-seeking, affecting adulthood and the culture such dominance-oriented people create (Eisler & Fry, 2019; Narvaez, 2008, 2014). Undercare, particularly of boys, is common in harsh patriarchal societies. Across generations undercare continues to degrade, leading to personalities vulnerable to fear, rage or greed (the wétiko virus of cannibalizing life noted by Natives in the European invaders of the Americas; Forbes, 2008), empowering ideologies of one kind of supremacy or another (Narvaez, 2014).

Civilizations have moved away from the EDN, polysemy, and right hemisphere development, at the risk of human species extinction. Right hemisphere development undergirds receptive intelligence awareness of sentience in the natural world, a sense of connectedness and placefulness on the earth (Narvaez, 2014). We now face the four horsemen of the environmental apocalypse: massive toxification of earth systems, degradation of the atmosphere, global burning and mass extinction (Wilson 1991). We think that the missing EDN plays a role in the widespread ecological autism that governs modern human culture.

Conclusion

Many things changed within civilization, including the raising of children and capacities for living with nature. Most adults in industrial civilization are unaware of the species-typical developmental system that optimizes normal human development and human capacities. Stuck in univocity or black-and-white thinking and applying it to life in general, modern persons have inherited a narrow understanding of the human person, a misunderstanding of how to raise a human and what optimal human capacities look like. In fact, there may be ongoing intergenerational effects. That is, in order to provide right hemisphere support of the infant's developing brain, caregiving must evoke right-hemisphere implicit cognitions and functioning *in the caregiver* in order to attune with the child. The caregiver must sensitively respond to the changing affective and bodily based cues from the infant in order to regulate his/her changing states.

However, the mother herself may need to have received EDN-consistent care in order that her right hemisphere work properly in caring for her child. Otherwise, the degradation of nurturing and development is passed on generation to generation. The effects may be exponential, meaning that mothers with poor mothering have impaired mothering instincts and empathy, a snowball effect over generations. As the provision of the human evolved developmental niche (EDN) deteriorated over the course of civilization, so did various human capacities. Educators and mental health professionals have noted the deterioration in US mental health over the last decades and attempt pharmacological or education interventions (e.g., social and emotional learning). This is not enough.

Two levels of change, bottom-up and top-down, are required to alter human futures. First, from the beginning of life, children need to be provided EDN-consistent care so they can develop their full human capacities. It will require organizing society around the needs of children and families, identifying ways to support nest provision through social policy (see Narvaez, 2018; Narvaez, Panksepp et al., 2013).

Second, top-down, the cultural stories and ideals should be shaped toward brain integration, helping us expect a more holistic, balanced orientation to life. A great deal of healing will be needed and many approaches can be used to grow or restore right hemisphere capacities in adulthood (Tweedy, 2021). The result will be a society that values relationships over things; prizes presence to more than control of life (Martin, 2021); embraces embodied living and individual uniqueness; supports interconnectedness; relishes mixed emotions and polyphonic music; and appreciates an amalgamation of widely different ideas. These will be grounded in ecological attachment, respect for ancestors and future generations, an Indigenous wisdom approach (Four Arrows & Narvaez, 2021).

References

- Bargh, J.A., & Chartrand, T. (1999). The unbearable automaticity of being. *American Psychologist*, 54, 462-479.
- Barnett, L. (2005). Keep in touch: The importance of touch in infant development. *Infant Observation*, 8(2), 115-123.
- Berman, M. (2000). *Wandering God: A study in nomadic spirituality*. Albany: State University of New York Press.
- Bowlby, J. (1951). *Maternal care and mental health* (Vol. 2). Geneva: World Health Organization.
- Bowlby, J. (2008). *Attachment*. Basic books.
- Bram, M. (2018). *A history of humanity*. Delhi: Primus Books.
- Burgdorf, J., Kroes, R. A., & Moskal, J. R. (2017). Rough-and-tumble play induces resilience to stress in rats. *NeuroReport*, 28(17), 1122-1126.
- Carter, S. S., Harris, J., Porges, S. W. (2009). Neural and evolutionary perspectives on empathy. In J. Decety J. & W. Ickes, *The Social Neuroscience of Empathy* (pp. 169-182). Cambridge: MIT Press.
- Cascio, C. J., Moore, D., & McGlone, F. (2019). Social touch and human development. *Developmental cognitive neuroscience*, 35, 5-11.
- Champagne, F. A. (2018). Beyond the maternal epigenetic legacy. *Nature neuroscience*, 21(6), 773.
- Davis, E. P., Glynn, L. M., Schetter, C. D., Hobel, C., Chicz-Demet, A., & Sandman, C. A. (2007). Prenatal exposure to maternal depression and cortisol influences infant temperament. *Journal of the American Academy of Child and Adolescent Psychiatry*, 46, 737-746.
- Deoni, S.C.L. Dean III, D.C., Piryatinsky, I., O'Muirheartaigh, J., Waskiewicz, N., Lehman, K., Han, M., & Dirks, H. (2013). Breastfeeding and early white matter development: A cross-sectional study. *Neuroimage*, 82, 77-86.
- Fish, E. W., Shahrokh, D., Bagot, R., Caldji, C., Bredy, T., Szyf, M., & Meaney, M. J. (2004). Epigenetic programming of stress responses through variations in maternal care. *Annals of the New York Academy of Sciences*, 1036(1), 167-180.
- Forbes, J.D. (2008). *Columbus and other cannibals: The wétiko disease of exploitation, imperialism, and terrorism, rev ed*. New York: Seven Stories Press.
- Gershoff, E. T. (2013) Spanking and child development: We know enough now to stop hitting our children. *Child Development Perspectives*, 7 (3), 133-137.

