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A Dimensional Approach to Maternal Attachment State of Mind: Relations to Maternal Sensitivity and Maternal Autonomy Support

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The aim of this study was to examine the developmental significance of the newly developed dimensional approach to attachment state of mind by investigating its capacity to predict individual differences in the quality of two caregiving behaviors—maternal sensitivity and maternal autonomy support—that are linked to numerous important child outcomes. Seventy-one upper-middle-class, predominantly French-speaking and Caucasian dyads participated in 3 home visits (34 girls). The Adult Attachment Interview (AAI) was administered when the infants were 8 months old, maternal sensitivity was assessed when they were 12 months old, and maternal autonomy support was assessed at 15 months. The results revealed that, above and beyond SES, maternal sensitivity was negatively related to the dismissing dimension of the AAI, whereas maternal autonomy support was negatively linked to the preoccupied/unresolved dimension. In contrast, the traditional AAI categories were not significantly linked to parenting. These results speak to the relevance of using a continuous approach to attachment state of mind when predicting individual differences in specific caregiving behaviors.

Keywords: adult attachment state of mind, maternal autonomy support, maternal sensitivity

One of the major breakthroughs in attachment research over the past few decades has been the development of the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996). The AAI assesses *state of mind with respect to attachment*, operationalized as the organization of adults' discourse when discussing their childhood relationships with their own parents. Studies with community samples (e.g., Pederson, Gleason, Moran, & Bento, 1998), at-risk groups (e.g., Tarabulsy et al., 2005), and meta-analytic data (van IJzendoorn, 1995) converge in suggesting that the AAI possesses a robust capacity to predict maternal behavior during mother–infant interactions. This convincing demonstration of predictive validity with respect to caregiving relationships has made the AAI one of the few gold standards of attachment research (van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004).

Increasingly, however, attachment researchers underscore the insufficient use that is made of the richness of information gathered with the AAI and thus advocate for the use of a dimensional rather than a categorical approach to individual differences in attachment state of mind (Hesse, 2008; Roisman, Fraley, & Belsky, 2007; Shaver, Belsky, & Brennan, 2000). Perhaps the most significant development in this regard is Roisman et al.'s (2007) demonstration that the latent structure of individual differences in state of mind is consistent with a continuous distribution along two dimensions: dismissing and preoccupied/unresolved. Although the psychometric properties of this bidimensional approach are convincing, its predictive validity with respect to caregiving has yet to be demonstrated. This is arguably an important task, given that predictive validity is what has made the AAI such a central instrument in attachment research. Accordingly, the purpose of this report is to investigate the relations between the dimensions of state of mind proposed by Roisman et al. and the quality of maternal behaviors.

Attachment State of Mind

Attachment state of mind is assessed using the AAI, which asks adults about the nature of their relationships with their parents when they were growing up and their current appraisal of these experiences. Following Main and Goldwyn's (1998) classification system, individuals are classified as having an autonomous, dismissing, preoccupied, or unresolved state of mind. Individuals with an autonomous state of mind value attachment relationships and display a coherent and collaborative discourse throughout the interview. Dismissing individuals tend to downplay the importance of attachment relationships, insisting that they recall very little. They also tend to speak of their attachment figures in idealistic terms, unsupported by episodic memories. Preoccupied individuals tend to have difficulty stepping back, and their discourse in the AAI may evidence a mixture of anger, confusion, and vagueness. Finally, individuals are classified as unresolved when they exhibit lapses in thought or speech when discussing traumatic experiences such as loss or abuse. Dismissing, preoccupied,

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and unresolved states of mind are characterized as insecure, whereas an autonomous state of mind is considered secure.[1]

Considerable evidence suggests that mothers with a secure state of mind display higher quality parenting behaviors (e.g., more responsiveness, less intrusiveness) than do those with insecure states of mind when interacting with their infants (Aviezer, Sagi, Joels, & Ziv, 1999; Heinicke & Levine, 2008; Pederson et al., 1998; Slade, Belsky, Aber, & Phelps, 1999; Tarabulsy et al., 2005), preschoolers (Busch, Cowan, & Cowan, 2008; Cohn, Cowan, Cowan, & Pearson, 1992; Crowell & Feldman, 1991), or school-age children (Crowell, O'Connor, Wollmers, Sprafkin, & Rao, 1991; Verschueren, Dossche, Marcoen, Mahieu, & Bakermans-Kranenburg, 2006). Fewer studies have explored individual differences among mothers classified in the different insecure categories. However, the studies that have considered this issue suggest that there may be nonnegligible differences in maternal behaviors. Crowell and Feldman (1988) found that while interacting with their 3-year-old children, mothers classified as dismissing were more remote and less supportive than secure mothers were. Mothers classified as preoccupied were found to be inconsistent, that is, warm at times and angry or coercive at other times. Other studies have also found links between maternal preoccupation and increased angry, hostile, and intrusive behaviors toward toddlers (Adam, Gunnar, & Tanaka, 2004; Bosquet & Egeland, 2001). Several studies have found unresolved attachment state of mind to be linked to anomalous or atypical maternal behaviors (for a review, see Madigan et al., 2006). Furthermore, Busch et al. (2008) found mothers classified as unresolved to be more authoritarian and to display more anger toward their preschoolers, compared with mothers not classified as unresolved.

