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# Toward a broader approach to the study of infant attachment: Links between maternal autonomy-support, attachment state of mind, maternal sensitivity, and infant security of attachment.

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Toward a broader approach to the study of infant attachment: Links between maternal autonomy-support, attachment state of mind, maternal sensitivity, and infant security of attachment.

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# Abstract

In order to further elucidate the mechanisms underlying the development of infant attachment patterns, Grossmann and colleagues (1999; 2008) have proposed a broader perspective to the study of infant attachment, addressing parental behaviors related to both sides of the attachment/exploration balance. With this broader approach in mind, this dissertation aimed at exploring the relation between infant security of attachment and two maternal behaviors, maternal sensitivity and autonomy-support, as well as each behavior's relation to maternal attachment state of mind.

Article 1 argues that Self-Determination theory (SDT), and its empirical work concerning parental exploration-related behaviors, may provide valuable insight in addressing the exploration side of the attachment/exploration balance. The article presents a theoretical and empirical overview of the field of attachment and the field of SDT, as well as drawing conceptual and empirical parallels between the two fields and discussing how they may complement one another. Article 2 explores the links between maternal sensitivity, maternal autonomy-support, and infant security of attachment. Seventy-one dyads participated in two home visits. Maternal sensitivity was assessed when the infants were 12 months old, while maternal autonomy-support and infant attachment were assessed at 15 months. Results indicate that maternal autonomy-support accounted for a significant portion of the variability in security of attachment above and beyond what is accounted for by maternal SES and maternal

sensitivity. Article 3 explores the links between two dimensions of maternal attachment state of mind (dismissing and preoccupied/unresolved), maternal sensitivity, and maternal autonomy-support. Seventy-one dyads participated in three home visits. The Adult Attachment Interview (AAI) was administered when the infants were 8 months of age, 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. The results presented in both article 2 and 3 are discussed along with their theoretical and clinical implications. Questions that may guide future research are proposed.

Keywords: Maternal sensitivity, maternal autonomy-support, infant security of attachment, maternal attachment state of mind.

# Résumé

Dans le but d'examiner les mécanismes qui sous-tendent le développement de la sécurité d'attachement chez l'enfant, Grossmann et al. (1999; 2008) proposent une perspective plus vaste de l'étude de l'attachement chez l'enfant, examinant les comportements parentaux pertinents aux deux côtés de l'équilibre entre le système d'attachement et le système d'exploration. La thèse se base sur cette approche pour explorer la relation entre la sécurité d'attachement chez l'enfant et deux comportements maternels, soit la sensibilité maternelle et le soutien à l'autonomie maternel, de même que la relation entre ces deux comportements et l'état d'esprit maternel face à l'attachement.

Le premier article propose que la théorie de l'autodétermination, avec ses études empiriques portant sur les comportements parentaux liés à l'exploration, offre une perspective utile pour l'étude des comportements d'exploration dans le cadre de l'équilibre attachement/exploration. L'article présente une revue théorique et empirique des domaines de l'attachement et de la théorie de l'autodétermination et souligne des analogies conceptuelles et empiriques entre les deux domaines, en plus de décrire la façon dont ils se complètent et se complémentent. Le deuxième article étudie les liens entre la sensibilité maternelle, le soutien à l'autonomie maternel et la sécurité d'attachement chez l'enfant. Soixante et onze dyades ont participé à deux visites à domicile. La sensibilité maternelle a été évaluée lorsque les enfants étaient âgés de 12 mois, alors que le soutien à l'autonomie maternel et la sécurité

d'attachement chez l'enfant l'ont été lorsque les enfants avaient atteint l'âge de 15 mois. Les résultats indiquent que le soutien à l'autonomie maternel explique une portion significative de la variance de la sécurité d'attachement, et ce, après avoir contrôlé pour la sensibilité maternelle et le statut socio-économique. Le troisième article examine les relations entre deux dimensions de l'état d'esprit maternel face à l'attachement (esquivant et préoccupé/non-résolu), la sensibilité maternelle et le soutien à l'autonomie maternel. Soixante et onze dyades ont participé à trois visites à domicile. L'Entrevue d'Attachement Adulte (EAA) a été administrée lorsque les enfants étaient âgés de 8 mois, la sensibilité maternelle a été évaluée alors qu'ils avaient atteint l'âge de 12 mois et le soutien à l'autonomie maternel, lorsqu'ils avaient 15 mois. Les résultats révèlent qu'après avoir contrôlé pour le statut socio-économique, la sensibilité maternelle est liée de façon négative à la dimension « esquivant » de l'EAA, alors que le soutien à l'autonomie maternel est lié de façon négative à la dimension « préoccupé/non-résolu ». Les résultats présentés dans le deuxième et le troisième article sont discutés, de même que de leurs répercussions théoriques et cliniques. Des questions susceptibles de guider des recherches futures sont proposées.

Mots-clés : sensibilité maternelle, soutien à l'autonomie maternel, sécurité d'attachement chez l'enfant, état d'esprit maternel face à l'attachement.

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# List of abbreviations

| | |
|---|---|
| AAI | Adult Attachment Interview |
| AQS | Attachment Q-sort |
| Ds | Dismissing attachment state of mind |
| E | Preoccupied attachment state of mind |
| F | Autonomous attachment state of mind |
| MBQS | Maternal Behavioral Q-Sort |
| SDT | Self-Determination theory |
| SES | Socioeconomic status |
| U | Unresolved attachment state of mind |

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# Introduction

Months before children are even born, they are listening to their mother's heartbeat, kicking in the womb, and reacting to their parent's voices and movements. Long before their parents cradle them for the first time, they are establishing their first relationships. While they will interact with many different people and engage in a variety of relationships throughout their life, attachment theorists argue that this very first relationship between a child and his or her caregiver is critical in providing the sense of emotional security that children need for healthy social, emotional, and cognitive development. In fact, John Bowlby (1982), the father of attachment theory, proposed that these very first relationships are essential to a child's survival.

Attachment theory posits that children are equipped with an attachment behavioral system, which innately drives them to engage in a variety of behaviors aimed at seeking or maintaining proximity to their attachment figure, therefore ensuring protection, and thus an increased survival advantage (Bowlby, 1982). Children are also presumed to possess an innate motivation to explore and master their environment, which also affords increased survival advantage. The two systems are thought to be intricately linked in that together they ensure that children learn all that they need to know to successfully navigate within their environment, while at the same time ensuring their safety and protection from the potential environmental dangers (Cassidy, 2008). Ainsworth (1985) noted that the balance between these two

systems is actually more important for development than either one of them alone. Children, who through repeated experiences with their caregiver, have come to trust that they will be protected in times of need, are described as having a secure attachment pattern. They are thought to benefit from a secure base from which they can venture out to explore their world. However, children who have not had such consistent responses to their needs, tend to present insecure attachment patterns as evidenced by attachment/exploration imbalances such as the inhibition of exploratory activities (insecure resistant) or the inhibition of bids for comfort and protection in times of danger or distress (insecure avoidant).

A large body of empirical research has documented links between security of attachment and a variety of child outcomes. Compared to children who exhibit insecure attachment patterns, children with secure attachment histories have been found to display more positive and harmonious parent-child interactions, increased capacity to develop close relationships with peers and adults, better emotion understanding and regulation, more positive self-regard, better social problem-solving skills, more advanced conscience development, as well as a variety of advantageous personality characteristics throughout childhood and adolescence (for a review see Thompson, 2008). Furthermore, when present in conjunction with other risk factors, attachment insecurity has been documented as a risk factor for several forms of childhood psychopathology (Deklyen & Greenberg, 2008).

Given the importance of early attachment experiences for subsequent child socio-emotional and cognitive development, the field of attachment has been particularly invested in exploring the factors that contribute to secure attachment relationships. Attachment research suggests that later, as adults, when women are asked to reflect upon their early attachment experiences, the manner in which they describe and think about these first relationships relates to the attachment patterns developed by their own children, thus evidencing an intergenerational transmission of attachment patterns (van IJzendoorn, 1995). Intuitively, theorists proposed that parental behaviors when interacting with their children must be the vehicle by which attachment patterns are transmitted from one generation to the next. A plethora of studies have aimed at exploring the parental behaviors that might elucidate this question. However, an important portion of variability remains unaccounted for, thus leaving a significant transmission gap (van IJzendoorn, 1995). Understanding the mechanisms underlying the development of attachment patterns is therefore still a main focus of attachment research.

Given the interdependence of the attachment behavioral system and the exploration system, Grossmann, Grossmann, Kindler, and Zimmermann (2008) propose a broader theoretical and empirical focus to attachment research, by introducing the concept of "psychological security". Grossmann and colleagues suggest that whether children are responding to a distressing event or facing obstacles as they navigate their environment, they must trust that their caregivers are available

to help them in times of need. It is proposed that the different parental behaviors that facilitate this trust work together to provide the child with "psychological security" in both contexts where the attachment system or the exploratory system is aroused. This viewpoint implies that parents must not only provide a secure base from which their children feel free to explore, they must also provide support to their children as they engage in exploration and develop new skills.

With this broader perspective in mind, the present dissertation aims at exploring parental behaviors aimed at fostering a sense of security within both attachment and exploration contexts in hopes of further elucidating the mechanisms underlying the development of secure attachment patterns. Specifically, two parental behaviors are explored: maternal sensitivity and maternal autonomy-support. The concepts of maternal sensitivity and maternal autonomy-support will not be extensively detailed here because they will be more thoroughly introduced in the first article presented in this dissertation. While maternal sensitivity is familiar to the field of attachment, maternal autonomy-support is a concept that is borrowed from the field of Self-Determination theory (SDT; Deci & Ryan, 2000). Whereas attachment theory finds its roots within the field of developmental psychology, SDT is embedded within the field of social psychology. It is a theory of human motivation, which views human beings as innately self-motivated to explore, learn, extend themselves, and master new skills (Ryan & Deci, 2000). This innate propensity is referred to as intrinsic motivation, and SDT is particularly interested in the social-contextual factors

that facilitate versus hinder these instinctive tendencies. Among these factors, SDT has devoted a great deal of empirical attention to parental autonomy-support, a behavior found to foster child exploration and mastery. The present dissertation argues that the concept of autonomy-support can provide useful additions to the field of attachment by providing a theoretical and empirical framework to address parental exploration-related behaviors. While SDT has extensively operationalized and studied parental autonomy-support, less work has been conducted with infants, and there are limited observational measures available. In contrast, the basic postulates of attachment theory are largely anchored in the work of Mary Salter Ainsworth, who conducted extensive field observations of mother-infant dyads in the 1950s and 1960s, and subsequent attachment research has mainly developed observational measures. In addition to the research question stated previously, another objective at the heart of this dissertation was therefore to study autonomy-support with infants using an observational measure.

The present dissertation is composed of three scientific articles, one theoretical and two empirical in nature. The first article serves as an overview of the theoretical tenets that laid the groundwork for the subsequent empirical studies. It provides an overview of both attachment theory and self-determination theory, and then discusses the potential role of self-determination theory in helping to further elucidate the mechanisms and processes underlying the development of secure attachment relationships. This article was submitted to *Canadian Psychology*, and

was invited for revisions and re-submission. The article has now been resubmitted to *Canadian Psychology*. The second article explores the relative contributions of maternal sensitivity and maternal autonomy-support in the prediction of infant security of attachment. This article has been conditionally accepted by *Social Development* pending minor revisions. The third article aims at assessing the relation between mothers' state of mind with respects to their own attachment experiences and the extent to which they display sensitivity and autonomy-support when interacting with their children. It has been submitted to *Developmental Psychology* and is awaiting review.

# Article 1

Attending to the exploration side of infant attachment: Contributions from Self-Determination theory

# Attending to the Exploration Side of Infant Attachment: Contributions from Self-Determination Theory

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# Attending to the Exploration Side of Infant Attachment: Contributions from Self-Determination Theory

## Abstract

Attachment researchers have long been striving to acquire a fuller understanding of the intergenerational transmission of attachment patterns. Most of the empirical work conducted has focussed on maternal sensitivity to infants' attachment needs. Given that infant attachment is defined as a balance between attachment and exploration, some researchers have stressed the need to devote increased empirical attention to maternal behaviors in the context of infant exploration. We propose that a fruitful approach to addressing maternal exploration-related behaviors may be to draw from self-determination theory (SDT) given its empirical focus on the parental behaviors that support children's innate propensity to explore. SDT has clearly operationalized parental exploration-related behaviors and has already related these behaviors to a wide array of important child outcomes. However, SDT has not extensively explored the link between these behaviors and infant attachment. This article highlights many conceptual, empirical, and methodological parallels that can be drawn between SDT and attachment theory, thus suggesting that they could be complementary on many levels.

# Attending to the Exploration Side of Infant Attachment: Contributions from Self-Determination Theory

Over the years, the field of attachment has been particularly invested in identifying the mechanisms underlying the intergenerational transmission of attachment patterns. Thus far, the largely accepted and extensively studied model assumes that maternal sensitivity mediates this intergenerational transmission. However, meta-analytic data suggest that maternal sensitivity accounts for only 23% of the direct association, thus leaving a transmission gap (van IJzendoorn, 1995). Several authors have stressed the need to explore other maternal behaviors in order to bridge this gap. Given 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, Grossmann, Grossmann, and Zimmermann (1999) stress the need to attend to parental behaviors in exploratory contexts. We propose that a fruitful approach may be to draw from a field of research that directly addresses exploration-related parental behaviors, such as self-determination theory (SDT; Deci & Ryan, 2000). This paper aims at highlighting the ways in which self-determination theory could complement attachment theory, and thus help to narrow the attachment transmission gap.

## *Infant Security of Attachment*

Empirical research has convincingly shown that parent-infant attachment plays a key role in subsequent psychosocial and behavioral child outcomes

(Thompson, 1999; Weinfield, Sroufe, Egeland, & Carlson, 1999). For instance, at various ages, children with secure attachment histories have been found to display less dependency, more ego-resilience and persistence, as well as more goal-directed and achievement-oriented behaviors. They have also been found to exhibit more social competence and empathy. In contrast, children with resistant attachment patterns have been found to be more prone to anxiety problems, while children with avoidant or disorganized attachment patterns have been shown to be more hostile and aggressive with their parents and peers. Furthermore, longitudinal studies suggest that early attachment continues to be associated with personal adjustment in adolescence and early adulthood (see Grossmann, Grossmann, & Waters, 2005). Given the importance of infant attachment for future adjustment, attachment researchers have long been striving to acquire a fuller understanding of the ways in which attachment patterns are formed, and the processes through which they impact child development. The empirical evidence available at this time suggests that a mother's state of mind with respect to her own early attachment experiences is the strongest predictor of infant attachment (van IJzendoorn, 1995).

