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Paternal Stimulation and Father-Infant Attachment

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Abstract

This study examined the longitudinal associations between fathers' observed parenting behaviors and father-infant attachment ($n = 58$ father-infant dyads). Fathers were observed playing with their infants at 9 months postpartum and were assessed for stimulating behaviors (i.e., physical and/or object stimulation), as well as their sensitivity and intrusiveness. When the infants were 12 to 18 months of age, fathers and infants participated together in the Strange Situation Procedure (SSP) to assess father-infant attachment security. Logistic regression analyses revealed that higher levels of paternal stimulation at 9 months postpartum were associated with greater odds of classification as a secure father-infant dyad. Additionally, fathers' observed intrusiveness at 9 months postpartum moderated this association; greater paternal stimulation was associated with significantly greater odds of father-infant attachment security at low and average levels of paternal intrusiveness, but not at high levels of paternal intrusiveness. This study provides new insight into the paternal behaviors that may foster secure father-infant attachment.

Keywords

father-infant attachment; father-child play; stimulation; sensitivity; intrusiveness

Although infants form attachments to their fathers as well as to their mothers, and the security of infants' attachment relationships with their fathers is relevant to children's developmental outcomes (Lamb, 2012), far less research has investigated the correlates of father-infant attachment relationships than has investigated the correlates of mother-infant attachment relationships (Lucassen et al., 2011). According to attachment theory, the security versus insecurity of infants' attachments to caregivers develops as a result of infants' experiences of parental behavior. In particular, parental sensitivity – the extent to which the parent perceives and responds consistently and appropriately to infant bids and signals (Ainsworth, Blehar, Waters, & Wall, 1978) – is believed to underpin the development of secure attachment. However, paternal sensitivity is a relatively weak predictor of father-

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infant attachment security (Lucassen et al., 2011), denoting a need to understanding other paternal behaviors that may contribute to secure father-infant attachment.

Various theories have been advanced to explain which other paternal behaviors might foster secure father-infant attachments, with a number pointing to the potential importance of paternal stimulating behaviors (e.g., sensitively stimulating play: Grossmann et al. 2002; activation relationship: Paquette, 2004) that may be more characteristic of father-child than mother-child interactions and more likely to promote secure father-infant attachment. However, little research has tested these theories, in part because of limited data on father-infant attachment, and because the parenting behaviors coded for fathers have not necessarily changed or expanded to reflect advances in theory. The purpose of this study was to examine the associations between paternal stimulation and father-infant attachment security in the context of parenting behaviors more typically examined as predictors of attachment: sensitivity and intrusiveness.

Differences in Paternal and Maternal Parenting Behavior

A majority of the research on parenting behavior that fosters father-infant attachment security has focused on paternal sensitivity, likely because sensitivity is a key precursor of secure attachment according to attachment theory (Ainsworth, Bell, & Stayton, 1974; Bowlby, 1969), and because sensitivity has consistently emerged as a modest-sized predictor ($r = .24$) of secure mother-infant attachment (de Wolff & van IJzendoorn, 1997). However, compared to maternal sensitivity, paternal sensitivity is a much weaker predictor of father-infant attachment security ($r = .12$) (van IJzendoorn & de Wolff, 1997; Lucassen et al., 2011). This opens up the possibility that the parenting behaviors that foster secure father-infant attachment may differ from those that foster secure mother-infant attachment.

In fact, a substantial base of evidence indicates modest but reliable differences in the ways in which mothers and fathers interact with their children from the first months of life (Feldman, 2003). Initial research provided insights into the differences between mother-child and father-child interactions through naturalistic, in-home observations of infants and their parents (Belsky, 1979; Belsky, Gilstrap, & Rovine, 1984; Lamb, 1977). Lamb (1977) observed infants at seven, eight, twelve, and thirteen months, and found that mothers were more likely to hold their infants in the context of caregiving and fathers were more like to hold their infants to engage in play. As the infants aged, the time mothers spent holding them in the context of caregiving decreased, but mothers did not increase the amount of holding their infants to engage in play. Similarly, Belsky (1979) observed parents with their 15-month old children in their homes for two hours on two separate weekdays. Mothers were found to engage in more caretaking and were more likely to use an object or event to stimulate their infants than fathers. Belsky et al. (1984) observed infants at one, three, and nine months postpartum, and found that compared to fathers at all three time points, mothers were more positively affectionate, responsive, and engaging with their infants; however, these differences declined over time, suggesting that fathers may become more comfortable with their infants over time.