The evidence reviewed above suggests that there may be variation in the way mothers classified as dismissing, preoccupied, or unresolved interact with their children. It therefore appears beneficial to consider the insecure states of mind separately when trying to explain individual differences in caregiving behaviors. However, given the resources required to administer and code the AAI, few samples are large enough to consider the insecure groups separately. Roisman et al. (2007) argued for the use of a dimensional approach to address this issue, noting that variability in states of mind may be better conceptualized in terms of degree than categories. Using three data sets (total $N = 504$), Roisman et al. (2007) explored the latent structure of the AAI and found that the variability is best captured by two independent dimensions: (a) a dismissing dimension containing scales typically used to identify secure versus dismissing individuals and (b) a preoccupied/unresolved dimension containing scales usually used to identify preoccupied and unresolved individuals. This structure is consistent with the results of factor analyses run on three other samples, with the AAI (Bernier, Larose, Boivin, & Soucy, 2004; Larose & Bernier, 2001) or with an AAI-like interview pertaining to friendships (Furman, 2001). However, the implications of a two-dimensional approach to the AAI for research on parent–child interactions have yet to be addressed.

Maternal Behavior in Different Contexts

Attachment theory posits that infant security of attachment is reflected by the way in which infants organize their behaviors so as to maintain a balance between their needs for protection and comfort and their need to explore the environment (Ainsworth, 1985), hence the importance of attending to caregiving behaviors aimed at supporting children's needs in both attachment-related and exploration-related contexts (Grossmann et al., 2002): maternal sensitivity and maternal autonomy support. Maternal sensitivity, which refers to a mother's capacity to perceive and interpret her infant's emotional cues and to respond promptly and appropriately (Ainsworth, Bell, & Stayton, 1974), has been found to predict a variety of child outcomes throughout development (see Beckwith, Chen, & Hamilton, 1999, for a review). In particular, sensitivity is currently one of the most robust precursors of infant security of attachment (De Wolff & van IJzendoorn, 1997).

Self-determination theory (Deci & Ryan, 2000) defines parental autonomy support as "the degree to which parents . . . use techniques which encourage independent problem solving, choice, and participation in decisions versus externally dictating outcomes . . . through punitive disciplinary techniques, pressure, or controlling rewards" (Grolnick & Ryan, 1989, p. 144). When parents are working with infants or children on problem-solving tasks, examples of autonomy-supportive behaviors may include providing informative feedback and positive encouragement, waiting for the child to require assistance before intervening, giving hints or suggestions upon child request and/or according to the child's needs, and providing assistance tailored to the child's abilities (Grolnick, Gurland, DeCourcey, & Jacob, 2002). Parental autonomy support has been found to relate to a variety of child outcomes, including infant mastery motivation and persistence (Frodi, Bridges, & Grolnick, 1985; Grolnick, Frodi, & Bridges, 1984), security of attachment (Whipple, Bernier, & Mageau, 2010), and executive functioning in toddlers (Bernier, Carlson, & Whipple, 2010). In school-age children, parental autonomy support has been linked to academic achievement (Grolnick & Ryan, 1989; Joussemet, Koestner, Lekes, & Landry, 2005), social adjustment (Joussemet et al., 2005), and fewer acting-out problems (Grolnick & Ryan, 1989; Joussemet et al., 2008). Given the significance of maternal sensitivity and maternal autonomy support for infant attachment and child development, they represent useful criteria against which to test the predictive validity of the AAI with respect to caregiving.

The Present Study

Our aim in this study is to investigate the relations between the two dimensions of state of mind proposed by Roisman et al. (2007) and the quality of maternal behaviors in response to two different infant needs, that is, maternal sensitivity and maternal autonomy support. In doing so, we are hoping to contribute to the literature new knowledge related to the developmental significance of a dimensional approach to the AAI. Given that past research on maternal behavior within the context of child exploration suggests that mothers classified as preoccupied tend to behave in an intrusive manner toward their children (Adam et al., 2004; Bosquet et al., 2001) and those classified as unresolved tend to adopt a more authoritarian style (Busch et al., 2008), which are behaviors that

[1] Given that the term *autonomy support* is used later in this article to refer to a specific maternal behavior, we refer to *autonomous state of mind* as *secure state of mind* from this point on to avoid confusion.

evidence low levels of autonomy support, it was hypothesized that the preoccupied/unresolved dimension of the AAI would relate negatively to maternal autonomy support. In contrast, owing to past research showing a clear link between a secure state of mind and maternal sensitivity (van IJzendoorn, 1995), in addition to research suggesting that mothers classified as dismissing display lower levels of maternal sensitivity than do those classified as secure or preoccupied, who in turn show similar levels of sensitivity (Pederson et al., 1998), the dismissing dimension of the AAI was expected to be negatively linked to maternal sensitivity.

Method

Participants

Seventy-one mother–infant upper-middle-class dyads (34 girls and 37 boys) living in a large Canadian metropolitan area (Montreal, Quebec) participated in this study. When they entered the study, the mothers were between 20 and 45 years old (M = 31 years, SD = 4.7). They were predominantly Caucasian (79%, with an additional 7% Caribbean Canadian, 4% Afro Canadian, 3% Latino Canadian, 3% Arabo Canadian, and 4% other) and had between 10 and 18 years of formal education (M = 15 years, SD = 2.5). Family income (in Canadian dollars) was based on categorical scores distributed as follows: 1 = *<$20,000*, 2 = *$20,000–$39,000*, 3 = *$40,000–$59,000*, 4 = *$60,000–$79,000*, 5 = *$80,000–$99,000*, 6 = *$100,000 and over* (in American dollars, the values for the categories were 1 = *<$17,000*, 2 = *$17,000–$33,000*, 3 = *$34,000–$51,000*, 4 = *$52,000–$68,000*, 5 = *$69,000–$85,000*, 6 = *$86,000 and over*). Mean annual family income was 4.04 (SD = 1.6). French was the predominant language spoken in the home (94%, whereas 6% spoke English). All but 10 mothers were married to or living with the child's father throughout data collection. Thirty-six infants were firstborns, and 35 had older siblings.

