Fathers Don't Mother and Mothers Don't Father:

What Social Science Research Indicates about the Distinctive Contributions of Mothers and Fathers to Children's Development

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Introduction

When M. Azim Surani set out in the late 1970s to create new mammalian life by combining two sets of a mother's genes or two sets of a father's genes, he was confident he could so. The development of in vitro fertilization (IVF) made it possible to combine two sets of a mother's genes and give the egg the correct number of chromosomes before implanting it into a female to grow. As science reporter Paul Raeburn describes, "Everything that was then known about genetics suggested that such an egg, even though all of its genes came from females, should develop normally."

But the eggs with only the mothers' genes could not survive. Similarly, when Surani implanted two sets of a father's genes, the eggs could not survive. His conclusion, as described by Raeburn (2014), was that, "mothers and fathers each contributed something with their genes that marked them as 'paternal' or 'maternal' – and that both were essential to the survival of the fertilized egg" (p. 44-45). These "paternal" and "maternal" genes appeared completely indistinguishable in every way, yet expressed themselves differently depending on whether they came from the mother or the father. Of the 20,000 human genes identified so far, only 100 have been found to carry special chemical imprints marking them as maternal or paternal, but those 100 are critical for survival.

The parallels between the need for both paternal and maternal genetic material for embryonic survival, and what social science indicates about maternal and paternal contributions to children's development are striking. Whether analyzing social-emotional, cognitive, or sexual development, fathers and mothers bring many similar capacities that enable healthy child development in apparently indistinguishable ways. But mothers and fathers also appear to retain distinctive capacities that provide unique and complementary contributions to children's development. Scholars debate whether or not these distinctive contributions are essential. After all, children who do not grow up with their fathers or mothers can develop as successfully as their peers. But what research does indicate is that fathers and mothers provide distinctive contributions that give children many important, even critical, advantages.

Unlike other mammals, the life that is created by male-female sexual relationships is born completely and totally dependent. That dependence necessitates extensive nurturing to enable growth from a state of complete helplessness to physical, emotional, intellectual, moral, and cultural maturity. The need for "nurture, food, protection, socialization and discipline," is so significant that some scholars refer to it as a "parental emergency" (Wilcox & Kline, 2012, p. 14). In their response to this "emergency," fathers and mothers reveal unique orientations, strengths, and styles of interaction, typically along gendered lines (Haltzman, 2012). While research findings indicate tremendous overlap in how a mother and father influence the wide range of a child's developmental domains, including motoric, cognitive, linguistic, and social-emotional (Parke, 2012, p. 134), they also consistently reveal distinct trends in parental influence

that reflect "genetically, anatomically, and hormonally influenced predispositions" based in gender (Bornstein, 2012, p. 92).

These parenting differences enable fathers and mothers to influence the same developmental domains through distinct "process-based pathways," that together benefit children's development in unique, significant, and often complementary ways (Park, 2012, p. 134). The developmental wholeness facilitated by the careful, consistent caregiving of both a mother and a father emerges as greater than the sum of the individual parts. Neither the father nor the mother is subordinate to each other. Rather, their intertwining differences reveal a complementarity that is measurably significant in facilitating healthy development.

This reality underscores conclusions such as that found in *Santosky v. Kramer* (1982), where the Supreme Court observed that a child's inability to "know" both of "his natural parents" is a "loss that cannot be measured." Social science research provides insight into how this statement is independently true of *both* mothers and fathers: Each brings distinctive contributions to children's development that cannot be easily replaced. Accordingly, a child's inability to know and be raised by either her father or her mother – or at least by *a* loving father and mother – is an identifiable "loss" to the child and to society.

The purpose of this paper is to review research that elucidates the distinctive contributions mothers and fathers make to the development of children. In an effort to cogently discuss these trends, biological and physiological sex differences that appear to be related to fathers' and mothers' distinct contributions are discussed first. This is followed by research exploring the distinctive contributions of mothers and fathers to children's social-emotional, cognitive, and sexual development, as well as their safety and protection.

Biological and Physiological Contributions to Parenting

Physiological Influences on Mothers' Parenting

A growing body of research exploring physiological changes in mothers and fathers has shed new light on how sex differences may predispose them toward distinctive contributions to children's development (Snowdon, 2012). Hormonal studies, in particular, show that mothers experience dramatic increases in both oxytocin and oxytocin receptors in the part of the brain that promotes maternal behaviors as they prepare to give birth, give birth, and care for their infants. Even when mothers do not physically bear their children (such as in adoption), they experience similar hormonal changes while caring for them. In experimental animals, this bonding chemical "strongly influences maternal care," acting as a switch that turns on maternal behavior toward the individual inciting its release (Nagasawa, Okabe, Mogi, & Kikusui, 2012).

Maternal oxytocin levels correlate with maternal behaviors including gazing at, affectionate touch, and frequent infant checking (Feldman, 2007). Oxytocin has also been associated with maternal social engagement, matching emotional states, and positive

communication, all of which are critical behaviors in promoting a secure bond between mother and child (Feldman, Gordon, Zagoory-Sharon, 2011). In addition to oxytocin, increases in opioids (including dopamine) and prolactin stimulate caregiving behaviors and feelings of wellbeing likely to enhance bonding with an infant (Shahrokh, Zhang, Diorio, Gratton, & Meaney, 2010; Bosch & Neumann, 2012).

The bonding capacity between mother and child is facilitated not only by maternal hormonal levels but by infant levels as well. Infant oxytocin levels have been found to be significantly correlated to their mothers' levels. Mothers' bonding behaviors stimulate the oxytocin system in their infants producing feelings of calm and wellbeing, and reducing stress responses (Seltzer, Ziegler, & Pollak, 2010). This may help explain why infants and young children who are not in the presence of their mothers throughout the day experience an increase in levels of the stress hormone cortisol. In contrast, children in the care of their mothers experience a reduction in cortisol levels across the day (Vermeer & IJzendoorn, 2006). The result is a complex interplay among oxytocin levels, stress-response patterns, and secure bonding that not only play a pivotal role in how a mother bonds with her child, but also affect a child's stress response systems.

Physiological Influences on Fathers' Parenting

The neuronal mechanisms involved in human bonding for mothers and infants are well known and even intuitive as an extension of the biological connection throughout gestation. Perhaps more remarkable is the evidence that fathers too experience significant physiological changes that seem to "prime" them for bonding with their child, particularly when they live with the mother and actively care for the infant (Snowdon, 2012; Berg & Wynne-Edwards, 2001). Studies have consistently identified a drop in testosterone levels for men after becoming fathers. But as Wilcox and Kline (2012, pg. 5) conclude, "Mammalian fathers who cooperatively parent with the mother of their children experience far more than just a drop in testosterone." Fathers experience significant changes in each of the three significant "bonding" hormones--prolactin, cortisol, and oxytocin--before, during and after birth.

Significantly, fathers' hormone patterns parallel the hormonal changes of mothers across the same time period (Storey, A. E., Walsh, C. J., Quinton, R. L., & Wynne-Edwards, K. E., 2000). But the same hormones evoke different patterns of responses from mothers and fathers. Gordon, Zagoory-Sharon, Leckman, and Feldman (2010) examined both mothers' and fathers' levels of oxytocin after a period of interaction with their infants. As expected, maternal oxytocin levels correlated with affectionate parenting behaviors such as expressing positive feelings, gazing at the infant, "motherese" vocalizations, and affectionate touch. Fathers' levels of oxytocin, however, correlated with "stimulatory" parenting behavior including touching in a stimulating way (such as tickling), change the position of the infant's body (such as, tossing them in the air), and using an object to engage with them. This suggests a biological basis for

how men and women typically relate differently to infants and toddlers, "with women more often cooing and cuddling and men tickling and tossing" (Belkin, 2010).

Thus, while mothers and fathers both experience the influence of bonding hormones that "prime" them for effective interactions with their infants, the same hormones elicit different bonding behaviors in men and women. Infants experience parallel increases in the same bonding hormones when interacting with both their fathers and mothers. But given the biologically intimate relationship of a mother and infant, her interactive patterns are a more formative influence on a child's bonding and stress response systems. The complementary nature of the interactive patterns exhibited by fathers and mothers, and the bonding response exhibited by children indicate measurable benefits for bonding with both a mother and a father.

