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Brief report

Maternal sensitivity assessed during the Strange Situation Procedure predicts child's attachment quality and reunion behaviors

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ABSTRACT

The 72-item version maternal behavior Q-set (MBQS; Pederson & Moran, 1995) was used to assess maternal behaviors ($N = 74$) during the Strange Situation Procedure. Results indicated that the MBQS scores significantly differentiated infant attachment categories and were significantly associated with a series of infants' reunion behaviors.

A central feature of attachment theory is its emphasis upon caregiver's predictably responsive and sensitive behaviors when interacting with the child (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1982) in fostering attachment security in the offspring. Despite this widely accepted assumption, however, the role of maternal sensitivity and its implication in predicting attachment security has not been well established (Atkinson et al., 2005; van IJzendoorn, 1995). Less robust findings regarding the sensitivity–security association can be partly explained by inconsistent definitions and methods or timing of assessing sensitivity (De Wolff & van IJzendoorn, 1997; Isabella, 1993). Nevertheless, a maternal sensitivity measure based on the Q-sort technique (Block, 1961), the Maternal Behavior Q-Set (MBQS: Pederson & Moran, 1995), has shown a stronger association ($r = .60$) to attachment security than the meta-analytic association ($r = .24$) De Wolff and van IJzendoorn (1997) reported (Pederson, Gleason, Moran & Bento, 1998). Studies that have administered the MBQS since its inception reveal consistent findings across samples and spans of time (Atkinson et al., 2005; Bailey, Moran, Pederson, & Bento, 2007; Pederson & Moran, 1996; Tarabulsy et al., 2003; Tarabulsy et al., 2005; Tarabulsy et al., 2008) in addition to its association with the original Ainsworth sensitivity scales (Moran, Pederson, Pettit, & Krupka, 1992). Thus, the MBQS can potentially serve as a measure of maternal sensitivity that produces *high* predictability of attachment security. It is possible this Q-sort measure of sensitivity may allow a richer and clearer understanding of the sensitivity–security association.

The MBQS consists of a set of 90 descriptions of maternal interactive behaviors that are sorted and compared to the sort of a prototypically sensitive mother. The MBQS was originally devised for home observations, with recommendations for observers to make two 2-h visits. However, Atkinson et al. (2005) showed that the MBQS applied to short (12 min) videotaped mother-infant interactions in the laboratory obtained strikingly similar results to another study that used the MBQS in 2-h home observations. A recent study further validated a short 25-item version of the MBQS based on a brief (10 min), video recorded mother–infant interaction (Tarabulsy et al., 2009).

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Table 1
MBQS mean scores comparisons among SSP classifications.

Group comparison	ANOVA $F(1, 74)$	Partial η^2	Observer power	B M (SD)	A M (SD)	C M (SD)	D M (SD)
Three-way	12.18***	.26	.994	.75 (.12)	.48 (.33)	.72 (.13)	
Four-way	9.80***	.30	.997	.76 (.12)	.45 (.33)	.72 (.13)	.71 (.19)

*** $p < .001$.

The Strange Situation Procedure (SSP: Ainsworth et al., 1978) is the gold standard attachment assessment in infancy (Solomon & George, 2008). Classifications of attachment patterns based on the SSP have been associated with individual differences in developmental outcomes (e.g., Sroufe, Egeland, Carlson, & Collins, 2005). The SSP consists of eight 3-min episodes (except for the first brief introductory episode), including two separations and two reunions. Certified coders first score the infant's behavior vis a vis the caregiver on four behavioral rating scales (Proximity Seeking, Contact Maintenance, Proximity Avoidance, and Contact Resistance), ranging from 1 to 7, for two reunion episodes separately, before classifying infants into one of three organized attachment patterns Ainsworth and colleagues identified (1978). Secure (B) infants typically greet and seek contact with the caregiver upon reunion, and return to exploration once settled. Avoidant (A) infants are characterized by conspicuous avoidance of proximity to or interaction with the caregiver upon reunion. Resistant (C) infants are perhaps most notable for their displays of ambivalence and anger with the caregiver in the reunion episodes. A fourth attachment pattern, the disorganized-disoriented (D) pattern was subsequently identified by Main and Solomon (1990) to account for the lack of the organized behavioral strategies (i.e., A, B, or C).