Procedure

Participating families were recruited randomly through birth lists provided by the Quebec Ministry of Health and Social Services. Families received a letter describing the project and were then contacted by phone; 39% of contacted families agreed to participate. Criteria for participation were full-term pregnancy and the absence of severe developmental delays. Three in-home visits were conducted. At Time 1, when infants were 8 months old, mothers were administered the Adult Attachment Interview and completed a sociodemographic questionnaire. At Time 2, when the infants were 12 months old, a 90-min visit was conducted, modeled after the work of Pederson and Moran (1995) for structure and length. This visit was purposely designed to create a situation where mothers would have to divide their attention between the research tasks and their infant's needs or signals. Maternal sensitivity was assessed with the Maternal Behavior Q-Sort (MBQS; described below) on the basis of observations made throughout this visit. To maximize the reliability of these observations, we first had research assistants attend a 2-day training workshop, during which they reviewed several videotapes of mother–infant interactions so as to practice coding the MBQS. After the workshop, the assistants performed their first few home visits with a more experienced colleague, and they completed the MBQS together. When the junior home visitors were ready to lead home visits, the first two or three visits were followed by a debriefing session either with Annie Bernier or with an experienced graduate student to review the salient elements of the visit before scoring the MBQS.

At Time 3, when the infants were 15 months old, mothers were asked to help their children with a series of problem-solving tasks. The first 5 min were spent working on tasks that were videotaped but not coded so that the dyads could get used to the camera. The dyads were then asked to work on a puzzle task that was designed to be challenging for the infants, such that they would require some adult assistance to complete it. This interaction, lasting 2–3 min, was videotaped as well and later coded for maternal autonomy-supportive behaviors (see below). Maternal autonomy support and maternal sensitivity were coded by independent observers. The AAI coders had never met the families and were unaware of all of the information pertaining to the dyads, including mothers' sensitivity and autonomy-support scores.

Measures

Maternal socioeconomic status (SES). Information pertaining to mothers' SES was obtained using an investigator-devised questionnaire where mothers were asked to provide sociodemographic information such as their level of education and their family income. Given the high correlation (r = .64) between maternal education and family income, these two variables were standardized and then averaged, yielding a global index of maternal SES.

Maternal state of mind. The AAI (George et al., 1996; French version by Larose & Bernier, 2001) was administered to assess mothers' state of mind with respect to attachment. The AAI is a semistructured interview pertaining to participants' childhood attachment experiences. Mothers were asked to describe their relationships with their parents when they were young; to recount specific childhood memories to support their descriptions; and to reflect on the ways in which their childhood attachment experiences might have influenced their development, their personality, or their parenting. They were also probed about any experiences of loss or trauma. The AAI has been shown to have excellent reliability, discriminant validity, and predictive validity (Bakermans-Kranenburg & van IJzendoorn, 1993; Crowell et al., 1996; Sagi et al., 1994).

Interviews were audiotaped, transcribed, and rated according to Main and Goldwyn's (1998) classification system. The participants' relationship with each parent was rated on five 9-point scales: Love, Rejection, Role Reversal, Pressure to Achieve, and Neglect. Their state of mind with regard to these experiences was rated next on thirteen 9-point scales: Idealization—Mother, Idealization—Father, Lack of Recall, Derogation, Fear of Loss, Anger—Mother, Anger—Father, Passivity, Unresolved Loss, Unresolved Abuse, Metacognitive Monitoring, Coherence of Transcript, and Coherence of Mind. Finally, on the basis of the score pattern of these scales, each participant was classified as autonomous with regard to attachment, dismissing of attachment, preoccupied with attachment, or unresolved with respect to a loss or a trauma (please see next paragraph for correspondence between these categories and the state of mind scales). The transcripts were

rated by a coder trained by David R. Pederson and certified as reliable by Main and Hesse's lab. In this study, 38 mothers were coded as having a secure state of mind (53.5%), five were coded as preoccupied (7%), 13 were coded as dismissing (18.3%), and 15 were coded as unresolved (21.1%). Fourteen (20%) of the transcripts were independently coded by a second rater, who was also certified as reliable by Main and Hesse's lab. Coders agreed on 12 of the 14 transcripts as to four-way primary classification (85.7%; $\kappa = .78$). Disagreements were settled by using the primary coder's scores.