- Girard, L. C., Doyle, O., & Tremblay, R. E. (2018). Breastfeeding and externalising problems: a quasi-experimental design with a national cohort. *European Child & Adolescent Psychiatry*, 27(7), 877-884.
- Goettner-Abendroth, H. (2013). *Matriarchal societies: Studies on Indigenous cultures across the globe* (K. Smith, trans.). New York: Peter Lang.
- Goetz, J. L., Keltner, D., & Simon-Thomas, E. (2010). Compassion: an evolutionary analysis and empirical review. *Psychological Bulletin*, 136(3), 351.
- Gottlieb, G. (2002). On the epigenetic evolution of species-specific perception: The developmental manifold concept. *Cognitive Development*, 17, 1287–1300.
- Haley, D. W., & Stansbury, K. (2003). Infant stress and parent responsiveness: Regulation of physiology and behavior during still-face and reunion. *Child Development*, 74(5), 1534-1546.
- Harlow, H. F. (1958). The nature of love. *American psychologist*, 13(12), 673.
- Hofer, M. A. (1994). Early relationships as regulators of infant physiology and behavior. *Acta Paediatrica*, 83, 9-18.
- Holden, C.J., & Mace, R. (2003). Spread of cattle led to the loss of matrilineal descent in Africa: A coevolutionary analysis. *Proceedings of the Royal Society of London B*, 270, 2425-2433. DOI 10.1098/rspb.2003.2
- Hrdy, S. B. (2009). *The woman that never evolved*. Harvard University Press.
- Klaus, M.H., & Kennell, J.H. (1976/1983). *Maternal-infant bonding: The impact of early separation or loss on family development*. St. Louis, MO: C.V. Mosby.
- 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* (pp. 19-64). New Brunswick, NJ: Aldine Transaction.
- Kringelbach, M. L., Lehtonen, A., Squire, S., Harvey, A. G., Craske, M. G., Holliday, I. E., ... & Stein, A. (2008). A specific and rapid neural signature for parental instinct. *PloS one*, 3(2), e1664.
- Ladd, C.O., Huot, R.L., Thrivikraman, K.V., Nemeroff, C.B., Meaney, M.J., Plotsky, P.M . (2000): Long-term behavioral and neuroendocrine adaptations to adverse early experience. *Prog Brain Res*, 122: 81–103.
- Lee, R. B., & Daly, R. (Eds.). (2005). *The Cambridge encyclopedia of hunters and gatherers*. New York: Cambridge University Press.
- Lee, S. J., Grogan-Kaylor, A., Berger, L. M. (2014). Parental spanking of 1-year-old children and subsequent child protective services involvement. *Child Abuse and Neglect*, 38(5), 875-883. doi: 10.1016/j.chiabu.2014.01.018.
- Liu, D., Diorio, J., Tannenbaum, B., Caldji, C., Francis, D., Freedman, A., ... & Meaney, M. J. (1997). Maternal care, hippocampal glucocorticoid receptors, and hypothalamic-pituitary-adrenal responses to stress. *Science*, 277(5332), 1659-1662.
- Louis-Jacques, A., & Stuebe, A. (2018). Long-term maternal benefits of breastfeeding: Longer durations of breastfeeding are associated with improved health outcomes for mothers and should be supported by ob/gyns. *Contemporary OB/GYN*, 63(7), 26+.
- Mann, B.A. (2006). *Daughters of Mother Earth: The wisdom of Native American women*. New York: Praeger.
- Martin, C.L. (2021). *Eskimos won't talk about Bears: Language as physics*. Malone NY: K-Selected Books.