Clarke-Stewart's (1978) longitudinal, observational research showed that from fifteen to thirty months, the amount of play fathers engaged in with their infants increased, but this was not the case for mothers. Power and Parke (1983) observed parents and their eight-month old infants in toy play sessions and found that mothers, but not fathers, were more likely to follow their infant's cues of expressing interest in a toy (e.g., toy play matched the infant's looking behavior). However, when infants expressed disinterest in the toys, fathers were more likely to engage in physical play instead of attempting to show or give the infant a new toy (which was how mothers responded to infants' disinterest). Consistent with these findings, MacDonald and Parke (1986) studied children ranging from one to ten years old, and found that fathers engaged in more vigorous play compared to mothers, that this difference increased across time, and peaked during the child's preschool years. This finding is consistent with more recent literature that points to the importance of a specific type of father-child play—rough-and-tumble play—that seems to be predictive of positive child and father-child outcomes for children ranging from roughly two to six years of age (St. George & Freeman, 2017). Even the intensity and patterning of mothers' and fathers' interactions with their five-month old infants differs, such that mothers' interactions are more socially oriented with affective signals, whereas fathers' interactions are characterized by more positive arousal with high-intensity turns (Feldman, 2003).

In sum, it seems that fathers, compared to mothers, engage in interactions with their infants that are of higher intensity, more physical in nature, and more focused on play than on caregiving. Despite differences in parenting behavior between mothers and fathers, children form attachment relationships with fathers as well as with mothers in the second half of the first year of life (Lamb, 2012). However, in light of these differences, and the gaps in understanding predictors of secure father-infant attachment, new theories have been advanced to illuminate the potential roles of other aspects of paternal parenting behavior in the development of children's attachment relationships with fathers.

Paternal Stimulation and Father-Infant Attachment

One aspect of father-child interaction that appears to be important to children's development of high-quality relationships with their fathers is fathers' propensity to exhibit sensitive, yet challenging physical stimulation of children; this has been referred to as play sensitivity (Grossmann et al., 2002) and the father-child activation relationship (Paquette, 2004). Grossmann et al. (2002) conceptualized play sensitivity as the father interacting with their child during play in a cooperative manner that encouraged the child to play in more mature ways and took the child's point of view into account. They found that fathers' play sensitivity when the child was 24 months of age was predictive of the child's internal attachment representations when the child was 10 and 16 years of age; for mothers, early attachment security was predictive of later attachment representations, but mothers' play sensitivity was not. Given that subsequent attachment representations were predicted by different aspects of mother-child and father-child interaction, this study highlights the importance of measuring multiple aspects of mother and father-child relationships to best capture the mechanisms that underpin the development of children's attachment representations.

Paquette (2004) theorized that the roles of mothers and fathers in establishing attachment security in children were different and complementary. One of the tenets of attachment theory is that the attachment relationship should allow for a secure base from which the child can explore the world and a safe haven to which the child can return when distressed (Ainsworth et al., 1978; Bowlby, 1969). Paquette (2004) argued that these two different, yet complementary processes (i.e., security and exploration) are provided by the mother (via a safe haven) and the father (via an empowerment to explore the environment) differentially; in this way, Paquette's theory attributes unique value to the father-child relationship. This empowerment of the child to be open and explore his or her environment is fostered by what Paquette calls the father-child activation relationship. The father-child activation relationship is defined as the father's distinctive ability to excite and destabilize his child while simultaneously providing safety, warmth, and security (Paquette, 2004). This relationship allows the child to develop skills for exploring new environments in brave ways, as well as for learning how to stand up for oneself when necessary.

