SECTION V

Conclusion

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The Future of Human Nature: Implications for Research, Policy, and Ethics

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Human nature is often described as selfish (Dawkins, 1976) and violent (Pinker, 2002; Wrangham & Peterson, 1998). Such views of human nature are contrary to the views of most societies throughout most of history (Sahlins, 2008). Most alarming, the belief that human nature is evil, or at least fundamentally self-interested, may lead to treatment of children in ways that violate humanity's evolved, social, mammalian heritage and, ironically, result in the outcomes that are feared. In other words, neglect, trauma, and abuse result in poor physical and mental health, as well as in diminished capacities for prosocial behavior, "proving" the evilness of human nature. The "enthusiasts of evolutionary egoism" fail to recognize "their ethnocentrism by taking certain of our customary practices as proof of their universal theories of human behavior" (Sahlins, 2008, p. 2).

The research evidence showing that human beings are malleable and highly responsive to their earliest experiences is quite sound. As demonstrated in the contributions of this volume, early experience sets up the morphology and functioning of the brain and body systems. The social mammals emerged over 30 million years ago with a particular set of parenting behaviors, represented in their human variation in the environment of evolutionary adaptedness (EEA; Bowlby, 1980). Current culturally derived childrearing practices diverge from these evolved, species-typical practices, potentially undermining the evolved human nature benefits that were common among foraging hunter-gatherers. Thus, the nature of human nature depends on the ontogenetic niche. When the niche moves far from the expected environment for a social mammal, the ensuing trouble is not surprising. And we see trouble for health and social well-being throughout societies where certain traditional cultural practices, such as breastfeeding, cosleeping, and alloparental care, have diminished.

In light of the findings presented in this volume, we have two sets of recommendations. One set is for researchers in the human and health sciences regarding how they might think about applying the volume's content to their areas of study. The other set of recommendations is for citizens and policymakers on how they might attend better to human needs that promote optimal development.

Recommendations for Future Research Across the Life and Social Sciences

Establish a Baseline for Evolved Human FunctioningScientists have been starting with the assumption that the members of the US population typically studied are in the range of normality (i.e., in intelligence, personality) and represent optimal development of the human genus. Such assumptions need to be made explicit and tested. In psychology, the population usually studied and generalized from is rarely representative of worldwide human nature, let alone our ancestral human personality and psychology (Henrich, Heine, & Norenzayan, 2010). According to our thesis, those raised with the fewest evolutionarily appropriate supports may be less flexibly intelligent and cooperative than those with the most supports. We recommend that scientists work to establish what is considered optimal by using as a baseline consistency with evolved, expected care informed by an understanding of cross-mammalian emotional needs. How much an individual's experience matches evolved, expected care and the supports required for optimal mammalian brain functions may be measurably linked to child and adult outcomes, as has been done in recent animal studies (Weaver, Szyf, & Meaney, 2002). Those with early experiences that match the fulfillment of ancestral mammalian needs may give us the best estimate of evolutionary typicality. For example, just as we have learned recently of widespread human deficiencies in vitamin D because most Westerners are not spending their days exposed to the sun to the same degree as our ancestors (Cannell, Hollis, Zasloff, & Heaney, 2008), our bodies and brains may be becoming deficient in other ways compared to our ancestors. We need to know which deficiencies matter and how they matter before we can design interventions to prevent or alleviate long-term detrimental outcomes (see Narvaez, in press, for further discussion).

ATTEND TO BASIC NEEDS

We also recommend that researchers attend to the basic emotional and motivational needs of the mammalian brain throughout the life span, in the context both of personality development and of medical vulnerabilities (Smith & MacKenzie, 2006). Comparable cross-species mammalian affective needs should be considered when doing research relevant to other mammals. Perhaps the greatest ill effect of living in cultures that do not follow the better side of our ancestral heritage is the stress it causes as the infant is developing its physiological and psychological competencies. Decades of studies have shown that diminished resilience to stress (e.g., sustained cortisol elevations following environmental challenges) commonly leads to diverse ill health effects both inside the womb and after birth (Chrousos & Gold, 1992; Lupien, McEwen, Gunnar, & Heim, 2009). We suggest that a link needs to be made between our suggested evolved, expected care and later outcomes. We follow with a few examples of how research can be informed by these concerns.