*Adult Attachment State of Mind*

Attachment state of mind refers to the way in which adults process thoughts and feelings regarding their own attachment experiences (Main, Kaplan, & Cassidy, 1985). It is assessed using the *Adult Attachment Interview* (AAI, George, Kaplan, & Main, 1996), a semi-structured interview where adults are probed about the nature of

their relationship with their parents when they were growing up. They are also asked to recount specific childhood memories and to reflect upon the ways in which the latter affected, and continue to affect, their lives. The interviews are transcribed verbatim and coded by means of a classification system, which assesses the thought processes and coherency apparent in the speaker's discourse (Main & Goldwyn, 1998). Individuals are classified as having an a*utonomous* (F), *dismissing* (Ds), or *preoccupied* (E) attachment state of mind. In discussing trauma or loss, they may be classified as *unresolved* (U), in which case they are also given a secondary best-fitting classification of F, Ds, or E. Individuals with an *autonomous* state of mind value attachment relationships. They hold an even-handed perspective of their relationships with their early attachment figures, their contributions to these relationships, and the role these experiences have played in shaping who they are today as adults. *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, while failing to substantiate their claims with concrete episodic memories. *Preoccupied* individuals tend to have difficulty stepping back and adopting an objective perspective regarding their relationship with their parents. Their discourse in the AAI may evidence mixtures of anger, fear, passivity, 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 (Main, & Goldwyn, 1998).

*Intergenerational Transmission of Attachment*

Maternal attachment state of mind has been found to predict infant security of attachment, even when the former is assessed prior to the child's birth (van IJzendoorn, 1995). Meta-analytic evidence suggests that mothers with autonomous states of mind tend to have infants who display secure attachment, dismissing mothers tend to have infants classified as avoidant, preoccupied mothers tend to have infants classified as ambivalent, and unresolved mothers tend to have infants classified as disorganized (van IJzendoorn, 1995). The magnitude of these associations is considered to be large for the social sciences ($d$ = 1.06; van IJzendoorn, 1995). This intergenerational transmission also appears to be very robust: it has been observed in middle-class samples (e.g., Main et al., 1985), low SES samples (e.g., Bus & van IJzendoorn, 1992), samples of adolescent mothers (Ward & Carlson, 1995), as well as in Western-European, Japanese and Middle-Eastern cultures (e.g., Grossmann & Grossmann, 1991; Kazui, Endo, Tanaka, Sakagami & Suganuma, 2000; Sagi et al., 1997) and evidence suggests that it cannot be accounted for by genetic factors (Bokhorst et al., 2003; Dozier, Stovall, Albus & Bates, 2001; O'Connor & Croft, 2001).

The classic model proposed by attachment theory explains intergenerational transmission through parental sensitivity to the child's signals, i.e., a mother's ability to respond to her infant's needs promptly and appropriately. However, in recent years, empirical evidence has suggested that maternal sensitivity may not suffice in

explaining the transmission of attachment. Meta-analytic data suggest that sensitivity accounts for only 23% of the direct association between parental attachment state of mind and infant security of attachment (van IJzendoorn, 1995). Subsequent studies have found very similar results, with maternal sensitivity explaining between 25% (Pederson, Gleason, Moran & Bento, 1998) and 36% (Raval et al., 2001) of the transmission. Hence, a large percentage of the common variance remains unexplained, thus leaving a *transmission gap* (van IJzendoorn, 1995). This challenging finding has been attributed by many to the quality of the measures of parental behaviors. It has been argued that the existing measures of sensitivity do not capture all relevant aspects of parent-child interactions likely to favour attachment security (van IJzendoorn, 1995). Hence, several authors have stressed the need to adopt a broader multidimensional approach to the study of infant attachment, where numerous maternal behaviors are considered (De Wolff & van IJzendoorn, 1997).

There is considerable evidence suggesting that maternal attachment state of mind is linked not only to maternal sensitivity, but also to individual differences in a variety of parenting behaviors (e.g. Adam, Gunnar & Tanaka, 2004; Cohn et al., 1992; Crowell & Feldman, 1988; Das Eiden et al., 1995; Ward & Carlson, 1995). Furthermore, meta-analytic data have highlighted that several maternal behaviors, yielding effect sizes similar to maternal sensitivity, contribute to shaping infant attachment (De Wolff & van IJzendoorn, 1997).

*Maternal Behaviors in the Context of Infant Exploration*

In addition to addressing a wider variety of maternal behaviors, Grossmann, Grossmann, and Zimmermann (1999) propose that we broaden the context within which we observe and study these behaviors. Specifically, they suggest that infant attachment be studied in the breadth with which the concept was originally defined by attachment theory.

Attachment theory posits that infants are equipped with distinct, yet inseparably linked attachment and exploratory behavioral systems (Bowlby, 1982). Ainsworth (1985) stated 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. In assessing infant attachment, it is therefore key to focus on this balance rather than focussing solely on the infant's comfort-seeking behaviors (Weinfield et al., 1999). While exploring their environments, infants described as having secure attachment relationships are able to seek out their caregivers for comfort and protection when they perceive a threat. Upon being comforted, these infants return promptly to their exploratory behaviors. However, insecure infants do not present the same balance between attachment and exploration. Infants classified as ambivalent tend to maintain attachment behaviors even in the absence of threat or stress, thus inhibiting their exploratory activities. Avoidant infants, on the other hand, appear to maintain exploration even when faced with a threatening or stressful situation. Given that

security of attachment consists of a balance between emotional security and competent exploration, one may reasonably propose that maternal behaviors aimed at fostering confident exploration are just as important in shaping the development of infant security of attachment as maternal sensitivity to the child's emotional needs, which specifically aims at providing comfort and protection. It is generally postulated that maternal sensitivity to child distress also fosters competent exploration by providing the child with a sense of trust in the fact that the attachment figure will be available should a threat arise during exploration. Although this undoubtedly influences child exploration, it seems reasonable to propose that parental behaviors aimed specifically at enhancing the child's confidence and autonomy should contribute to the exploration side of attachment security.

Sroufe and Fleeson (1988) propose that attachment relationships include a wide range of interactive contexts. Along these lines, Thompson (1999) notes that infants' experiences with their caregivers provide answers to two questions, both equally central: "What do others do when I am upset?"; "What happens when I venture to explore?" (Thompson, 1999, p. 282). Grossmann et al. (1999) suggest that we adopt a wider view of attachment by addressing what they refer to as *security of exploration*. Grossmann et al. (2002) note that during exploration infants are faced with novel stimuli and challenges, which may elicit fear, wariness, or withdrawal. In order to foster secure exploration, the attachment figure must be sensitive to the infant's emotional needs and expressions, while at the same time providing

appropriate support and challenge to the child with respects to his or her exploratory activities (Grossmann et al., 2002). Parental behaviors during child exploration will affect the child's sense of security during challenging tasks. In sum, Grossmann et al. (1999; 2002) suggest that parental behaviors should not only be assessed in contexts where the child's attachment system is activated, but also in contexts where the exploratory system is activated.

In keeping with Bowlby's eclectic tradition, we propose that a fruitful approach to addressing parental behaviors within the context of child exploration may be to draw from another field of research, one that has extensively studied child exploration, and presents precise operational definitions and measures of exploration-related parental behaviors. Given its empirical focus on the parental behaviors that support children's innate propensity to explore, self-determination theory (SDT; Deci & Ryan, 2000) appears to be a promising conceptual framework to build on Grossmann et al.'s (1999; 2002) work on the importance of parental behaviors in the context of infant exploration, and thus further our understanding of the intergenerational transmission of attachment patterns.

The remainder of this paper aims at drawing several theoretical and methodological parallels between attachment theory and self-determination theory, with the goal of highlighting the ways in which SDT may contribute to our current understanding of the intergenerational transmission of attachment patterns. A brief review of SDT's basic postulates and empirical findings will be presented. A

discussion will then follow highlighting how SDT may offer a useful theoretical framework from which to consider the exploration side of the attachment-exploration balance.

## Self-Determination Theory (SDT)

SDT views children as active agents. At the heart of the theory lies the assumption that humans are innately motivated, curious, and agentic. They naturally explore their environments, striving to acquire new skills, seek challenges, and extend themselves (Ryan & Deci, 2000). This ongoing process is referred to as *intrinsic motivation*, which is defined as the "innate propensity to explore and master one's internal and external worlds" (Ryan, Connell, & Grolnick, 1992, p.170). Thus, infant exploration, as defined by attachment theory, is an expression of intrinsic motivation. While infants are thought to be innately inclined to explore and seek challenge, SDT theorists caution that this natural tendency does not necessarily take place automatically, regardless of context (Deci & Ryan, 2002). Instead, SDT adopts a dialectical view where active organisms interact with social agents that may support or hinder their natural tendencies. The concept of basic psychological needs provides the basis from which social contexts are described as supportive versus undermining.

### *Psychological needs*

SDT posits that there are three basic psychological needs that must be fulfilled in order for healthy development to occur: the needs for autonomy, competence, and relatedness (Deci & Ryan, 2002). These needs are assumed to be

universal, but the avenues through which they are satisfied may vary from one culture to another or from one developmental stage to another (Deci & Ryan, 2000). Optimal social and psychological outcomes are presumed to depend on the extent to which these three needs are fulfilled. Furthermore, it is assumed that, given the opportunity, all humans will naturally gravitate toward contexts that satisfy these three needs (Deci & Ryan, 2002). The need for *competence* is defined as the need to experience oneself as effective in interacting with one's environment. The need for *relatedness* is defined as caring for others, feeling connected, accepted, and cared for by others, as well as experiencing a sense of belongingness with one's community. SDT theory draws a parallel between the need for relatedness and Bowlby's concept of security of attachment by suggesting that children's need for relatedness is fulfilled through a secure relationship with their caregivers (Grolnick, 2003). Finally, the need for *autonomy* is defined as the need to experience one's actions as emanating from one's own integrated values and interests, thus experiencing a sense of volition. It should be noted that autonomy can not be equated with independence. SDT views the autonomy versus heteronomy dimension as orthogonal to the independence versus dependence dimension (Deci & Ryan, 2002). Autonomy refers to the degree to which one feels volitional and experiences his or her behaviors as coherent with one's values and goals (Deci & Ryan, 2002). As such, a person may feel autonomous and still highly depend and rely on others. SDT states that all three needs must be fulfilled in order for intrinsic motivation and well-being to result. Deprivation of the three

psychological needs may lead to various forms of psychopathology, ill-being, or unhealthy development (Deci & Ryan, 2000; Grolnick, 2003).

## Supporting Children's Need for Autonomy: A review

While all three psychological needs are considered to be fundamental to healthy development and well-being, the need for autonomy has been the main focus of SDT research given that the other two needs have received considerable empirical attention in other fields of research. SDT proposes that individuals will be most intrinsically motivated when the environment supports their need for autonomy, rather than controlling their behavior. Empirical evidence shows that various events such as threats, rewards, surveillance, deadlines, and evaluation are linked to decreases in intrinsic motivation, and are presumed to thwart a person's sense of autonomy (Deci & Ryan, 2000). On the other hand, autonomy-supportive events such as providing choice and acknowledging feelings have repeatedly been found to enhance intrinsic motivation (see Deci & Ryan, 2000). In the context of parent-child interactions, parents have been found to differ in the extent to which they adopt autonomy-supportive versus controlling behaviors with their children.

### *Parental Autonomy-Support*

SDT defines parental autonomy-support as "The degree to which parents value and use techniques which encourage independent problem solving, choice, and participation in decisions versus externally dictating outcomes, and motivating achievement through punitive disciplinary techniques, pressure, or controlling

rewards" (Grolnick & Ryan, 1989, p. 144). As discussed previously, the need for autonomy is not synonymous with the need for independence. In certain fields of study, the term autonomy-support (or encouragement of autonomy; e.g., Meins, Fernyhough, Fradley, & Tuckey, 2001) is used to describe parental behaviors aimed at encouraging children to do things by themselves without parental assistance. However, SDT uses the term autonomy-support to refer to parental behaviors aimed at supporting a child's values, interests, and sense of volition. In contrast, parental controlling behaviors are defined as *"pressures to think, feel, or behave in specified ways, thereby ignoring the person's needs and feelings"* (Mageau & Vallerand, 2003, p. 886). When adults are working with infants or children on problem-solving tasks, examples of controlling behaviors may include giving directives, taking over, telling the answers, and unsolicited checking. In contrast, autonomy-supportive behaviors may take the form of informative feedback and positive encouragement, giving hints, suggesting strategies, solicited checking, and waiting for the child to require assistance before intervening (Grolnick, Gurland, DeCourcey, & Jacob, 2002).

A substantial array of empirical work has established links between the use of autonomy-supportive versus controlling approaches with children and a number of child outcomes throughout various stages of child development.

Carefully controlled experimental studies have established a clear link between autonomy-support and intrinsic motivation, and results have consistently highlighted the adverse effects of controlling behaviors on intrinsic motivation (for

reviews see Deci, Koestner, & Ryan, 1999; Grolnick, 2003; Mageau & Vallerand, 2003). For instance, Koestner, Ryan, Bernieri, and Holt (1984) asked 6-to-7 year old children to engage in a painting task. The children were given instructions regarding how to use the paint and how to keep the material clean. Some children were given the guidelines in an autonomy-supportive manner, others were spoken to in a controlling manner, and some children were given no guidelines at all. The results showed that children in the controlling condition exhibited less intrinsic motivation than the children in the two other conditions. Specifically, when they were given the choice between painting and doing some other activity, they spent less time painting than the other children. Children in the controlling condition also displayed less creativity in their paintings than the children in the other two conditions.

Following these laboratory studies, where the controlling adult was in most cases a confederate research assistant, a number of researchers attempted to study autonomy-supportive versus controlling behaviors in the context of parent-child interactions. Given that infant exploration is probably one of the purest displays of intrinsic motivation, Grolnick et al. (1984) explored the way in which mothers' autonomy- supportive versus controlling behaviors toward their 12 month-old infants affected the latter's motivation to explore their environment. They found that mothers who displayed overt autonomy-supportive behaviors had infants who were more persistent during play. Frodi, Bridges, and Grolnick, (1985) followed up this sample of mother-infant dyads eight months later when the infants were 20 months old.

Maternal interpersonal style and infant mastery motivation (exploration) were reassessed at this time, and were once again found to be inter-related. Specifically, maternal autonomy-support toward their 20-month old child was found to predict greater infant persistence and competence.

Evidence suggests that school-age children are also influenced by their mother's autonomy-supportive versus controlling behaviors. Deci, Driver, Hotchkiss, Robbins, et al. (1993) asked mothers and their 6- to 7- year-old children to play together in a laboratory setting. Maternal vocalizations were recorded and coded. Children's intrinsic motivation was assessed by means of a self-report measure assessing the extent to which children reported liking the target activity, and an observational measure that assessed the amount of time the children spent doing the target activity during a free-choice period where they could choose to do any activity they wished. The results showed that maternal controlling vocalizations were negatively related to both measures of children's intrinsic motivation.

