

Raising Virtuous Children: Children's Basic Needs and the Evolved Nest

Mary Tarsha and Darcia Narvaez, University of Notre Dame

Abstract: Humans were created to be cooperative but it requires extensive nurturing. Children arrive highly immature with many basic needs that must be met for optimal development. The evolved nest provides the set of experiences provided by families and communities that match up with the maturational schedule of the child. We describe the evolved nest and its effects. Our work demonstrates how important the evolved nest is for the physiological and mental wellbeing of children (and adults), as well as sociality and morality. Moral virtue relies on the well-constructed psychosocial neurobiology that the evolved nest nurtures. The nest contains many similarities with how early Christians lived and functioned, as a community of care, cooperation and companionship.

All parents want to nurture good children. In ancestral contexts, the whole community—the village-- helped foster virtue in the community's children. In modern societies, children have experiences that often go against virtue development, not only in the neighborhood but in the society and even with the family. We discuss how virtue develops and what needs to be provided by families and communities for virtue development.

The Nature of Virtue

What is virtue? To help us make sense of what virtue is and why it is important, it is common to think back to the Greek philosophers, the writings of Aristotle and Thomas Aquinas. For example, Thomas Aquinas, after Aristotle, noted that all people desire the good in any given moment—and they act on that desire. He stated that “every creature is oriented toward its own goodness, that is, its fullness of being in accordance with the ideal of its species” (Porter, 1990; Narvaez, 2016a). This means that all creatures are geared toward their own optimization and virtue is part of that aim. In fact, the whole of the cosmos is created in goodness and oriented towards goodness. Consequently, there is no difference between what is good for one and what one ought to do. In this way, virtue subsumes flourishing and involves living the life that is good for one to live. For humans it involves cooperative attunement to others for good ends.

Living a good life, a life that involves flourishing, requires perceptive cooperation with one's ecological setting. To flourish does not mean that one's lifestyle hurts, harms or diminishes the biodiverse world but enhances. Human flourishing does not come at the expense of ecological health. To live a good life and to practice virtue means cooperation with all of life, including nonhumans.

While Aquinas sheds light on virtue and the goodness of creation, it is critical to understand how virtue is formed. Recent empirical evidence from neuroscience, developmental psychology and ethnographic research helps illuminate how virtue is shaped by experience. Understanding the converging evidence about virtue development, we can add to Aquinas' view that when children are raised well, they become good human beings. That is, we are not born fully formed by any measure. This includes social and moral development. At birth, the human brain is very immature. Compared to other hominids, newborn humans are the most biologically

immature and human children have the longest maturational schedule of any animal (Trevathan, 2017)—neuroimaging studies indicate that the brain does not fully mature until the third (sometimes fourth) decade of life (Westlye et al., 2009)! As a result of the long maturational schedule of the human brain and other neurobiological systems, much of a person’s development takes place through a dynamic interaction among physiological maturation, social experience and quality of caregiving. Much of who we are and become is the result of the social ecology in which we are raised, the type of environment that surrounds us during these critical, sensitive years of development (Narvaez, 2016a). Neuroscientist and epigeneticist Frances Champagne articulated this well when she said, the “quality of the social environment becomes embedded at a biological level” (Champagne, 2010, p. 299. Champagne was referring to the fact that experience has the power to act upon the genome, influence genetic expression, turning genes on or off (this is referred to as epigenetics). The influence of the environment on neurobiological architecture and genetic expression in early life often persists into adulthood (Gudsnuk & Champagne, 2011; Bludau, Royer, Meister, Neumann & Menon, 2019). In other words, the type of care received during childhood and most importantly, during the first years of life, shapes one’s neurobiology. This, in turn, influences one’s mental health, as well as social and moral capacities.

Infants and children are dependent on their caregivers to lay the foundations of sociality and morality. The sociomoral brain is co-constructed through the behavior of mothers and other caregivers. To put it a different way, infants are not born corrupt and selfish, needing strong coercion to force them towards goodness, sociality and morality. There is no evil baby. In fact, the opposite is true. All creation is oriented towards goodness, including every infant and child, as Aquinas articulated. Children are hardwired for sociality and morality but they need to learn the how’s: how to be social and how to be moral in a life of relationships. The precise “how’s” of sociality are co-constructed through caregiver interaction with infants and children, shaping the unconscious mind and laying the foundations for virtue (or vice). In this way, whom the child becomes is biosocially constructed.

Understanding the importance of environment and the life-long impact caregivers have upon shaping children’s development leads us to wonder: what is the best environment for children to develop and flourish? Here are two less-optimal strategies. A common reaction to learning about the importance of caregiving is to become child-centered. This means that parents/caregivers stop play or work and revolve family life around a set of engineered goals for the child with sports lessons, music lessons and keeping them busy with achievement activities. Child-centered parenting can lead to smothering the child, becoming invasive and intrusive, a form of obsessive-compulsive behavior (tiger parenting). Here, the child is actually robbed of independence and autonomy, encouraged to be self-centered and focusing on winning. The child’s unique spirit barely has a chance to grow.

The opposite parenting strategy is that of a parent-centered family. In this approach, parents are the center of the family, not the children. Parental work or other adult agendas take precedence over the child’s needs and this evokes a detached relational orientation (speaking in terms of attachment framework). In order to maintain the superiority of adult agendas, parents emotionally detach from their own emotions and their children’s. Common phrases of detached mindsets include things such as “children should be seen and not heard,” or reassurances like, “they won’t remember.” When parents practice emotional detachment, “tuning out” their children, known practices that are harmful for children are rationalized and made acceptable.

These practices include cry-it-out sleep training (Middlemiss, Granger, Goldberg & Nathans, 2012; Callaghan & Tottenham, 2016) and spanking (Gershoff et al., 2018).

The heart of the problem with both of these parenting approaches is that they assume the family is a competition, an either/or, zero-sum game. It is only the child's or the parent's needs that can be satiated. These approaches operate via a one-up or one-down operation so that one group or family member has more control and power. In the parent-centered family, parents' needs dominate, and children's are subordinate, whereas in child-centered parenting, children's presumed needs are higher than their parents'. The good news is that an alternative, healthier parenting approach is possible, one that incorporates the needs of all family members, fostering relational communion and psychological wellbeing: life-centered parenting.