EXAMINE CURRENT EPIDEMIC PROBLEMS IN LIGHT OF EVOLVED, EXPECTED CARE

Childrearing practices coevolved with the increasing helplessness of the human infant at full-term birth of 40 to 42 weeks (Trevathan, 2011). In recent decades, not only has the understanding of needy babies been minimized, but ~~also~~ babies are increasingly born prematurely for a host of reasons (World Health Organization, 2012). This trend only increases the need to use evolved caregiving practices to ensure healthful outcomes.

Sleeping disorders, including sudden infant death syndrome (SIDS). Reports from foraging societies indicate that children and adults typically sleep in physical proximity with abundant touch. Typically, in Western culture, people sleep alone or with a single other person, and sleep labs test individuals in isolation. An orientation informed by evolutionary principles suggests that physical isolation might be tested as one possible cause of poor sleep. Caregiving in the United States typically isolates infants from close human contact for long periods of time, resulting in limited caregiver responsiveness and curtailed breastfeeding (Centers for Disease Control and Prevention, 2004). Additionally, we know from animal studies that a dearth of touch in the early years is related to underdevelopment of serotonin receptors (Kalin, 1993). Caregiving practices that include isolation likely influence serotonin and other brain system development during maturation, including various more specific prosocial neurochemistries such as endogenous opioids and oxytocin (Meinischmidt & Heim, 2007). For instance, infants with faulty serotonin receptors are more likely to die of SIDS (Audero et al., 2008; Paterson et al., 2006). These findings suggest that investigation of cosleeping versus sleeping in isolation might reveal important individual differences in sleep quality and have significant implications for neurodevelopment.

Depression. Faulty serotonin receptors are associated not only with sleep disturbances but also, at least among adults, ~~in~~ the likelihood of depression (Caspi et al., 2003). Depression is an important avenue for research given that the United States has an epidemic of depression in real numbers (U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, 1999) as does the rest of the world (World Health Organization/World Organization of Family Doctors, 2008). Because of the dearth of affectionate touch, pursuant to John Bowlby's theories of attachment, Prescott (1996) came to the conclusion that most children in the United States are susceptible to somatosensory affectional deprivation, a condition related to depression, violent behavior, and stimulus seeking. Prolonged social isolation of animals can promote all these symptoms, but the neurobiological links to behavior and outcomes need to be made.

Mental health and birth experience. In the EEA, birth took place in circumstances similar to those of other animals (except assistance may have become necessary over the course of evolution; ~~Trevarthen,~~). In our ancestral past, infants and mothers were not subject to the interruptions in natural processes that accompany

giving birth in the United States (Wagner, 2006), which is now commonly envisioned as a medical procedure. An orientation consistent with evolutionary principles would suggest that each intervention by medical personnel should be studied for its effects on infant brain development and on entrainment between mother and infant. Common cultural practices and their effects should also be studied. For example, birthing practices can be examined for their psychological as well as physiological effects. Insel (1997) pointed out that although it is used routinely in birthing practice, little research has been performed on the effects of synthetic oxytocin (Pitocin) on the infant or on the emerging mother–infant relationship. Liu and colleagues (2007) review hospital practices and their detrimental effects on infants. More psychological research needs to be conducted in these areas. Moreover, the modern medical advances that have so significantly reduced infant and maternal mortality during the course of childbirth might be enhanced even further by efforts to study and ameliorate the stressful and potentially long-lasting effects of specific, and possibly unnecessary, medical procedures. Since World War II (when most births became hospital births, now approximately one-third being cesarean), depression and anxiety rates have climbed, reaching epidemic proportions in the United States and around the world (U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, 1999; World Health Organization/World Organization of Family Doctors, 2008). Could there ~~be a causal~~ relation?

Mental health and early caregiving. As noted in the introductory chapter, ancestral parenting practices (e.g., natural childbirth, no separation of mother and child, lengthy and frequent breastfeeding, constant touch, responsivity to needs, multiple adult caregivers, free play in nature) have declined in recent decades. Are these declines linked to compromises in mental and physical health? Some evidence suggests a connection. For example, the National Institute of Child Health and Human Development, Early Child Care Research Network (2004) has concluded that emotion dysregulation and poor attachment at 6 months depress performance in later assessments of social and cognitive capacities. Likewise, postnatal experiences may influence the manifestation of autism in genetically susceptible individuals (Morrow et al., 2008). The quality of early environments, especially opportunities for self-initiated playful social engagements, may determine the incidence of attention deficit/hyperactivity disorder–type problems later in life (Panksepp, 2007). Moreover, these issues appear to be on the rise. About 21%~~%~~ of US children ages 9 to 17 have a diagnosable mental or addictive disorder associated with some demonstrable impairment, which reflects rate increases compared to the past (Haggerty, 1995). Further evidence is discussed in this volume: Breast milk has the amino acids that promote serotonin synthesis; touch increases prosocial hormones such as endogenous opioids and oxytocin, and these neurotransmitters and hormones are all implicated in mental health (Panksepp, 2003). More recently, type 2 diabetes and depression have been linked to one another (Golden et al., 2008), suggesting holistic organismic dysfunctions. Similarly, disorders in stress reactivity (e.g., the