Roisman et al. (2007) identified two independent dimensions that effectively account for individual differences in state of mind. The first dimension contains the state-of-mind scales that typically differentiate secure from dismissing participants (Idealization—Mother, Idealization—Father, Lack of Recall, Metacognitive Monitoring, Coherence of Transcript, and Coherence of Mind), and the second dimension represents scales that mostly reflect preoccupation and unresolved status (Anger—Mother, Anger—Father, Passivity, Unresolved Loss, Unresolved Abuse, Fear of Loss, and Derogation). In the present study, the Derogation, Fear of Loss, and Unresolved Abuse scales were dropped due to low occurrence (all Ms < 1.49 on a 1–9 scale). Given that the sample size precluded the use of confirmatory factor analysis, exploratory factor analysis was conducted on the remaining state-of-mind scales to confirm the structure found by Roisman et al. (2007). The current sample of 71 participants was, however, still too small to obtain stable results even with an exploratory approach. For the purpose of this analysis, we included 44 additional mothers who had participated in similar projects in our lab. These mothers were recruited by the same means, were also administered the AAI when their infants were 8 months old, and completed the same sociodemographic questionnaire, and their AAI transcripts were coded by the same reliable coders as those in the current study. Although they scored slightly lower ($M = 2.2$) on the Unresolved Loss scale, $t(113) = 2.18$, $p < .05$, than did mothers from the current study ($M = 2.9$), they did not differ on the other nine state-of-mind scales (all ts < 1.77, *ns*), on the 10 AAI experience scales (all ts < 1.41, *ns*), or on sociodemographics such as maternal and paternal education and family income (ts < 0.62, *ns*). These two samples were thus combined into a larger sample of 115 mothers, whose AAI state-of-mind scores were submitted to exploratory factor analysis. The scree test (Nunnally & Bernstein, 1994) identified two predominant factors, which replicated Roisman et al.'s two-factor structure. The AAI scales differentiating secure from dismissing participants formed one factor, which explained 34.4% of the variability in AAI scores, whereas scales reflecting preoccupation and unresolved loss loaded on a second factor that explained 23.2% of the variance. Each item loaded on its respective factor and all loadings were above .38, with no cross-loadings.

On the basis of these results, the AAI state-of-mind scales were averaged into the two dimensions identified by Roisman et al. (2007), with the Metacognitive Monitoring, Coherence of Transcript, and Coherence of Mind scales reverse coded. The dismissing scale presented excellent internal consistency ($\alpha = .87$) and the preoccupied/unresolved dimension presented acceptable internal consistency ($\alpha = .61$). The two dimensions were not correlated ($r = -.05$). Intraclass correlations (ICCs) between the two raters' scores on the 14 double-coded transcripts were .90 for the dismissing dimension and .87 for the preoccupied/unresolved dimension.

Maternal sensitivity. The MBQS (Pederson & Moran, 1995; French version by Tarabulsy et al., 2005) is a 90-item measure designed to assess the quality of maternal behaviors during in-home mother–infant interactions. Items describing potential maternal behaviors are sorted by an observer into nine piles (10 items in each pile) depending on the degree to which the items resemble the mother under observation. This sort is then correlated with a criterion sort representing the prototypically sensitive mother, which is provided by the authors of the instrument. The sensitivity scores can thus vary from -1 = *least sensitive* to 1 = *prototypically sensitive*. In the present study, 25 home visits (36%) were conducted by two research assistants, who completed the MBQS independently. Agreement between the two raters' sorts was high, $ICC = .89$.

The development of the MBQS was anchored in the descriptions of sensitivity and responsiveness provided by Ainsworth et al. (1974; Ainsworth, Blehar, Waters, & Wall, 1978). Pederson, Moran, and their colleagues (e.g., Pederson et al., 1990, 1998; Pederson & Moran, 1995) have provided detailed validity and reliability information. The MBQS is significantly correlated with other assessments of maternal behavior such as the Home Observation for Measurement of the Environment Inventory (Caldwell & Bradley, 1978) and the Ainsworth scale of sensitivity (see Pederson & Moran, 1995). Its predictive validity is well demonstrated by meta-analytic data, which reveal that it is currently the sensitivity measure that is most predictive of infant attachment security (van IJzendoorn et al., 2004).

Maternal autonomy support. Following Whipple et al.'s (2010) rating system, we coded maternal behaviors during a mother–infant puzzle task using four scales ranging from 1 = *not autonomy supportive* to 5 = *extremely autonomy supportive*. The four scales included (a) appropriate help (i.e., mother provides assistance according to the child's abilities and adapts the task to create an optimal challenge for him or her), (b) maternal verbalizations (i.e., mother provides encouragement, gives solicited hints and suggestions, and uses a tone of voice that communicates to the child that she is there to help), (c) perspective taking (i.e., mother takes her child's perspective and demonstrates flexibility in her attempts to keep the child on task), and (d) supporting volition (i.e., mother provides the child with the opportunity to make choices and ensures that the child plays an active role in the completion of the task). Given the intercorrelations among the four scales (ranging from .49 to .84), they were averaged to obtain a total autonomy-support score ($\alpha = .87$). All videotapes were coded by Natasha Whipple, and 38 of the 71 interactions were also coded by a second independent observer (we aimed to have double coding on at least 50% of the tapes, given that this was a newly developed rating system). ICC between coders for the total autonomy-support score showed high interrater agreement, $ICC = .86$.

Results

Preliminary Analyses

Table 1 shows that the two AAI dimensions and the two indicators of parenting behavior presented adequate variability. Vari-

Table 1
Ranges, Means, and Standard Deviations for the Adult Attachment Interview Dimensions, Maternal Sensitivity, and Maternal Autonomy Support

Main variable	Range	*M*	*SD*
Dismissing	2.00 to 7.40	4.30	1.30
Preoccupied/unresolved	1.00 to 5.70	2.60	1.10
Maternal sensitivity	−0.60 to 0.86	0.58	0.35
Maternal autonomy support	1.00 to 5.00	3.40	1.10

Note. $N = 71$.

ation on AAI dimensions within each attachment state-of-mind category was examined next. The descriptive statistics displayed in Table 2 suggest that a continuous approach to state of mind allows one to detect individual differences among individuals classified in the same global attachment category while retaining their dominant features. We then examined whether sociodemographic variables (child gender, maternal age, and SES) were related to the AAI dimensions, maternal sensitivity, or maternal autonomy support. As presented in Table 3, no differences were found according to child gender or maternal age. The AAI was not related to SES. However, maternal sensitivity and maternal autonomy support were related to SES, which was therefore entered as a covariate in subsequent regression analyses. The correlation between maternal sensitivity and maternal autonomy support was .13, suggesting that they are two distinct parenting behaviors.