Biological and Physiological Differences in Fathers' and Mothers' Parenting Orientation

Parallel physiological responses in mothers and fathers predispose them both for distinct forms of increased responsiveness and attentiveness in caring for children. For fathers, however, paternal involvement and sensitivity is highly dependent on the quality of the relationship with the mother of their child (Parke, 1995). The more physically and emotionally close a father is to the mother, the more likely he is to be involved with their child. This is reflected in his hormonal responses as well as behavior. When the relationship between mother and father is strained, men tend to withdraw from their children (Bjorklund & Jordan, 2012, p. 73). This holds true not only for humans, but in the behavior of other mammals as well (Bjorklund & Jordan, 2012).

Distinct orientations with physiological and biological underpinnings seem to be at play. Evolutionary biology perspectives explain that a mother's and father's interest in reproducing themselves through their offspring means different investments and psychological orientations for men and women. Specifically, Robert Trivers' (1972) parental investment theory posits that females invest more of their time and focus in parenting while males tend to focus their time and attention in attracting and retaining potential mates. From an evolutionary perspective, these unique orientations towards mating and parenting have meant "distinctive biological endowments and psychological orientations," evolving over time "in connection with their distinctive reproductive strategies" (Wilcox & Kline, 2012, p. 6). These unique endowments and orientations translate into different strengths between men and women in the parenting of offspring (Bjorklund & Jordan, 2012).

Indeed, mothers seem "biased to care for and invest in their children" (Bjorklund & Jordan, 2012, p. 69). This underlies the reality that "in almost all species and regions of the world, across a wide diversity of subsistence activities and social ideologies, observational studies indicate more maternal than paternal investment" (Bornstein, 2012, p. 100). As Bjorklund and Jordan argue, "In mammals, conception and gestation occur within the female body, and she must invest the time associated with pregnancy as well as that required by postpartum suckling" (2012, p. 66) This resulting difference in "obligatory investment in offspring," has, according to

evolutionary biology resulted in “different psychologies” with respect to how and how much men and women devote themselves to parenting (Bjorklund & Jordan, 2012, p. 67).

In measures of engagement with children, for example, one study found that mothers spontaneously engaged their infants 1.5 to 2 times more frequently than their husbands, and provided routine care 3 to 4 times more frequently (Belsky, Gilstrap, and Rovine, 1984). Although these differences may have narrowed some in recent years, particularly in Western cultures, differences in contact time between mothers and fathers with their children persist and are dramatic across all cultures and stages of development (Bornstein, 2012, Park, 2012). Even fathers who are the primary caregivers exhibit the same interaction style and patterns as fathers who are more traditional (Bornstein, 2012, p. 99). Thus, Bjorklund and Jordan (2012, p. 71) conclude, “It goes without saying that mothers have a major influence on their children” regardless of whether they are the primary caregiver.

In summary, fathers and mothers both experience physiological changes that prime them to be more effective caregivers. But the same hormones elicit different responses for fathers and mothers. Where mothers are more likely to affectionately touch, gaze and coo at, and express positive feelings, fathers are more likely to stimulate, toss, and use an object to engage with them. Thus, mothers and fathers are physiologically primed to nurture children in distinct ways. Yet, across time and cultures, mothers are likely to invest more time and energy in the direct care of their children than fathers. Indeed, they seem to be “biased” to do so.

Parental Influences on Social-Emotional Development

Mothers’ Distinctive Contributions to Social-Emotional Development

For mothers, her biological and physiological priming seems to be strongly oriented toward the significant goal of attachment, “a biologically rooted motivational system in human infants and their caregivers, thought to have evolved to ensure proximity between a caregiver and its dependent defenseless offspring” (Kline & Stafford , p. 202). As attachment scholar Ross Thompson (2009, p. 46) summarizes, the attachment relationship has been identified as a predictor of a “dizzying variety” of outcomes including cognitive and language development; frustration tolerance; self-recognition; behavior problems; relations with peers, friends, and siblings; interactions with unfamiliar adults; exploration and play; competence in classrooms; curiosity; ego resilience; and math achievement. The observable effects are “some of the most robust in developmental psychology” (Bjorklund & Jordan, 2012, p. 71).

John Bowlby’s attachment theory has been important in making sense of extensive evidence showing the significant influence of a mothers’ relationship with her child from infancy. His initial exploration of the early bonding of infants and mothers began after he found a consistent pattern of disrupted mother-child relationships and subsequent adult mental and behavioral disorders (1944). Children who had been deprived of maternal care during extended periods in their early lives seemed to develop into individuals who “lacked feeling, had

superficial relationships, and exhibited hostile or antisocial tendencies" (Kobak, 1999, p. 23). Bowlby concluded that continual attachment between a mother and her child is critical for a child's healthy social-emotional development.

Margaret Ainsworth expanded on these concepts by identifying the importance of an *emotionally secure* attachment, and the specific characteristics of mother-infant interactions that lead to such an emotionally secure attachment (Ainsworth, Blehar, Waters, & Wall, 1978). In her studies of mothers in Uganda and Baltimore, Ainsworth found that a mother's ability to detect, interpret and respond in a positive, non-intrusive way to her infant's characteristics and needs was critical to the development of an emotionally secure attachment (Ainsworth et al., 1978). These findings led to extensive research into the biological and psychological roots of the mother-infant relationship and its essential role in healthy social development.

Findings from Ainsworth's research indicated that when a mother is consistently available and sensitive in her interactions, the child receives the physical and psychological protection necessary to foster playing, exploring and appropriate social behaviors (Bretherton & Munholland, 1999). If this security is threatened, fear activates the attachment system to reestablish access to the attachment figure. Fear that is not appropriately addressed may develop into feelings of depression, anxiety, aggression, and defensive distortions of vulnerable feelings (Kobak, 1999).

In the many years since Ainsworth's first findings, studies have repeatedly shown the significant influence of a mother's maternal sensitivity on her child's development. The National Institute of Child Health and Human Development (2003) concluded that the way a mother interacts with her child, her *maternal sensitivity*, is not only the most important factor in attachment security, but also the strongest, most consistent predictor of her child's cognitive, social, and emotional development. This finding was the result of extensive research into the potential effects of daycare on children's development. Even when children spent long hours away from their mothers, her maternal sensitivity was the most consistent predictor of all aspects of their development.

Neuropsychological studies of infant brain development since Bowlby's and Ainsworth's work have also been important in demonstrating why the effects of maternal interactions are so long-lasting. Mothers seem to have a unique ability to sensitively modify the stimulation they give to their infants. Through finely tuned perceptions, they match their infants' intellectual and emotional state and provide the optimal "chunked bits" of positive interaction needed for the child's developing brain (Schore, 1994). This process affects changes "in the hypothalamic-pituitary-axis" with positive effects on memory, cognitions, stress tolerance, and cardiovascular, metabolic and immune function, as well as emotional and behavioral regulation (Kline & Stafford, 2012, p. 203).

As Bowlby himself explained, it appears that through the uniquely attuned interactions of a mother, a child develops an "internal working model" for understanding and experiencing all other relationships (Bowlby, 1973, p. 203). When the attachment relationship is secure, the infant learns to appropriately interpret and self-reflect about past and future attachment situations and to regulate relationship closeness and conflict resolution (Bretherton & Munholland, 1999). A continued secure attachment across development enables the child to develop the capacity to appreciate, understand and empathize with the feelings of others (Thompson, 1999). When the attachment is insecure, the infant develops "a mistrusting orientation" to relationships and is unable to appropriately understand and regulate social behavior. Continued insecurity prevents the child from developing appropriate social regulatory mechanisms.

Early attachment security has been a predictor of children's social interactions, personality development, and behavioral problems, as well as their attachment behaviors as adults with their own children (Berlin, Cassidy, & Belsky, 1995; Fagot, 1997; Sroufe, Carlson, & Shulman, 1993; Steele, Steele, Croft, & Fonagy, 1999). And although not inherently pathological, an insecure attachment has been identified as an "initiator of pathways probabilistically associated with later pathology" (Sroufe, Carlson, Levy, & Egeland, 1999, p. 1). This explains why early socioemotional experiences have repeatedly been associated with children exhibiting anti-social behaviors across development. Through the attachment process, and its associated maternal sensitivity, children develop the capacity to appreciate, understand and empathize with the feelings of others. This in turn, enables children to develop the moral awareness and responsibility that forms the underpinnings of their moral behavior beyond infancy.