Taken together, Grossmann et al. (2002) and Paquette (2004) provided a theoretical basis for expanding understanding of father-child attachment. In particular, these papers sparked interest in parenting behaviors beyond sensitivity – such as stimulation and destabilization during play – that fathers may specialize in and that may play a role in the development of high-quality father-child relationships. This idea fits well into the secure base and safe haven aspects of an attachment relationship, whereby the secure base aspect supports the child in exploration and the safe haven aspect serves the function of comfort and protection when the child grows weary (Ainsworth et al., 1974). It may be that fathers interact in ways that emphasize the secure base function from which their infant or child explores, given previous work pointing to the importance of their stimulation behaviors to father-child attachment (Grossmann et al., 2002; Paquette, 2004).

However, relatively limited empirical work has directly investigated the roles of stimulating types of parenting behaviors in the development of father-infant attachment relationships. In their meta-analysis of sensitivity and father-infant attachment security, Lucassen et al. (2011) reported that the combination of paternal stimulation and sensitivity was not a stronger predictor of father-child attachment security than sensitivity alone. However, the definitions and assessments of stimulation from the studies included in the meta-analysis varied widely. For example, Cox, Owen, Henderson, and Margand (1992) assessed stimulation in terms of activity level (e.g., amount of observed verbal and physical activity), Volling, McElwain, Notaro, and Herrera (2002) used a measure of purely physical play and stimulation (e.g., clapping hands, tickling, bouncing, swinging), and Easterbrooks and Goldberg (1984) included a measure of emotional supportive quality of assistance that included expression of positive and negative affect (physical and verbal), intrusiveness, and accessibility.

One study testing the links between father-infant attachment and paternal stimulation (via frightening behaviors; Hazen, McFarland, Jacobvitz, & Boyd-Soisson, 2010) in 125 two-parent families found that fathers exhibited more frightening behaviors (i.e., threatening physical and facial/verbal behaviors, frightened behaviors, dissociated/disorganized behaviors, and role-reversed behaviors) than mothers while interacting with their infants.

Additionally, fathers with secure attachments with their infants were more likely to exhibit sensitivity after a frightening behavior, whereas fathers with insecure attachments with their infants were less likely to exhibit sensitivity after a frightening behavior. Hazen et al. (2010) argued that this supports Paquette's (2004) ideas that fathers' frightening—or destabilizing, activating—behaviors may play an important function in the father-child attachment relationship.

The Present Study

The ideas of Grossmann et al. (2002) and Paquette (2004), coupled with the intriguing findings of Hazen et al. (2010), suggest examination of paternal stimulation and father-infant attachment within the context of sensitive and intrusive parenting behavior. We conceptualized paternal stimulation as behaviors that served to use objects or physical means to heighten the infant's arousal during father-infant interactions, and developed coding scales to assess paternal stimulation accordingly. In particular, we tested whether paternal stimulation was associated with father-infant attachment security, and further considered whether this association was moderated by paternal sensitivity or intrusiveness. Based on theory and research reviewed above, we expected that greater paternal stimulation would be associated with a higher likelihood of secure father-infant attachment, but only in the context of high paternal sensitivity and/or low paternal intrusiveness.

Method

Participants and Procedure

The sample for this study was drawn from the New Parents Project, a longitudinal study of families headed by dual-earner U.S. couples that followed mothers, fathers, and their first-born children across the early months and years of parenthood. In the third trimester of pregnancy, 182 couples expecting their first biological child were recruited via a variety of approaches – e.g., announcements made in childbirth education classes, flyers posted in doctors' offices, newspaper advertisements, and referrals from other participants. Of these couples, in the third trimester of pregnancy, 86% were married and 14% cohabiting. The median annual family income was \$79,500 and the median level of education for both expectant mothers and fathers was a bachelor's degree. Expectant mothers were 28.24 years old on average ($SD = 4.02$, range: 18–42), and expectant fathers were 30.20 years old on average ($SD = 4.81$, range: 18–50). The majority of participants identified as White (85% of mothers and 86% of fathers); 6% of mothers and 7% of fathers identified as Black, 3% of mothers and 3% of fathers identified as Asian, 2% of mothers and 4% of fathers identified as other races, and 4% of mothers and 1% of fathers identified as multiple races. Four percent of mothers and 2% of fathers identified as Hispanic. Forty-nine percent of the children born to participating parents were female.