In addition to the effects of parental autonomy-support on children's intrinsic motivation, a great deal of research has also examined its effects on a variety of other important child outcomes. Using child-report measures, Avery and Ryan (1988) explored the link between children's perceptions of their parents and their self-perceptions and overall adjustment. They used the Blatt Object Representation Scale (BORS) to assess the extent to which children perceived their relationship with each parent as presenting positive involvement and autonomy-support. The BORS scores

were found to be positively related to children's perceived cognitive and social competence, as well as their perceived self-worth and general adjustment. Furthermore, the BORS scores were positively related to children's popularity with peers (Avery & Ryan, 1988). Chirkov and Ryan (2001) examined the effects of parental autonomy-support versus control in adolescent samples from two distinct cultural settings, Russia and the United States. In both samples, perceived parental autonomy-support was positively related to well-being indicators such as self-esteem, self-actualization (which included measures of one's orientation toward self-acceptance, self-realization, and intimate relationships), and life satisfaction. Parental autonomy-support was also found to be related to academic self-regulation in both populations. In another study with an adolescent sample, Williams, Cox, Hedberg, and Deci (2000) found that high school students who perceived their parents as autonomy-supportive, also reported holding more intrinsic life values such as personal growth, fitness, affiliation, and community contribution, whereas students who perceived their parents as controlling reported more extrinsic aspirations such as fame, image, or financial success. Furthermore, students of controlling parents reported engaging in more risky behaviors such as the use of tobacco, marijuana, and alcohol, as well as early sexual intercourse. Although based on self-reported outcomes in most cases, these findings are consistent with previous experimental results, which suggested that autonomy-support may favour children's personal adjustment.

It should be noted that, with a few exceptions (e.g. Grolnick & Ryan, 1989), most of the studies mentioned above assessed parental autonomy-support via child reports. Given the interactive nature of parent-child relationships, obtaining parental reports of the nature of their behavior toward their children would definitely add to the reliability of the results. However, obtaining parental reports of their own parenting behaviors is challenging because the measures must be carefully designed to avoid transparency, which could lead to biased responses. In order to address this problem, Grolnick and Ryan (1989) developed an interview-based assessment tool, where parents are asked to describe how they motivate their children to do various activities, and how they respond to their children's behaviors. They interviewed parents of children in grades 3 to 6 in order to explore the degree to which they tended to be autonomy-supportive versus controlling with their children. Parental autonomy-support was found to be positively related to the extent to which children reported regulating their behavior in an autonomous (rather than externally controlled) manner. Parental autonomy-support was also found to be inversely related to teachers' reports of children's acting out and learning problems. Furthermore, parental autonomy-support was found to predict achievement on standardized tests, and grades. Using archival data collected by Sears, Maccoby, and Levin (1957), Joussemet, Koestner, Lekes, and Landry (2005) used this interview-based coding system to explore the impact of maternal autonomy-support on children's social and academic adjustment. Maternal autonomy-support and control were coded during an

interview that mothers participated in when their child was 5 years old. Maternal autonomy-support assessed at age 5 was found to be positively related to teacher ratings of social and academic adjustment at age 8, as well as the children's reading achievement scores at this age. The fact that this study used a longitudinal design and included multiple types of measures from multiple informants (parental interviews, teacher ratings, objective achievement scores) gives particular weight to the results obtained.

Few studies have addressed the ways in which parental control versus autonomy-support affects the quality of the parent-child relationship itself, or other variables related to family functioning. Nevertheless, some studies have made some steps toward addressing this question. Assor, Roth, and Deci (2004) explored the link between college students' recollection of their parents' use of control and their own feelings toward them. Students were asked to report the extent to which their parents displayed conditional love and acceptance when they were children. The use of conditional positive regard is defined by SDT as a highly controlling behavior. The results indicated that the participants who perceived their parents as providing conditional positive regard during their childhood, also recalled experiencing high levels of parental disapproval, and feeling more resentment toward their parents during their childhood and adolescence. While these results suggest that the use of controlling parenting strategies could have a detrimental effect on the quality of the parent-child relationship, we should be cautious in drawing conclusions given that the

variables were all measured via retrospective adolescent reports. Retrospective accounts can be particularly vulnerable to biases. Furthermore, given that all variables were assessed using self-report measures, there is a potential risk of shared method variance.

Very few studies have directly explored the link between parental control versus autonomy-support and attachment. In a sample of female University students, La Guardia, Ryan, Couchman, and Deci (2000) explored the link between need satisfaction and security of attachment, as measured by the Inventory of Adolescent Attachments (Greenberg, 1982; Greenberg, Siegel, & Leitch, 1983) and Bartholomew and Horowitz's (1991) Relationship Questionnaire. They found greater satisfaction of the three psychological needs to be linked to greater security of attachment, as well as to more positive views of self and others. The need for autonomy and for competence continued to predict these variables even when the need for relatedness was partialed out. When considered independently, all three needs were also significantly associated with attachment security. It should be noted, however, that this study explored adult, rather than infant, attachment, and was not limited to the parent-child relationship. It should also be noted that given that all variables were self-reported, the associations could have been inflated by shared method variance. Clearly, although there is tentative evidence that autonomy-support may be related to attachment-based constructs, more research is needed to address the link between

parental autonomy-support and attachment with infants, preschool, and school-age children.

Finally, in the study discussed previously where Frodi et al. (1985) explored the link between maternal autonomy-support and infant mastery motivation, infant attachment was also assessed at both 12 and 20 months old using the Strange Situation procedure (Ainsworth & Wittig, 1969). Maternal autonomy-supportive versus controlling behaviors were not found to be related to infant attachment at any age. However, the authors noted that the analyses were conducted with small cell sizes, which could have significantly limited their statistical power. Furthermore, they noted that their sample did not show the expected stability in attachment classifications between the 12 month and 20 month assessments. Although the instability was not statistically significant, the authors cautioned that further analyses should be conducted including only the participants who evidenced stability in their attachment relationship with their mother. Such analyses were not possible in this study given the small cell sizes. The authors stressed the fact that their study should be considered as exploratory in nature, and they suggested that future research be conducted in this area.

*Antecedents of Parental Autonomy-Support*

While empirical data clearly highlights the existence of marked individual differences in parenting behaviors, further research is needed to elucidate the factors that may explain why some parents tend to adopt more controlling (and less

autonomy-supportive) behaviors than others toward their children. Previous research conducted by SDT theorists concerning the antecedents of parental autonomy-support has found that parents who are perfectionist (Flett, Hewitt, Oliver, & MacDonald, 2002) or achievement oriented (Pomerantz & Eaton, 2001), who feel anxious when they are apart from their children (Soenens, Vansteenkiste, Duriez, & Goossens, 2006), who hinge their self-esteem on their child's behavior (Grolnick, Price, Beiswenger, & Sauk, 2007), who have a strong fear of failure (Elliot & Thrash, 2004), and who lack trust in organismic development (Landry et al., 2008) tend to be less autonomy-supportive and more controlling than parents without these characteristics. Other antecedents that have been proposed include: economic hardship, stressful life events, and parents' orientation toward control or autonomy-support (Grolnick et al., 2002). It has also been suggested that certain children may tend to elicit, through their behavior, more control from their parents than others (Anderson, Lytton, & Romney, 1986).

Empirical evidence also suggests that interaction effects may occur between maternal personality and situational factors. In an experimental study with mothers and their school-age children, Grolnick and colleagues (2002) first determined each mother's individual tendency to control behavior or support autonomy based on their child's reports. Mothers were then asked to assist their children in completing certain tasks. The extent to which mothers were pressured regarding their child's performance (i.e., the level of maternal ego-involvement) was experimentally

manipulated. The results indicated that mothers who came in to the lab with a controlling tendency, and who were put in the high-pressure condition, were more controlling than all other mothers. Mothers who came in with a tendency to support autonomy were not affected by the pressure manipulation. Overall, these results suggest that there are individual differences in mothers' orientations toward control versus autonomy-support, and based on their orientation, some mothers may be more vulnerable than others to external pressures placed on them and their children. These mothers are more likely to become ego-involved in their children's performances, and thus more controlling. Given the importance of mothers' orientation toward autonomy-support versus control with respect to their vulnerability to situational pressures, these results lead us to wonder what factors explain these individual differences in maternal orientations.

Although we know that maternal orientations toward autonomy-support versus control influence the extent to which mothers behave in an autonomy-supportive versus controlling manner with their children, very little research has directly addressed the antecedents of these maternal orientations. However, SDT proposes that based on their early autonomy-supportive versus controlling experiences with their parents, children will develop generalized autonomy versus control-orientations, which will then in turn guide their behaviors with their own children (Ryan & Grolnick, 1986). One may thus speculate that autonomy-supportive and controlling parenting styles could be intergenerationally transmitted. Assor, Roth,

and Deci (2004) investigated the use of conditional positive regard (a behavior that is defined by SDT as controlling) over three generations. Their results indicated that mothers who reported that their parents displayed conditional positive regard when they were young, were themselves perceived by their daughters as adopting the same approach. While these results lend some support to the intergenerational hypothesis, more extensive research is required to fully address the question.

### *Conceptual Parallels*

Upon review of SDT literature, several conceptual parallels between SDT and attachment theory stand out. SDT notes that healthy development, intrinsic motivation, and well-being require the satisfaction of three basic psychological needs: competence, relatedness, and autonomy. Furthermore, SDT proposes that children have the opportunity to satisfy their needs for competence and autonomy when they are engaged in exploration within social contexts attuned to supporting these needs, while their need for relatedness is fulfilled through a secure attachment relationship with their caregivers (Grolnick, 2003). Thus, SDT recognizes that children have both attachment-related and exploration-related needs. In this sense, a clear parallel can be drawn between SDT and attachment theory. Attachment theory also highlights the importance of both exploration and attachment needs by defining security of attachment as a balance between the two (Weinfield et al., 1999).

However, SDT and attachment theory address the issue of infant exploration from slightly different perspectives. SDT notes that intrinsic motivation is more than

just simple exploration of the environment, it refers to facing challenges, producing effects, and seeking feedback. Thus, the theory emphasizes the quality more so than the quantity of exploration. SDT assesses child exploration within exploratory contexts such as free play situations or problem-solving tasks, and focuses on the parental behaviors within these contexts that specifically support or hinder the quality of child exploration (e.g. providing choice, perspective-taking, providing an optimal challenge, age-appropriate suggestions, solicited help, encouragement, etc). Attachment theory is primarily interested in the balance between infants' attachment and exploratory behaviors. The theory presumes that when infants are in need of comfort or protection, their attachment system is activated while their exploratory system is somewhat dormant, making them unavailable to engage in exploratory activities. Infants who through past experience with their caretakers have come to trust that their parents will be available to attend to their attachment needs, are thought to be more available to explore. Thus, attachment theorists are interested in the degree to which infants are available to explore their environments. Attachment theory therefore focuses on the parental behaviors that attend to infants' attachment needs, thereby providing them with a secure base from which to explore. One may reasonably propose that studying the parental behaviors that have been shown to foster infant exploration (Grolnick et al., 1984; Frodi, Bridges, and Grolnick, 1985) could be a parsimonious and potentially useful addition to the search for the precursors of security of attachment.

*Empirical Parallels*

While SDT and the field of attachment present very different empirical foci, their work could be complementary in many ways. SDT provides a clear theoretical framework within which to assess and understand parent-child interactions in the context of exploration. However, SDT is a relatively new field, thus many empirical questions have not yet been extensively explored. For instance, while SDT research places considerable focus on the child outcomes related to different parenting styles, few studies have explored the effects of parental behaviors on the quality of the parent-child relationship itself. Secondly, further investigation is needed to explore the parental, child, or environmental antecedents of autonomy-supportive versus controlling parenting styles. While a possible intergenerational transmission of parental orientations towards autonomy-support has been hypothesized, this question has not been extensively investigated. It is also noteworthy that the field has not yet allotted a great deal of empirical attention to parental behaviors toward infants. Most of the research pertains to school-age children.

The field of attachment has conducted most of its work with infant populations. Furthermore, the field has long adopted an intergenerational perspective. Maternal sensitivity has been extensively studied as a mediator of the intergenerational transmission of attachment patterns. However, attachment researchers recognize the fact that in order to fully understand the mechanisms underlying this process, the field must broaden its approach to include other maternal

behaviors. De Wolff and van IJzendoorn (1997) conducted a meta-analytic study including a wide range of maternal behaviors shown to be related to infant attachment. They found that several maternal behaviors that were clearly conceptually distinct from maternal sensitivity yielded similar effect sizes. However, the maternal behaviors were not necessarily assessed within an exploratory context designed to activate the child's exploratory system.

As mentioned previously, certain researchers have stressed the need to attend to the exploration side of the attachment-exploration balance and assess parental behaviors in the context of infant exploration (Grossmann et al., 1999). While some attachment research has addressed parental exploration-related behaviors (Matas, Arend, & Sroufe, 1978), the field still presents few operational definitions or measures of these behaviors (Grossmann et al., 1999). Furthermore, the field of attachment has not yet conducted studies in which parental behaviors are independently assessed both within contexts where the infant's attachment system is activated and within contexts where the exploration system is activated. In order to fully capture the mechanisms through which attachment patterns are formed, it appears reasonable to assume that we must consider both sides of the attachment-exploration balance and assess parental behaviors related to both sides. Furthermore, we might benefit from striving to create a fit between the type of parental behavior assessed and the context within which it is measured. While maternal sensitivity is best assessed in a context where the child's attachment system is activated, parental

behaviors thought to affect infant exploration should be assessed within a context thought to activate the infant's exploration system (see figure1).

SDT is particularly well-suited to inform the exploration side of the attachment-exploration balance. It provides a framework within which parental behaviors related to child exploration are clearly defined and operationalized. Furthermore, SDT research has already linked these parental behaviors to a variety of important child outcomes, including the quality of infant exploration. Thus, SDT presents a clear theory-driven framework to assess parental behaviors toward their children in exploratory contexts.

### *Methodological Parallels*

SDT and attachment theory go about the study of parent-child interactions employing very different, yet complementary methodologies. SDT theorists note that it is the functional significance, or meaning, attributed to specific controlling versus autonomy-supportive events in a given interpersonal context that affect children, not the event itself (Ryan & Grolnick, 1986; Ryan, Mims, & Koestner, 1983). Thus, it is the child's perception of the environment as controlling or autonomy-supportive that is crucial. While some SDT studies use observational measures, most tend to use paper-and-pencil measures, which have the advantage of tapping into children's perceptions of parental behaviors. However, these types of measures also introduce certain biases. If they were taken together with more objective observational assessments of parental behaviors, a more complete picture would likely emerge.