Main Analyses

The main hypotheses to be tested were that the preoccupied/unresolved dimension of the AAI would relate negatively to maternal autonomy support, whereas the dismissing dimension of the AAI was expected to be negatively linked to maternal sensitivity. Table 3 presents the zero-order correlations between the AAI dimensions, maternal sensitivity, and maternal autonomy support. As expected, the dismissing dimension of the AAI was negatively linked to maternal sensitivity; however, it was not related to maternal autonomy support. In contrast, the preoccupied/unresolved dimension was negatively linked to maternal autonomy support but unrelated to maternal sensitivity.

To provide a more thorough test of our hypotheses accounting for interrelations among SES, parenting, and state-of-mind variables, we submitted the data to two hierarchical regression analyses. Table 4 presents the results of the first regression equation, predicting maternal sensitivity. SES was entered in the first block, followed by the two AAI dimensions in the second. The model accounted for 17% of the variance, $F(3, 67) = 4.55$, $p < .01$. SES predicted 8% of the variance, and the two AAI dimensions added 9% to the prediction. As presented in Table 4, the dismissing dimension of the AAI was uniquely related to maternal sensitivity when SES and the preoccupied/unresolved dimension were controlled. Table 5 presents the results of the second regression, predicting maternal autonomy support. SES was entered in the first block, followed by the two AAI dimensions. The model accounted for 22% of the variance, $F(3, 67) = 6.35$, $p < .001$. SES predicted 12% of the variance, and the two AAI dimensions predicted an additional 11%. As shown in Table 5, this was due to the unique relation between the preoccupied/unresolved dimension and maternal autonomy support.

Hence, each AAI dimension was related in a unique and independent way to one specific maternal behavior, indicating that the dimensional approach shows predictive validity with respect to caregiving. To explore how this prediction compared with that of the traditional categorical approach, we ran a last set of hierarchical regression analyses using the AAI categories to predict maternal behaviors. AAI categories were dummy coded to reflect the contrasts underlying the AAI dimensions: dismissing versus secure and preoccupied/unresolved versus secure. Two hierarchical regressions were performed, one predicting maternal sensitivity and one predicting autonomy support. For each analysis, SES was entered in the first block, followed by the AAI dummy codes in the second. Unlike AAI dimensions, AAI categories did not predict maternal sensitivity, $\Delta R^2 = .05$, $F(3, 67) = 1.88$, $p = .16$, or maternal autonomy support, $\Delta R^2 = .05$, $F(3, 67) = 1.80$, $p = .17$, over and beyond SES. In addition, no specific contrast significantly predicted maternal sensitivity (dismissing vs. secure, $p = .20$; preoccupied/unresolved vs. secure, $p = .08$) or maternal autonomy support (dismissing vs. secure, $p = .29$; preoccupied/unresolved vs. secure, $p = .27$). Overall, including AAI categories instead of the AAI dimensions yielded total percentages of explained variance of 13% (maternal sensitivity) and 16% (maternal autonomy support), compared with 17% and 22% as reported above.[2]

Discussion

With the aim of exploring the developmental significance of the dimensional approach to the AAI proposed by Roisman et al. (2007), in the present study, we sought to investigate the relation between adult attachment state of mind and two distinct aspects of maternal behavior: sensitivity and autonomy support. The results suggested that maternal sensitivity was related to the dismissing dimension of the AAI but not to the preoccupied/unresolved dimension, whereas maternal autonomy support was associated with the preoccupied/unresolved dimension of the AAI but not with the dismissing dimension. These results remained when controlling for maternal SES. When using analyses based on the traditional AAI groups, no unique predictions of parenting behavior emerged as significant.

The AAI scales traditionally used to differentiate secure and dismissing individuals thus accounted for individual differences in mothers' responses to their children's emotional needs and cues, whereas the scales typically used to identify preoccupied and unresolved states of mind were not telling in this respect. These results are in line with those of Pederson et al. (1998), who found dismissing mothers to be less sensitive than mothers classified as secure or preoccupied, as well as meta-analytic findings demonstrating a link between a secure state of mind and maternal sensi-

[2] To ensure that the nonsignificant results with AAI categories were not due to the use of regression instead of the more usual analysis of variance framework when working with AAI categories, we also submitted the data to analyses of covariance with planned contrasts (dismissing vs. secure and preoccupied/unresolved vs. secure; controlling for SES). Results were nonsignificant for both contrasts, whether on sensitivity or autonomy support.

Table 2
Descriptive Statistics on the Dismissing and Preoccupied/Unresolved Dimensions According to Original Adult Attachment Interview (AAI) Category

	Dismissing dimension		Preoccupied/ unresolved dimension	
AAI category	*M*	*SD*	*M*	*SD*
Secure	3.50	0.89	2.40	0.74
Dismissing	6.04	0.77	1.76	0.49
Preoccupied	4.13	0.23	4.56	0.78
Unresolved	5.01	0.73	3.33	1.33

Note. $N = 71$.

tivity (van IJzendoorn, 1995). In contrast, the scales traditionally used to identify preoccupied and unresolved individuals predicted the extent to which mothers were supportive of their children's need for autonomy during exploration, but the scales typically used to differentiate secure and dismissing individuals were not predictive in this respect. This is in line with studies that found preoccupied and unresolved states of mind to be linked to intrusive and authoritarian parenting (Adam et al., 2004; Bosquet & Egeland, 2001; Busch et al., 2008).