The mother is not the only person who can establish this critical bond with a child. But both biological and socialized influences appear to uniquely strengthen maternal capacity in this significant bonding process. As Bjorklund & Jordan (2012, p. 68) explain, though women express all emotions other than anger stronger than men, they are "better able to regulate emotions than men." This "superior ability to manage emotional expression" likely strengthens their nurturing capacity as mothers. Bjorklund and Jordan (2012, p. 68) explain further, "Caring for infants and young children often requires delaying one's own gratification and the inhibition of aggressive responses, areas in which a female advantage is consistently found."

Across all stages of a child's development mothers emerge as the preferred "source of comfort in times of stress" (Parke, 2012, p. 123). Indeed, children's awareness of and capacity to identify their emotions is often the consequence of maternal labeling during the process of caregiving. For many mothers, the emotion work of helping children identify feelings and openly discuss them is integral to their efforts to nurture them (Erickson, 2005), emerging as a hallmark characteristic in mothers' interactions with daughters as well as sons (Denham, Workman, Cole, Weissbrod, Kendziora, & Zhan-Waxler, 2000).

Fathers' Distinctive Contributions to Children's Social-Emotional Development

Given the profound influence of a mother's unique orientations, strengths, and styles of interaction, it may appear that mothers are more important in the socio-emotional lives of their children than fathers. But this is perhaps where recent research has been most enlightening. As explained by fathering scholar, David Eggebeen (2012, p. 249) "*Literally, hundreds of studies over the past two decades have consistently demonstrated that fathers have a measurable impact on children. Studies show that infants are positively affected by the interactions and care given by their fathers. Good studies have found that the quality of parenting exhibited by the father as well as the resources they bring to their family predict children's behavior problems, depression, self-esteem, and life-satisfaction. This research further indicates that the influence of fathers extends into adolescents and young adulthood. Adolescents and young adults both function best when their fathers are engaged and involved in their lives. Additional work demonstrates that fathers play an important role in helping their children make the transition to adulthood*." Across the entire life span of a child, researchers have identified a unique and significant positive influence from fathers.

David Popenoe (1996, p. 163), noted sociologist and pioneer in fatherhood research clarifies the distinctive nature of a father's influence: "Fathers are far more than just 'second adults' in the home…Involved fathers bring positive benefits to their children that no other person is as likely to bring." This includes in the area of social-emotional development. A father's closeness to and engagement in the life and activities of his children has predicted positive child outcomes in every area of social-emotional behavior (Parke, 2012). This influence is exhibited through his affection, responsiveness, encouragement, instruction, and everyday assistance, as well as his involvement in rule formulation, discipline, monitoring, and supervision. In both nurturing and guidance-oriented behaviors, fathers influence children's outcomes even when mothers' influence is taken into account.

As with mothers, secure father-infant attachment is not only important in infancy but is an important predictor of social-emotional health across development. Michael Lamb, who worked with Margaret Ainsworth in her explorations of mother-infant attachments, was first to identify both the capacity and significance of a father-child attachment. Children with fathers who were more affectionate and responsive in their interactions during infancy demonstrated more secure attachments, evidenced in their confidence exploring the environment around them and readily accepting comfort when reunited with their parent after a brief separation (Lewis & Lamb, 2003).

Fathers and Children's Behavior

The father-child bond continues to predict important benefits across development, particularly in social-emotional behaviors. The U.S. Department of Health and Human Services (2006) reported on a study of school-aged children which "found that children with good relationships with their fathers were less likely to experience depression, to exhibit disruptive

behavior, or to lie, and were more likely to exhibit pro-social behavior." This same study (Mosley & Thompson, 1995) found that boys with involved fathers had fewer school behavior problems and that girls had stronger self-esteem. In addition, the Department of Health and Human Services (2006) report identifies numerous other findings showing that children who live with their fathers are"more likely to have good physical and emotional health, to achieve academically, and to avoid drugs, violence, and delinquent behavior.

For adolescents, father involvement and closeness explained a "unique proportion" of the variance in adolescent behavioral problems (Aguilar, Sroufe, Egeland, & Carlson, 2000). Another study found that closeness to fathers was the strongest predictor of not engaging in anti-social behavior (Marcus & Betzer, 1996). In a more complex analysis fathering scholar David Eggebeen found, specifically, that the number of activities a father does with his adolescent was significantly and negatively related to depression symptoms and delinquency (Eggebeen, 2012). And the effect of this relationship quality carried beyond adolescence into young adulthood and later.

Lack of father involvement has repeatedly been identified as a predictor of delinquent and criminal behaviors, particularly for sons. Amato and Rivera's (1999) nationally representative sample analysis of the relationship between parents' involvement and children's behavior found that fathers' involvement was linked to lower levels of delinquency and criminal activity, even after controlling for maternal involvement. Cobb-Clark and Terkin (2011) found that adolescent boys (but not girls) engaged in more delinquent behavior if there was no father figure in their lives. For sons, the mere presence of a father in their homes, irrespective of both direct father involvement and available economic resources predicted less delinquent behavior. The presence of a father figure suggested "protective effects, particularly for males, in both adolescence and young adulthood."

Some of this effect may be due to the discipline style used by fathers, as opposed to mothers. Evidence suggests that fathers intervene less often to discipline children's behavior. But when they do, they exhibit more firmness and predictability in following through on predetermined consequences for specific behaviors. In turn, children respond differently to their father's discipline. While they are more likely to resist their mother's directives, they are more likely to comply with their father's requests and demands. Parenting scholars Kyle and Marsha Kline Pruett note, "Fathers tend to be more willing than mothers to confront their children and enforce discipline, leaving their children with the impression that they in fact *have* more authority." In contrast, mothers tend to draw on their emotional connection to their children as the source of their "authority," using more reasoning and flexibility in carrying out discipline. While this combination provides children a complementary, balanced approach to discipline, it may also illuminate why fathers' involvement is more strongly related to delinquent behavior.

Fathers and Children's Relational Capacities

Fathers' involvement emerges as a consistent predictor of children's behaviors across development, but it also emerges as a key predictor of the quality of relationships children form with others. In a complementary dynamic, mothers seem facilitate foundational identity formation while fathers orient children in their relationships with others. This complementarity appears to be reflected even in the way mothers and fathers hold their infants. As parenting scholars Kyle and Marsha Pruett explain, mothers most often hold infants in a way that enables "maximum contact," where the infant has more ready access to the mother's face and body but less to the outside word. Fathers, in contrast, are more likely to hold the infant in a way that gives the baby the same view of the world as the father has. This "football hold," orients the infant's face outward, toward others.

Consistent with this holding orientation, father-child closeness during early development has been a powerful predictor of the quality of relationships in adulthood. An extensive longitudinal study indicated that fathers' involvement with their children in adolescence was the most significant predictor of their empathy as adults (Koestner, Franz, and Weinberger, 1990). Analyses that followed indicated that his closeness to his children was also the most significant predictor of their marital relationship quality and extra-marital relationship quality in adulthood (Franz, McClelland, and Weinberger, 1991).

Some of this relational capacity is due to the way fathers play with their children. Fathers consistently participate "less than mothers in caregiving such as feeding and diapering in infancy and in providing meals, school lunches, and clothing as the child develops." Instead, fathers "spend a greater percentage of the time available for interaction with their children in play activities…" (Parke, 2012, p. 127). And this play seems to particularly facilitate the capacity to form healthy peer relationships.

Fathers who spent time playing with their children, and elicited positive emotion during their play, had children with the highest peer ratings (Parke, 2012). Further, fathers who were less-directive in carrying out the play, and who invited more highly physical play had boys with the highest popularity ratings among their peers (Parke, 2012). An extensive international study found that fathers who were less coercive and showed more responsiveness in terms of patience and playfulness had children who were less aggressive with their peers (Hart, Nelson, Robinson, Olsen, & McNeilly-Choque, 1998). Preschool children whose play with their fathers was characterized by balanced opportunities for the children to direct the play "were less aggressive, more competent, and better liked by peers" (Parke, 2012, p. 132).

Studies that have looked more carefully at these processes show that fathers' play facilitates the development of emotional regulation, and knowledge of and use of emotional display norms, which influence children's social acceptance. As the Department of Health and Human Services (2006) report noted, "Rough-housing with dad" appears to "teach children how to deal with aggressive impulses and physical contact without losing control of their emotions."

Through his play with his children, fathers help children learn how to temper and channel emotions in a positive interactive way, as well as gain confidence in their ability to do so. These findings elucidate why the quality of the father-child attachment is relatively more effective in explaining children's self-esteem and pro-social behaviors than mother-child attachment.