Furthermore, paper-and-pencil measures are not very well-suited for studies conducted with infants or preschoolers who are not of age to fill out paper-and-pencil measures. When conducting studies with young children, observational measures could be particularly useful in that they assess not only parental behaviors, but also the context within which they take place, i.e. the significance of these behaviors given the specific context.

In the field of attachment, interview and observational measures are the instruments of choice. However, the field has developed few measures of parental behaviors in the context of exploration. Although SDT measures have mostly been developed for school-age children, SDT has extensively operationalized these parental behaviors and has thus laid the groundwork for observational measures. In fact, Grolnick and colleagues (1984) have developed an observational measure of parental autonomy-support and control in the context of infant exploration, thus suggesting that these concepts can readily be assessed during infancy via observational measures.

SDT often conducts controlled experimental studies thus enabling researchers to consider causal links. The field of attachment rarely conducts such studies thus limiting the extent to which causality can be addressed. On the other hand, given that SDT is a relatively new field, few studies present prospective or longitudinal designs, thus limiting the extent to which mediation and moderation models can be tested. Many attachment studies are longitudinal, thus permitting researchers to explore the

changes in parent-child interactions through time, the intergenerational transmission of behavioral patterns, and the antecedents of various parental behaviors, in addition to allowing for the examination of theoretical models. Possible mediating and moderating variables are often considered. In sum, attachment theory could benefit from SDT's use of experimental designs, while SDT could gain from attachment theory's longitudinal designs.

## Conclusion

Given the numerous parallels that can be drawn between attachment theory and SDT, it appears clear that these two fields could complement one another in many ways, and thus benefit from collaborative work combining both theoretical perspectives. The field of attachment is renowned for its longitudinal designs as well as its use of rigorous observational measures of both child and parental behaviors. Traditional attachment studies explore the intergenerational transmission of attachment patterns as well as several factors proposed to mediate (e.g., Pederson et al., 1998) or moderate (e.g., Atkinson et al., 2005) the transmission. While the field has dedicated a great deal of its empirical work to the study of maternal sensitivity, it has become apparent that in order to fully understand the intergenerational transmission of attachment, additional maternal behaviors must be considered. Grossmann et al. (1999) have pointed to the fact that maternal behaviors in the context of child exploration have been somewhat overlooked, and could potentially prove to be very informative. A promising area for future research would be to

explore parental autonomy-supportive versus controlling behaviors, as defined by SDT, as a potential predictor of infant security of attachment. The field of attachment would thus benefit from an elaborate theoretical framework where the quality of exploration is clearly defined and operationalized, as are the parental behaviors that support or hinder it. Maternal autonomy-support could then be assessed in contexts where the infant's exploration system is activated, such as a challenging task unlikely to activate the attachment system. Taken together with the study of maternal sensitivity within contexts where the attachment system is activated, this theory-driven approach to understanding the exploration side of infant security of attachment may prove to be useful in narrowing the transmission gap, thus contributing to solve one of the great challenges of contemporary attachment research.

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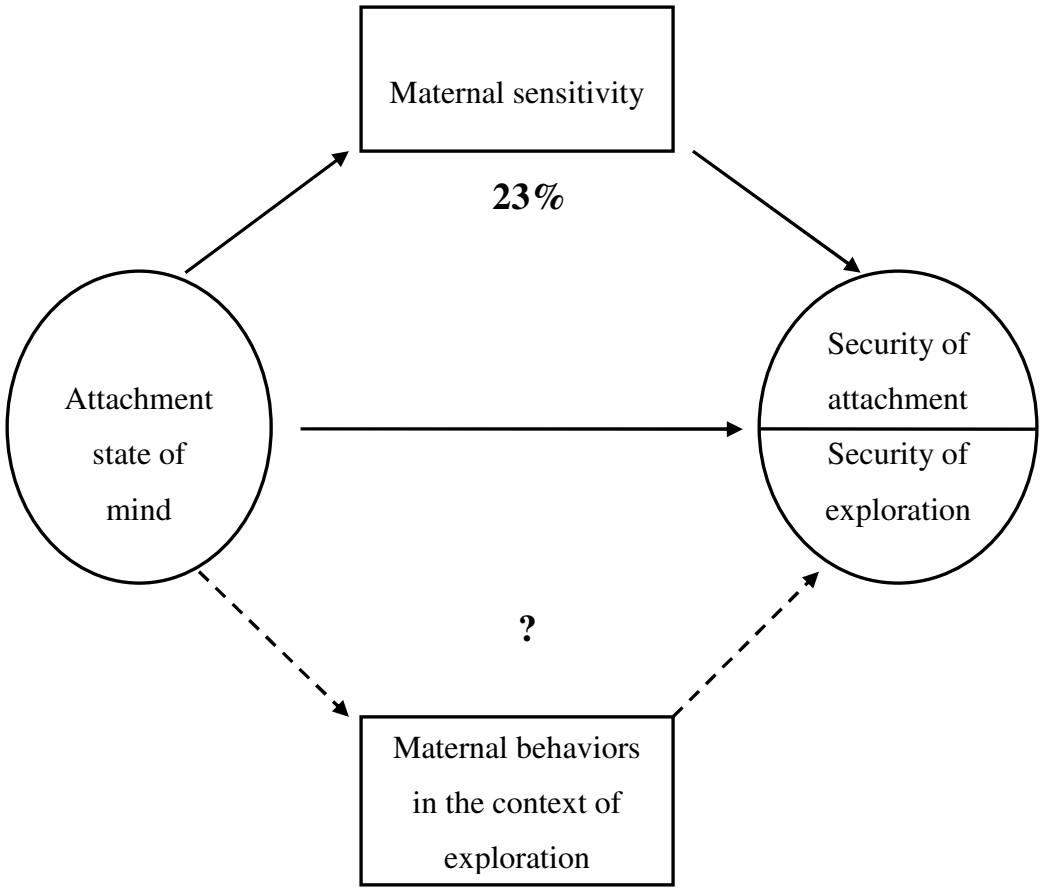
Figure Captions

*Figure 1.* Schematic representation of the proposed role of parental autonomy-support in narrowing the transmission gap.



# Article 2

Broadening the study of infant security of attachment: Maternal autonomy-support in the context of infant exploration

# Broadening the study of infant security of attachment:

# Maternal autonomy-support in the context of infant exploration

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## Abstract

While security of attachment is conceptualized as a balance between infants' attachment and exploratory behaviors, parental behaviors pertaining to infant exploration have received less empirical attention. Drawing from self-determination theory, this study seeks to improve the prediction of infant attachment by assessing maternal autonomy-support during infant exploration, in addition to maternal sensitivity. Seventy-one dyads participated in two home visits. Maternal sensitivity was assessed when the infants were 12 months old, while maternal autonomy-support and infant attachment were assessed at 15 months. The results revealed that autonomy-support explained an additional portion of the variance in attachment when maternal SES and sensitivity were controlled. These results speak to the relevance of a theory-driven approach to examining maternal behaviors in the context of child exploration.

## Broadening the study of infant security of attachment:

## Maternal autonomy-support in the context of infant exploration

One of the greatest challenges currently facing the field of attachment is to improve our understanding of the mechanisms underlying the development of infant security of attachment. Indeed, three distinct meta-analyses have suggested that maternal sensitivity to infants' attachment needs, the putative main precursor of infant attachment, accounts for only a moderate portion of the variance in attachment security (Atkinson et al., 2000a; De Wolff & Van IJzendoorn, 1997; Goldsmith & Alansky, 1987). Several authors have thus highlighted the need to explore other maternal behaviors likely to contribute to the development of infant attachment. Given that secure attachment is defined as an appropriate balance between proximity-seeking and competent exploration, Grossmann, Grossmann, and Zimmermann (1999) underscore the importance of attending to parental behaviors in exploratory contexts as well as attachment contexts. Working in this direction, some attachment studies focusing on parental exploration-related behaviors have highlighted the importance of these parental behaviors in understanding the development of infant security of attachment (e.g., Matas, Arend, & Sroufe, 1978). However, few studies have included parental behaviors in both contexts of exploration and attachment in order to assess their interplay in explaining infant attachment. Using a theory-driven approach, the present study aims to further operationalize parental behaviors in the context of infant exploration by drawing from a field of research that directly

addresses exploration-related parental behaviors, such as self-determination theory (SDT; Deci & Ryan, 2000). Furthermore, this study aims at assessing maternal behaviors related to each side of the attachment-exploration balance with the goal of improving the prediction of infant security of attachment.

*Infant attachment security and maternal sensitivity*

Empirical research has convincingly shown that parent-infant attachment plays a key role in subsequent psychosocial and behavioral child outcomes (Thompson, 1999; Weinfield, Sroufe, Egeland, & Carlson, 1999). For instance, at various ages, children with secure attachment histories have been found to display less dependency, more ego-resilience and persistence, as well as more goal-directed and achievement-oriented behaviors. They have also been found to exhibit more social competence and empathy. In contrast, children with resistant attachment patterns have been found to be more prone to anxiety problems, while children with avoidant or disorganized attachment patterns have been shown to be more hostile and aggressive with their parents and peers (Thompson, 1999; Weinfield et al., 1999). Furthermore, longitudinal studies suggest that early attachment continues to be associated with personal adjustment in adolescence and early adulthood (see Grossmann, Grossmann, & Waters, 2005). Given the importance of infant attachment for future adjustment, attachment researchers have long been striving to acquire a fuller understanding of the ways in which attachment patterns are formed.

Thus far, most of the research conducted has focused on maternal sensitivity to infants' attachment needs, i.e., a mother's ability to respond to her infant's needs promptly and appropriately. However, in recent years, it has become clear that maternal sensitivity may not suffice in fully explaining the development of infant attachment patterns. A classic meta-analytic study showed that maternal sensitivity accounts for only 23% of the intergenerational transmission of attachment patterns, and thus cannot fully explain the correspondence between parents' and their infants' attachment patterns (Van IJzendoorn, 1995). The author argued that the unexplained common variance may be due to the fact that the existing measures of maternal interactive behavior do not capture all of the relevant aspects of parent-child interactions likely to favor security of attachment (Van IJzendoorn, 1995).

In a subsequent meta-analysis, De Wolff and Van IJzendoorn (1997) explored the relevance of different parental behaviors in shaping infant attachment. The authors found that several maternal behaviors that are conceptually distinct from maternal sensitivity yielded comparable effect sizes in the prediction of infant security of attachment. They therefore stressed the need to adopt a broader multidimensional approach to the study of infant attachment, where several maternal behaviors are considered (De Wolff & van IJzendoorn, 1997). Two other meta-analyses yielded similar conclusions, finding that the link between maternal sensitivity and infant attachment is robust, but smaller in magnitude than what was originally thought (Atkinson et al., 2000a; Goldsmith & Alansky, 1987).

Furthermore, this finding holds true even when using extensive home-based assessments of sensitivity (e.g., Pederson, Gleason, Moran & Bento, 1998; Raval et al., 2001; Tarabulsy et al., 2005). It thus appears potentially useful to follow De Wolff and van IJzendoorn's suggestion, and study a broader diversity of parental behaviors in addition to maternal sensitivity. However, in order to yield meaningful results, it seems critical that the search for other precursors of attachment be theoretically driven. Furthermore, Grossmann and colleagues (1999) propose that in addition to addressing a wider variety of maternal behaviors, we should also broaden the contexts within which we observe these behaviors. Specifically, they suggest that infant attachment be studied in the breadth with which the concept was originally defined by attachment theory.

Attachment theory posits that infants are equipped with two distinct, yet inseparably linked, behavioral systems: the attachment and the exploratory system (Bowlby, 1982). Ainsworth (1985) stated 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. In assessing infant attachment, it is therefore key to focus on this balance rather than focusing solely on the infant's comfort-seeking behaviors (Weinfield et al., 1999). Along these lines, Thompson (1999) proposes that infants' experiences with their caregivers provide answers to two questions, both equally central: "What do others do when I am upset?"; and "What happens when I venture to

explore?" (Thompson, 1999, p. 282). Thus, one may propose that in addition to maternal sensitivity to infants' emotional needs for comfort and protection, maternal behaviors aimed at providing appropriate support and challenge to the child with respect to his or her exploratory activities are also important in shaping the development of infant security of attachment (Grossmann et al., 2002).

It is generally postulated that a mother's sensitivity to her child's distress also fosters competent exploration by providing the child with a sense of trust in the fact that the attachment figure will be available should a threat arise during exploration. Although this undoubtedly influences child exploration, it seems reasonable to propose that parental behaviors aimed specifically at enhancing the child's confidence in the context of exploration may also contribute to the exploration side of attachment security. Matas et al. (1978) assessed maternal behaviors toward their 2-year old children during a problem-solving task. Maternal behaviors were rated on two scales, reflecting the extent to which mothers were involved and attentive to their children while helping them feel comfortable with the task; and the quality of assistance they provided, i.e., the extent to which they gave their children enough assistance to stay focused on the task without solving it for them. These maternal behaviors were found to differentiate children previously identified as presenting secure versus insecure attachment patterns during the Strange Situation assessment conducted six months prior, at 18 months of age.

Despite these noteworthy findings, and the more recent call for increased attention to be paid to a broader range of maternal behaviors, very few attachment studies have independently assessed both maternal behaviors within contexts where the infant's attachment system is activated and within contexts where the exploration system is activated. Thus, to our knowledge, no studies have disentangled the relative contributions of maternal behaviors pertaining to each side of the attachment-exploration balance in predicting infant security of attachment. With the goal of building on the work of Matas et al. (1978), and in keeping with Bowlby's eclectic tradition, the current study draws from Self-determination theory (SDT; Deci & Ryan, 2000), which is particularly well-suited to inform the exploration side of the attachment-exploration balance. SDT provides a theory-driven framework within which parental behaviors related to child exploration are clearly defined and operationalized, and they have already been linked to a variety of important child outcomes, including the quality of infant exploration.

*Self-Determination Theory (SDT)*

SDT posits that children naturally explore their environments, striving to acquire new skills, seek challenges, and extend themselves (Ryan & Deci, 2000). This ongoing process is referred to as *intrinsic motivation*, which is defined as the "innate propensity to explore and master one's internal and external worlds" (Ryan, Connell, & Grolnick, 1992, p.170). Infant exploration is probably one of the purest expressions of intrinsic motivation. However, while infants are thought to be innately

inclined to explore and seek challenge, SDT theorists caution that this natural tendency does not take place automatically, regardless of context (Deci & Ryan, 2002). Instead, SDT proposes that individuals will be most intrinsically motivated when the environment supports their need for autonomy, rather than controlling their behavior. Autonomy, as defined by SDT, is not synonymous with independence. In certain fields of study, the term autonomy-support (or encouragement of autonomy; e.g., Meins, Fernyhough, Fradley, & Tuckey, 2001) is used to describe parental behaviors aimed at encouraging children to do things by themselves without parental assistance. In contrast, SDT uses the term autonomy-support to refer to parental behaviors aimed at supporting children's goals, interests, choices, and sense of volition rather than controlling their behaviors (Grolnick & Ryan, 1989, p. 144). When adults 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 appropriate assistance given the child's abilities (Grolnick, Gurland, DeCourcey, & Jacob, 2002).