Taken together, these results suggest that the specific way in which mothers reflect on and integrate their own childhood attachment experiences is related to their capacity to fulfill certain needs of their children but not others. Mothers who downplay the importance of early childhood caregiving relationships and speak of them in a detached manner display less sensitivity to their children's needs for comfort and reassurance in a naturalistic, home-based situation. The emotional distance that these mothers exhibit with regard to their own experiences may hinder their capacity to tune in to their children's emotional states and needs. However, their dismissing stance does not undermine their capacity to be autonomy supportive in a structured problem-solving context that is less involving emotionally. For their part, mothers who have difficulty stepping back and taking an objective stance when recounting their childhood experiences and mothers who exhibit lapses in thought or speech when discussing traumatic experiences have difficulty supporting their children's need for volition during exploration, perhaps as a result of a similar difficulty stepping back as they see their children struggle with a difficult task. By suggesting that specific components of state of mind relate in nonredundant ways to precise aspects of parenting, these findings highlight the possibility of identifying parents' specific caregiving strengths and needs on the basis of varied indicators including their state of mind, which may help develop more effective intervention programs tailored to parents' unique challenges (Bick & Dozier, 2008).

To the best of our knowledge, the dimensional structure found by Roisman et al. (2007), although consistent with that found in three independent samples (Bernier et al., 2004; Furman, 2001; Larose & Bernier, 2001), has not yet been examined in terms of its developmental significance by research pertaining to parent–child interactions. The current study presents an initial step in this direction by suggesting that the two-dimension structure can effectively account for individual variations in different aspects of parenting behavior within different interactive contexts. The results also highlight the usefulness of a continuous approach when working with small sample sizes, given that the identified differences in parenting behavior could not be found when using AAI categories.

Nonetheless, future research should address certain shortcomings. The fact that internal consistency was considerably higher for the dismissing than the preoccupied/unresolved dimension is of concern, and more research is needed to ascertain whether aggregating preoccupied and unresolved indicators truly leads to a less reliable index than an aggregate of the dismissing scales or whether this is specific to the current sample. There are theoretical and empirical reasons to suspect that the former may be true. Given that the preoccupied/unresolved dimension groups together scales that were originally developed to assess two distinct states

Table 4
Summary of Regression Analysis Predicting Maternal Sensitivity

Block	R^2	ΔR^2	ΔF	β
1. Socioeconomic status	.08		6.19*	.29*
2. Socioeconomic status	.17	.09	3.51*	.26*
AAI: Dismissing				−.30**
AAI: Preoccupied/unresolved				−.04

Note. $N = 71$. AAI = Adult Attachment Interview.
* $p < .05$. ** $p < .01$.

Table 3
Zero-Order Correlations Between Demographic Variables, the Two Dimensions of the Adult Attachment Interview, Maternal Sensitivity, and Maternal Autonomy Support

Variable	1	2	3	4	5	6	7
1. Maternal age	—	.00	.40***	.00	.09	.02	−.02
2. Child gender		—	−.11	−.10	.01	.04	−.12
3. Socioeconomic status			—	−.08	−.19	.29*	.34**
4. Dismissing				—	−.05	−.31**	−.05
5. Preoccupied/unresolved					—	−.07	−.38***
6. Sensitivity						—	.13
7. Autonomy support							—

Note. $N = 71$. Gender: 1 = boy, 2 = girl.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 5
Summary of Regression Analyses Predicting Maternal Autonomy Support

Block	R^2	ΔR^2	ΔF	β
1. Socioeconomic status	.12		8.97**	.34**
2. Socioeconomic status	.22	.11	4.57**	.27*
AAI: Dismissing				−.05
AAI: Preoccupied/unresolved				−.33**

Note. $N = 71$. AAI = Adult Attachment Interview.
* $p < .05$. ** $p < .01$.

of mind, it is to be expected that it may present lower internal consistency. Furthermore, indicators of both preoccupied and unresolved status are somewhat less frequently observed than are dismissing indicators in normative populations, including in the current sample. This lower rate of occurrence can contribute to diminished reliability. Overall, then, although the results of the current study present promising support for the developmental usefulness of a preoccupied/unresolved dimension, psychometric research with much larger samples, characterized by greater cultural and socioeconomic diversity, appears necessary to further examine the underlying distribution of individual differences in preoccupied and unresolved states of mind. Another limitation of the current study is the very different lengths of the observation periods used for sensitivity and autonomy support. Although we did not aim to compare these two behaviors, assessing them in more equivalent methodological contexts may have been preferable.

The results of the current study present initial evidence in favor of the use of a dimensional approach to the AAI such as that proposed by Roisman et al. (2007) for research on parent–child relationships. When working with small samples, which is often the case in attachment research, adopting a continuous approach constitutes an alternative to merging the different insecure groups into one category. Indeed, such an approach may allow one to identify true differences that would have gone unnoticed with the sole use of the categorical approach (e.g., in the current study). It is important to note that it also allows researchers to retain differences between types of insecure states of mind, which the current results suggest may relate in unique and theoretically consistent ways to specific types of parenting behaviors.