hypothalamic–pituitary–adrenal axis) are linked to physiological and psychological ailments (Chrousos & Gold, 1992). Clearly, careful and causal mapping of caregiving practices to physical and mental health outcomes needs to be done.

Medical toxins. The annals of medicine abound with possible iatrogenic diseases from the use of modern medicines in infants, from possible toxic factors that may cause autism, to the use of antiepileptic medications after the first febrile seizure leading to various developmental delays, to the excessive use of antibiotics in infancy, which may promote asthma (Kozyrskyj, Ernst, & Becker, 2007). Although the scientific database on such demographic findings is weak, for obvious reasons, causal studies on humans would be unethical, so animal studies might be conducted to illuminate any connections.

EXAMINE THE EFFECTS OF THE MISSING EVOLVED AND EXPECTED CARE ON HEALTH AND IMMUNITY, INCLUDING CANCER

The gravest outcome of practices inconsistent with evolutionary principles may be the stress caused as infants' physiological systems are maturing. Decades of studies have shown that poor stress responses (e.g., elevated and poorly regulated cortisol) can lead to many ill health effects (Chrousos & Gold, 1992). Many other specific factors deserve to be investigated.

Early affection and vagal tone. As pointed out by Carter and Porges (this volume), the quality of vagal nerve functions may be dependent on the quality of early nurturing. As a cholinergic inflammatory pathway, the vagus nerve communicates with the spleen to control immune function (Kessler et al., 2006). Nurturing physical touching by the caregiver fosters proper vagal tone, which influences multiple biological, including emotional, regulations (Calkins, 1997; Donzella, Gunnar, Krueger, & Alwin, 2000; Porges, 1991; Porter, 2003). Further work needs to be done on the timing, type, and length of touch for developing good vagal tone. Perhaps "baby wearing" is required for optimal vagal tone development.

Infant feeding, stress, and eating disorders. The mother's diet during gestation influences preferences of the child after birth (Leathwood & Maier, 2005). As with psychobehavioral maternal care practices (Meaney, 2001), there may be nutritionally mediated snowballing transgenerational effects. Feeding decreases stress response under maternal absence (Rosenfeld, Ekstrand, Olson, Suchecki, & Levine, 1993), suggesting a relation between nonoptimal early care, high levels of stress during development, and eventual overeating. This hypothesis deserves investigation. In addition, bottle-feeding may encourage overfeeding (Li, Fein, & Grummer-Strawn, 2008).

Excessive separation distress, crying, and depression. The impact of early social loss on depression has been well documented (Bowlby, 1980; Heim & Nemeroff, 1999), but other factors may well influence rising rates of depression. For example, a popular childrearing standard encourages parents to allow little babies to cry themselves to sleep, with the presumption that this is the best course for family

homeostasis as well as development of independent attitudes. The emphasis behind this practice is on learning to self-soothe at an early age, rather than gradual acquisition of these skills through mutual regulation with a caregiver. A host of reasons both psychological and neurochemical suggest that such practices may be directly or indirectly linked to the ongoing epidemic of depression (Watt & Panksepp, 2009), but causal connections have yet to be established.

The marginalization of natural play. Much is being written about our failure to provide children with opportunities for joyful engagements with each other and with nature. Such practices may have long-term consequences on a variety of mental health parameters, for natural social play may be an experience-expectant process that helps certain forms of neural maturation with benefits for the development of higher executive brain functions (Panksepp, 2001, 2007). Comparisons of children who do and do not engage in such play would be relatively easy to conduct, although longitudinal work in this area would clearly be most informative.