A substantial array of empirical work has established a clear link between autonomy-support and intrinsic motivation (for reviews see Deci, Koestner, & Ryan, 1999; Grolnick, 2003; Mageau & Vallerand, 2003). For example, Grolnick, Frodi, and Bridges (1984) investigated the way in which mothers' autonomy-supportive

versus controlling behaviors toward their 12 month-old infants affected the latter's motivation to explore the environment. They found that mothers who displayed overt autonomy-supportive behaviors had infants who were more persistent during play (i.e., spent more time engaging in appropriate task-related behaviors). Frodi, Bridges, and Grolnick (1985) followed up this sample of mother-infant dyads eight months later when the infants were 20 months old. Maternal autonomy-support and infant mastery motivation (exploration) were reassessed at this time, and were once again found to be inter-related. Specifically, maternal autonomy-support toward 20-month-old children was found to relate to greater child persistence and competence. Maternal autonomy-support scores remained stable between the 12-month and the 20-month assessments.

In addition to the link between autonomy-support and intrinsic motivation, an important body of empirical work has also established links between parental autonomy-support and a number of child outcomes throughout various stages of child development. For instance, parental autonomy-support has been found to relate to children's academic achievement (Grolnick & Ryan, 1989; Joussemet, Koestner, Lekes, & Landry, 2005), social adjustment (Joussemet et al., 2005), popularity with peers (Avery & Ryan,1988), acting out problems (Grolnick & Ryan, 1989; Joussemet et al., 2008), perceived self-worth and self-competence (Avery & Ryan,1988), as well as child well-being and life satisfaction (Chirkov & Ryan, 2001). However, very few studies have directly explored the link between parental autonomy-support and

attachment. Frodi et al. (1985) examined the association between maternal autonomy-support and infant attachment at both 12 months and 20 months. Maternal autonomy-supportive behaviors were not found to relate to infant attachment at any age. However, the authors noted that the analyses were conducted with small cell sizes, which could have significantly limited their statistical power. Furthermore, they noted that their sample did not show the expected stability in attachment classifications between the 12-month and 20-month assessments. The authors thus cautioned that their study should be considered as exploratory in nature, and they suggested that future research be conducted in this area. More research is thus needed to further investigate the link between autonomy-support and security of attachment.

*The present study*

The present study aims at assessing maternal behaviors in both attachment and exploratory contexts. Both maternal sensitivity and maternal autonomy-support were assessed in order to explore their unique and combined associations with infant attachment. As postulated by attachment theory, it was hypothesized that maternal sensitivity would be significantly linked to infant security of attachment. It was further predicted that maternal autonomy-support would explain an additional, and distinct, portion of the variance of security of attachment. We assessed sensitivity with the Maternal Behavior Q-Sort (Pederson & Moran, 1995), which meta-analytic data have shown to hold high predictive power with respect to attachment (Atkinson et al., 2000b). Using an assessment of sensitivity with strong predictive validity

constitutes an especially stringent test of the hypothesis that autonomy-support *adds* to the prediction of attachment above and beyond the contribution of sensitivity.

## Method

### *Participants*

Seventy-one upper-middle class mother-infant dyads (37 girls and 34 boys) living in a large Canadian metropolitan area participated in this study. Mothers were predominantly Caucasian (80% of the sample) and French-speaking (82 % of sample). They had a mean age of 30.8 years (*SD*= 4.5). On average, they had 15 (*SD*= 2.4) years of formal education and their family income ranged from under 20,000 $ to above 100,000$ (CDN). All but seven mothers were married to, or living with, the child's father at the time of data collection.

### *Measures*

*Maternal socioeconomic status.* Information pertaining to mothers' socioeconomic status was obtained using a self-report questionnaire where mothers were asked to provide socio-demographic information such as their level of education and their family income. Given the high correlation ($r$ = .65) between maternal education and family income, these two variables were centered and averaged, yielding a global index of maternal socioeconomic status (SES).

*Maternal sensitivity.* Maternal sensitivity was assessed when infants were 12 months of age, using the Maternal Behavior Q-Sort (MBQS; Pederson & Moran, 1995). The MBQS 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. Items in the first pile are those that are least representative of the mother under study, and they are given a score of *1*. Items in the ninth pile are those that are most representative of the mother under study and they receive a score of *9*. Items in the second pile receive a score of *2*, and so on. The observer's 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 thus vary from -1= *least sensitive* to 1 = *prototypically sensitive*. In the present study, the MBQS scores are based on observations made throughout a 90-minute home visit when the infants were 12 months old. Inter-rater reliability was conducted for 20% (n = 14) of the dyads and was found to be .85 (intra-class coefficient).

The development of the MBQS is anchored in attachment theory, more specifically in the descriptions of sensitivity and responsiveness provided by Ainsworth and her colleagues (1974; 1978). Pederson, Moran and their colleagues (Pederson et al., 1990, 1998; Pederson & Moran, 1995; Tarabulsy, Avgoustis, Phillips, Pederson, & Moran, 1997) have provided detailed validity and reliability information. The MBQS is significantly correlated with other assessments of maternal behavior, such as the HOME Inventory (Caldwell & Bradley, 1978) and the Ainsworth scales 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 (Atkinson et al., 2000b). In fact, the MBQS presents twice the predictive validity with respect to attachment than that offered by brief free-play sequences (Atkinson et al., 2000b).

*Maternal autonomy-support.* Mother-infant dyads were asked to complete a challenging problem-solving task (puzzle) together at T2. Based on the videotapes of these interactions, maternal behaviors were coded on four scales ranging from 1=*not autonomy-supportive* to 5=*extremely autonomy-supportive*. The four scales were developed based on Grolnick et al.'s (1984) rating system. In their system, Grolnick et al. (1984) coded maternal behaviors along two scales: verbal and non-verbal behaviors. In the current study, we further categorized these scales into four distinct categories that specifically reflect the behaviors implied by the definition of autonomy-support (Grolnick & Ryan, 1989, p. 144), as well as those explicitly proposed in previous SDT studies (e.g., Grolnick et al., 2002). The four scales included the extent to which the mother (1) intervenes according to the infant's needs, and adapts the task to create an optimal challenge for the child; (2) encourages her child in the pursuit of the task, gives useful hints and suggestions, and uses a tone of voice that communicates to the child that she is there to help; (3) takes her child's perspective and demonstrates flexibility in her attempts to keep her child on task; (4) follows her child's pace, 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

inter-correlations between the four scales (ranging from .51 to .82), the four scales were averaged to obtain a total autonomy-support score ($\alpha$ = .89). All videotapes were coded by the first author of this report, and 38 of the 71 interactions were also coded by a second independent observer. Intra-class correlation between coders for the total autonomy-support score showed very satisfying inter-rater agreement, *ICC* = .86.

*Infant security of attachment.* Infant security of attachment was measured when infants were 15 months old, using the Attachment Behavior Q-set (AQS; Waters, 1995). The AQS is comprised of 90 items describing potential infant behaviors. As with the Maternal Behavior Q-sort, following a home visit, an observer sorts 90 items describing potential infant behaviors into nine piles based on the degree to which each item reflects the infant under observation. Each cluster of items receives a score from 1= *least representative of infant* to 9 = *most representative of infant*. The observer's sort is then correlated with a criterion sort provided by the developers of the instrument. Like sensitivity scores, attachment scores thus vary from -1= *most insecure* to 1= *prototypically secure*. In the present study, AQS scores were based on observations performed throughout a 90-minute home visit. Inter-rater reliability was conducted for 21% (n = 15) of the dyads and was found to be .88 (intra-class coefficient). Meta-analytic data (Van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004) suggest that the observer-AQS shows excellent construct validity, with attachment scores converging with maternal

sensitivity, attachment security assessed with Ainsworth's Strange Situation procedure, and child socio-emotional adaptation.

*Procedure*

This project is part of a larger longitudinal study on early parent-child relationships and children's developmental pathways. Participating families were recruited randomly through birth lists provided by the Ministry of Health and Social Services. Criteria for participation were full-term pregnancy, and the absence of a severe developmental delay. Two in-home visits lasting about 90 minutes each were conducted when the infants were 12 months old (T1) and 15 months old (T2). Prior to the first visit, mothers had completed a questionnaire aimed at collecting socio-demographic information [1]. Both T1 and T2 home visits were modeled after the work of Pederson and Moran, and aimed at challenging the mother's capacity to divide her attention between several competing demands, thus reproducing the natural conditions of daily life when caring for an infant. The home-visit protocol was thus purposely designed to create a situation where maternal attention was being solicited by both the research tasks and the infant's demands, which placed the dyad in a challenging situation, likely to activate both the infant's attachment system and the mother's caregiving system.

In order to maximize the reliability of the observations performed during the home visits, we followed Pederson and Moran's recommendations for training our home visitors. Research assistants first attended a two-day training workshop

consisting of seminars related to 1) early mother-infant interactions, 2) behavioral observation and 3) techniques of home visiting. Furthermore, during the workshop, they reviewed several videotapes of mother-infant interactions in order to practice coding the MBQS and the AQS. After the training workshop, the assistants performed their first few home visits with a more experienced colleague, and they completed the MBQS or the AQS together. When the junior home visitors were ready to lead a home visit without the assistance of a colleague, the visits were followed by a debriefing session either with the P.I. or with an experienced graduate student, in order to review the salient elements of the visit before scoring the MBQS or the AQS.

During the first visit, mothers were asked to complete a series of tasks (questionnaires, interview, etc.) aimed at creating a situation where they would have to divide their attention between the research tasks and their infant's needs or bids for attention. Maternal sensitivity was assessed with the MBQS based on observations made during this visit. During the second visit, mothers were asked to help their children complete a problem-solving task (puzzle task) that was designed to be slightly too difficult for the infants, such that they would require some adult assistance to complete it. This interaction was videotaped and later coded for maternal autonomy-supportive behaviors. During this visit, mothers were also asked to engage in various research tasks aimed at keeping them occupied throughout the visit so that the research assistant could observe the infant's attachment behaviors in the context of limited maternal availability. Infant attachment was assessed with the

AQS based on observations made during this second visit. Observers in charge of infant attachment assessments did not participate in the coding of autonomy-support and in fact, most of them were not familiar with the concept and its measurement. Autonomy-support coders were blind to attachment scores, and to any aspect of the home visit that was not part of the videotaped sequence.

## Results

### *Preliminary Analyses*

Maternal autonomy-support scores ranged from 1.0 to 5.0, with a mean of 3.5 (*SD* = 1.1). Maternal sensitivity scores ranged from -.60 to .86, with a mean of 0.59 (*SD* = .34). Finally, scores for infant security of attachment ranged from -.29 to .82, with a mean of 0.46 (*SD* = 0.27). All three main variables thus presented satisfying variability. No gender differences were found for maternal sensitivity, infant attachment or maternal autonomy-support. Zero-order correlations were conducted to examine whether any of the main variables were related to maternal SES. Maternal sensitivity ($r$ =.32, $p < .01$), maternal autonomy-support ($r$ =.25, $p < .05$), and infant security of attachment ($r$ =.31, $p < .01$) were all significantly related to maternal SES. Given these results, maternal SES will be entered as a covariate in the main regression analysis.

### *Main Analyses*

Table 1 presents the bivariate correlations between the three main variables under study: maternal sensitivity, maternal autonomy-support, and infant security of

attachment. As expected, maternal sensitivity was significantly linked to infant security of attachment ($r$ = .33, $p$ < .01). In line with our hypotheses, maternal autonomy-support was also significantly linked to infant security of attachment ($r$ = .32, $p$ < .01). Maternal autonomy-support and maternal sensitivity were not significantly related, thus suggesting that they refer to two distinct maternal behaviors.

Infant security of attachment was submitted to a hierarchical regression analysis wherein maternal SES was entered in the first block, followed by maternal sensitivity in the second block, and maternal autonomy-support in the third block (see Table 2). The overall model was significant, $F(3,69) = 5.67$, $p < .01$, explaining 21% of the variance of security of attachment. Maternal SES accounted for 10% of the variance of infant attachment. Maternal sensitivity accounted for 6 % of the variance of infant security of attachment when maternal SES was controlled, and maternal autonomy-support explained an additional and unique 5% of the variance above and beyond maternal SES and maternal sensitivity. Results show that infants who have sensitive ($\beta$ = .23, $p$ < .05) and autonomy-supportive ($\beta$ = .23, $p$ < .05) mothers tend to display higher security of attachment. Both maternal behaviors thus significantly contribute to infant security of attachment.

The regression analysis presented above represents a very empirically stringent test of our hypothesis that maternal autonomy-support adds to the prediction of security above and beyond the contribution of sensitivity, given that it also partials

out the common variance between SES and the three main constructs. However, for the purpose of theoretical clarity, we also ran a hierarchical regression analysis without including maternal SES, which examined the unique contribution of autonomy-support in the prediction of attachment, after accounting for sensitivity. Although less empirically rigorous, this model complements the previous one because it is closer to the central theoretical question, and closer to the manner in which links between sensitivity and attachment are usually reported in attachment studies. The analysis reveals that, if SES is not partialled out, sensitivity account for 10.8% ($p < .01$) of the variance of infant attachment, while autonomy-support explains an additional and unique 7.2% ($p < .05$) of the variance above and beyond maternal sensitivity.

## Discussion

Infants' experiences with their caregivers provide answers to two questions, both equally central: "What do others do when I am upset?"; and "What happens when I venture to explore?" (Thompson, 1999, p. 282). It has been suggested that in order to fully capture the mechanisms through which attachment patterns are formed, one should focus on the maternal behaviors related to both sides of the attachment-exploration balance that defines infant security of attachment (Grossmann et al., 1999). In contrast to the quality and quantity of work that has been devoted to refining the operationalization and measurement of maternal sensitivity to infants' attachment needs, the field of attachment has not yet developed a clear theoretical

framework from which to assess maternal behaviors related to infant exploration. The purpose of this report was to introduce a theory-driven approach to addressing maternal behaviors in the context of infant exploration, and assess whether these behaviors are related to infant security of attachment. Furthermore, given that few attachment studies have included maternal behaviors related to *both* sides of the attachment-exploration balance, this study aimed at assessing both maternal sensitivity and maternal autonomy-support in their respective contexts, in order to compare their relative contributions to the prediction of infant attachment. Results showed that maternal sensitivity predicted infant security of attachment, and maternal autonomy-support made a significant independent contribution to the prediction of infant attachment above and beyond maternal sensitivity. Specifically, maternal sensitivity was significantly linked to infant attachment, explaining 6% of the variance when maternal SES was controlled and 11% of the variance when maternal SES was not controlled. These results are not surprising given that the association between maternal sensitivity and infant attachment has already been clearly established across numerous attachment studies. The association found in this study ($r$ = .33) is comparable to what has been documented in classic meta-analytic reviews ($r$ =.24 in De Wolff & Van Izendoorn, 1997; $r$ = .32 in Goldsmith & Alansky, 1987).