In sum, the emotional bond that a child forms with both a mother and a father have a profound influence on social-emotional development. Mothers tend to exhibit unique capacities for emotional attentiveness and responsiveness, which facilitates the security necessary for the formation of healthy identity in children. Fathers' involvement and closeness also appears to be related to almost every aspect of children's social-emotional health, but fathers seem to distinctly influence children's capacity for prosocial behaviors and healthy relationships. Play is a critical way through which children receive these important contributions from fathers. Consistent with the way mothers and fathers tend to hold their infants (cuddling vs. football hold), mothers seem to make distinct, even critical contributions to children's identity formation, while fathers make distinct contributions to children's capacity for healthy relationships with others.

Parental Influences on Cognitive Development

Social-emotional development in children lies at the heart of every other aspect of development including cognitive development. As with studies evaluating parental influences on social-emotional development, there is much overlap in the capacities that fathers and mothers both exhibit in influencing cognitive development. But there are also distinctive capacities consistently reflected in mothers and fathers that seem to provide distinctive contributions to children's cognitive development.

Mothers' Distinctive Contributions to Children's Cognitive Development

The emotional sensitivity mothers provide in early infancy emerges as foundational to cognitive capacities. In speaking of this finely-tuned process, three psychiatrists from the University of California at Berkeley concluded, "*Whether they realize it or not, mothers use the universal signs of emotion to teach their babies about the world. … Emotionality gives the two of them a common language years before the infant will acquire speech. … It isn't just his mother's beaming countenance but her synchrony that he requires—their mutually responsive interaction*" (Lewis, Amini, & Lannon, 2000, p. 61-62). The relatively simple yet profound process of "mutually responsive interaction" implicates the influence of a mother on a whole host of cognitive capacities including IQ development, shared attention, referential communication, social learning, language, autobiographical memory, and theory of mind, among others" (Bjorklund and Jordan, 2012, p. 71).

Recent findings exploring the relationship between breastfeeding and brain development have clarified the intricately bound processes of mother-child emotional connection and intellectual stimulation. After years of research findings showing a correlation between

breastfeeding and brain development, more sophisticated research methods revealed that the correlation was due to the fact that mothers who breastfeed are also more likely to engage in behaviors that enhance brain development (Gibbs & Forste, 2014). The observed behaviors included attention to emotional cues and consistent exposure to language through reading. The benefits of reading to a child were experienced as mothers were attentive to emotional cues from their children in the process of reading to them. This confirmed other research on attachment demonstrating that emotional attentiveness is the critical foundation for cognitive development. And that is most often best facilitated through maternally sensitive interactions between a mother and child.

The interrelationship of emotional attentiveness and cognitive stimulation may also help explain why mothers tend to engage in more teaching-oriented, didactic interactions with children than fathers (Parke, 2012). Mothers seem to be especially attuned to emotional responses and at the same time more focused on teaching through verbal interaction. For example, beginning in infancy, mothers are more likely to use objects in engaging with a child. But rather than using the object to physically arouse the child (as fathers typically do), mothers use the object for teaching – drawing attention to it and labeling its characteristics (color, shape, purpose) while engaging with the child (Parke, 2012). As children grow, mothers provide essential stimulation when they ask questions or give suggestions that invite the child's thinking, or when they provide conceptual links among objects, activities, locations, persons, or emotions (Hubbs-Tait, McDonald, Culp, & Miller, 2002). This teaching orientation has important implications for cognitive development, including memory, problem-solving, and language advancement.

Mothers also tend to be more verbal in their interactions compared to fathers. This verbal interactive style, including both the number of words she uses and her emotionally positive expressions, are important in developing conceptual capacity. Hart & Risley's (1995) landmark study on children's exposure to language in the home revealed that the variation in children's IQs and language abilities is relative to the number of words, and patterns of speech they hear from the adults who care for them. By age three, not only were 86-98% children's vocabulary derived from their parents' vocabularies, but average words used, duration of conversations and speech patterns were "strikingly similar" to those of their caregivers. At ages nine and ten, academic ability was attributable to the number of words a child heard from caregivers from birth to age three. Caregivers of more advanced children used significantly more words in speaking to their children, directed more of their speech to their children, and used more positive speech (indeed in a 6:1 ratio) than those with less advanced children. Compared to their less-successful counterparts, these children would have heard 30 million more words and 560,000 more words of praise by the age of four, producing a larger and more intractable gap between the trajectories for academic success than could ever be reconciled by schooling in later years.

As Hart and Risley (2003) explain, when children become more independent they can seek out their own stimulating activities. But their interests and capacities for other activities are shaped by their earliest experiences. During this most critical period of their development, children are entirely helpless, dependent on the adults who care for them to receive the emotionally responsive, one-to-one interactions essential for their development. Emotionally sensitive, cognitively-stimulating interactions during the critical period of infancy are the source of the central nervous system activity that shapes cognitive and emotional functioning for the rest of their lives. And these are precisely the interactions for which mothers seem to be biologically and psychologically primed.

Fathers' Distinctive Contributions to Children's Cognitive Capacities and Educational Achievement

With all the foundational contributions mothers seem to make to children's cognitive development, fathers emerge as significant predictors of specific cognitive capacities and educational achievement. The U.S. Department of Health and Human Services (2006) report repeatedly identified better educational outcomes for children with fathers who are "involved, nurturing, and playful" with their infants. These effects parallel the contributions of mothers' interactions in stimulating cognitive development, and are reflected in higher IQs, language development and cognitive skills. As infants become toddlers, those with involved fathers go on to be more academically prepared to start school. Social-emotional readiness facilitates academic readiness, as children with involved fathers as toddlers are "more patient and can handle the stresses and frustrations associated with schooling more readily than children with less involved fathers."

In addition, fathers seem to matter more than mothers in children's expressive language development (Pancsofar and Vernon-Fegans, 2010). Mothers, who typically spend more time with their children, seem to be more likely to simplify their language to ensure understanding, while fathers are more likely to use a broader vocabulary with more unique words. That broader vocabulary use in fathers' interactions with their children has significant implications for language development.

During adolescence, responsive and involved fathering predicts "better verbal skills, intellectual functioning, and academic achievement" (U.S. Department of Health and Human Services, 2006). Further explorations of academic achievement indicate that involved biological fathers had children who were "43 percent more likely to earn mostly A grades and 33 percent less likely to repeat a grade," compared to other children. In addition, Bradford Wilcox's (2014) recent analyses of college graduation rates found that teens who had involved fathers were 98% more likely to graduate from college, and those with "very involved" fathers were 105% more likely to graduate (2014) when compared to teens with less involved fathers.

Wilcox suggested four possible explanations as to why fathers seem to make such an impact on educational achievement. First, fathers who are involved are likely to help with homework and provide advice or knowledge that helps children excel in school. Second, involved fathers are more likely to monitor and guide children's behaviors, helping them "steer clear of risky behaviors" that might negatively impact school achievement. Third, involved fathers seem to "foster an authoritative environment" that, as Wilcox explains, is "characterized by an appropriate mix of engagement, affection, and supervision," and facilitative of learning and achievement. Finally, involved fathers are more likely to provide financial support to facilitate academic achievement, including a college education (Wilcox, 2014).These same supportive behaviors are likely to be observed in mothers. But the distinctive style reflected in fathers appears to be significant specifically in children's educational achievement.

Characteristics reflected in fathers' psychological orientations and styles of interaction also seem to be particularly important in facilitating cognitive capacities and educational achievement. First, fathers' physical play is "characterized by arousal, excitement, and unpredictability" when compared to mothers' more modulated, less arousing, more conventional methods (Parke, 2012, p. 127). This unique "destabilizing" orientation corresponds with typical approaches in other father-child interactions that may play an important role in "stimulating children's openness to the world" by exciting, surprising, and destabilizing them (Palkovitz, 2012, p. 226). These unique characteristics have led researchers to describe a father's relationship with his children as an "activation relationship" primarily developed through play (Paquette, 2004).

Second, fathers seem to be particularly oriented toward the development of independence and ability to take risks. This comprehensive, facilitative approach to independence often "translates into educational and occupational success" (Wilcox, 2014). Daniel Paquette found from his research that fathers "tend to encourage children to take risks, while at the same time ensuring safety and security, thus permitting children to learn to be braver in unfamiliar situations, as well as to stand up for themselves."