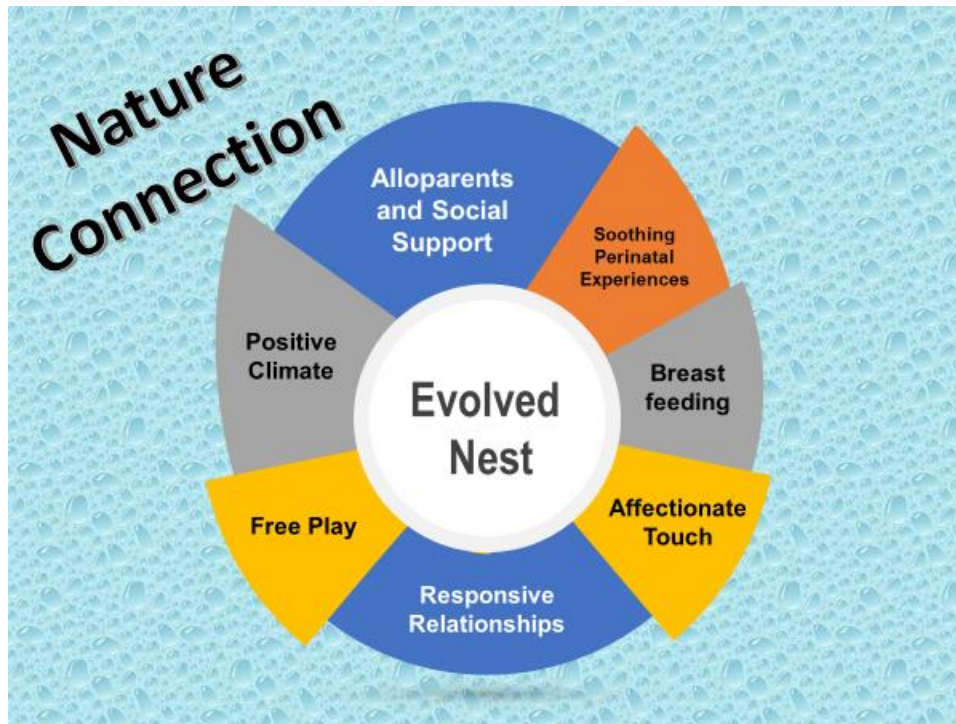
In life-centered families, parents are sensitive to the needs of children while continuing to act as adults within a community. The children are treated as equals but with extra needs as they develop. Children are incorporated into adult life coordinating the meeting of parent and child needs. For example, in life-centered parenting breastfeeding is understood to be normal and a natural necessity, and something that does not remove the mother and infant from society and community life. This means that on-request breastfeeding—the baby suckles and is nourished at will, without being rushed or denied or isolated—is understood to be fundamental to the infant's development. When the baby wants to breastfeed frequently, this is not seen as a demanding, selfish behavior, something that needs to be controlled or denied. Rather, the mother's continual free-flowing gift of responding to the infant's request to breastfeed is understood to build a healthy body and brain, as well as secure emotional attachment, a critical component of healthy psychological development. The mother and family function to meet the infant's needs and, simultaneously, remain integrated in community life.

The Evolved Nest

For 99% of their genus history, humans lived in small-band hunter-gatherer communities around the world (SBHG; Fry, 2006; Lee & Daly, 2005). SBHG adults are highly prosocial, compassionate, generous, caring, and egalitarian, with some scholars even recognizing their capacity for a higher consciousness (Fry & Souillac, 2013; Ingold, 2005; Martin, 1999; Narvaez, 2016b; Wolff, 2001). The SBHG way of caring for their young—life-centered, companionship care—is described as the *evolved nest* (i.e., Evolved Developmental Niche or EDN; Narvaez & Gleason, 2013). Every animal evolved a nest for its young, and humanity's is particularly intensive, providing deep companionship, responsivity and nurturing. Humanity's evolved nest consists of many social mammalian adaptations, intensive parenting practices that evolved over 30 million years ago (Konner, 2010). Among humans, nested care is a system that is provisioned by the community, not simply by mothers and/or fathers. The evolved nest includes: (1) affectionate touch: being held or kept near others constantly; (2) prompt and appropriate responses to fusses, cries, and needs, as to keep the young child in an optimal state of arousal; (3) breastfeeding on request (two to three times per hour initially) and on average for two to five years; (4) multiple allomothers, that is, frequent care by responsive individuals other than mothers (fathers and grandmothers, in particular) and social support; (5) multiage, self-directed, social free-play in nature; (6) positive home climate; (7) soothing perinatal experiences and (8) connection to nature (for reviews, see Narvaez, Panksepp, Schore & Gleason, 2013). When a community is sensitive and well-tuned to the needs of its youngest members by providing nested care to its young, then optimal development takes place, leading to a prosocial, virtuous, and peaceable personality (Narvaez, 2018; 2019; Tarsha & Narvaez, in press).

Although nest characteristics may seem odd when compared to mainstream, Western culture, it is important to remember that nest characteristics make up the majority of the way in which our human species lived and thrived. In order to further understand the importance of the nest, we next briefly discuss empirical evidence for each component and how it relates to moral development. See Figure 1 for the list of components.

Figure 1. The Evolved Nest for Young Children



Soothing Perinatal Experiences

Common obstetrical practices in the West include numerous painful, often developmentally disrupting procedures. Many of these practices began during an era in which infants were presumed to not feel pain (they do) but still continue in hospitals out of habit (Narvaez, Panksepp, Schore & Gleason, 2013). These painful procedures include but are not limited to: spanking, separating mother and child, circumcision, bright lights, noxious odors, gestational ultrasounds (which can influence neuronal migration and are correlated with autism), and sucrose solution to mitigate pain (which is not an effective analgesic) (Slater et al., 2010; Rosman et al., 2018; Ang, Gluncic, Duque, Schafer & Rakic, 2006). But most importantly, these intrusive perinatal experiences often disrupt the natural rhythms of development, including mother-child bonding and breastfeeding. Babies who experience natural births that provide immediate skin-to-skin contact and breastfeeding are more self-regulated and have more relational attunement with their mothers compared to those who are swaddled or separated (Van Sleuwen et al., 2007). A meta-analysis was conducted that consisted of 38 randomized control trials, totaling 3,472 mother-infant dyads to investigate the effects of skin-to-skin contact immediately after birth (Moore, Bergman, Anderson & Medley, 2012). Skin-to-skin contact improved breastfeeding duration, children's cardio-respiratory-metabolic stability, temperature, self-regulation, and reduced stress associated with birth, with benefits that persisted for 10 years.

Despite the overwhelming evidence for skin-to-skin contact and immediate breastfeeding, routine medical practices separate mother and infant worldwide with fewer than half of newborns breastfed in the first hour (Cadwell, Brimdyr & Phillips, 2018).

Another common yet detrimental practice is selective (non-medically indicated) cesarean birth. In the United States, cesarean birth comprises nearly 32% of births (Hamilton, Osterman, Driscoll, & Rossen, 2017), with the number of worldwide cesareans reported to be 21% [95% confidence interval, 19%–22%), which is double the percentage since 2000 (Boerma et al., 2018). The long-term effects of cesarean births is still being investigated but mounting evidence demonstrates that negative effects include: 1) for the infant: hormonal, physical, bacterial abnormalities which can subtly alter neonatal physiology, alternations to immune development leading to allergy, atopy, asthma, and reduced intestinal gut microdiversity, with some long-term effects such as obesity and asthma; 2) for the mother: increased risk of uterine rupture and complications for subsequent pregnancies that include, abnormal placentation, ectopic pregnancy, stillbirth, preterm birth, with these risks, for the mother, increasing in a dose-response manner (Sandall et al., 2018).

These birthing practices and invasive procedures (done to both the infant and mother) are far from traditional, evolved and expected care (Trevathan, 2013; 2017). Within nested care, parents follow the natural rhythms of the mother and child; in fact, this is true for all mammalian parents. What the nest provides for the mother and infant is the possibility to bond to one another, immediately after birth, and this, in turn, promotes breastfeeding and many positive psychological outcomes. In fact, there is growing evidence that an infant's type of birth experience (cesarean or vaginal, stressful or not) effects epigenetic changes (Vaiserman, 2015; Szyf, 2009). This means that changes are made all the way down to the genetic level, not changing the sequence of the DNA but altering how these genes are expressed. In this way, we see that soothing perinatal experiences protect the infant and the mother against stress that can disrupt numerous neurobiological processes—including epigenetic alterations—that otherwise allow them to bond and the child to grow well.