References

Adam, E. K., Gunnar, M. R., & Tanaka, A. (2004). Adult attachment, parent emotion, and observed parenting behavior: Mediator and moderator models. *Child Development, 75,* 110–122. doi:10.1111/j.1467-8624.2004.00657.x

Ainsworth, M. D. S. (1985). Patterns of infant–mother attachment: Antecedents and effects on development. *Bulletin of the New York Academy of Medicine, 61,* 771–791.

Ainsworth, M. D. S., Bell, S. M., & Stayton, D. J. (1974). Infant–mother attachment and social development: "Socialization" as a product of reciprocal responsiveness to signals. In M. P. M. Richards (Ed.), *The integration of the child into a social world* (pp. 99–135). London, England: Cambridge University Press.

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

Aviezer, O., Sagi, A., Joels, T., & Ziv, Y. (1999). Emotional availability and attachment representations in kibbutz infants and their mothers. *Developmental Psychology, 35,* 811–821. doi:10.1037/0012-1649.35.3.811

Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (1993). A psychometric study of the Adult Attachment Interview: Reliability and discriminant validity. *Developmental Psychology, 29,* 870–879. doi:10.1037/0012-1649.29.5.870

Beckwith, L., Chen, S. E., & Hamilton, C. E. (1999). Maternal sensitivity during infancy and subsequent life events relate to attachment representation at early adulthood. *Developmental Psychology, 35,* 693–700. doi:10.1037/0012-1649.35.3.693

Bernier, A., Carlson, S. M., & Whipple, N. (2010). From external regulation to self-regulation: Early parenting precursors of young children's executive functioning. *Child Development, 81,* 326–339. doi:10.1111/j.1467-8624.2009.01397.x

Bernier, A., Larose, S., Boivin, M., & Soucy, N. (2004). Attachment state of mind: Implications for adjustment to college. *Journal of Adolescent Research, 19,* 783–806. doi:10.1177/0743558403260096

Bick, J., & Dozier, M. (2008). Helping foster parents change: The role of parental state of mind. In H. Steele & M. Steele (Eds.), *Clinical applications of the Adult Attachment Interview* (pp. 452–470). New York, NY: Guilford Press.

Bosquet, M., & Egeland, B. (2001). Associations among maternal depressive symptomatology, state of mind and parent and child behaviors: Implications for attachment-based interventions. *Attachment & Human Development, 3,* 173–199. doi:10.1080/14616730010058007

Busch, A. L., Cowan, P. A., & Cowan, C. P. (2008). Unresolved loss in the Adult Attachment Interview: Implications for marital and parenting relationships. *Development and Psychopathology, 20,* 717–735. doi:10.1017/S0954579408000345

Caldwell, B. M., & Bradley, R. H. (1978). *Home Observation for Measurement of the Environment manual.* Little Rock, AK: University of Arkansas at Little Rock.

Cohn, D. A., Cowan, P. A., Cowan, C. P., & Pearson, J. (1992). Mothers' and fathers' working models of childhood attachment relationships, parenting styles, and child behavior. *Development and Psychopathology, 4,* 417–431. doi:10.1017/S0954579400000870

Crowell, J. A., & Feldman, S. S. (1988). Mothers' internal models of relationships and children's behavioral and developmental status: A study of mother–child interaction. *Child Development, 59,* 1273–1285. doi:10.2307/1130490

Crowell, J. A., & Feldman, S. S. (1991). Mothers' working models of attachment relationships and mother and child behavior during separation and reunion. *Developmental Psychology, 27,* 597–605. doi:10.1037/0012-1649.27.4.597

Crowell, J. A., O'Connor, E., Wollmers, G., Sprafkin, J., & Rao, U. (1991). Mothers' conceptualizations of parent–child relationships: Relation to mother–child interaction and child problems. *Development and Psychopathology, 3,* 431–444. doi:10.1017/S0954579400007616

Crowell, J. A., Waters, E., Treboux, D., O'Connor, E., Colon-Downs, C., Feider, O., & Posada, G. (1996). Discriminant validity of the Adult Attachment Interview. *Child Development, 67,* 2584–2599. doi:10.2307/1131642

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11,* 227–268. doi:10.1207/S15327965PLI1104_01

De Wolff, M. S., & van IJzendoorn, M. H. (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child Development, 68,* 571–591. doi:10.2307/1132107

Frodi, A., Bridges, L., & Grolnick, W. (1985). Correlates of mastery-related behavior: A short-term longitudinal study of infants in their second year. *Child Development, 56,* 1291–1298. doi:10.2307/1130244

Furman, W. (2001). Working models of friendships. *Journal of Social and Personal Relationships, 18,* 583–602. doi:10.1177/0265407501185002

George, C., Kaplan, N., & Main, M. (1996). *Adult Attachment Interview protocol* (3rd ed.). Unpublished manuscript, University of California at Berkeley.

Grolnick, W., Frodi, A., & Bridges, L. (1984). Maternal control style and the mastery motivation of one-year-olds. *Infant Mental Health Journal, 5,* 72–82. doi:10.1002/1097-0355(198422)5:2<72::AID-IMHJ2280050203>3.0.CO;2-O

Grolnick, W. S., Gurland, S. T., DeCourcey, W., & Jacob, K. (2002). Antecedents and consequences of mother's autonomy support: An experimental investigation. *Developmental Psychology, 38,* 143–155. doi:10.1037/0012-1649.38.1.143

Grolnick, W. S., & Ryan, R. M. (1989). Parent styles associated with children's self-regulation and competence in school. *Journal of Educational Psychology, 81,* 143–154. doi:10.1037/0022-0663.81.2.143

Grossmann, K., Grossmann, K. E., Fremmer-Bombik, E., Kindler, H., Scheuerer-Englisch, H., & Zimmermann, P. (2002). The uniqueness of the child–father attachment relationship: Fathers' sensitive and challenging play as a pivotal variable in a 16-year longitudinal study. *Social Development, 11,* 301–337. doi:10.1111/1467-9507.00202

Heinicke, C. M., & Levine, M. S. (2008). The AAI anticipates the outcome of relation-based early intervention. In H. Steele & M. Steele (Eds.), *Clinical applications of the Adult Attachment Interview* (pp. 99–125). New York, NY: Guilford Press.