Andrea Doucet (2006) found further evidence of this unique father orientation in extensive interviews of a large sample of fathers who were primary caregiver. Consistently, fathers reflected a focus on helping children learn to do things independently and find solutions to their problems. Initially Doucet wondered if fathers just weren't as nurturing as mothers. Fathers' behaviors did not seem to fit the traditional definition of "holding close and sensitively responding." But further analysis revealed how this seeming "indifference" was a strategic form of nurturing. A key part of nurturing also includes the capacity to "let go." It was this careful "letting-go" that fathers were particularly good at—in ways that mothers were not.

Another way fathers reflect an orientation toward facilitating independence is in their play. Ross Parke's research indicates that fathers focus less on physical play with their children

as they age. By adolescence, fathers typically engage in more verbal play in the form of sarcasm, humor, and word play (Parke, 2012, p. 128). This verbal play involves teasing and joking "more like a peer," but within the safety of a father-child relationship. As Parke (2012, p. 128) concludes, "Evidence suggests that fathers may help adolescents develop their own sense of identity and autonomy by being more 'peer-like'," thus facilitating healthy differentiation and strengthening independence.

Finally, fathers tend to be more "cognitively demanding" of their children in pushing them towards better understanding and exhibition of skills, while mothers tend toward more scaffolding, as they reach in and help their children (Palkovitz, 2012). Repeatedly, researchers have observed that mothers tend to intervene in responding to children's concerns and actively help them solve problems. In a complementary way, fathers tend to hold back from actively intervening to help solve a problem, while continuing to offer verbal and nonverbal support to children. Acknowledging this complementary pattern, the U.S. Department of Health and Human Services (2006) report concludes, "Fathers often push achievement while mothers stress nurturing, both of which are important to healthy development. As a result, children who grow up with involved fathers are more comfortable exploring the world around them and more likely to exhibit self-control and pro-social behavior."

In sum, both fathers and mothers make important and unique contributions to children's cognitive development and educational achievements. The distinct emotional attentiveness mothers tend to exhibit lays the foundation for cognitive development. Mothers are also more likely to be teaching-oriented in their interactions with their children. Their more verbal, teaching-oriented, and emotionally sensitive interactions are the central influence on neural development and cognitive functioning in young children. Fathers, in turn, bring distinct psychological orientations and styles of interaction that are important in cognitive abilities and educational achievement. This is reflected in fathers' distinct contributions to children's vocabulary development, openness to the outside world, risk-taking, independence, and academic achievement. Thus, while both mothers and fathers are a significant influence on cognitive development, they express that influence in distinct ways that contribute differently to the important dimensions of children's cognitive functioning.

Parental Gender Differences and Children's Gender Identity Development

While evidence clearly suggests that fathers and mothers each provide distinctive contributions to children's social-emotional and cognitive development, evidence also suggests that the presence of differences between mothers and fathers is itself important to development – particularly in specific psychological capacities and sexual identity development.

Henry Biller's extensive work on fathering and infant development led him to conclude that differences between the mother and father "can be very stimulating" to children, "even those that appear quite superficial," and even if the father and mother "behave in generally similar

ways." Their presence presents contrasting images and experiences – a father who is usually larger, has a deeper voice, wears different clothes, moves and reacts differently, and communicates in a different verbal style to children as well as adults – all of which are distinct from the mother. The infant also learns mothers and fathers "can be expected to fulfill different needs," with findings indicating that infants may prefer the mother "when hungry or tired," and prefer the father "when seeking stimulation of more active play" (Biller, 1993, p. 12).

Fathering scholar, Rob Palkovitz, draws on findings from researchers in Toulouse, France, as well as developmental scholar Danielle Paquette, in explaining that even though less differentiated parenting appears to be "more socially desirable" today, there is considerable evidence that "the family structure that is most favorable to the socioaffective development of young children" is one in which parents reflect the "different styles, voices, histories, and connections" of distinct maternal and paternal patterns.

Children benefit from "discrimination learning in the positive sense, the formulation of and analyses of differences," as they experience the psychological and physical differences between their two parents. Thus Palkovitz concludes, "Experiencing parental differences affords children the opportunity to develop nuanced understandings of individual differences in personality as well as gender, enhancing social cognition…" as well as resulting in "more advanced cognitive functioning" (Palkovitz, 2012, p. 229).

Experiencing parental gender differences is also argued to be core to children's gender identity development. In 2003, a distinguished group of 33 neuroscientists, pediatricians, and social scientists comprising the Commission on Children at Risk (2003) reviewed research exploring gender development of children. Their report, "Hardwired to Connect" confirmed that typically at about 18-24 months a child "begins to show a deep need to understand and make sense of her or his sexual embodiment." The need to "attach social significance and meaning" to his or her own gender "appears to be a human universal." Indeed, the report concludes, "Gender also runs deeper, near to the core of human identity and social meaning—in part because it is biologically primed and connected to differences in brain structure and function, in part because it is also deeply implicated in the transition to adulthood."

In the need to attach significance to his or her gender, and make sense of his or her own identity, a child's relationships with mother and father "become centrally important," and both the "same-sex-as-me parent and the opposite-sex-from-me-parent play vital roles" (Commission on Children at Ricks, 2003). Psychologists have long understood that human beings come to understand their identity through experiencing themselves in relation to others. The experience of a parent who is opposite sex, as well as a parent who is of the same sex, thus plays an important role in facilitating a child's ability to understand his or her own gender identity. Observing this in her extensive anthropological work, Margaret Mead concluded, "One of the most important learnings for every human child is how to be a full member of its own sex and at

the same time fully relate to the opposite sex. This is not an easy learning; it requires the continuing presence of a father and a mother …." (Mead, 1949, p. 359).

Psychologist Barbara Eisold (1998) provided insight into the deep yearnings children have to experience both genders in order to make sense of themselves in her report, "Recreating Mother." Eisold describes a 4 ½ year-old son of two fathers, who is receiving psychotherapy to deal with the un-mourned loss of "Mommy," his first babysitter, who had been fired when he was 2 1/2 years old. In his yearning to experience his Mommy, he fantasized about buying a new mother, ultimately creating his own mother figure, as she seemed essential to his ability to understand what it meant to become a boy/man. His therapist described how this struggle related to his understanding of himself: "Nick was often beside himself with anxiety. He wanted desperately to be liked by other children and by [his teacher]. He had trouble waiting, and was not certain about what would make him likable."

In her analysis of the boy's experience, Eisold poignantly asks, "How do we explain why this child, the son of a male couple, seemed to need to construct a woman – 'Mother' -- with whom he could play the role of a loving boy/man? How did such an idea enter his mind? What inspired his intensity on the subject?" Natural developmental forces seemed to demand that this child psychologically reconstruct "Mommy" in order to make sense of his own identity and wholeness as an individual.

Certainly it must be some of those same developmental forces at work in the description by Frank Ligtvoet (2013) who recently described in the New York Times, "*Sometimes when my daughter, who is 7, is nicely cuddled up in her bed and I snuggle her, she calls me Mommy. I am a stay-at-home dad. My male partner and I adopted both of our children at birth in open domestic adoptions. We could fill our home with nannies, sisters, grandmothers, female friends, but no mothers. My daughter says 'Mommy' in a funny way, in a high-pitched voice. Although I refer the honors immediately to her birth mom, I am flattered. But saddened as well, because she expresses herself in a voice that is not her own. It is her stuffed-animal voice. She expresses not only love; she also expresses alienation. She can role-play the mother-daughter relationship, but she cannot use her real voice, nor have the real thing*." Observing that his daughter's natural longings for a motherly presence are ever present, he concludes that, "motherless parenting is a misnomer." Even "*when she is not physically there, she is – as we know from many accounts of adult adoptees – still present in dreams, fantasies, longings and worries*."

This hunger for the experience and closeness with both a mother and father also emerges in explorations of children's sexual behaviors. Studies have repeatedly found that girls who are not reared by their biological fathers are much more likely to engage in sexual relations at an early age and become pregnant as teenagers. The effect is so consistent that scholars have concluded that, "An absent father is the single greatest risk factor in teen pregnancy for girls" (Palkovitz, 2012). Indeed the presence and emotional closeness of fathers seems to "set the reproductive strategy" girls use throughout their lives (Raeburn, 2014, p. 162).