Breastfeeding

While breastmilk is the most beneficial source of nutrition for an infant, breastfeeding involves much more than nutrition. It involves intimate mother-child contact and social bonding (Fouts, Hewlett & Lamb, 2012). This makes it a critical factor for humans to develop normally. Because it involves both nutrients and intimate social bonding, we examine each aspect separately, but it is important to remember that they are both interacting and dynamically changing, helping the baby to grow optimally.

Regarding composition, mammalian milk is both complex and species specific. More than 4,000 different mammalian species produce milk, each unique to its own species (Beck et al., 2015). For humans, breast milk contains numerous macro and micronutrients and continually changes according to the needs of the infant. It is composed of sugars (oligosaccharides), fats (lipids), proteins, and numerous other bioactive agents, including compounds that reduce inflammation and enhance the immune system (Andreas, Kampmann & Le-Doare, 2015). When examining just the sugar component—which functions as prebiotics for the infant—we find diverse glycans (sugars) in each mother. This means that each mother produces a milk and prebiotic that is unique to her (Aako et al., 2017). It is also important to recognize that while human milk is packed with diverse, rich nutrients, it is also thin. Unlike other animals that have thick milk, human milk is very fluid and this is related to the frequency of ingestion or suckling. Infants need to nurse more often than other mammals because of

human milk's thin composition, nursing or sucking on average every 20 minutes (Hewlett, & Lamb, 2005).

When a mother begins nursing, the first milk produced is called colostrum, which is thicker than later milk. It is a fluid that is saturated with growth factors and immunoglobulins, health protective agents that support the infant's immune system (Ballard & Morrow, 2013). Many of these vital elements that are ubiquitous in human milk are not found in infant formula. For example, breast milk contains diverse prebiotics (explained earlier) which are not found in infant formula (Martin, Ling & Blackburn, 2016). Formula also lacks adiponectin which is a protein that helps the body process sugars and fatty substances. High levels of adiponectin are related to lower levels of obesity and disease (Martin et al., 2006). Another key compound that formula lacks and only recently was added as supplement is tryptophan, an important hormone for sleeping, waking, and maintaining emotional tone. Tryptophan and its impact on sleep-wake cycles and emotions are both related to depression (Salgado-Delgado, Tapia Osorio Saderi & Escobar, 2011).

When examining long-term benefits, there is a plethora of advantages to both the mother and child. For children, breastfeeding decreases the risk of numerous diseases and infections compared to formula fed infants.¹ Breastfeeding significantly reduces the risk of: diarrhea, meningitis, ear infections, diabetes, externalizing behaviors, including hyperactivity (Girard, Doyle & Tremblay, 2018; Stuebe & Schwarz, 2010). Put simply, feeding a baby formula is increasing the risk for the infant/child to get sick, in one way or another, either in the moment or long-term. For women, the benefits of breastfeeding for a long duration have been extensively studied and include: reduced risk of breast cancer, ovarian cancer, endometrial cancer, metabolic syndrome, hypertension, myocardial infarction (heart attack), type II diabetes and lastly, premature maternal death (Louis-Jacques & Stuebe, 2018).

With regard to the nest, breastfeeding is on-request and goes on anywhere from 2 to 5 year or longer. In fact, the average age of weaning is around 4 years of age (Hrdy, 2009). Unfortunately, in the United States, only around 25% of women exclusively breastfeed their infants at 6 months of age and only 34% breastfeed at all at 1 year (Louis-Jacques & Stuebe, 2018). Recent evidence demonstrates there exists a dose-response relationship between duration of breastfeeding and positive outcomes. This means that women and children who breastfeed for a longer period enjoy greater benefits and protection from adverse outcomes. In short, breastfeeding is a dyadic process that helps the infant grow well, protects him/her from numerous adverse health conditions, all while simultaneously promoting maternal health as well. Breastfeeding also comes with freedoms and financial benefits, liberating parents from the burden of preparing formula properly (~28 minutes/bottle according to our lab's calculations) and paying for formula. It is the best way to support every infant and mother.

Our lab empirically examines the relation of nest components, like breastfeeding, to child development and flourishing. For example, in a Chinese dataset, breastfeeding length was related to young children's greater conscience development and inhibitory self-control (Narvaez, Gleason et al. 2016).

Positive Touch and Physical Closeness of Caregivers

The benefits of positive touch and the closeness of caregivers (or their absence) has been studied for many years (e.g., Harlow, 1958). Continual contact and physical closeness with caregivers is critical for normal development (Barnett, 2005). There is mounting evidence from animal as

¹ It should be noted that most studies comparing formula-fed and breastfed infants look at 3 months of feeding, not comparing children who receive several years of breastfeeding, which our species expects.

well as human studies that demonstrate the harmful effects of being separated from caregivers (Duhn, 2010; Ardiel, & Rankin, 2010; Field, 2014). Being separated from caregivers and being deprived of physical contact is stressful for any infant or child. This stress then ramps up the central nervous system's stress response (hypothalamic-pituitary-axis) and this can alter mental and physical health for a life-time. But what exactly does closeness and physical touch mean?

In our ancestral context where the nest is provided, babies and young children are kept physically close, in contact with their mothers and others at all times. This included times during the night and during time of sleep (Narvaez, Panksepp, Schore, & Gleason, 2013). Only 14% of infants in the United States regularly sleep in a bed near caregivers (National Institute of Child Health and Human Development, 2013). We now know that physical touch influence brain development and secure emotional attachments, leading to the promotion of healthy social and cognitive functioning in adulthood, including prosociality and moral behavior (Cushing & Kramer, 2005; Panksepp, 2007).

Another important finding regarding the importance of touch is its relationship to anxiety. Numerous studies (both animal and human) show that deprivation of touch in early life or childhood leads to anxiety in later life (Cascio, Moore, & McGlone, 2019; Fish et al., 2004; Franklin et al., 2014). The connection between lack of touch and anxiety is *not* correlational or an association. Scientists have begun to unravel the pathway and mechanisms by which lack of touch *causes* increased stress which leads to the development of anxiety. In addition, research shows that increasing touch in childhood (before adolescence) with a simple gesture on the shoulder decreases anxiety for those children who need it most, the socially anxious child (Brummelman et al., 2019). If your child suffers from anxiety, it is not too late to begin implementing simple gestures of affection throughout the day. This easy, free intervention strategy can have many positive effects, benefiting your child for many years to come.

The modern, western way of caring for infants and children promotes numerous devices for raising a child, things such as strollers, high-chairs, cribs and car seats. While these tools can be helpful from time to time, they can also stifle physical contact and closeness. It is important to remember that physical closeness does not mean a pat on the back once in a while, although that can be positive and reaffirming for older children. The nested way of providing for children's need for physical closeness and positive touch involves almost continual contact in the first year of life and plenty of carrying and closeness in the early years.