The current study utilized data on the quality of father-infant interaction and father-infant attachment collected at 9 and 12–18 months postpartum, respectively. At 9 months postpartum, these fathers and their infants were videotaped while interacting together for 5 min. Fathers were instructed to try to teach their baby how to play with either a shape sorter

or stacking rings (randomly selected). At 12–18 months, 59 toddlers and their fathers participated together in the Strange Situation Procedure (SSP; Ainsworth et al., 1978).

Of the larger sample of 182 families, 153 couples participated in the observational portion of the assessment conducted at 9 months postpartum. Statistical comparisons of families who participated in the 9-month observations versus those who did not on demographic variables indicated no significant differences (see Altenburger, Schoppe-Sullivan, Lang, Bower, & Kamp Dush, 2014). The current study focuses on data from a subsample of 59 father-infant dyads that participated in the observed father-infant interaction at 9 months postpartum and completed the Strange Situation Procedure (SSP; Ainsworth et al., 1978) to assess the security of father-infant attachment at 12–18 months postpartum. The demographic profile of the 59 fathers who participated in the SSP with their infants at 9 months postpartum was largely similar to that of the full sample of fathers. These fathers were also 88% married, 86% White, and 29.66 years of age ($SD = 3.90$). Their median family income was \$80,000. Statistical comparisons between these 59 fathers and children who participated in the attachment assessment and the rest of the New Parents Project sample revealed no significant differences in fathers' marital status, age, race, or family income. However, fathers who participated in the SSP were more likely to have a bachelor's degree or greater; $\chi^2(1) = 4.57, p < .05$. In addition, children who participated in the SSP with their fathers were more likely to be male, $\chi^2(1) = 8.45, p < .01$. Comparisons of the quality of fathers' observed interactions with their infants at 9 months postpartum revealed no significant differences between fathers who subsequently participated in the SSP versus those who did not.

Measures

Fathers' parenting.—The 5-min father-infant interactions were video recorded and subsequently coded by a team of two trained raters for paternal sensitivity and intrusiveness using the Parent-Child Coding Manual (adapted from Cox & Crnic, 2002). These sensitivity and intrusiveness scales have much in common with Ainsworth's sensitivity-insensitivity and cooperation-interference scales (see Bernard, Meade, & Dozier, 2013). These episodes were also coded using a set of two additional 5-point rating scales that reflected the frequency and intensity of fathers' stimulation (i.e., physical stimulation and object stimulation) during the interaction. These scales were created for the current study to provide greater specificity than the broader "Stimulation of Development" subscale of the Parent-Child Coding Manual (see Appendix for full coding scales). The physical stimulation scales measured the extent to which the father stimulates the baby's body to heighten the baby's level of arousal, taking into account both frequency and intensity. Examples of physical stimulation include exercising the baby's arms and legs and lifting the baby up to "fly." The object stimulation scale measured the extent to which the father employed objects for the purposes of stimulating the baby, taking into account both frequency and intensity. Examples of object stimulation include moving or shaking a toy in front of the baby's face or tickling the baby with a toy. The coders double-coded 100% of the episodes, and significant disagreements were resolved through conferencing. Reliability was acceptable; agreement within one scale point ranged from 96–99% and gammas (see Liebetrau, 1983) ranged from .54 to .77.