Bruce Ellis' foundational work establishing the important link between fathers and daughters' sexual development further identified that daughters who are close emotionally and physically to their fathers have a reduced risk of early puberty, as well as early initiation of sex. Ellis found that girls who spent more time without a father in their homes had an onset of puberty 11 months earlier than their older sisters who had spent more time with their fathers in the home (Ellis & Tither, 2008). Ellis further found that girls whose fathers left home before they were six years of age were six times more likely to become pregnant as teenagers compared to girls who were reared by their biological fathers.

The emotional and physical closeness of a father in early to middle childhood emerges as a "key life transition" that alters the sexual development of daughters (Raeburn, 2014, p.164). In offering some explanation for these findings Bradford Wilcox concludes, "Girls raised in homes with their fathers are more likely to receive the attention, affection, and modeling that they need from their own fathers to rebuff teenage boys and young men who do not have their best interests at heart" (Wilcox, 2012).

But it is not only daughters' sexual identity development that is affected by closeness to their fathers. Without the closeness and modeling of a father, boys appear to engage in what David Popenoe (1996) calls "compensatory masculinity," exhibited in rejecting and denigrating anything feminine while seeking to prove masculinity through violent and aggressive domination. In contrast, "Boys who are raised in homes with their fathers are more likely to acquire the sense of self-worth and self-control that allows them to steer clear of delinquent peers and trouble with the law" including in their sexual behaviors (Wilcox, 2012).

Self-control and self-worth become defining characteristics of their masculine identity, manifesting themselves in behavioral patterns as well as achievements. Given that paternal influence, Bruce Ellis hypothesized that fathers' involvement may enhance a boy's competitive urge, "spurring sons to achieve more when they grow up and leave the family" (Raeburn, 2014, p. 166). This hypothesis is underscored by increasing evidence of a gender gap in educational achievement which appears to be strongly related to boys not growing up with their fathers (Hassett, 2013).

Maggie Gallagher effectively summarizes the distinctive contributions mothers and fathers appear to make to children's sexual development:

"What a boy gets from experiencing the dependable love of a father is a deep personal experience of masculinity that is pro-social, pro-woman, pro-child...Without this personal experience of maleness, a boy (who like all human beings is deeply driven to seek some meaning for masculinity) is vulnerable to a variety of peer and market-driven alternative definitions of masculinity, often grounded in…aggression, physical strength, and sexual proclivities…

She continues, "The importance of a father in giving a boy a deeply pro-social sense of his own masculinity may be one reason why one large national study found that boys raised

outside of intact marriages were two to three times more likely to commit a crime leading to imprisonment. Similarly a girl raised without a father does not come to adolescence with the same deep experience of what male love feels like when it is truly protective, not driven primarily by a desire for sexual gratification. At the same time, fatherless girls may experience a hunger for masculine love and attention that leaves her particularly vulnerable to use and abuse by young adult males. Girls raised without fathers are at high risk for unwed motherhood."

Parental Influences on Safety, Survival and Thriving

No discussion of distinctive contributions of mothers and fathers in children's development would be complete without acknowledging the significance of fathers in protecting children. Across cultures, mothers are the central influence in a child's likelihood of survival, while fathers emerge as protectors from danger. Fathering scholar Bradford Wilcox summarized, "By dint of their size, strength, or aggressive public presence, [fathers] appear to be more successful in keeping predators and bad peer influences away from their sons and daughters." Noting a substantial body of research, he continues, "Fathers play an important role in ensuring the safety of their children, both by monitoring their children's activities and peers, and by signaling to others, from neighborhood bullies to adults seeking a target for abuse, that they will not tolerate harm to their children…Indeed, by simply sticking around, ordinary dads play an important role in protecting their children from physical, sexual and emotional abuse" (Wilcox, 2012).

The Fourth National Incidence Study of Child Abuse and Neglect Report to Congress (Administration for Children and Families, 2010) found that children raised by their married mother and fathers were the least likely to experience physical, sexual, and emotional abuse. Children living with their single mother and unrelated boyfriend were 10 times more likely to be abused when compared to children living with their married mother and father. These findings are consistent with the recent Center for Disease Control (2014) report on the National Survey of Children's Health for 2011-2012. Children living in families with their married biological parents were overwhelmingly safer than children living with just one biological parent, or with non-parental caregivers. While 70% of children living with both biological parents never experienced adverse childhood events, 78% of those living with just one biological parent had experienced at least one of them, and 81% of those living without either biological parent.

Fathers emerge as critical protectors in these findings, though cultural stereotypes have suggested that fathers may be likely to pose the most important threat to children. In contrast to that cultural stereotype, the Department of Health and Human Services (2006) reported that in 2003, 41% of child victims were maltreated by their mothers acting alone, while only 18.8% of children were maltreated by fathers acting alone. In addition, unrelated male figures and stepfathers in households were significantly more likely to be abusive than married fathers. As Wilcox and Wilson (2014) conclude, *some* men do pose a threat to the welfare of children, but *other men* are more likely to protect both their wives and their children: married biological

fathers. Children raised in a home with their married fathers are "markedly less likely to be abused or assaulted than children living without their own father."

It is likely a combination of factors that explain why fathers emerge as such important protectors of their children. As discussed above, fathers are much more likely to be involved and attentive to their children than step fathers or unrelated boyfriends. Their day-to-day presence in the home means that "unrelated males are less likely to have sustained interaction with children of the family." It also means that children are more likely to receive the level of emotional support and connection that makes them less vulnerable to potential predators. Children being raised in a home with their married fathers are also more likely to live in safer areas and to spend less time in dangerous areas with potentially dangerous predators. Whatever the combination of factors, research findings repeatedly indicate that a distinct and critical contribution of fathers is the safety and protection they provide for their children.

Conclusion

Canadian fathering scholar Andrea Doucet (2006) once shared an illuminating moment from her extensive research with primary caregiver fathers. After a long evening discussing their experiences as single dads, Doucet asked a group of sole-custody fathers, "In an ideal world, what resources or supports would you like to see for single fathers?" She expected to hear that they wanted greater social support and societal acceptance, more programs and policies directed at single dads. Instead, after a period of awkward silence, one dad stood and said, "An ideal world would be one with a father and a mother. We'd be lying if we pretended that wasn't true." Nods of agreement followed with expressions of approval from the other dads. Although many had had bitter experiences of separation and divorce, they could not ignore the inherent connectedness of mothering and fathering—and the profound deficit experienced when one or the other is not there. They knew because they had lived it.

Doucet's experience complements Azim Surani's experience attempting to create new mammalian life. Although everything then known about the science of genetics suggested it should be possible to combine two sets of a mother's genes or two sets of a father's genes and create new life, it was not so. The paternal and maternal genes appeared indistinguishable. But for the developing mammal, they expressed themselves differently whether they came from a mother or a father in ways that were essential for survival. As Surani found, both a father and a mother were needed to create life, and as described by Doucet's fathers, both were needed to best facilitate the nurturing of that life.

This review provides social science underpinnings for the intuitive sense and experience of those fathers. It is clear that there is much overlap in the capacities, skills and behaviors of mothers and fathers that enable children to develop and even thrive. But as this review demonstrates, mothers and fathers retain distinctive capacities, styles, and orientations that

emerge as important, if not critical, contributors in children's social-emotional, cognitive, and sexual development, as well as their safety and protection.

Some of these distinct contributions are "primed" by physiological sex differences. Mothers and fathers both experience the influence of bonding hormones that "prime" them for effective interactions with their infants. But the same hormones elicit different bonding behaviors in men and women, indicating that mothers and fathers are physiologically primed to nurture children in distinct ways. This allows children to experience distinct interactive patterns, that both contribute to forming the bonds that are essential for healthy development.

Across time and cultures, mothers, are likely to invest more time and energy in the direct care of their children than fathers. This becomes particularly important as children depend on a strong attachment bond for the essential foundation that allows healthy social-emotional development. Mothers' psychological orientation and interactive style make them particularly important in this foundational process. In particular, mothers tend to exhibit unique capacities for emotional attentiveness and responsiveness, which facilitates the security necessary for the formation of healthy identity in children. Fathers' involvement and closeness also appears to be related to almost every aspect of children's social-emotional health, but fathers seem to distinctly influence children's capacity for prosocial behaviors and healthy relationships. The way fathers play with their children, acknowledged as a consistently unique aspect of father-child interactions, is particularly significant in facilitating children's prosocial, relational capacities.

Similarly, both fathers and mothers make important and distinct contributions to children's cognitive development and educational achievements. Mothers' more verbal, teaching-oriented, and emotionally sensitive interactions are the central influence on neural development and cognitive functioning in young children. In turn, fathers' distinct psychological orientations and styles of interaction are important in cognitive abilities that include vocabulary development, openness to the outside world, risk-taking, independence, and likelihood of educational accomplishments.