Our empirical examination of touch shows that greater affectionate touch in infancy is related to young children's empathy and inhibitory self-control in the USA and China (Narvaez, Gleason et al., 2016). Among US adults reporting on their childhood experiences, greater affectionate touch and less corporal punishment was related to a more open-hearted moral orientation and less self-protectionist moral orientation, including greater perspective taking and relational attunement (Narvaez et al., under revision).

Responsivity

Responsivity to infants and children means caring for their needs in the moment, not delaying or withholding care, and keeping baby in optimal arousal while the brain grows rapidly moment by moment. Unfortunately, several voices in popular western culture suggest that responsivity is not important and possibly harmful to children. Some believe that meeting the needs of infants and children will exacerbate innate selfishness, vice and dependency. Examples of such thinking include delaying food, sleep or breastfeeding because otherwise providing them will make the baby "demanding," more "difficult," and "spoiled." The opposite is true.

Fortunately, we know there are decades of research that directly counter such claims. Evidence from numerous fields shows that rapid responsivity to infants—moving in when the baby shows discomfort—is the foundation of right-brain affect regulation (Schorer, 2015; 2003). Caregivers who respond to the needs of their babies (under age 3) act as external emotional and psychological regulators and stabilizers so the many physiological systems under final development are established in healthy ways (Hofer, 1994; Schorer, 2001). The bodies and brains of young children need the physical and emotional guidance of adult caregivers to learn to adjust their emotional and physiological responses to changes in the environment. It is only through the presence of these external helpers that children learn to calm down and return to a growth inducing biochemistry instead of the panicked stress response that focuses on survival. Thus, when the adult caregiver is absent, hindered, or culturally prevented from providing responsive care, children establish dysregulated systems. When children are left unattended in distress, they eventually learn to shut down to stay alive, which looks to an insensitive adult like they are “self-soothing” (another myth). As one can see, nonresponsiveness builds dysregulation at the foundation of personality, rather than the mythical baby independence.

What specifically does responsive care promote? When warm, responsive care is provided, multiple positive effects take place. Children raised with abundant responsive care develop neurobiological systems that respond well to arousal and stress (e.g., via a well-developed oxytocinergic system), both on their own and with others (Liu et al., 1997; Schorer, 2003; Haley & Stansbury, 2003). It helps shape a child’s vagal tone, an important cranial nerve that helps calm, soothe and restore both emotional and physiological stress (Porges, 2011), and. Provides an important foundation for developing prosociality, compassion and openheartedness, all key ingredients of virtue development (Goetz, Keltner & Simon-Thomas, 2010; Carter, Harris, & Porges, 2009).

Mutually responsive caregiving predicts better socialization, for example, stronger conscience development (Kochanska, 2002; Kochanska, Boldt & Goffin, 2019). In our empirical work, responsiveness is always significantly related to positive child outcomes (wellbeing, happiness, low anxiety and depression, social attunement, empathy, conscience, self-regulation) and so we always use it as a control to see if other nest components matter too.

Free Play

Play is an important part of mammalian childhoods and is shown to promote numerous positive outcomes in children. The kind of play discussed here is natural physical play—not play in organized sports or activities. While these structured events can and do have other benefits, the type of play that is known to facilitate important emotional and psychological benefits is self-directed free play—play that is unstructured, with other children of different ages, and as much as possible, in nature. This type of play promotes brain development in general, including affectively beneficial gene expression profiles, emotion regulation, resilience to stress and is an effective treatment for ADHD and promoting of prosocial behavior (Panskepp, 2018; Burgdorf, Kroes, Beinfeld, Panskepp & Moskal, 2010; Burgdorf, Kroes & Moskal, 2017).

When play is missing from children’s daily lives, as this is happening in schools throughout the United States and elsewhere, children lose the chance to develop their right-brain hemisphere (Miller & Almon, 2009). The right-brain controls key aspects of prosocial behavior and self-regulation. Thus, it makes sense that play, especially rough and tumble play, is an effective intervention strategy for ADHD and other self-regulatory disorders. Those children who lack play in their early life have altered social, sexual and conflict interactions with peers (van den Berg et al., 1999). Without play, children lack emotional and relational flexibility, the

ability to shift and change actions when unexpected events take place (Spinka, Newberry & Bekoff, 2001). Play throughout childhood develops all of these important parts of the brain, giving the child the best chance to experience a healthy adult emotional life, which includes control over their body/mind/emotions and social flexibility, the ability to dynamically interact with others.

Our work on play shows that play facilitates healthy vagal tone in young children (Tarsha et al., in preparation), correlates with young children's moral feelings and behavior China (Narvaez, Wang et al., 2013) and with young children's empathy in the USA (Narvaez, Gleason et al., 2016).

Alloparents and Social Support

Alloparents is a term that refers to caregivers other than the mother (aka, allomothers, Hrdy, 2009). In order to provide the intensive responsive, nurturing care to infants and children, multiple caregivers, or alloparents, are needed. These can include trusted family members such as grandparents, aunts and uncles or other members of the community who are capable of providing loving, kind care. When children are surrounded by a large network of caregivers, this increases the likelihood that they will be cared for in a kind, loving and responsive manner, while also increasing mothers' experience of feeling socially supported which, in turn, increases maternal responsiveness to her child (Hrdy, 2011).

Alloparents and high levels of social support does not refer simply to friends or homes where parents feel comfortable dropping their children off for a play date. Having such friends is helpful but alloparents typically refers to adults who are helping care for the children on a daily basis, best with the parents nearby. Ideally the adults and the children are together, living and functioning as a group. In this way, both the parents and the children feel supported. Alloparents provide a social network of care and concern, ensuring that children find at least one (best three) person who loves them unconditionally. In traditional societies, alloparents supported good rather than poor parenting as the whole community would end up living with the shaped nature of the child.

In our empirical work, In a longitudinal study, mothers reporting more social support at children's 6 months of age (staying the same at 18 months), had children who were more prosocial at two and three years of age (Narvaez, Gleason et al., 2013). In an adult study, that adults reporting more social support in childhood tend to be less socially withdrawn or emotionally detached but instead communally engaged with others (Narvaez, Thiel et al., 2016).

Positive (Home) Climate

This nest component addresses the emotional climate in the home in which the child is immersed. The overarching feeling that is important for the child to have as they develop is a sense of being loved, cherished and appreciated. This will enable a sense of security, within the family, giving the child the experience of deep friendship both in the home (with other family members) and outside the familial unit. In turn, this promotes an openhearted orientation to life rather than a self-protection orientation.

In our measurement, positive home climate refers to a greater prevalence of positive rather than negative emotional atmosphere. Positive emotions include joy, serenity, expansiveness whereas detrimental (negative) emotions include sadness, fear, anger and humiliation. Adults who report more positive emotions in childhood are more secure, mentally healthier, less distressed and less likely to have a self-protective morality. A negative home climate in childhood predicts self-protectionism of various kinds in social situations (e.g., withdrawal, opposition, sense of superiority, viciousness) (Narvaez, Thiel et al., 2016).