Father-infant attachment security.—The Strange Situation Procedure (SSP) was utilized to assess father-infant attachment (Ainsworth et al., 1978). The SSP is a laboratory procedure in which infants experience a series of separations and reunions with a caregiver and the introduction of a stranger. The SSP episodes were video recorded and coded using the standard coding system by professional coders. One of the 59 SSP assessments was deemed uncodable. Of the remaining 58 father-infant dyads, 55.2% were classified as secure, 13.8% as avoidant, 13.8% as resistant, and 17.2% as disorganized. Of the 10 father-infant dyads classified as disorganized, eight received a secondary classification of secure. Given the modest sample size, the insecure groups were combined according to primary classification, such that 32 father-infant dyads were coded as secure, and the remaining 26 father-infant dyads as insecure. Even though father-son dyads were overrepresented in the subsample that completed the SSP, there was no significant association between child gender and security versus insecurity with father, $\chi^2(1) = .09, p = .77$.

Analysis Plan

First, descriptive statistics and intercorrelations were computed and inspected. Because of the object-oriented nature of the task and the moderate and significant correlation between fathers' object and physical stimulation, $r = .32, p < .001$, these ratings were averaged to form a composite variable reflecting paternal stimulation. Next, a logistic regression analysis was conducted to predict the odds of father-infant attachment security (vs. insecurity) at 12–18 months from paternal stimulation, paternal sensitivity, and paternal intrusiveness at 9 months (first step). On the second step, the interactions between paternal stimulation and paternal sensitivity and between paternal stimulation and paternal intrusiveness were entered to further test whether the effect of paternal stimulation depended on other paternal behaviors. All predictors were standardized prior to computation of interaction effects and logistic regression analysis.

Results

Preliminary Analyses

Correlations and descriptive statistics for fathers' sensitivity, intrusiveness, and stimulation in the sample of $n = 153$ fathers who completed the father-infant interaction at infant age 9 months are shown in Table 1.

Logistic Regression Analysis

The results of the logistic regression analysis predicting father-infant attachment security from fathers' parenting behavior are shown in Table 2. On the first step, paternal stimulation was the only significant predictor of father-infant attachment security, $OR = 2.03, p < .05$. On the second step, a significant paternal stimulation X paternal intrusiveness interaction revealed that the association between paternal stimulation and father-infant attachment security depended on the level of paternal intrusiveness, $OR = 0.44, p < .05$. Post-hoc probing of this significant interaction effect using Hayes' PROCESS macros (2013) indicated that greater paternal stimulation was associated with significantly greater odds of security with the father at low (1.92) and average (2.47) levels of paternal intrusiveness, $ps < .01$. However, at high levels of paternal intrusiveness (3.03), the association between

paternal stimulation and father-infant attachment security became nonsignificant, $p = .37$. Additional analyses using the Johnson-Neyman technique revealed that greater paternal stimulation significantly increased the odds of secure father-infant attachment up to an intrusiveness score of 2.76 on a 5-point scale.

Discussion

In sum, this study provides evidence that – consistent with several theoretical perspectives on father-child attachment relationships (Grossmann et al., 2002; Paquette, 2004)– consideration of paternal stimulating parenting behaviors in addition to (and in conjunction with) other parenting behaviors more typically associated with attachment security may be fruitful for understanding the paternal behaviors that underlie secure father-infant attachment. In particular, we found that greater paternal object and physical stimulation of the infant by the father during father-infant interaction at 9 months postpartum predicted greater likelihood of secure attachment to father in toddlerhood, but only if levels of paternal intrusiveness during father-infant interaction were low to moderate.

Our findings are consistent with Grossmann et al.'s (2002) notion of play sensitivity. Grossmann et al. found that when fathers encouraged their two-year-old child's mature play and took the child's view into account, children's attachment representations at 10 and 16 years of age were more secure. Although we did not assess directly fathers' ability to take their child's perspective, our findings suggest that fathers who are able to refrain from imposing their own agenda on their 9-month-old infant (i.e., by exhibiting average to low intrusiveness), while also stimulating their infant frequently and intensely (physically or using an object), are more likely to have securely attached infants at 12 to 18 months of age. Therefore, paternal stimulation may only be an effective avenue for fostering secure attachment if fathers are able to detect and end their stimulating behaviors when those behaviors have become intrusive. Modulating stimulation in this manner likely requires mentalizing abilities such as reflective functioning (Fonagy, Steele, Steele, Moran, & Higgitt, 1991), and should be a focus of future research on father-child attachment (see Ruiz et al., this volume).