Maternal autonomy-support was also found to be significantly related to infant security of attachment, explaining 7% of the variance above and beyond maternal sensitivity, and 5% of the variance when both maternal SES and maternal

sensitivity were controlled. The results thus suggest that maternal autonomy-support explains a unique portion of the variance of infant attachment that is comparable in magnitude to what can be explained by maternal behaviors related to infants' attachment needs. Results also revealed that maternal sensitivity and autonomy-support were not related, which lends further support for the premise that they are two separate concepts that may influence infant behavior in different ways. Taken together, these findings lend some support to the idea put forth by Grossmann et al. (1999) who suggested that studying maternal behaviors related to infant exploration may add to our current understanding of the mechanisms through which attachment patterns are formed.

Some attachment studies have addressed the exploration side of the attachment-exploration balance in various ways. For instance, certain early attachment studies addressed the link between infant security of attachment and the quality of infant exploration (e.g., Belsky, Garduque, & Hrncir, 1984). Other studies, like the present study, have specifically focussed on parental behaviors in the context of exploration, and have found them to be linked to infant security of attachment or the quality of child exploration (for a review see Grossmann, Grossmann, Kindler, & Zimmermann, 2008). However, in many of these studies, the investigators were interested in parental *sensitivity,* but in the context of exploration. During exploration, children are often faced with stimuli or challenges that may elicit fear, wariness, or distress thus activating the attachment system; previous studies were interested in

parental sensitivity in response to their child's distress in these types of situations (e.g., Grossmann & Grossmann, 1991; Grossmann & Grossmann, 1993). In the present study, we were interested in maternal behaviors specifically aimed at supporting the infant's exploration system, thus building on the work of Matas et al. (1978), as well as Grolnick et al. (1984). The current findings converge with those reported by Matas and colleagues in highlighting the relevance of maternal behaviors in the context of infant exploration with respects to our understanding of attachment security.

Furthermore, while many attachment studies have explored the links between various types of maternal behaviors and infant attachment (for a review see De Wolff & Van IJzendoorn, 1997), very few have explored whether these behaviors make an independent contribution to the prediction of infant attachment when maternal sensitivity, as defined in the Ainsworth tradition, is controlled. Given that maternal sensitivity explains a substantial portion of the variance of infant security of attachment, coupled with the great care that went into assessing sensitivity in the present study, this report presents a particularly stringent test of the links between maternal autonomy-support and infant attachment by controlling for the contribution of sensitivity. The results thus present a first step toward addressing the exploration side of the attachment-exploration balance in a theory-driven manner.

While this study presents an initial step toward a wider view of infant attachment, future studies are needed to replicate the findings and address certain

shortcomings. For instance, infant security of attachment was assessed at the same age as maternal autonomy-support, whereas maternal sensitivity was measured three months earlier during a previous home visit. This methodological consideration may have favoured the additional contribution of autonomy-support to the prediction of infant attachment. However, the fact that attachment and autonomy-support were assessed by independent observers contributes to weakening the concern that shared method variance would account for their inter-relation. Furthermore, the weak and non-significant link between sensitivity and autonomy-support suggests that the latter is not simply another form of sensitivity that owes its unique link to attachment to the fact that it was assessed at the same age. The non-significant correlation between sensitivity and autonomy-support rather suggests that they are conceptually distinct behaviors that relate to different portions of the variance in attachment security. We are aware of very few studies that have examined the short-term stability of maternal sensitivity. However, in one recent, carefully conducted study using the same sensitivity measure as that used in the current study, Tarabulsy and colleagues (2005) found moderate and highly significant stability of maternal sensitivity over a longer (4 months) period of time ($r = .42$, $p < .01$), and with a high-risk sample (adolescent mothers and their infants). Given the low-risk nature of our sample, which makes for greater stability, this suggests that the non-significant correlation between autonomy-support and sensitivity probably reflects a conceptual distinction rather than sheer temporal variation. However, there is no doubt that future studies are needed where

sensitivity and autonomy-support are assessed in methodologically equivalent contexts in order to clarify the exact magnitude of their respective contributions to infant attachment when methodology can clearly be ruled out as an alternate hypothesis.

Therefore, given the design used here, the clearest contributions of this study are (1) the clear and theory-driven operationalization of maternal behaviors in the context of infant exploration, and (2) the demonstration that such behaviors relate to infant attachment, assessed concurrently but independently, even after partialling out the portion of infant attachment that was already predicted by maternal sensitivity and SES. However, the unambiguous demonstration that autonomy-support adds, in a causal way, to the prediction of infant attachment beyond the contribution of maternal sensitivity, awaits further research assessing sensitivity and autonomy-support concurrently, and infant attachment subsequently.

Finally, the AQS does not assign attachment classifications as does the Strange Situation procedure, and thus does not allow for a distinction between the different types of insecure attachment, which are characterized by different exploration-proximity seeking imbalances. Given that children presenting ambivalent attachment patterns are characterized by hyperactivation of attachment behaviors and underactivation of exploratory behaviors, it is possible that maternal autonomy-support be particularly useful in distinguishing secure and ambivalent infants. Future

research using the Strange Situation procedure to measure attachment is thus needed to explore these questions.

Despite these limitations, the present study presents many theoretical implications. Given the importance of infant attachment for future child adjustment, it is critical to move toward a greater understanding of the ways in which attachment patterns are formed. Maternal sensitivity has already been established as an important and reliable predictor, but it is increasingly clear that it is not the only key variable involved. Grossmann et al. (1999) have suggested that addressing the exploration side of the attachment-exploration balance may inform some of the current gaps in our understanding of the development of infant attachment. The present study introduces work from another field of research, one that has extensively studied maternal exploration-related behaviors, and thus presents a theory-driven framework from which to address mother-infant interactions within an exploratory context. Furthermore, given that both maternal sensitivity and maternal autonomy-support were assessed within their respective contexts, the present study presents a rigorous test of the ideas put forth by Grossmann et al. (1999). Both maternal sensitivity and autonomy-support were found to significantly and independently predict infant attachment, thus lending support for the idea that maternal behaviors related to both sides of the attachment-exploration balance play a unique role in the development of infant attachment. While maternal sensitivity most likely contributes to the quality of infant exploration by providing the infant with a secure base from which to explore, it

appears that maternal behaviors directly aimed at supporting the child while he or she explores provide an additional contribution. Maternal autonomy-support could thus be a promising candidate to help narrow the so-called attachment transmission gap (Van IJzendoorn, 1995), which remains one of the greatest conceptual and empirical challenges of current attachment research.

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## Footnotes

[1] The initial visit, not included in the current study, involved a research assistant going to the family's home to explain the project in detail, get parents' informed consent, perform an interview with the mother, and ask her to complete a socio-demographic questionnaire, from which the socio-economic information used in the present study was gathered.

Table 1.

*Bivariate correlations between the three main variables*

| | Sensitivity | Autonomy-support | Infant attachment |
|---|---|---|---|
| Sensitivity | - | .17 | .33** |
| Autonomy-support | | - | .32** |
| Infant attachment | | | - |

**$p < .01$

Table 2.

*Summary of regression analyses predicting infant security of attachment*

| Block | $R^2$ | $\Delta R^2$ | F Change | β |
|---|---|---|---|---|
| 1. SES | .10 | | 7.34** | .31** |
| 2. SES | | | | .23 |
| Sensitivity | .16 | .06 | 4.78* | .26* |
| 3. SES | | | | .18 |
| Sensitivity | | | | .23* |
| Autonomy-support | .21 | .05 | 3.93* | .23* |

Note: Seventy of the seventy-one participants were included in this analysis. One participant was dropped from analyses due to missing data related to her socioeconomic status.

* $p < .05$; ** $p < .01$

# Article 3

A dimensional approach to maternal attachment state of mind: Relations to maternal sensitivity and maternal autonomy-support

# A dimensional approach to maternal attachment state of mind: Relations to maternal sensitivity and maternal autonomy-support

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## Abstract

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 that are linked to numerous important child outcomes: maternal sensitivity and maternal autonomy-support. Seventy-one dyads participated in three home visits. The Adult Attachment Interview (AAI) was administered when the infants were 8 months of age, 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. These results speak to the relevance of using a continuous approach to attachment state of mind when predicting individual differences in specific caregiving behaviors.

## A dimensional approach to maternal attachment state of mind: Relations to maternal sensitivity and maternal autonomy-support

One of the major breakthroughs in attachment research over the last 20 years 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), with 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 elegant 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. However, although the psychometric properties of Roisman et al.'s bi-dimensional approach are convincing, its predictive validity has yet to be demonstrated. One may argue that a fundamental test of the value of this new approach to the AAI would be for it to show the same predictive validity with respect to caregiving that has made the AAI such a central instrument in attachment research (see Sroufe's (2003) discussion of the need for alternative approaches to attachment measurement to retain the construct's original predictive validity). Accordingly, the purpose of this report is to investigate the relations between the two dimensions of state of mind proposed by Roisman et al. and the quality of maternal behaviors.

*Attachment state of mind*

Attachment state of mind refers to the way in which adults process thoughts and feelings regarding their own attachment experiences (Main, Kaplan, & Cassidy, 1985). It is assessed using the AAI, which probes 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, while failing to substantiate their claims with concrete episodic memories. Preoccupied individuals tend to have difficulty stepping back and adopting an objective perspective regarding their relationship with their parents. Their discourse in the AAI may evidence mixtures of anger, fear, passivity, 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 (Main & Goldwyn, 1998). Dismissing, preoccupied, and unresolved states of mind are characterized as insecure whereas an autonomous state of mind is considered secure[1].

There is considerable evidence suggesting that secure versus insecure attachment states of mind are linked to a variety of maternal interactive behaviors throughout child development. Compared to mothers with insecure states of mind, mothers with a secure state of mind have been found to display greater encouragement of autonomy and appropriate control toward their infants (Heinicke & Levine, 2008), as well as less negative affect and intrusiveness (Slade, Belsky, Aber, & Phelps, 1999). Furthermore, they have been found to be more sensitive toward their infants than insecure mothers (Pederson et al., 1998; Tarabulsy et al., 2005), to better scaffold their infants' play, and to set limits more competently (Aviezer, Sagi, Joels, & Ziv, 1999). With their preschool children, mothers classified as insecure have been found to be less warm and to provide less structure during problem-solving than those classified as secure (Cohn, Cowan, Cowan, & Pearson, 1992), and to

display more anger and anxiety (Busch, Cowan, & Cowan, 2008). Mothers with a secure state of mind have also been found to be more thorough in preparing their preschoolers for a brief separation, and more responsive and affectionate upon reunion (Crowell & Feldman, 1991). Finally, mothers classified as secure have been found to be warmer, more responsive, more supportive, more flexible, and less controlling while interacting with their school-age children (Crowell, O'Connor, Wollmers, Sprafkin, & Rao, 1991; Verschueren, Dossche, Marcoen, Mahieu, & Bakermans-Kranenburg, 2006).

These studies clearly highlight the fact that mothers with insecure attachment states of mind interact with their children in less favorable ways than those with a secure state of mind. 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 are in fact important individual differences in maternal behaviors. Crowell and Feldman (1988) videotaped mothers as they worked with their 3-year old children on a set of problem-solving tasks. Mothers classified as dismissing were found to display a style characterized as cool and remote, and they were found to be less supportive and helpful than secure mothers. Mothers classified as preoccupied were found to be inconsistent, i.e., warm and gentle at times, and at other times angry, coercive or puzzled. 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, atypical or even frightening maternal behaviors, as measured using either the AMBIANCE or FR coding systems (for reviews see Hesse & Main, 2006; Madigan et al., 2006). Furthermore, Busch et al. (2008) found mothers classified as unresolved with respect to loss to be more authoritarian and to display more anger than those who were not unresolved as they worked on a challenging problem-solving task with their preschoolers.

The evidence reviewed above suggests that there is substantial 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, very few samples are large enough to consider the insecure groups separately without compromising statistical power (Roisman et al., 2007). Hesse (2008) thus suggests that attachment researchers make better use of the richness of information that is conveyed by the AAI state of mind subscales.

Roisman et al. (2007) argue for the use of a dimensional rather than categorical approach to the AAI to address these issues, noting that variability in states of mind may be better conceptualized in terms of degree rather 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: (1) a dismissing dimension containing scales typically used to differentiate secure vs. dismissing individuals; and (2) 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 each of these 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 needs, 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 (see De Wolff & van IJzendoorn, 1997).

Self-Determination theory (SDT; Deci & Ryan, 2000) defines parental autonomy-support as "The degree to which parents value and use techniques which encourage independent problem solving, choice, and participation in decisions versus externally dictating outcomes, and motivating achievement through punitive disciplinary techniques, pressure, or controlling rewards" (Grolnick & Ryan, 1989, p. 144*).* When adults 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), and executive functioning in toddlers (Bernier, Carlson, & Whipple, in press). 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), popularity with peers (Avery & Ryan, 1988), and fewer acting out problems (Grolnick & Ryan, 1989; Joussemet et al., 2008). Of particular interest for the present study, recent findings also suggest that parental autonomy-support in the context of infant exploration can predict infant security of attachment above and beyond maternal sensitivity (Whipple, Bernier,

Mageau, 2009). Given the significance of both maternal sensitivity and maternal autonomy-support for healthy child development, they represent useful criteria against which to test the predictive validity of the AAI with respect to caregiving.

*The present study*

The aim of 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 contexts and infant needs, i.e., maternal sensitivity and maternal autonomy-support. In doing so, we are hoping to contribute new knowledge related to the developmental significance of the dimensional approach to the AAI proposed by Roisman et al. 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 to parenting (Busch et al., 2008), which are behaviors that 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 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 dyads (34 girls and 37 boys) living in a large Canadian metropolitan area participated in this study. When they entered the study, the mothers were between 20 and 45 years old (mean = 31 years; *SD* = 4.7). They were predominantly Caucasian (79% of the sample), and had between 10 and 18 years of formal education (mean = 15 years; *SD* = 2.5). Their family income ranged from under 20,000$ to above 100,000$ (CDN). All but ten mothers were married to, or living with, the child's father throughout data collection.