Nature Connection

All components of the nest reflect a humble approach to nature, honoring humanity's social mammalian heritage, immaturity in early life and the evolved system of care proper development requires. But with ecological crises affecting everyone's daily life, it is important to emphasize that honoring creation require emotional commitment to the wellbeing of the biocommunity. Several scholars have pointed to the lack of ecological attachment—emotional connection—to the natural world as the deeper source of our ecological crises (Berry, 2013; Louv, 2005). Connecting to the natural world—all created things—occurs naturally in childhood, as long as children are regularly immersed in complex natural environs with freedom to roam. Nature connection is promoted not only by experiences in nature alone or with family, but in family conversations about ecological systems, animal and plant life and respectful practices to honor the lives of animals and plants and the more than human. In our ancestral context, human communities learned from nature as well. Deep observation of animals and plants fostered awareness of how to promote wellbeing in the biocommunity (Martin, 1999).

Connectedness to nature is deeply rooted within the Catholic tradition where the goodness of the natural world is recognized. Some specific examples include Sts. Francis of Assisi (brother sun and sister moon), Aquinas, and Anthony of Egypt. Anthony made the famous remark that to learn about God and to relate to Him, he preferred the book of nature to the written word (Athanasius, 1950). The idea is that connecting to nature is a basic human need but it also is a way to connect with God. Connecting to nature means taking time to wonder at the created world, breathing in its complexities and beauty all while wanting to respect and cultivate it, rather than dominate and control it.

The Evolved Nest (or lack of it) Shapes Society

The nest components are part of our heritage and shape wellbeing and the foundations for morality. When the evolved nest is provided by the community to infants and children, their brains develop properly, building foundations for prosocial and moral capacities. When we asked mothers to report on a young child's experience of the nest in the past week (self-directed play, affection, no corporal punishment, family togetherness) it predicts children's moral socialization (e.g., empathy, self control) and children's social thriving (relational attunement) (Narvaez, Woodbury et al., 2019).

In our ancestral context, the nest continued through life, prompting healthy functioning generally, with remedies for healing when, inevitably, a person failed in their virtuous treatment of others, including the other than human (Ross, 2006). Well cared for, well-formed, nested individuals grow up to become adults who prosocially engage with their family and community. Nested adults are motivated to help others, exhibit concern for others around them, including the created world. Ultimately, they become wise elders. These wise grandparents and elders demonstrate wellness, openheartedness, compassion and virtue. In this way, it is evident that a *cycle of cooperative companionship* develops (Narvaez, 2014), where the wise and healthy elders help meet the basic needs of younger generations. It creates a cascade of benefits flowing from the older members of the community to the younger ones. Because healthy grandparents are capable of being present, both emotionally and physically, to participate in caring for the needs of the youngest members of the family and community, parents are not isolated in their caregiving activities. This means that infants, children and parents are surrounded—*nested*—with care from many adults, not just the mother or father.

What happens when the nest is not provided?

When aspects of the nest are not provided, this deprives infants and children of what they need to grow well, shifting a child from an optimal trajectory to one of dysregulation. As discussed above, physical and neurobiological processes are thwarted, along with the basic building blocks of socioemotional intelligence, self-regulation and morality (Schor, 1997; 2002; Narvaez, 2014). Children who experience less than optimal development, are not given their uniqueness but learn to be on guard, bracing against the world. They age into adults and elders who are absorbed with their own needs, unable to care for the new generation. They are unable to fully engage with others, attend to the needs of the community and unlikely to reach wisdom as a community leader. The deterioration of the nest means that the cascading benefits from generation to generation do not take place. Instead of a cycle of cooperative companionship, a *cycle of competitive detachment* takes hold (Narvaez, 2014). This means that children are deprived of numerous alloparents, the much-needed broad network of adult caregivers. It also means that parents lack support themselves, which can lead to less responsive, warm parenting (Taraban, et al., 2018). Basic needs are not met and impair development and outcomes across generations.

Basic Needs

Abraham Maslow (1970) identified a set of basic needs that humans need fulfilled in order to reach their potential. He listed (in our words) physiological, security, social belonging, competency and self-actualization needs. In our view, a baby needs all of these simultaneously to grow well (Narvaez, 2018). Susan Fiske (2004) identified a BUCET list of basic needs: belonging, understanding, competence/control, self enhancement and trust. Erik Erikson (1950) identified sensitive periods in development for developing some of Fiske's BUCET list (or their opposite): trust in the first year of life; autonomy vs. shame/self-doubt in toddlerhood; initiative vs. guilt in the preschool years; industry vs. inferiority in childhood; identity vs. role confusion in adolescence; intimacy vs. isolation in young adulthood; generativity vs. stagnation in adulthood; and integrity vs. despair in elderhood. Each of these components are seeded in early life when psychosocial and neurobiological structures are set on trajectories for the lifespan. In more traditional societies, community practices necessarily supported these phases across the lifespan. But it is rare to find such supports in anyone's life in industrialized, economically-focused societies.

Where to go from here?

For most of us, it is easy to identify with the cycle of competitive detachment and recognize that many communities lack most, if not all, components of the nest. It seems to be a cultural trend in which we are immersed (in the West), one that emphasizes production and materialisms, a "Sacred Money and Markets" orientation (Korten, 2005). However, it is becoming more apparent that the price tag for emphasizing economic wealth over all is social and ecological poverty (ibid). The wealthier societies become, the more detached they become from those in need, including nonhumans and their ecological surroundings.

When we adults consider the components of the nest in our own lives, it can stir up a sense of unmet needs in our childhoods. While this might be initially painful, it is important to remember that changing the societal cycle from competitive detachment to cooperative companionship begins within each adult, the leaders of the family. Trauma and undercare in our own childhoods can make providing responsive, nested care aversive. A child's needs may seem overly demanding and rationalizations to ignore the intensive needs become attractive. Thus, parents need to understand how the parental brain can shut down in face of child needs leading to "blocked care" (Hughes & Baylin, 2012). Parents can learn to recognize their own unmet needs

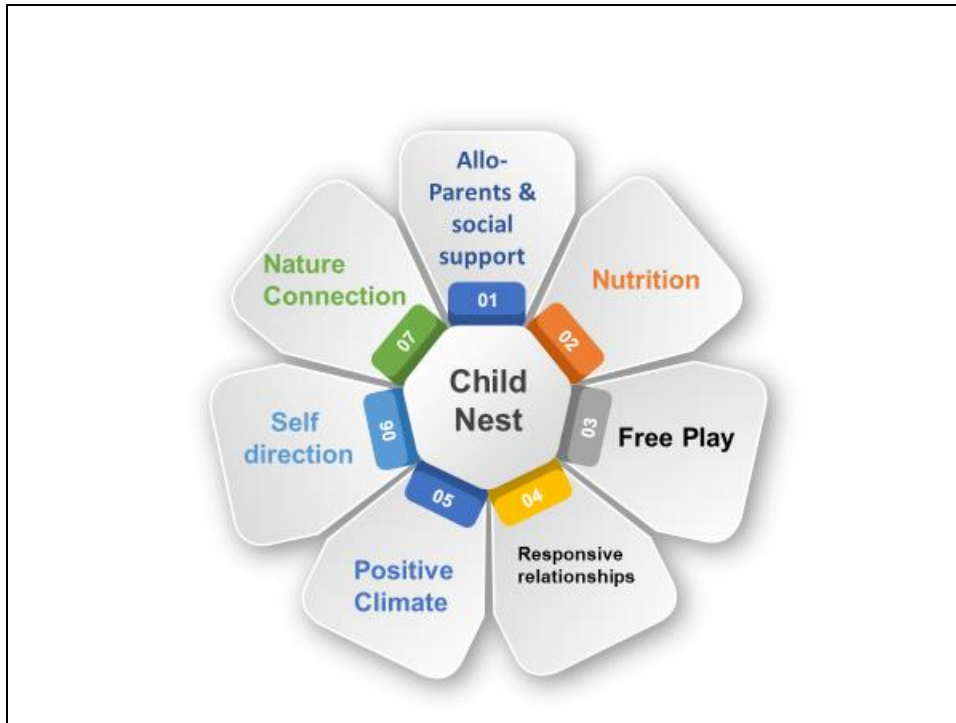
and address their primal wounds with sensitivity, working through the painful realization and promoting self healing (Narvaez, 2014).