The present study used the MBQS to explore whether maternal behaviors assessed during the SSP can significantly predict children's SSP reunion behaviors and attachment classification, partly motivated by Tarabulsy et al.'s (2009) success in validating the economical adaptation of the MBQS. In addition, the SSP that Bretherton refers to as a "20-minute miniature drama" (Bretherton, 1992, p. 765) may present unique, rapidly changing contextual variations in which mothers' varied spontaneous response/interactive behaviors may be observable. For example, Lyons-Ruth and colleagues observed specific maternal behaviors[1] during the SSP because "maternal attachment-related caregiving responses might best be observed under conditions when the infant's attachment system was known to be aroused" (Lyons-Ruth, Bronfman, & Parsons, 1999, p. 71). In this study, we used 72 items, slightly reduced from the full set of 90 from Version 3.0 of the MBQS (see below). MBQS coders were graduate students with solid understanding of attachment theory and measures although not trained in SSP coding. They were required to read available MBQS-related literature and familiarize themselves with all descriptors of maternal behaviors identified in each card. With 5 SSP pilot cases, they practiced until they became accustomed to the sorting task and generally agreed with interpreting descriptors of maternal behaviors. During this training process, we identified some items that described maternal behaviors, such as, Item 13: "Uses sibling or television to keep baby (B) entertained" or Item 19: "Places B in another room when B is in a bad mood or cranky", that were not applicable for observation during the SSP. We removed these items, leaving a total set of 72 items that were potentially observable during the SSP. The items that were removed to create the current 72-item version are: 4, 6, 8, 12, 13, 14, 18, 19, 24, 25, 36, 37, 38, 40, 50, 51, 56, 58. To our knowledge, this is the first study to use the MBQS to rate maternal behaviors during the SSP and examine their association with infants' reunion behaviors as well as attachment security.

Seventy-four mothers and their 12-month-olds ($M = 54$ weeks, $SD = 3.1$) from the local community participated in the study as part of a longitudinal social-emotional development project. Thirty-seven (50%) infants were boys, and 42 (57%) were first-borns. Mothers ranged from 20 to 40 years old ($M = 29.4$, $SD = 4.9$). The majority of mothers (84%) were Caucasian with 11% Hispanic and 5% others. The sample was considered middle class (Hollingshead $M = 2.57$, $SD = .81$).

The dyads underwent the standard SSP. The 72-item version MBQS was used to assess mothers' behaviors during the video-recorded SSP. The primary MBQS coder was blind to all information relating to the dyads. A second coder was also blind to all information about the dyads. Two coders achieved overall agreement of .89 on 26 cases (35%), using Pearson correlations. All SSPs were coded by a certified coder. Over half of these (38 cases) were double coded by two other certified coders (25 and 13, respectively). Inter-rater agreement for a three-way analysis was 84%, *kappa* = .72, and a four-way analysis was 82%, *kappa* = .74. Disagreements were conferenced, and resolved. For agreement between a primary coder and a reliability coder who coded 25 cases (34%) on the eight reunion scales (i.e., 4 scales for the two reunion episodes), the intraclass correlation (ICC) ranged from .76 to .95 ($M = .88$).

The attachment classification frequency distributions were 53 (72%) B, 11 (15%) A, and 10 (13%) C for the three-way (ABC) organized categorization and 46 (62%) B, 10 (14%) A, 9 (12%) C, and 9 (12%) D for the four-way (ABCD) categorization. The MBQS scores ranged from −.17 to .88 ($M = .71$, $SD = .19$). A series of ANOVAs revealed that the MBQS scores significantly differed among attachment classifications in both the three-way ($F(1, 74) = 12.18$, $p < .001$) and four-way ($F(1, 74) = 9.80$, $p < .001$) categorical configurations (Table 1). Post hoc comparison using the Scheffe test indicated that the mean MBQS score of avoidant infants ($M = .45$, $SD = .33$) was significantly different than the secure infants ($M = .76$, $SD = .12$), $p < .001$,

[1] We treat specific maternal behaviors, known as frightened/frightening behaviors or atypical maternal behaviors, separately from overall maternal interactive behaviors included in the MBQS, and thus, discussion of these maternal behaviors or studies of these behaviors is beyond the scope of this paper.