CONSIDER ECONOMIC OUTCOMES

Early life experiences lead to lifelong outcomes that affect mortality and morbidity (McEwen, 2003). Heckman (2008) has marshaled data showing that life outcomes for American youth are worsening, especially in comparison to 50 years ago. He presents substantial evidence that improving early care for children provides an estimated 10%~~%~~ return on investment (an underestimate since health costs are not included). Even small changes in early caregiving practices could reap enormous economic rewards in adulthood. For example, infant formula diets lead to greater health care costs (Ball & Wright, 1999), whereas greater length of breastfeeding is linked to greater upward social mobility as an adult (Martin, Goodall, Gunnell, & Smith, 2007).

Recommendations for Policy, National Initiatives, and Ethical Orientation

If science is to be of service to society, scientists need to step up and advocate for sound policies and practices warranted by empirical evidence. Speaking up for the welfare of children is an ethical responsibility for all those in the profession, particularly when the profession is supported by taxpayer dollars. We suggest that the following actions be taken by the psychological, psychiatric, and medical associations and their members.

POLICY STATEMENTS

Formulate policy statements on parenting. As noted by mental health researchers and confirmed with experimental data, poor parenting increases across generations,

with cascading and accruing deleterious effects of deficient early childhoods (Perry, Pollard, Blakely, Baker, & Vigilante, 1995; Weaver et al., 2002). We must figure out how to mitigate these generational snowballing effects. We advocate a precautionary principle regarding parenting practices. If we take to heart ~~the parenting~~ practices ~~of our ancestors~~ and the ~~findings~~ we have thus far ~~evolved, expected care and the basic prosocial brain systems on which such higher human faculties are founded~~, then we must reframe some current childrearing practices as "risky," such as formula feeding (Walker, 1993), sleeping in isolation (McKenna & McDade, 2005), institutional daycare (Belsky, 2001), "crying it out" (Blunt Bugental, Martorell, & Barraza, 2003), lack of skin-to-skin ~~care~~ (Morelius, Theodorsson, & Nelson, 2005), and parenting in isolation (Amato, 2007). Policy statements could explicitly support breastfeeding, safe cosleeping, caring touch, and responsive caregiving (much along the lines of those advocated by Attachment Parenting International). Policy statements on parenting could also advocate "best parental practices" education for all members of a society, including college students, among whom we authors find widespread misunderstanding of infants' and children's basic needs.

Formulate a policy statement on structuring society and institutions to support children and families. With an eye toward prevention of mental and physical health problems due to poor early experience, professional organizations can advocate greater societal support for children and families. Specific suggestions could be made for social-governmental policies where parents and families are central in social planning and taxpayer support (e.g., extensive nutritional education, optimal psychobehavioral care, increased availability of maternal and paternal leaves and play sanctuaries for children; see Calnen, 2007, for a review). Institutional supports for breastfeeding and childcare, such as sensitive workplace daycare as well as local breast milk banks, would ensure that the burden of childcare would not fall exclusively on mothers or prevent them from working. What is more, neighborhood community and family support systems are essential for all new parents, but particularly for those who are struggling financially. Poverty for 6 months or more in early life has long-term detrimental effects (Brooks-Gunn & Duncan, 1997), and children reared in poverty are more likely to be depressed throughout their life course than those with sufficient financial resources (Gilmana, Kawachia, Fitzmauricec, & Buka, 2002).

Support for children and families is particularly crucial for improving mental health outcomes. After all, the effects of having a depressed or overly stressed mother in early life are lifelong (e.g., Ashman, Dawson, Panagiotides, Yamada, & Wilkinson, 2002). Although maternal depression is viewed as a "relatively common deviation in early experience" (Dawson, Ashman, & Carver, 2000, p. 699), we propose that it is tragically "common" because our social environments are not meeting human mammalian needs. As already noted, too much stress in early life, especially early social deprivation, leads to hyperactive stress response systems (Kertes, Gunnar, Madsen, & Long, 2008). Policies that acknowledge and try to amend the

plethora of stressors experienced by parents may have long-term benefits not just for individuals, but for society as a whole.

NATIONAL INITIATIVES

Establish a national database on the relation of early experience to mental health. Ever since the work of Rene Spitz (1947), abundant evidence has emerged regarding how powerfully social neglect affects mental health outcomes. As we have noted, the literature on the consequences of child abuse and neglect on future psychiatric problems is constantly growing (e.g., Teicher, 2002). Many of these effects can be modeled in animals so as to help work out the details of the underlying brain mechanisms (Panksepp, 2001). A national database on child neglect and abuse effects could be a significant contributor to this effort (as suggested by Dawson et al., 2000). We suggest an extensive federal initiative to establish a substantive database on how such vicissitudes affect the developmental landscapes of both animals and humans. Only when we explicate the toxicity of particular environments and practices can we work deliberately to eradicate them.