Many modern structural and cultural practices make it difficult for families to provide each component of the nest. These challenges include inflexible work schedules, short maternity/paternity leave, financial debt, lack of education and missing social support. In this way, modern families are faced with the challenge of meeting their children's needs at a time in history with more obstacles than ever before. Trends within unnested cultures are to minimize the needs of the child, rather than try to correct the unjust systems and structures that are in place. So, what are families to do?

One solution to these seemingly insurmountable obstacles is moral innovation. This is the idea that when one has a deep, rich understanding of oneself, other people and the human existence, he/she is equipped with the ability to generate solutions to even the most difficult circumstances. Moral innovation is “the capacity to frame and to realize more comprehensive and inclusive ends that make it possible for us to live well together with others” (Johnson, 1996; Narvaez, 2010). We can create new ways of living and being within our unique family situations, ways that support the nest, life-centered parenting and living well together. With their deep, intimate (hopefully) understanding of their children, parents and family members are capable of creating new ways of living well together in order to provide the nest components.

An example of implementing moral innovation in the family as an adult family member, might be to consider asking, on a daily basis, if the children's needs are being met. This helps off-set the sometimes-consuming focus of work, finances, and other adult demands. Decide to ask yourself, or with your partner, this question every day at the same time (e.g., while brushing your teeth, driving home from work). As your children become older, you can include them in the questioning. For example, questions can be posed to toddlers or school aged children, “Did you get enough hugs today? Did you get enough self-directed physical play (running around time) today? Did you get enough social bonding experiences today?” Questions like these can help foster reflective capacities, teaching children to recognize their own needs as they grow. Eventually, the child will learn to recognize the feeling of an unmet need, will be able to articulate his/her want to the loving caregiver, and figure out ways to have the appropriate experience. With older children, discussions about the nest (you can use the Child Nest as a guide, see Figure 2) and basic needs are very constructive. These conversations can include questions about how their needs might be changing as they grow and develop.

Figure 2. The Child Nest



Another example of moral innovation includes trying to change behaviors that irritate the adults. Often times, an adult reaction to annoying behavior is either passivity, ignoring, or control, exerting power and punishment. Rather than resorting to these extremes, ask the question: “What basic need is being expressed?” If the child is older, you can even ask them directly, talking through the nest components. Satiating the unmet need will ameliorate the troublesome behavior and catalyze prosocial behavior and child flourishing (Narvaez, 2018).

Lastly, it might be helpful to reflect upon the basic mechanics of the family asking the question: is there enough time built into the daily schedule for children to freely play (not organized activities or screen time)? If the answer to this question is no, that could indicate that more downtime is needed, creating space for the child to interact with nature, engage in pretend play, or take up a wrestling match (rough-and-tumble play). Recognizing that time to be free, create and play are just as fundamental to familial health as good nutrition is an important step toward creating a counter-cultural home environment. This goes against the current trend in society that indicates weeknights and weekends are intended for busy schedules packed with carpools, organized sports, music lessons and numerous other activities. Even seemingly good things like social/prayer groups could stretch family life to the point that children are deprived of the freedom to play and create. Safeguard time, every day if possible, to rest and play in the family.

The Nest as Lived Theology

The nest is about meeting the needs of all family members, most especially infants and children. In this way, living and applying the nest in families and communities is a way of putting theology into action: living out justice, mercy and love. Because justice is concerned with right relationship, the nest is a way to implement justice at a personal and familial level (Philpott, 2012). Right relationship requires satiating of needs, for all family members, and the nest provides concrete ways to bring this into fruition. The nest also assumes

the ecclesiological understanding of mercy because it is focused on restoring human dignity and safeguarding against the feeling of humiliation (Pope John Paul II, 1980). When unneeded care is implemented in the family, basic rights of all members is degraded and this creates feelings of humiliation, distrust and shame. The nest is concerned with prevention of these adverse outcomes and in this way, is a form of agape love. It is important to recognize that love in action involves prevention, not just correction of wrongdoing. Nested parenting contains many similarities to early Christian communities' way of living where intensive nurturing was expected and supported by the community (Tarsha & Narvaez, in preparation).

Conclusion

The nest is an ecological system of care for infants and children that promotes human flourishing, including moral and virtue development. Humans are made to be cooperative but it requires extensive, responsive care, as outlined in the nest. Each component of the nest has extensive empirical evidence from multiple areas of research including developmental psychology, neuroscience, and anthropology showing how critical it is for healthy development to unfold.

The nest is universal and applies to all children because it centers on upholding the dignity of the child, the dignity of the parents, and the dignity of the family, including extended family members. By promoting and implementing the nest, families meet the basic needs of their children. This promotes human flourishing and virtue—in both children and adult family members—generating communities of cooperative companionship.

References

- Aakko, J., Kumar, H., Rautava, S., Wise, A., Autran, C., Bode, L., ... & Salminen, S. (2017). Human milk oligosaccharide categories define the microbiota composition in human colostrum. *Beneficial Microbes*, 8(4), 563-567.
- Andreas, N. J., Kampmann, B., & Le-Doare, K. M. (2015). Human breast milk: A review on its composition and bioactivity. *Early human development*, 91(11), 629-635.
- Ang, E. S., Gluncic, V., Duque, A., Schafer, M. E., & Rakic, P. (2006). Prenatal exposure to ultrasound waves impacts neuronal migration in mice. *Proceedings of the National Academy of Sciences*, 103(34), 12903-12910.
- Ardiel, E. L., & Rankin, C. H. (2010). The importance of touch in development. *Paediatrics & child health*, 15(3), 153-156.
- Athanasius, S. (1950). *The Life of Saint Antony* (No. 10). New York: Paulist Press.
- Ballard, O., & Morrow, A. L. (2013). Human milk composition: nutrients and bioactive factors. *Pediatric Clinics*, 60(1), 49-74.
- Barnett, L. (2005). Keep in touch: The importance of touch in infant development. *Infant Observation*, 8(2), 115-123.
- Beck, K. L., Weber, D., Phinney, B. S., Smilowitz, J. T., Hinde, K., Lönnerdal, B., ... & Lemay, D. G. (2015). Comparative proteomics of human and macaque milk reveals species-specific nutrition during postnatal development. *Journal of Proteome Research*, 14(5), 2143-2157.
- Bergman, N. J., Linley, L. L., & Fawcus, S. R. (2004). Randomized controlled trial of skin-to-skin contact from birth versus conventional incubator for physiological stabilization in 1200-to 2199-gram newborns. *Acta Paediatrica*, 93(6), 779-785.