Our findings are also consistent with Paquette's (2004) theory of the father-child activation relationship, whereby the father-child attachment relationship appears to focus more on the exploration aspect of attachment than the safe haven aspect, as further evidenced by our null findings for paternal sensitivity (Ainsworth et al., 1978; Bowlby, 1969). Our findings align with a small, but growing body of literature that points to the importance of fathers stimulating their infants and children for a high-quality father-child attachment relationship as well as for the child's confidence in exploring new experiences (Grossmann et al., 2002; Hazen et al. 2010; Paquette, 2004; St. George & Freeman, 2017; Stevenson & Crnic, 2013). The exact mechanisms underlying the role of paternal stimulation in father-child attachment remain to be explicated; one possibility is that paternal stimulation that is not overly intrusive aids the child in regulating arousal and emotion during exploration (Stevenson & Crnic, 2013).

Unexpectedly, paternal sensitivity was not directly associated with father-infant attachment security. Although this was unanticipated, it is not entirely surprising because the findings regarding this association have been mixed. Paternal sensitivity has been found to be only a weak predictor of father-infant attachment security (van IJzendoorn & de Wolff, 1997; Lucassen et al., 2011), and some researchers have found no link between paternal sensitivity and attachment security (Braungart-Rieker, Garwood, Powers, & Wang, 2001; Volling et al., 2002). Additionally, paternal sensitivity did not moderate the association between paternal stimulation and attachment security. This finding was also unexpected, and suggests that the link between paternal stimulation and attachment security persists regardless of how sensitive fathers are towards their infants. It is important to note that our modest sample size may have had limited power to detect modest effect sizes associated with sensitivity in past research (de Wolff & van IJzendoorn, 1997).

It is also possible that the context in which we observed father-infant interaction may have been better suited for capturing paternal support for infant exploration (i.e., stimulation) than sensitivity to infant distress, and thus may not have been a perfect match for the Strange Situation Procedure (SSP), which assesses both the secure base and safe haven aspects of attachment. Moreover, some would go further and argue that alternatives to the SSP such as the Risky Situation (Paquette & Bigras, 2010) may be superior measures of father-child attachment because of an explicit focus on the father's support for the child's exploration. However, the status of the SSP as an appropriate assessment of father-infant attachment has not yet been settled in the literature.

Despite contributing to a small, but growing body of literature investigating predictors of father-infant attachment security beyond paternal sensitivity, this study's contributions need to be considered in light of its limitations. First, the sample size for this study was modest ($n = 58$ dyads), which limited statistical power and therefore our ability to detect significant associations. Additionally, the modest sample size meant that this study was only able to compare secure versus insecure father-infant attachment relationships, rather than considering the full range of attachment patterns (i.e., insecure-avoidant, insecure-resistant, and disorganized). Second, the fathers in our sample were primarily White, highly educated, and financially secure. Therefore, results may not generalize to other populations of fathers. Third, the observation of fathers' parenting behavior at 9 months postpartum was brief (i.e., 5 minutes), and more robust associations between fathers' parenting behavior and father-infant attachment security may have been obtained with longer and more extensive observations of father-infant interaction. Fourth, fathers were instructed to teach their infant how to play with a toy as opposed to being observed during a free play session and may not have displayed behavior typical of their daily interactions.

Despite these limitations, this study represents an important step towards broadening perspectives on parenting behaviors engaged in by fathers that may contribute to the development of secure father-infant attachment relationships, which in turn foster children's positive development (Lamb, 2012). By understanding the avenues through which fathers and infants develop secure attachments, parent education can be improved. Educators should empower fathers to interact with their infant in a stimulating way, so long as they are taught to recognize when those behaviors are becoming intrusive. Applying this broad view of

fathers' parenting behaviors in future research using larger, more diverse samples of fathers and children, and including lengthier observations of father-infant interaction across multiple tasks, contexts, and points in development, promises to yield a more comprehensive account of the underpinnings of children's early relationships with their fathers.