Distinct contributions of both fathers and mothers in sexual identity and sexual behavior patterns are also elucidated by social science research. Indeed, the presence and emotional closeness of fathers appears to "set the reproductive strategy" girls use throughout their lives, becoming the "key life transition," that influences sexual development and behaviors (Raeburn, 2014, p. 162). In turn, the presence and emotional closeness of fathers appears to be central to a boys' development of healthy masculinity. Those who do not experience the needed presence and closeness of a father appear to engage in "compensatory masculinity" reflected in their rejection and denigration of all that is feminine, and increased likelihood of engaging in violent and dangerous behaviors.

Finally, decades of findings consistently reveal that fathers provide a distinct and critical contribution in providing safety and protection for their children.

The findings provide a social science context for the conclusion that a child's inability to be raised by a loving father and mother is a "loss that cannot be measured" (*Santosky v. Kramer,* 1982). Although both fathers and mothers have the capacity to be equally competent caregivers with high degrees of similarity, they also provide distinctive contributions that provide children with many important, even critical, advantages. Mothers do not father and fathers do not mother. Each emerges as a unique source of distinct and important, if not critical, nurturing in the development of children.

References

Administration for Children and Families (2010). National incidence study of child abuse and neglect (NIS-4), 2004-2009. Retrieved September 29, 2014 from http://www.acf.hhs.gov/programs/opre/research/project/national-incidence-study-of-child-abuse-and-neglect-nis-4-2004-2009.

Aguilar, B., Sroufe, L. A., Egeland, B., and Carlson. E. (2000). Distinguishing the early-onset/persistent and adolescence-onset antisocial behavior types: From birth to 16 years. *Development and Psychopathology, 12*(2), 109-132.

Amato, P. R., and Rivera, F. (1999). Paternal involvement and children's behavior problems. *Journal of Marriage and Family, 61,* 375-384.

Ainsworth, M. D., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the Strange Situation.* Hillsdale, NJ: Erlbaum.

Belkin, L. (2010). Why mothers and fathers play differently. *New York Times,* September 2, 2010. Retrieved August 29, 2014 from http://parenting.blogs.nytimes.com/2010/09/02/why-mothers-and-fathers-play-differently/?_php=true&_type=blogs&_r=0.

Belsky, J., Gilstrap, B., and Rovine, M. (1984). The Pennsylvania Infant and Family Development Project: I. Stability and change in mother-infant and father-infant interaction in a family setting at one, three, and nine months. *Child Development, 55,* 692-705.

Berlin, L. J., Cassidy, J., & Belsky, J. (1995). Loneliness in young children and infant-mother attachment: A longitudinal study. *Merrill-Palmer Quarterly, 41,* 91-103.

Bjorklund D. F., and Jordan, A. C. (2012). Human parenting from an evolutionary perspective. In W. B. Wilcox, & K. K. Kline (Eds.), *Gender and Parenthood* (pp. 61-90). New York: Columbia University Press.

Bornstein, M. H. (2012). Parenting x gender x culture x time. In W. B. Wilcox, & K. K. Kline (Eds.), *Gender and Parenthood* (pp. 91-119). New York: Columbia University Press.

Bosch, O. J., and Neumann, I. D. (2012). Both oxytocin and vasopressin are mediators of maternal care and aggression in rodents: From central release to sites of action. *Hormonal Behavior, 61*(3), 293-303.

Bowlby, J. (1944). Forty-four juvenile thieves: Their characters and home life. *International Journal of Psychoanalysis, 25,* 19-52, 107-127.

Bretherton, I., & Munholland, K. A. (1999). Internal working models in attachment relationships. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of Attachment* (pp. 89-111). New York: The Guilford Press.

Broughton, A. E. (2002). U. study says dads are important, too. *Salt Lake Tribune,* April 5, 2002. Retrieved September, 29, 2014 from http://www.fact.on.ca/news/news0204/st020405.htm.

Center for Disease Control (2014). Children in nonparental care: Findings from the 2011-2012 National Survey of Children's Health. *ASPE Research Brief*, March, 2014. Retrieved September 29, 2014 from http://aspe.hhs.gov/hsp/14/ChildrenNonparentalCare/rb_nonparentalcare.pdf.

Cobb, D. A., and Tekin, E. (2011). Fathers and youth's delinquent behavior. *National Bureau of Economic Research*, Working Paper no. 17501. Retrieved September 29, 2014 from http://www.nber.org/papers/w17507.

Commission on Children at Risk. (2003). *Hardwired to connect: The new scientific case for authoritative communities.* New York: Institute for American Values.

Denham, S. A., Workman, E., Cole, P. A., Weissbrod, C. Kendziora, K. T., and Zahn-Waxler, C. (2000). Prediction of externalizing behavior problems from early to middle childhood: The role of parental socialization and emotion expression. *Development and Psychopathology, 12*(1), 23-45.

Diener, M.L., Mangelsdorf, S.C., McHale, J.L & Frosch, C.A. (2002). Infants' behavioral strategies for emotion regulation with fathers and mothers: Associations with emotional expressions and attachment quality. *Infancy, 3*(2), 153-174.

Doucet, A. (2006). *Do Men Mother.* Toronto, Canada: University of Toronto Press.

Eggebeen, D. J. (2012). Do fathers matter for adolescent well-being? In W. B. Wilcox, & K. K. Kline (Eds.), *Gender and Parenthood* (pp. 249-270). New York: Columbia University Press.

Eisold, B. K. (1998). Recreating mother: The consolidation of "heterosexual" gender identification in the young son of homosexual men. *American Journal of Orthopsychiatry, 68*(3), 433-442.

Ellis, B. J., Bates, J. E., Dodge, K. A., Fergusson, D. M., Horwood, J. L., Pettit, G. S., and Woodward, L. (2003). Does father absence place daughters at special risk for early sexual activity and teenage pregnancy? *Child Development, 74*(3), 801-821.

Erickson, R. (2005). Why emotion work matters: Sex, gender, and the division of household labor. *Journal of Marriage and Family, 67*, 337-351.

Fagot, B. I. (1997). Attachment, parenting, and peer interactions of toddler children. *Developmental Psychology, 33,* 489-499.

Feldman R., Gordon I., Zagoory-Sharon O. (2010). The cross-generation transmission of oxytocin in humans. *Hormonal Behavior, 58,* 669–676.

Feldman R., Gordon I., Zagoory-Sharon O. (2011). Maternal and paternal plasma, salivary, and urinary oxytocin and parent-infant synchrony: considering stress and affiliation components of human bonding. *Developmental Science, 14,* 752–761

Feldman R., Weller A., Zagoory-Sharon O., Levine A. (2007). Evidence for a neuroendocrinological foundation of human affiliation: Plasma oxytocin levels across pregnancy and the postpartum period predict mother-infant bonding. *Psychological Science, 18,* 965-970.

Gibbs, B. J., and Forste, R. (2014). Breastfeeding, Parenting and Early Cognitive Development. *The Journal of Pediatrics, 164* (3), 487-493.

Gordon I., Zagoory-Sharon O., Leckman J. F., Feldman R. (2010). Oxytocin and the development of parenting in humans. Biol. Psychiatry 68, 377–382

Gray, P. B., and Anderson, K. G. (2010). *Fatherhood: Evolution and human paternal behavior.* Boston, MA: Harvard University Press.

Haltzman, S. (2012). The effect of gender-based parental influences on raising children: The impact on couples' relationships. In W. B. Wilcox, & K. K. Kline (Eds.), *Gender and Parenthood* (pp. 304-321). New York: Columbia University Press.

Hart, B. and Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children.* Baltimore, MD: Paul H. Brookes Publishing.

Hart, B. and Risley, T. R. (2003, Spring). The early catastrophe: The 30 million word gap. *American Federation of Teachers,* pp. 4-9.

Hart, C. H., Nelson,D. A., Robinson, C. C., Olsen S.F., McNeilly-Choque, M. K. (1998).Overt and relational aggression in Russian nursery-school-age children: Parenting style and marital linkages. *Developmental Psychology, 34*(4), 687-97.

Hassett, K. A. (2013). Boys left behind. *American Enterprise Institute,* April 08, 2013. Retrieved September 29, 2014 from http://www.aei.org/article/economics/boys-left-behind/.