Hesse, E. (2008). The Adult Attachment Interview: Protocol, method of analysis, and empirical studies. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 552–598). New York, NY: Guilford Press.

Joussemet, M., Koestner, R., Lekes, N., & Landry, R. (2005). A longitudinal study of the relations of maternal autonomy support to children's adjustment and achievement in school. *Journal of Personality, 73,* 1215–1236. doi:10.1111/j.1467-6494.2005.00347.x

Joussemet, M., Vitaro, F., Barker, E. D., Côté, S., Nagin, D. S., Zoccolillo, M., & Tremblay, R. E. (2008). Controlling parenting and physical aggression during elementary school. *Child Development, 79,* 411–425. doi:10.1111/j.1467-8624.2007.01133.x

Larose, S., & Bernier, A. (2001). Social support processes: Mediators of attachment state of mind and adjustment in late adolescence. *Attachment & Human Development, 3,* 96–120. doi:10.1080/14616730010024762

Madigan, S., Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., Moran, G., Pederson, D. R., & Benoit, D. (2006). Unresolved states of mind, disrupted parental behavior, and disorganized attachment: A review and meta-analysis of a transmission gap. *Attachment & Human Development, 8,* 89–111. doi:10.1080/14616730600774458

Main, M., & Goldwyn, R. (1998). *Adult attachment scoring and classification system.* Unpublished manuscript, University of California at Berkeley.

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York, NY: McGraw-Hill.

Pederson, D. R., Gleason, K. E., Moran, G., & Bento, S. (1998). Maternal attachment representations, maternal sensitivity, and the infant–mother attachment relationship. *Developmental Psychology, 34,* 925–933. doi:10.1037/0012-1649.34.5.925

Pederson, D. R., & Moran, G. (1995). A categorical description of infant–mother relationships in the home and its relation to Q-sort measures of infant–mother interaction. *Monographs of the Society for Research in Child Development, 60*(2–3, Serial No. 244), 111–132.

Pederson, D. R., Moran, G., Sitko, C., Campbell, K., Ghesquire, K., & Acton, H. (1990). Maternal sensitivity and the security of infant–mother attachment: A Q-sort study. *Child Development, 61,* 1974–1983. doi:10.2307/1130851

Roisman, G. I., Fraley, R. C., & Belsky, J. (2007). A taxometric study of the Adult Attachment Interview. *Developmental Psychology, 43,* 675–686. doi:10.1037/0012-1649.43.3.675

Sagi, A., van IJzendoorn, M. H., Scharf, M., Koren-Karie, N., Joels, T., & Mayseless, O. (1994). Stability and discriminant validity of the Adult Attachment Interview: A psychometric study in young Israeli adults. *Developmental Psychology, 30,* 771–777. doi:10.1037/0012-1649.30.5.771

Shaver, P. R., Belsky, J., & Brennan, K. A. (2000). The Adult Attachment Interview and self-reports of romantic attachment: Associations across domains and methods. *Personal Relationships, 7,* 25–43. doi:10.1111/j.1475-6811.2000.tb00002.x

Slade, A., Belsky, J., Aber, J. L., & Phelps, J. L. (1999). Mothers' representations of their relationships with their toddlers: Links to adult attachment and observed mothering. *Developmental Psychology, 35,* 611–619. doi:10.1037/0012-1649.35.3.611

Tarabulsy, G. M., Bernier, A., Provost, M. A., Maranda, J., Larose, S., Moss, E., . . . Tessier, R. (2005). Another look inside the gap: Ecological contributions to the transmission of attachment in a sample of adolescent mother–infant dyads. *Developmental Psychology, 41,* 212–224. doi:10.1037/0012-1649.41.1.212

van IJzendoorn, M. H. (1995). Adult attachment representations, parental responsiveness, and infant attachment: A meta-analysis on the predictive validity of the Adult Attachment Interview. *Psychological Bulletin, 117,* 387–403. doi:10.1037/0033-2909.117.3.387

van IJzendoorn, M. H., Vereijken, C. M. J. L., Bakermans-Kranenburg, M. J., & Riksen-Walraven, J. M. (2004). Assessing attachment security with the attachment Q-sort: Meta-analytic evidence for the validity of the observer AQS. *Child Development, 75,* 1188–1213. doi:10.1111/j.1467-8624.2004.00733.x

Verschueren, K., Dossche, D., Marcoen, A., Mahieu, S., & Bakermans-Kranenburg, M. (2006). Attachment representations and discipline in mothers of young school children: An observation study. *Social Development, 15,* 659–675. doi:10.1111/j.1467-9507.2006.00363.x

Whipple, N., Bernier, A., & Mageau, G. A. (2010). Broadening the study of infant security of attachment: Maternal autonomy-support in the context of infant exploration. *Social Development.* Advance online publication: doi:10.1111/j.1467-9507.2010.00574.x

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