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Appendix

PHYSICAL STIMULATION

This assesses the extent to which parent **directly stimulates the baby's body** to heighten baby's level of arousal, with extent defined in both **frequency** and **intensity**. Examples of physical stimulation include tickling baby, exercising baby's limbs, dancing with baby, lifting baby above head to "Fly", jiggling baby, rubbing face in baby's tummy or rubbing a toy into baby's body. These attempts do not have to be successful in arousing baby. If physical stimulation is in the context of burping, holding, or picking up/positioning the child—it does not count. **A child can also be physically stimulated by a toy.**

(Be sure to distinguish between parents' stimulating behaviors and soothing behaviors.)

1. **No instances of stimulation** are observed.
2. **One to three** fleeting instances or one moderately intense instance is observed in the episode.
3. **Four to six** fleeting instances or a few moderately intense instances are observed in the episode.
4. Stimulation is **frequent and/or a number of intense** episodes of stimulation are observed. Physical stimulation **characterizes** the way the parent interacts with infant.
5. Stimulation is **frequent AND intense**. Physical stimulation dominates and is practically continuous throughout the episode.

OBJECT STIMULATION

This scale assesses the extent to which parent employs objects for the purposes of stimulating baby (i.e., intentionally attempting to heighten the arousal level of). Extent is defined in terms of frequency and intensity. Examples of object stimulation would include shaking a rattle or other toy in front of baby's face, tickling baby with a teddy bear, holding baby in front of a mirror for the purpose of allowing baby to look at self in mirror, or holding baby in front of a painting or knick-knack shelf so that s/he can look at objects. Note

that parent does not have to succeed in heightening infant's arousal. With regard to intensity, an important distinction involves the extent to which parent's stimulation is active or passive. Examples of active stimulation would include manipulations of baby's body and shaking of toys; these are relatively intense compared to passive stimulation, which would include holding baby in front of a mirror.

1. **No instances of stimulation** are observed.
2. **One to three** fleeting instances or one moderately intense instance is observed in the episode.
3. **Four to six** fleeting instances or a few moderately intense instances are observed in the episode.
4. Stimulation is **frequent and/or a number of intense** episodes of stimulation are observed. Object stimulation **characterizes** the way the parent interacts with infant.
5. Stimulation is **frequent AND intense**. Object stimulation dominates and is practically continuous throughout the episode.

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Table 1

Descriptive Statistics and Correlations for Fathers' Sensitivity, Intrusiveness, and Stimulation

Variable	M	SD	Range	1.	2.
1. Sensitivity	3.12	0.55	1.00–4.00		
2. Intrusiveness	2.50	0.61	1.50 – 4.50	–0.42 **	
3. Stimulation	2.67	0.39	1.5 – 4.25	–0.07	0.24 **

Note. There were no statistically significant differences in fathers' parenting behavior by child gender or by toy type (i.e., shape sorter vs. ring stacker).

**
 $p < .01$

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Table 2

Logistic Regression Analysis: Father-infant Attachment Security as predicted by Fathers' Parenting Behavior

Variable	<i>B</i>	<i>SE B</i>	<i>OR</i>	<i>p</i>
Step 1				
Paternal Stimulation	0.71	0.33	2.03	.03
Paternal Sensitivity	-0.32	0.36	0.73	.39
Paternal Intrusiveness	-0.31	0.36	0.73	.39
Step 2				
Paternal Stimulation	1.00	0.40	2.71	.01
Paternal Sensitivity	-0.24	0.39	0.79	.55
Paternal Intrusiveness	-0.01	0.39	0.99	.97
Paternal Stimulation*Paternal Sensitivity	-0.22	0.50	0.80	.66
Paternal Stimulation*Paternal Intrusiveness	-0.83	0.41	0.44	.045

Note. We used a significance criterion of $p < .05$.