Establish a research initiative focused on how the missing evolved, expected care may affect mental health at all ages. How do early caregiving environments contribute to well-being throughout the life span? For example, throughout most of human evolution, isolation at any time was most likely rare (Lee & Daly, 2005). Today, loneliness from lack of satisfying social contact is on the increase and is related to poor immune function, greater stress response, higher blood pressure, and greater depression (Cacioppo & Patrick, 2008).

ETHICAL RESPONSIBILITY

Psychologists as professionals should be advocates for the optimality of early experience as part of their ethical responsibilities. The American Psychological Association has position papers on mental health, but they emphasize intervention. We propose that *prevention* and *developmental optimization* be major priorities. "Thrive by five" should be a national motto for childrearing practices. The field and its cousin fields know enough now to make critical recommendations. The inferred nature of evolved, expected care from modern anthropological studies and the cross-species or naturalistic approach to mammalian social/brain development can form the starting assumptions for optimizing human development and well-being. Divergences from these standards represent risks that must be assessed. To ignore the long arm of evolutionary adaptation is to risk ill-adapted persons who cannot approach with equanimity and intelligence the problems humanity faces, which are exacerbated by increasingly poor child upbringing. These are ethical concerns and should be considered in professional ethical standards.

Psychologists should advocate for humane treatment. Gawande (2009) has reminded us that solitary confinement for a mammal constitutes the greatest torture.

Extended confinement leads to psychopathy. As an extension of its position on torture, which applies primarily to noncitizen combatants, psychological and psychiatric associations should prepare a position paper against solitary confinement, which would also apply to US citizens. Such a paper would advocate humane treatment of those who are confined whether in prisons, hospitals, or nursing homes.

Conclusion

The recommendations for research and policy outlined here make the assumption that evolved, expected care and mammalian needs are the default (perhaps "without fault") grounding for evidence-based examination of how different environments contribute to optimal functioning. The onus of "proof"—or scientifically, the "weight of evidence"—should be shifted to those who argue for maintaining the status quo of arbitrary or convenient cultural practices that go against basic human/mammalian needs.

When societies forget the past and the mammalian nature of their citizens, they seem prone to set up detrimental cultural practices based often on arbitrary belief systems. No matter how cognitively sophisticated such systems may seem (e.g., Huxley, 1932; Rogers & Skinner, 1956), engineering mammalian nature, without a full consideration of the benefits and harms of different childrearing practices, is unreasonable and often tragic. The current epidemic of autism, where an estimated 1 in ~~100~~ children is diagnosable, symbolizes the problems we may face, as most agree that environmental toxins and stressors in early life contribute to it (e.g., Good, 2009; Panksepp, 1979). Ill-advised practices and beliefs have become normalized without much fanfare, such as the common use of infant formula, the isolation of infants in their own rooms, the belief that responding too quickly to a fussing baby is spoiling it, the placing of infants in impersonal daycare, and so on. We recommend that scientists and citizens step back from and reexamine these common, culturally accepted practices and pay attention to their potentially lifelong effects.

At the same time, we recognize the great neural and psychological resilience that human children and other animals can exhibit in the face of adversity (Kagan, 1997). This resilience has been a key argument of those who do not see "thrive by five" early childhood policies to be wise investments in child development, physical, and mental health. For a counterpoint, see the Organization for Economic Cooperation and Development (2009), which uses international data to support early investment. Human resilience, as measured to date, does often indicate that the harm done in childhood can be partly reversed by later enrichments (Lester, Masten, & McEwen, 2007). However, none of these studies have yet focused clearly enough on the intrapsychic emotional qualities of lived lives, nor on ~~their~~ flourishing.

Psychology and related fields are undergoing a paradigm shift, challenging the cognitive model of human development with a social-emotional model grounded in neurobiology. The shift comes none too soon. "Think of the investment that

evolution has made in the child's brain. . . . For most of history, civilizations have crudely ignored that enormous potential. In fact the longest childhood has been that of civilization, learning to understand that" (Bronowski, 1973, p. 425). The available clinical evidence already strongly suggests that the harm wreaked by early deprivations will, more often than not, leave lifelong psychological scars. The long-term costs to humanity may be even greater. Societally promoted enhancements of lifetime capacities for health and happiness are worthy investments and goals.

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