### *Measures*

*Maternal socioeconomic status.* Information pertaining to mothers' socioeconomic status was obtained using an investigator-devised questionnaire where mothers were asked to provide socio-demographic 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 centered and averaged, yielding a global index of maternal socioeconomic status (SES).

*Maternal state of mind.* The Adult Attachment Interview (AAI; George et al., 1996) was administered to assess mothers' state of mind with respect to attachment. The AAI is a semi-structured 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 upon 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 audio taped, transcribed verbatim, 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 regards to these experiences was rated next on nine scales: Idealization, Lack of Recall, Anger, Derogation, Metacognitive Monitoring, Passivity, Fear of Loss, Coherence of Transcript, and Coherence of Mind. Finally, 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. Individuals classified as unresolved were also assigned a secondary, best-fitting classification. The transcripts were rated by a coder trained by David R. Pederson and certified as reliable by Main and Hesse's lab. In the present study, 38 mothers were coded as having an autonomous state of mind (53.5%), 5 were coded as preoccupied (7 %), 13 as

dismissing (18.3 %) and 15 as being unresolved (21.1%). Fourteen (20%) of the transcripts were independently coded by a second rater, also reliable with Main and Hesse. Coders agreed on 12 of the 14 transcripts as to 4-way primary classification (85.7 %; $\kappa = .78$).

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 (mother idealization, father idealization, lack of memory, metacognitive monitoring, and coherence of mind), and the second dimension represents scales that mostly reflect preoccupation and unresolved status (mother anger, father anger, passivity, unresolved loss, unresolved abuse, fear of loss, and derogation). In the present study, the derogation and fear of loss scales were dropped due to insufficient variability. The remaining state of mind scales were averaged into the two dimensions identified by Roisman et al., with the metacognitive monitoring 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 ($\alpha = .66$). The two dimensions were not correlated ($r = .02$), which is in line with Roisman et al.'s work that uncovered two independent dimensions. Intra-class correlations between the two raters' scores were *ICC* = .90 for the dismissing dimension and *ICC* = .87 for the preoccupied/unresolved dimension.

*Maternal sensitivity.* Maternal sensitivity was assessed when infants were 12 months of age, using the Maternal Behavior Q-Sort (MBQS; Pederson & Moran, 1995). The MBQS 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 (ranging from very similar to very unlike her behavior). The observer's 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, the MBQS scores are based on observations made throughout a 90-minute home visit. Twenty-five 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 is anchored in attachment theory, more specifically in the descriptions of sensitivity and responsiveness provided by Ainsworth and her colleagues (1974; 1978). Pederson, Moran and their colleagues (Pederson et al., 1990, 1998; Pederson & Moran, 1995; Tarabulsy, Avgoustis, Phillips, Pederson, & Moran, 1997) have provided detailed validity and reliability information. The MBQS is significantly correlated with other assessments of maternal behavior such as the HOME 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 (Atkinson et al., 2000; van IJzendoorn et al., 2004).

*Maternal autonomy-support.* Mother-infant dyads were asked to complete a challenging problem-solving task (puzzle task) together when the infants were 15 months old. Based on the videotapes of these interactions, maternal behaviors were coded on four scales ranging from 1=*not autonomy-supportive* to 5=*extremely autonomy-supportive*. The four scales were developed based on Grolnick et al.'s (1984) rating system, while using some additional principles proposed by SDT as well as the work of Matas, Arend, and Sroufe (1978). In their rating system, Grolnick et al. (1984) coded maternal behaviors along two scales: verbal and non-verbal behaviors. In the current study, we chose to further categorize these scales into four distinct categories that specifically reflect the behaviors implied by the definition of autonomy-support (Grolnick & Ryan, 1989), as well as those explicitly proposed in previous SDT studies (e.g., Grolnick et al., 2002). The four scales included: the extent to which the mother (1) provides assistance according to the infant's abilities, and adapts the task to create an optimal challenge for the child; (2) encourages her child in the pursuit of the task, gives useful hints and suggestions, and uses a tone of voice that communicates to the child that she is there to help; (3) takes her child's perspective and demonstrates flexibility in her attempts to keep her child on task; (4) follows her child's pace, 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 inter-correlations 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 the first author of this report, and 38 of the 70 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). Intra-class correlation between coders for the total autonomy-support score showed very satisfying inter-rater agreement, *ICC* = .86.

*Procedure*

This project is part of a larger longitudinal study on early parent-child relationships and children's developmental pathways. Participating families were recruited randomly through birth lists provided by the Ministry of Health and Social Services. Criteria for participation were full-term pregnancy and the absence of severe developmental delays. Three in-home visits were conducted. At T1, when infants were 8 months of age, mothers were administered the Adult Attachment Interview and they completed the socio-demographic questionnaire. At T2, when the infants were 12 months old, a 90-minute visit was conducted, modeled after the work of Pederson and Moran. It was thus purposely designed to create a situation where mothers would have to divide their attention between the research tasks and their infant's needs or bids for attention. Maternal sensitivity was assessed with the MBQS based on observations made during this visit. In order to maximize the reliability of

these observations, research assistants first attended a two-day training workshop, during which they reviewed several videotapes of mother-infant interactions in order 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 the P.I. or with an experienced graduate student, in order to review the salient elements of the visit before scoring the MBQS.

At T3, when the infants were 15 months old, mothers were asked to help their children complete 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 was videotaped and later coded for maternal autonomy-supportive behaviors. Maternal autonomy-support and maternal sensitivity were coded by independent observers. The AAI coders had never met the families and were blind to all information pertaining to the dyads, including mothers' sensitivity and autonomy-support scores.

## Results

### *Preliminary Analyses*

Scores on the dismissing dimension of the AAI ranged from 2.0 to 7.4 with a mean of 4.4 (*SD* = 1.3) and those on the preoccupied/unresolved dimension ranged from 1.0 to 5.5 with a mean of 2.7 (*SD* = 1.1). Maternal autonomy-support scores ranged from 1.0 to 5.0, with a mean of 3.3 (*SD* = 1.1) and maternal sensitivity scores

ranged from -.60 to .86, with a mean of .58 (*SD* = .35). All variables thus presented satisfying variability. 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 1, no gender differences were found, and maternal age was not related to any of the main variables. SES was not related to the AAI. However, maternal sensitivity and maternal autonomy-support were related to SES, which was therefore entered as a covariable in subsequent regression analyses. The correlation between maternal sensitivity and maternal autonomy-support was $r = .12$, suggesting that they are two distinct parenting behaviors.

*Main Analyses*

Table 1 also 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 ($r = -.31$, $p < .01$), however it was not related to maternal autonomy-support. In contrast, the preoccupied/unresolved dimension of the AAI was negatively related to maternal autonomy-support ($r = -.38$, $p < .01$), but it was not linked to maternal sensitivity.

In order to provide a more thorough test of our hypotheses accounting for inter-relations among SES, parenting, and state of mind variables, the data was submitted to two hierarchical regression analyses. Table 2 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, $F$ (3,70) = 4.66, $p < .01$. SES predicted 8% of the variance ($p < .05$), and the two AAI dimensions added 9 % ($p < .05$) to the prediction. As presented in Table 2, the dismissing dimension of the AAI was significantly related to maternal sensitivity ($\beta = -.29$, $p < .01$) when SES and the preoccupied/unresolved dimension were controlled. Table 3 presents the results of the second hierarchical regression, predicting maternal autonomy-support. SES was entered in the first block, followed by the two AAI dimensions in the second. The model accounted for 22% of the variance, $F$ (3,70) = 6.12, $p < .001$. SES predicted 12% of the variance ($p < .01$), and the two AAI dimensions predicted an additional 10% ($p < .05$) of variance. As presented in Table 3, this was due to the unique relation between the preoccupied/unresolved dimension of the AAI and maternal autonomy-support ($\beta = -.32$, $p < .01$).

## Discussion

With the aim of exploring the developmental significance of the dimensional approach to the AAI proposed by Roisman et al. (2007), the present study 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.

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 and colleagues (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 sensitivity (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, as the latter set out to explore and master their environments, but the scales typically used to differentiate secure and dismissing individuals were not predictive in this respect. This is in line with studies that have found preoccupied and unresolved states of mind to be linked to intrusive and authoritarian parenting (Adam et al., 2004; Bosquet et al., 2001; Busch et al., 2008).

Taken together, these results suggest that while both maternal sensitivity and autonomy-support are related to mothers' state of mind with respect to their early childhood experiences, each behavior may stem (in part) from different aspects of maternal state of mind. When asked about their childhood experiences with their own

caregivers, mothers who downplay the importance of these early relationships and who speak about their experiences in a cold detached manner, display less sensitivity to their children's emotional cues and needs for comfort and reassurance. However, their dismissing stance is irrelevant in determining their capacity to be autonomy-supportive toward their children in the context of child exploration and problem-solving. On the other hand, mothers who have difficulty stepping back and taking an objective stance when recounting their early childhood experiences, as well as mothers who exhibit lapses in thought or speech when discussing traumatic childhood experiences, have difficulty supporting their children's need for autonomy in the context of exploration. However, their preoccupation or unresolved state of mind does not appear to undermine their capacity to detect and respond to their children's emotional cues and needs in a naturalistic, home-based situation. Thus, the way in which mothers reflect upon and integrate their own childhood attachment experiences appears to affect their capacity to fulfill certain of their children's needs, but not others.

Attachment state of mind is conceptualized as a set of "rules for the organization of information relevant to attachment and for obtaining or limiting access to that information" (Main et al., 1985, p. 67). That these rules would favor or limit not only mothers' processing of their own attachment experiences, but also their capacity to perceive, interpret and respond to information about their child's attachment and exploratory needs in specific dyadic interactions, stands to reason.

Specifically, the emotional distance that mothers with a dismissing state of mind exhibit in regards to their own experiences may hinder their capacity to tune into their children's emotional states and needs. Mothers with a preoccupied state of mind on the other hand, may not experience difficulty tuning in to their children's emotional needs given that their own emotions are so potent. However, their difficulty in stepping back and distancing themselves from their own experience may make them more prone to become emotionally over involved as they see their children struggle with problem-solving activities, making it hard for them to step back and respect their children's need for autonomy.

The results of the present study add further support to the role of maternal state of mind as an important antecedent of maternal behaviors (van IJzendoorn, 1995). Previous research conducted by SDT theorists concerning the antecedents of parental autonomy-support has found that parents who are perfectionist (Flett, Hewitt, Oliver, & MacDonald, 2002) or achievement oriented (Pomerantz & Eaton, 2001), who feel anxious when they are apart from their children (Soenens, Vansteenkiste, Duriez, & Goossens, 2006), who hinge their self-esteem on their child's behavior (Grolnick, Price, Beiswenger, & Sauk, 2007), who have a strong fear of failure (Elliot & Thrash, 2004), and who lack trust in organismic development (Landry et al., 2008) tend to be less autonomy-supportive and more controlling than parents without these characteristics. The present findings add to this work in suggesting that mothers who present difficulties stepping back and taking a more objective stance with respect to

their childhood experiences and/or who present disorganization in their thoughts when discussing traumatic childhood experiences, exhibit more difficulty supporting their children's need for autonomy than other mothers. It seems plausible to hypothesize that these mothers' dispositions may make them more vulnerable to some of the documented risk factors for controlling behaviors such as hinging their self-esteem on their child's behavior, for example.

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 present 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.

Future studies are needed to replicate the current findings with larger independent samples. Furthermore, 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, in that the lower reliability of the latter translates into less statistical power. The results found with the preoccupied/unresolved dimension, which in fact tended to be slightly higher than those pertaining to the dismissing dimension, argue against the hypothesis that this methodological limitation substantially interfered with the study's capacity to detect

true relations. The issue is non-negligible however, 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 two insecure states of mind, whereas the dismissing dimension reflects only one type of insecurity, it is to be expected that the former would present lower internal consistency. In line with this, Roisman et al. (2007) found that the dismissing dimension was clearly unidimensional, whereas variation in preoccupied and unresolved states of mind could be accounted for by either one or two factors (passive and angry preoccupation). In addition, while Roisman et al. found unambiguous support for the continuous nature of their dismissing dimension, they found that individual differences in preoccupied/unresolved states of mind were equally consistent with underlying taxonic or dimensional distributions. Overall then, while the results of the current study present promising support for the developmental usefulness of a preoccupied/unresolved dimension, psychometric research with much larger samples appears necessary to further examine the underlying distribution of individual differences in preoccupied and unresolved states of mind.

The results of the current study present initial evidence in favor of the utilization of a dimensional approach to the AAI such as that proposed by Roisman et al. (2007) for research on parent-child relationships. Having clearly established that

attachment state of mind is relevant to understanding caregiving behaviors, the field of attachment is ripe for more in-depth questions, for instance with respect to the non-redundant ways in which specific components of state of mind are associated to precise aspects of parenting in response to different interactive contexts and child needs. Given that different states of mind present different challenges for treatment providers (Dozier & Sepulveda, 2004; Slade, 1999), the possibility of identifying mothers' specific caregiving strengths and needs, on the basis of varied indicators including their state of mind, could help develop more effective intervention programs for at-risk families, tailored to parents' unique challenges (Bick & Dozier, 2008).

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## Footnotes

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

Table 1.

*Zero-order correlations between demographic variables, the two dimensions of the AAI, maternal sensitivity, and maternal autonomy-support.*

| | 1. | 2. | 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|---|---|---|
| 1.Maternal age | ---- | .00 | .40** | .00 | .08 | .02 | -.02 |
| 2.Child gender | | | -.11 | -.10 | .04 | .04 | -.12 |
| 3.SES | | | | -.08 | -.22 | .28* | .34** |
| 4.Dismissing | | | | | .02 | -.31** | -.05 |
| 5.Preoccupied/unresolved | | | | | | -.13 | -.38** |
| 6.Sensitivity | | | | | | | .13 |
| 7.Autonomy-support | | | | | | | ---- |

* $p < .05$; ** $p < .01$

Table 2

*Summary of regression analysis predicting maternal sensitivity*

| Block | $R^2$ | $\Delta R^2$ | F Change | β |
|---|---|---|---|---|
| 1. SES | .08 | | 6.19* | .29* |
| 2. SES | .17 | .09 | 3.66* | .25* |
| AAI: dismissing | | | | -.29** |
| AAI: preoccupied/unresolved | | | | -.07 |

* $p < .05$; ** $p < .01$

Table 3

*Summary of regression analyses predicting maternal autonomy-support*

| Block | $R^2$ | $\Delta R^2$ | F Change | β |
|---|---|---|---|---|
| 1. SES | .12 | | 8.97** | .34** |
| 2. SES | .22 | .10 | 4.26* | .27* |
| AAI: dismissing | | | | -.03 |
| AAI: preoccupied/unresolved | | | | -.32** |

* $p < .05$; ** $p < .01$

# Conclusion

Given that security of attachment is defined as a balance between the child's attachment and exploration behavioral systems, Grossmann and colleagues (Grossmann, Grossmann, Kindler, & Zimmermann, 2008; Grossmann, Grossmann, & Zimmermann, 1999) have proposed that in order to fully understand the mechanisms underlying the development of attachment patterns, we need to adopt a broader approach to the study of attachment, and consider parental behaviors aimed at supporting children's needs in both attachment and exploratory contexts. This dissertation proposes that Self-Determination theory (SDT; Deci & Ryan, 2000) may have some valuable theoretical and empirical contributions to make in addressing parental behaviors within the context of exploration. Based on the ideas put forth by Grossman and colleagues, the present dissertation intended to explore the role of two maternal behaviors aimed at supporting children's needs related to each side of the attachment/exploration balance: maternal sensitivity and maternal autonomy-support. Furthermore, we sought to explore how each of these behaviors related to mothers' state of mind with respects to their own childhood attachment experiences. By doing so, we hoped to further elucidate the mechanisms underlying the development of secure attachment patterns. Following the theoretical overview of attachment and SDT research presented in the first article of this dissertation, two empirical studies were conducted to address these research questions.