- McEwen, B. S. (2019). Prenatal programming of neuropsychiatric disorders: An epigenetic perspective across the lifespan. *Biological Psychiatry*, *85*(2), 91-93.
- McGilchrist, I. (2019). *The master and his emissary: The divided brain and the making of the western world*. Yale University Press.
- Minagawa-Kawai, Y., Matsuoka, S., Dan, I., Naoi, N., Nakamura, K., & Kojima, S. (2009). Prefrontal activation associated with social attachment: facial-emotion recognition in mothers and infants. *Cerebral Cortex*, *19*(2), 284-292.
- Montagu, A. (1968). Brains, genes, culture, immaturity, and gestation. In A. Montagu (Ed.) *Culture: Man's adaptive dimension* (pp. 102-113). New York: Oxford University Press.
- Murgatroyd, C., Patchev, A.V., Wu, Y., Micale, V., Bockmuhl, Y., Fischer, D., Holsboer, F., Wotjak, C.T., Almeida, O.F.X., & Spengler, D. (2009). Dynamic DNA methylation programs persistent adverse effects of early-life stress. *Nature Neuroscience*, *12*, 1559-1566.
- Narvaez, D. (2019). Original practices for becoming and being human. In Narvaez, D., Four Arrows, Halton, E., Collier, B., Enderle, G. (Eds.), *Indigenous sustainable wisdom: First Nation knowhow for global flourishing* (pp. 90-110). New York: Peter Lang.
- NICHD Early Child Care Research Network. (2003). Child care in the world—past and present: Does amount of time spent in child care predict socioemotional adjustment during the transition to kindergarten? *The Journal of the Japan Society for Child Health*, *62*, 418-431.
- Panksepp, J. (2018). PLAY and the construction of creativity, cleverness, and reversal of ADD in our social brains. In T. Marks-Tarlow, M. Solomon & D. J. Siegel (Eds.), *Play and creativity in psychotherapy* (pp. 242–270). New York, NY: Norton
- Power, M.L., & Schulkin, J. (2016). *Milk: The biology of lactation*. Baltimore: Johns Hopkins University Press.
- Rowlands, I. J., & Redshaw, M. (2012). Mode of birth and women's psychological and physical wellbeing in the postnatal period. *BMC pregnancy and childbirth*, *12*(1), 138.
- Schore, A. N. (1994). *Affect regulation and the origin of the self*. Mahwah, NJ: Erlbaum.
- Schore, A. N. (2000). Attachment and the regulation of the right brain. *Attachment and Human Development*, *2*, 23–47.
- Schore, A. N. (2009). Attachment trauma and the developing right brain: Origins of pathological dissociation. In P. F. Dell & J. A. O'Neil (Eds.), *Dissociation and the dissociative disorders: DSM–V and beyond* (pp. 107–141). New York, NY: Routledge.
- Schore, A. N. (2011). The right brain implicit self lies at the core psychoanalysis. *Psychoanalytic dialogues*, *21*(1), 75-100.
- Schore, A. N. (2019a). *The development of the unconscious mind*. WW Norton & Company.
- Schore, A. N. (2019b). *Right brain psychotherapy*. WW Norton & Company.
- Serrano-Villar, M., Huang, K. Y., & Calzada, E. J. (2017). Social support, parenting, and social emotional development in young Mexican and Dominican American children. *Child Psychiatry and Human Development*, *48*(4), 597–609. <https://doi.org/10.1007/s10578-016-0685-9>
- Skenazy, L. (2010). *Free-range kids: How to raise safe, self-reliant children (without going nuts with worry)*. San Francisco: Jossey-Bass.
- Spinka, M., Newberry, R. C., & Bekoff, M. (2001). Mammalian play: training for the unexpected. *The Quarterly Review of Biology*, *76*(2), 141-168.

- Szyf, M. (2009). Early life, the epigenome and human health. *Acta Paediatrica*, 98(7), 1082-1084.
- Trevathan, W.R. (2011). *Human birth: An evolutionary perspective, 2nd Ed.* New York: Aldine de Gruyter.
- Tucker, D. M., Roth, D. L., & Bair, T. B. (1986). Functional connections among cortical regions: topography of EEG coherence. *Electroencephalography and clinical neurophysiology*, 63(3), 242-250.
- Turkle, S. (2017). *Alone together: Why we expect more from technology and less from each other.* New York: Basic Books.
- Tweedy, R. (Ed.) (2021). *The divided therapist: Hemispheric differences and contemporary psychotherapy.* London: Routledge.
- Vaiserman, A. M. (2015). Epigenetic programming by early-life stress: Evidence from human populations. *Developmental Dynamics*, 244(3), 254-265.
- Van den Berg, C. L., Hol, T., Van Ree, J. M., Spruijt, B. M., Everts, H., & Koolhaas, J. M. (1999). Play is indispensable for an adequate development of coping with social challenges in the rat. *Developmental Psychobiology: The Journal of the International Society for Developmental Psychobiology*, 34(2), 129-138.
- Van Reenen, S. L., & Van Rensburg, E. (2013). The influence of an unplanned caesarean section on initial mother-infant bonding: mothers' subjective experiences. *Journal of Psychology in Africa*, 23(2), 269-274.
- Warren, K.J. (2000). *Ecofeminist Philosophy: A Western perspective on what it is and why it matters.* Lanham, MD: Rowman & Littlefield.
- Wasserstein, J., & Stefanatos, G. A. (2000). The right hemisphere and psychopathology. *Journal of the American Academy of Psychoanalysis*, 28(2), 371-395.
- Wells, N. (2000). At home with nature: Effects of "greenness" on children's cognitive functioning. *Environment and Behavior*, 32, 775-795.
- Wilson, E.O. (1991). Biodiversity, prosperity, and value In F.H. Bormann & S.R. Kellert (Eds.), *Ecology, economics, ethics: The broken circle.* New Haven: Yale University Press.
- Wolff, R. (2001). *Original wisdom.* Rochester, VT: Inner Traditions.