Hubbs-Tait, L., McDonald, A., Culp, R. E., and Miller, C. E. (2002). Relation of maternal cognitive stimulation, emotional support, and intrusive behavior during Head Start to children's kindergarten cognitive abilities. *Child Development, 73,* 110-131.

Kline, K. K., and Stafford, B. (2012). Essential elements of the caretaking crucible. In W. B. Wilcox, & K. K. Kline (Eds.), *Gender and Parenthood* (pp. 193-214). New York: Columbia University Press.

Kobak, R. (1999). The emotional dynamics of disruptions in attachment relationships: Implications for theory, research, and clinical intervention. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of Attachment* (pp. 21-43). New York: The Guilford Press.

Koestner, R., Franz, C., and Weinberger, J. (1990). The family origins of empathic concern: A 26-year longitudinal study. *Journal of Personality and Social Psychology, 58,* 709-717.

Lamb, M. E., and Lewis, C. (2003). Fathers' influences on children's development: The evidence from two-parent families. *European Journal of Psychology of Education, 8*(2), 211-228.

Lewis, T., Amini, F., and Lannon, R. (2000). *A General Theory of Love.* New York: Random House.

Ligtvoet, F. (2013). The misnomer of motherless parenting. *New York Times,* June 22, 2013. Retrieved August 29, 2014 from http://www.nytimes.com/2013/06/23/opinion/sunday/the-misnomer-of-motherless-parenting.html?_r=0.

Marcus, R. F., and Betzer, P. D. (1996). Attachment and antisocial behavior in early adolescence. *Journal of Early Adolescence, 16*(2), 229-248.

Mead, M. (1949). *Male and Female: A study of the sexes in a changing world.* New York, NY: W. Morrow and Company.

Moore, K. A., Jekielek, S. M., and Emig, C. (June, 2002). *Marriage from a child's perspective: How does family structure affect children, and what can we do about it?* Child Trends Research Brief. Retrieved August 28, 2014 from http://www.childtrends.org/wp-content/uploads/2013/03/MarriageRB602.pdf

Mosley, J., and Thompson, (1995). Fathering behavior and child outcomes: The role of race and poverty. In W. Marsiglio (Ed.), *Fatherhood:Contemporary theory, research, and social policy* (pp. 148-165). Thousand Oaks, CA: Sage.

Nagasawa, M., Okabe, S., Mogi, K., & Kikusui, T. (2012). Oxytocin and mutual communication in mother-infant bonding. *Frontiers in Human Neuroscience, 6*(31). Retrieved August 28, 2014 from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3289392/#B39.

NICHD Early Child Care Research Network (2003a). Does amount of time spent in child care predict social-emotional adjustment during the transition to kindergarten? *Child Development, 74*(4), 976-1005.

Palkovitz, R. (2012). Gendered parenting's implications for children's well-being: Theory and research in applied perspective. . In W. B. Wilcox, & K. K. Kline (Eds.), *Gender and Parenthood* (pp. 215-248). New York: Columbia University Press.

Pancsofar, N., and Vernon-Feagans, L. (2010). Fathers' early contributions to chidlren's language development in families from low-income rural communities. *Early Childhood Research Quarterly, 25*(4), 450-463.

Paquette, D. (2004). Theorizing the father-child relationship: Mechanisms and developmental outcomes. *Human Development, 47,* 193-219.

Parke, M. (2003). *Are married parents really better for children? What research says about the effects of family structure on child well-being*. The Center for Law and Public Policy (CLASP). Retrieved August 28, 2014, from http://www.clasp.org/resources-and-publications/states/0086.pdf

Parke, R. D. (1995). Fathers and families. In M. H. Bornstein (Ed.), *Handbook of Parenting: Status and Social Conditions of Parenting,* vol. 3, 2nd ed., 27-73. Mahwah NJ: Lawrence Erlbaum.

Parke, R. D. (2012). Gender differences and similarities in parental behavior. In W. B. Wilcox, & K. K. Kline (Eds.), *Gender and Parenthood* (pp. 120-163). New York: Columbia University Press.

Popenoe, D. (1996). *Life without father: Compelling new evidence that fatherhood and marriage are indispensable for the good of children and society.* New York: Martin Kessler Books.

Pruett, K. & Pruett, M. (2009). *Partnership Parenting.* Philadelphia, PA: Da Capo Books.

Raeburn, P. (2014). *Do Fathers Matter? What Science Tells Us about the Parent We've Overlooked.* New York: Scientific American.

Schore, A. N. (1994). *Affect regulation and the origin of the self: The neurobiology of emotional development.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Seltzer L. J., Ziegler T. E., Pollak S. D. (2010). Social vocalizations can release oxytocin in humans. *Proceedings of the Royal Society B: Biological Sciences, 277,* 2661–2666.

Shahrokh, D. K., Zhang, T.Y., Diorio, J., Gratton, A.., Meaney, M. J. (2010). Oxytocin-dopamine interactions mediate variations in maternal behavior in the rat. *Endocrinology, 151*(5), 2276-2286.

Silverstein, L. B. and Auerbach, C. F. (1999). Deconstructing the essential father. *American Psychologist, 43*, 397-407.

Snowdon, C. T. (2012). Family life and infant care: Lessons from cooperatively breeding primates. In W. B. Wilcox, & K. K. Kline (Eds.), *Gender and Parenthood* (pp. 40-60). New York: Columbia University Press.

Sroufe, L. A., Carlson, E. A., Levy, A. K., & Egeland, B. (1999). Implications of attachment theory for developmental psychopathology. Development and Psychopathology, 11, 1 – 13.

Sroufe, L. A., Carlson, E., & Shulman, S. (1993). Individuals in relationships: Development from infancy through adolescence. In D. C. Funder, R. D. Parke, C. Tomlinson-Keasey & K.Widaman (Eds.), *Studying lives through time: Personality and development* (pp. 315-342). Washington, D. C.: American Psychological Association.

Steele, H., Steele, M., Croft, C., & Fonagy, P. (1999). Infant-mother attachment at one year predicts children's understanding of mixed emotions at six years. *Blackwell Publishers Ltd. 1999.*

Storey, A. E., Walsh, C. J., Quinton, R. L., and Wynne-Edwards, K. E. (2000). Hormonal correlates of paternal responsiveness in new and expectant fathers. *Evolution and Human Behavior, 21,* 79-95.

Strathearn L., Fonagy P., Amico J., Montague P. R. (2009). Adult attachment predicts maternal brain and oxytocin response to infant cues. *Neuropsychopharmacology,34,* 2655–2666.

Thompson, R. A. (2009). The development of the person: Social understanding, relationships, conscience, self. In W. Damon and R. M. Lerner (Eds.), *Handbook of Child Psychology,* 6th edition: *Social, Emotional, and Personality Development,* vol. 3, ed. N. Eisenberg, 24-98. New York: John Wiley.

Thompson, R. A. (1999). Early attachment and later development. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of Attachment* (pp. 265-286). New York: The Guilford Press.

Trivers, R. (1972). Parental investment and sexual selection. In B. Campbell (Ed.) *Sexual Selection and the Descent of Man* (pp. 136-179). Chicago: Aldine.

U. S. Department of Health and Human Services: Child Welfare Information Gateway (2006). The importance of fathers in the healthy development of children. By Rosenberg, J., and Wilcox,

W. B. Retrieved August 29, 2014 from https://www.childwelfare.gov/pubs/usermanuals/fatherhood/.

Wilcox, B. (2014). Dad and the diploma: The difference fathers make for college graduation. *American Enterprise Institute,* April 22, 2014. Retrieved September 29, 2014 from http://family-studies.org/dad-and-the-diploma-the-difference-fathers-make-for-college-graduation/.

Wilcox, W. B. (2012). Are dads really disposable? *Deseret News,* June 14, 2012. Retrieved September 29, 2014 from http://www.deseretnews.com/article/865557457/Fathers-Day-Are-dads-really-disposable.html?pg=all

Wilcox, W. B. and Kline, K. K. (2012). Introduction. In W. B. Wilcox, & K. K. Kline (Eds.), *Gender and Parenthood* (pp. 1-17). New York: Columbia University Press.

Wilcox, W. B., and Wilson, R. F. (2014). One way to end violence against women. Married dads. *Washington Post,* June 10, 2014. Retrieved September 30, 2014 from http://www.washingtonpost.com/posteverything/wp/2014/06/10/the-best-way-to-end-violence-against-women-stop-taking-lovers-and-get-married/.