- Berry, W. (2013). *It all turns on affection. 2012 Jefferson Lecture*. Washington, D.C.: National Endowment for the Humanities.
- Bird, R. B., & Power, E. A. (2015). Prosocial signaling and cooperation among Martu hunters. *Evolution and Human Behavior*, 36(5), 389-397.
- Bludau, A., Royer, M., Meister, G., Neumann, I. D., & Menon, R. (2019). Epigenetic Regulation of the Social Brain. *Trends in Neurosciences*.
- Boerma, T., Ronsmans, C., Melesse, D. Y., Barros, A. J., Barros, F. C., Juan, L., ... & Neto, D. D. L. R. (2018). Global epidemiology of use of and disparities in caesarean sections. *The Lancet*, 392(10155), 1341-1348.
- Brummelman, E., Terburg, D., Smit, M., Bögels, S. M., & Bos, P. A. (2019). Parental touch reduces social vigilance in children. *Developmental cognitive neuroscience*, 35, 87-93.
- Burgdorf, J., Kroes, R. A., & Moskal, J. R. (2017). Rough-and-tumble play induces resilience to stress in rats. *NeuroReport*, 28(17), 1122-1126.
- Burgdorf, J., Kroes, R. A., Beinfeld, M. C., Panksepp, J., & Moskal, J. R. (2010). Uncovering the molecular basis of positive affect using rough-and-tumble play in rats: a role for insulin-like growth factor I. *Neuroscience*, 168(3), 769-777.
- Cadwell, K., Brimdyr, K., & Phillips, R. (2018). Mapping, measuring, and analyzing the process of skin-to-skin contact and early breastfeeding in the first hour after birth. *Breastfeeding Medicine*, 13(7), 485-492.
- Callaghan, B. L., & Tottenham, N. (2016). The neuro-environmental loop of plasticity: A cross-species analysis of parental effects on emotion circuitry development following typical and adverse caregiving. *Neuropsychopharmacology*, 41(1), 163.
- 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.
- Champagne, F. A. (2010). Epigenetic influence of social experiences across the lifespan. *Developmental psychobiology*, 52(4), 299-311.
- Cascio, C. J., Moore, D., & McGlone, F. (2019). Social touch and human development. *Developmental cognitive neuroscience*, 35, 5-11.
- Cushing, B.S., and Kramer, K.M. (2005). Mechanisms underlying epigenetic effects of early social experience: the role of neuropeptides and steroids. *Neuroscience and Biobehavioral Reviews*, 29, 1089-1105.
- Duhn, L. (2010). The importance of touch in the development of attachment. *Advances in Neonatal Care*, 10(6), 294-300.
- Erikson, E. H. (1950). *Childhood and society*. New York: Norton.
- Field, T. M. (2014). *Touch in early development*. New Jersey: Psychology Press.
- 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.
- Fiske, S.T. (2004). *Social beings: A core motives approach to social psychology*. New York, NY: Wiley.
- Fouts, H. N., Hewlett, B. S., & Lamb, M. E. (2012). A biocultural approach to breastfeeding interactions in Central Africa. *American anthropologist*, 114(1), 123-136.
- Franklin, T. B., Russig, H., Weiss, I. C., Gräff, J., Linder, N., Michalon, A., ... & Mansuy, I. M. (2010). Epigenetic transmission of the impact of early stress across generations. *Biological psychiatry*, 68(5), 408-415.

- Fry, D. P. (2006). *The human potential for peace: An anthropological challenge to assumptions about war and violence*. New York: Oxford University Press.
- Fry, D. P., & Souillac, G. (2013). The relevance of nomadic forager studies to moral foundations theory: moral education and global ethics in the twenty-first century. *Journal of Moral Education*, 42(3), 346-359.
- Gershoff, E. T., Goodman, G. S., Miller-Perrin, C. L., Holden, G. W., Jackson, Y., & Kazdin, A. E. (2018). No longer up for debate: Physical punishment causes negative outcomes for children. *PRC Research Brief* 3(12). DOI:10.15781/T22R3PG2X.
- 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.
- Goetz, J. L., Keltner, D., & Simon-Thomas, E. (2010). Compassion: an evolutionary analysis and empirical review. *Psychological Bulletin*, 136(3), 351.
- Gudsnuk, K. M., & Champagne, F. A. (2011). Epigenetic effects of early developmental experiences. *Clinics in perinatology*, 38(4), 703-717.
- 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.
- Hamilton, B., J. Martin, M. Osterman, A. Driscoll, and L. Rossen. (2017). Births: Provisional data for 2016. *Vital Statistics Rapid Release* (Report No. 002, June 2017). Retrieved from <http://www.cdc.gov/nchs/data/vsrr/report002.pdf>
- Hewlett, B. S., & Lamb, M. E. (2005). Emerging issues in the study of hunter-gatherer children. *Hunter-Gatherer Childhoods: Evolutionary, Developmental and Cultural Perspectives*. Transaction Publishers, New Brunswick, New Jersey, 3-19.
- Hofer, M. A. (1994). Early relationships as regulators of infant physiology and behavior. *Acta Paediatrica*, 83, 9-18.
- Hrdy, S. B. (2011). *Mothers and others*. Cambridge, MA: Harvard University Press.
- Hughes, D. A., & Baylin, J. (2012). *Brain-based parenting: The neuroscience of caregiving for healthy attachment*. New York, NY: Norton.
- Ingold, T. (2005). On the social relations of the hunter-gatherer band. In R.B. Lee, R.B. & R. Daly (Eds.), *The Cambridge encyclopedia of hunters and gatherers* (pp. 399-410). New York: Cambridge University Press.
- John Paul II. (1980). *Dives in Misericordia*. [Encyclical letter]. Retrieved from http://w2.vatican.va/content/john-paul-ii/en/encyclicals/documents/hf_jp-ii_enc_30111980_dives-in-misericordia.html.
- 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(6), 191-195.
- Kochanska, G., Boldt, L. J., & Goffin, K. C. (2019). Early relational experience: A Foundation for the unfolding dynamics of parent-child socialization. *Child Development Perspectives*, 13(1), 41-47.
- Lee, R. B., & Daly, R. (Eds.). (2005). *The Cambridge encyclopedia of hunters and gatherers*. New York: Cambridge University Press.
- 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. *Contemporary Ob/Gyn*, 64(7). Retrieved from <https://www.contemporaryobgyn.net/breast-health/long-term-maternal-benefits-breastfeeding>
- Louv, R. (2005). *Last child in the woods: Saving our children from Nature Deficit Disorder*. New York: Workman.
- Martin, C., Ling, P. R., & Blackburn, G. (2016). Review of infant feeding: key features of breast milk and infant formula. *Nutrients*, 8(5), 279.
- Martin, C.L. (1999). *The way of the human being*. New Haven, CT: Yale University Press.
- Martin, L. J., Woo, J. G., Geraghty, S. R., Altaye, M., Davidson, B. S., Banach, W., ... & Morrow, A. L. (2006). Adiponectin is present in human milk and is associated with maternal factors. *The American Journal of Clinical Nutrition*, 83(5), 1106-1111.
- Maslow, A. (1970). *Motivation and personality*, 2nd ed. New York: Harper & Row.
- Middlemiss, W., Granger, D. A., Goldberg, W. A., & Nathans, L. (2012). Asynchrony of mother–infant hypothalamic–pituitary–adrenal axis activity following extinction of infant crying responses induced during the transition to sleep. *Early Human Development*, 88(4), 227-232.
- Miller, E., & Almon, J. (2009). *Crisis in the kindergarten: Why children need to play in school*. College Park, MD: Alliance for Childhood.
- Moore, E. R., Anderson, G. C., Bergman, N., & Dowswell, T. (2012). Early skin-to-skin contact for mothers and their healthy newborn infants. *The Cochrane database of systematic reviews*, 5(5), CD003519. doi:10.1002/14651858.CD003519.pub3
- Narvaez, D. (2013). The 99%--Development and socialization within an evolutionary context: Growing up to become “A good and useful human being.” In D. Fry (Ed.), *War, Peace and Human Nature: The convergence of Evolutionary and Cultural Views* (pp. 643-672). New York: Oxford University Press.
- Narvaez, D. (2014). *Neurobiology and the development of human morality: Evolution, culture and wisdom (Norton Series on Interpersonal Neurobiology)*. New York, NY: W.W. Norton.
- Narvaez, D. (2016). Baselines for virtue. In J. Annas, D. Narvaez, & N. Snow (Eds.), *Developing the virtues: Integrating perspectives* (pp. 14-33). New York, NY: Oxford University Press.
- Narváez, D. (2016b). Revitalizing human virtue by restoring organic morality. *Journal of Moral Education*, 45(3), 223-238.
- Narvaez, D. (Ed.) (2018). *Basic needs, wellbeing and morality: Fulfilling human potential*. New York: Palgrave-MacMillan.
- Narvaez, D., Wang, L., Cheng, A., Gleason, T., Woodbury, R., Kurth, A., & Lefever, J.B. (under revision). The importance of early life touch for psychosocial and moral development.
- Narvaez, D., Gleason, T., Lefever, J.B., Wang, L., & Cheng, A. (2016). Early experience and ethical orientation. In D. Narvaez, *Embodied morality: Protectionism, engagement and imagination* (pp. 73-98). New York, NY: Palgrave-Macmillan.
- Narvaez, D., Panksepp, J., Schore, A., & Gleason, T. (2013). The value of using an evolutionary framework for gauging children’s well-being. *Evolution, Early Experience and Human Development: From Research to Practice and Policy* (pp. 3-30). New York: Oxford University Press.

- Narvaez, D., Thiel, A., Kurth, A., & Renfus, K. (2016). Past moral action and ethical orientation. In D. Narvaez, *Embodied morality: Protectionism, engagement and imagination* (pp. 99-118). New York, NY: Palgrave-Macmillan.
- Narvaez, D., Woodbury, R., Gleason, T., Kurth, A., Cheng, A., Wang, L., Deng, L., Gutzwiller-Helfenfinger, E., Christen, M., & Nöpflin, C. (2019). Evolved Development Niche Provision: Moral socialization, social maladaptation and social thriving in three countries. *Sage Open*, 9(2). <https://doi.org/10.1177/2158244019840123>
- Panksepp, J. (2007). The neuroevolutionary and neuroaffective psychobiology of the prosocial brain. *The Oxford handbook of evolutionary psychology* (pp. 145-162). Oxford: Oxford University Press.
- 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
- Porges, S. W. (2011). *The polyvagal theory: neurophysiological foundations of emotions, attachment, communication, and self-regulation (Norton Series on Interpersonal Neurobiology)*. New York: WW Norton & Company.
- Rosman, N. P., Vassar, R., Doros, G., DeRosa, J., Froman, A., DiMauro, A., ... & Abbott, J. (2018). Association of prenatal ultrasonography and autism spectrum disorder. *JAMA pediatrics*, 172(4), 336-344.
- Ross, R. (2014). *Indigenous healing: Exploring traditional paths*. Toronto: Penguin Canada.
- Salgado-Delgado, R., Tapia Osorio, A., Saderi, N., & Escobar, C. (2011). Disruption of circadian rhythms: a crucial factor in the etiology of depression. *Depression Research and Treatment*, 2011:839743.
- Sandall, J., Tribe, R. M., Avery, L., Mola, G., Visser, G. H., Homer, C. S., ... & Taylor, P. (2018). Short-term and long-term effects of caesarean section on the health of women and children. *The Lancet*, 392(10155), 1349-1357.
- Schore, A. N. (2001). Effects of a secure attachment relationship on right brain development, affect regulation, and infant mental health. *Infant Mental Health Journal*, 22(1-2), 7-66.
- Schore, A. N. (2003). *Affect regulation and the repair of the self (Norton Series on Interpersonal Neurobiology)* (Vol. 2). New York: WW Norton & Company.
- Schore, A. N. (2015). *Affect regulation and the origin of the self: The neurobiology of emotional development*. New York: Routledge.
- Slater, R., Cornelissen, L., Fabrizi, L., Patten, D., Yoxen, J., Worley, A., ... & Fitzgerald, M. (2010). Oral sucrose as an analgesic drug for procedural pain in newborn infants: a randomised controlled trial. *The Lancet*, 376(9748), 1225-1232.
- Spinka, M., Newberry, R. C., & Bekoff, M. (2001). Mammalian play: training for the unexpected. *The Quarterly Review of Biology*, 76(2), 141-168.
- Stuebe, A. M., & Schwarz, E. B. (2010). The risks and benefits of infant feeding practices for women and their children. *Journal of Perinatology*, 30(3), 155.
- Szyf, M. (2009). Early life, the epigenome and human health. *Acta Paediatrica*, 98(7), 1082-1084.
- Taraban, L., Shaw, D. S., Leve, L. D., Natsuaki, M. N., Ganiban, J. M., Reiss, D., & Neiderhiser, J. M. (2018). Parental depression, overreactive parenting, and early childhood externalizing problems: moderation by social support. *Child Development*. <https://doi.org/10.1111/cdev.13027>.
- Tarsha, M. S., & Narvaez, D. (in press). Early experience and aggression. *Peace Review*.

- Trevathan, W.R. (2013). Birth and the first postnatal hour. In D. Narvaez, J. Panksepp, A.N. Schore, & T. Gleason (Eds.), *Evolution, early experience and human development: From research to practice and policy* (pp. 221-240). New York: Oxford University Press.
- Trevathan, W. R. (2017). *Human birth: An evolutionary perspective*. New York: 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 Sleuwen, B. E., Engelberts, A. C., Boere-Boonekamp, M. M., Kuis, W., Schulpen, T. W., & L'Hoir, M. P. (2007). Swaddling: a systematic review. *Pediatrics*, 120(4), e1097-e1106.
- Weaver, I. C., Meaney, M. J., & Szyf, M. (2006). Maternal care effects on the hippocampal transcriptome and anxiety-mediated behaviors in the offspring that are reversible in adulthood. *Proceedings of the National Academy of Sciences*, 103(9), 3480-3485.
- Westlye, L. T., Walhovd, K. B., Dale, A. M., Bjørnerud, A., Due-Tønnessen, P., Engvig, A., ... & Fjell, A. M. (2009). Life-span changes of the human brain white matter: diffusion tensor imaging (DTI) and volumetry. *Cerebral cortex*, 20(9), 2055-2068.
- Wolff, R. (2001). *Original wisdom: Stories of an ancient way of knowing*. New York: Simon and Schuster.