The first empirical study explored the relative contribution of maternal sensitivity and maternal autonomy-support in the prediction of infant security of

attachment. Results indicated that both maternal sensitivity and maternal autonomy-support, as measured in their respective contexts, were related to infant security of attachment. While replicating previous research establishing a clear link between maternal sensitivity and infant security of attachment (van IJzendoorn, 1995), these results also suggest that maternal autonomy-support, as measured within the context of infant exploration, is conceptually distinct from maternal sensitivity, and adds to the prediction of infant security of attachment above and beyond what can be accounted for by maternal sensitivity. While SDT research has already found maternal autonomy-support to be linked to a variety of important child outcomes throughout development, the impact of maternal autonomy-support on the quality of mother-child relationships has not been extensively explored. The current results provide evidence for the importance of autonomy-support not only as indicated by child outcomes, but also relational outcomes. Furthermore, as mentioned previously, few SDT studies have measured maternal autonomy-support using an observational measure, and few studies have assessed maternal autonomy-support in infancy. This dissertation therefore presents a step toward addressing these shortcomings.

Given the documented relation between mothers' state of mind with respect to their own childhood attachment experiences and the corresponding attachment patterns displayed by their infants (van IJzendoorn, 1995), the second empirical article sought to assess the relation between two dimensions of maternal attachment state of mind (dismissing and preoccupied/unresolved) and maternal behaviors during

mother-infant interactions pertaining to each side of the attachment/exploration balance (maternal sensitivity and autonomy-support). The results indicate that mothers who present higher levels of dissmissiveness when recounting their childhood experiences tend to display less sensitivity toward their children, but their dismissive stance does not seem to relate to their level of autonomy-support toward their infants during a problem-solving task. On the other hand, mothers who present high levels of preoccupation and unresolved status when recounting their early attachment experiences tend to present lower levels of autonomy-support, but their preoccupied/unresolved disposition does not appear relevant to their capacity to respond sensitively to their children's emotional needs.

Taken together, the results of the two empirical studies presented in this dissertation offer support for the broader perspective put forth by Grossmann et al. (1999; 2008) suggesting that greater attention be paid to parental behaviors within the context of infant exploration. The results suggest that maternal behaviors related to each side of the attachment/exploration balance make unique contributions to the variability in infant security of attachment. Furthermore, depending on their state of mind with respects to their own childhood attachment experiences, some mothers present more difficulties supporting their child's needs in one context than in the other. While a full transmission model was not tested in the studies presented, the results beg the question as to whether the intergenerational transmission of attachment patterns may be mediated by different maternal behaviors according to

individual differences in mothers' state of mind. For instance, perhaps the relation between maternal preoccupation and infant ambivalence is mediated by maternal autonomy-support, whereas the association between maternal dismissing state of mind and infant avoidance is better explained by maternal sensitivity.

One may also question whether the studies would have presented different results had they been conducted with children of different ages and therefore at diverse developmental stages. Each age presents associated developmental challenges, and therefore different child needs. For instance, as infants become toddlers, autonomy in mastering the environment becomes a central challenge (Sroufe & Rutter, 1984). During adolescence, as teenagers prepare for adulthood, they struggle with establishing their identity, their independence, and their autonomy. They tend to rely more and more on friends and romantic partners when in need of emotional support or comfort. At the same time, adolescence is a time filled with new experiences and uncertainty, which likely elicit intense emotions and anxiety. It seems reasonable to assume that as children get older, their needs change, and each stage therefore presents different challenges to the mother-child relationship. Perhaps the relative predictive strength of maternal sensitivity and maternal autonomy-support with respects to attachment security varies from one developmental stage to the next. Given the results presented in the second study, suggesting that depending on their state of mind with respect to their attachment experiences, mothers present different challenges when responding to their children's needs, one may wonder whether some

mothers will experience greater obstacles than others depending on the developmental stage of their child. For example, mothers who present higher level of preoccupation and/or an unresolved state of mind with respect to their attachment experiences may find toddlerhood especially challenging as they are frequently called to support their child's exploration needs. As their children move into adolescence, they may find it particularly challenging to step back and support their teenager's attempts to become more independent, but they may not experience difficulty relating to their teenager's emotional experience and providing support in times of uncertainty and anxiety. Mothers who present higher levels of dismissiveness, on the other hand, may not find toddlerhood particularly challenging given the increased focus on exploration needs. During adolescence, they may not present specific difficulties supporting their teenager's need for increased independence and autonomy, but they may have difficulty connecting to their teenager's emotional experience and providing the emotional support required.

While this dissertation did not explore paternal sensitivity and paternal autonomy-support, some evidence suggests that mothers and fathers differ in their roles with respects to their children's attachment and exploration needs (for a review see Grossmann et al., 2008). Specifically, fathers are thought to play a particularly important role in supporting their children's exploration needs. Evidence also suggests an association between fathers' attachment state of mind concerning their early attachment experiences and the quality of their support in the context of child

exploration (for a review see Grossmann et al., 2008). Future research is needed to further understand the ways in which mothers and fathers work together to support their children's attachment and exploration needs, as well as the ways in which their individual characteristics with respects to attachment state of mind might interact in impacting their relationships with their children.

As mentioned in the discussion section of each article, the studies presented in this dissertation have notable limitations which should be addressed in future studies. For example, the results of the first study should be replicated using a design in which maternal sensitivity and autonomy-support are assessed at the same time, and infant security of attachment is measured at a different time. This would allow for clearer results concerning the relative predictive strength of each maternal behavior with respects to security of attachment. Furthermore, the tool selected to measure infant attachment does not assign attachment classifications as does the Strange Situation procedure, and thus does not allow for a distinction between the different types of insecure attachment patterns, which are characterized by different exploration-proximity seeking imbalances. Future research using the Strange Situation procedure would help determine the nature of the associations between maternal sensitivity, maternal autonomy-support and the different insecure attachment patterns. Future research is also needed to test the full intergenerational transmission model with maternal sensitivity and autonomy-support serving as mediators.

Nevertheless, the results of the two empirical studies presented in this dissertation bring forth important theoretical implications for the field of attachment and the field of SDT. Namely, the results presented provide evidence for the importance of maternal behaviors related to each side of the attachment/exploration balance, thus affording additional empirical support for the broader perspective suggested by Grossmann and colleagues (1999; 2008). Furthermore, the results suggest that Self-Determination theory can provide important insight related to some of the current questions in the field of attachment. Within the context of this dissertation, an observational measure of maternal autonomy-support toward infants was developed and validated, which will hopefully serve in future SDT studies. The results also provide important insight that may guide clinical interventions aimed at helping mother-infant dyads with attachment-related problems. For instance, the results speak to the importance of targeting each dyad's specific challenges. Some mothers, such as those with high levels of preoccupation and/or unresolved childhood trauma, would benefit from interventions aimed at helping them step back and take a more objective stance, thus giving their child space to explore and master new skills. In contrast, some mothers, such as those who display high levels of dismissiveness related to their childhood experiences, may benefit more from assistance in connecting to their own, as well as their child's, emotional experience. In sum, the results presented suggest that the ways in which mothers reflect upon their own childhood experiences, including childhood trauma, relate to the way they respond to

their children's attachment and exploration needs, which in turn affects the quality of the mother-infant relationship. Hence the importance of carefully assessing maternal behaviors in response to children's needs in different contexts, as well as maternal attachment state of mind, in order to establish appropriate and effective treatment targets.

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# Appendix A:

Maternal Behavior Q-sort (MBQS; Pederson & Moran, 1995)

## Maternal Behavior Q-Sort (MBQS; Pederson & Moran, 1995)

| Item | | Score |
|---|---|---|
| 12. | Interprets cues correctly as evidenced by baby's response. | 9.00 |
| 54. | Interactions revolve around baby's tempo and current state. | 9.00 |
| 9. | Responds consistently to baby's signals. | 8.92 |
| | *Low: Responses are unpredictable or arbitrary.* | |
| 29. | Slows pace down; waits for baby's response in face-to-face interactions. | 8.83 |
| 63. | Monitors and responds to baby even when engaged in some other activity such as cooking or having a conversation with visitor. | 8.83 |
| 60. | When baby is distressed, is able to quickly and accurately identify the source. | 8.75 |
| 53. | Well-resolved interaction with baby – interaction ends when baby is satisfied. *(Also consider termination of ongoing interactions that baby is enjoying.)* | 8.58 |
| 6. | Interactions appropriately vigorous and exciting as judged from baby's responses. | 8.50 |
| 66. | Arranges her location so that she can perceive baby's signals. | 8.25 |
| 46. | Cues baby, and waits for response in feeding. | 8.17 |

| | | |
|---|---|---|
| 64. | Responds immediately to cries/whimpers. | 8.17 |
| 58. | Aware of baby's moods and fluctuations in state. | 8.08 |
| 61. | Seems to be aware of baby even when not in the same room. | 8.08 |
| 1. | Notices when her baby smiles and vocalizes | 8.00 |
| 5. | Notices when baby is distressed, cries, fusses, or whimpers. | 7.92 |
| 23. | Respects baby as individual, that is, able to accept baby's behavior even if it is not consistent with her ideal. | 7.67 |
| 47. | Balances task and baby's activities in feeding. | 7.67 |
| 67. | When in the same room as baby, provides baby with unrestricted access to her. | 7.67 |
| 15. | Aware of how her moods affect baby. | 7.58 |
| 45. | Encourages baby's initiatives in feeding. | 7.58 |
| 44. | Balances task and baby's activities when changing diapers. | 7.42 |
| 10. | Greets baby when reentering room. | 7.25 |
| 18. | Structures environment considering baby's *and* own needs. *(Consider the balance in this item.)* | 7.17 |
| 24. | Knows a lot about her baby; good informant. | 7.17 |
| 34. | Seeks face-to-face interactions. | 7.00 |

| | | |
|---|---|---|
| 42. | Is animated in social interactions with baby. | 6.92 |
| 22. | Resolves negative feelings about baby; that is, has some negative feeling about baby but can set these aside in interacting with baby. | 6.83 |
| 36. | Predominantly positive mood about baby. | 6.75 |
| 40. | Praise directed toward baby. | 6.75 |
| 38. | Displays affection by touching. | 6.50 |
| 37. | Comments are generally positive when speaking about baby | 6.25 |
| 86. | Encourages interaction of baby with visitor; for example, invites visitor to hold baby; ensures that baby is "introduced" to visitor (e.g., "Look who's here!") | 6.25 |
| 35. | Points to and identifies interesting things in baby's environment. | 6.17 |
| 49. | Environment is safe, "baby proofed". | 6.17 |
| 90. | Often brings toy or other object within baby's reach and attempts to interest her in it. | 6.08 |
| 33. | Creates interesting environment. | 6.00 |
| 39. | When holding, cuddles baby as a typical mode of interaction; molds baby to self. | 6.00 |
| 32. | Provides age-appropriate toys. | 5.83 |

| | | |
|---|---|---|
| 21. | Is delighted over baby. | 5.75 |
| 89. | Very alert to "dirty diaper"; seems to change diapers as soon as indication of need. | 5.75 |
| 30. | Plays games with baby such as peek-a-boo, patty cake. | 5.67 |
| 31. | Makes an effort to take baby on "outings" such as shopping, visiting friends. | 5.58 |
| 79. | Frequently repeats words carefully and slowly to the baby as if teaching meaning or labeling an activity or object. | 5.58 |
| 82. | Feels at ease leaving the child with a baby-sitter in the evening. | 5.50 |
| 48. | Provides nutritional snacks. | 5.08 |
| 85. | Is very reluctant to leave the baby with anyone other than husband or close relative. (Determine from interview). | 5.08 |
| 27. | Seems "long suffering" in her attitude about her maternal duties. | 4.67 |
| 56. | Very concerned that baby is well dressed and attractive at all times. | 4.33 |
| 72. | At first glance, home shows little evidence of presence of infant. | 4.33 |
| 25. | Idealizes baby – does not acknowledge negative aspects. | 4.25 |
| 43. | Kisses baby on head as major mode of expressing affection. | 4.25 |

| | | |
|---|---|---|
| 81. | Makes frequent use of playpen in order to permit carrying out normal household chores. | 4.25 |
| 14. | Scolds baby. | 4.08 |
| 17. | Worried about spoiling; has lots of "shoulds" about baby's care. | 3.92 |
| 69. | Seems overwhelmed, depressed. | 3.92 |
| 75. | Attempts to involve baby in games or activities that are obviously beyond the child's current capability. | 3.83 |
| 50. | Sometimes will interfere with appropriate activity if it is likely to get baby messy or soiled. | 3.75 |
| 41. | Flat affect when interacting with baby. | 3.67 |
| 51. | Disturbed by baby becoming messy during feeding; these concerns sometimes interfere with feeding. | 3.58 |
| 26. | Critical in her descriptions of baby. | 3.50 |
| 76. | Sometimes will break off from the child in mid-interaction to speak to visitor or attend to some other activity that suddenly comes to mind. | 3.50 |
| 83. | Leaves the room without any sort of "signal" or "explanation" to the baby (e.g. "I'll be back in just a minute"). | 3.50 |
| 77. | Often "parks" the baby in front of the television in an attempt to keep her entertained. | 3.42 |

| | | |
|---|---|---|
| 70. | Responds accurately and promptly to signals of distress, but often ignores (is unresponsive to) signals of positive affect. | 3.33 |
| 87. | Seems awkward and ill at ease when interacting directly with the baby face to face. | 3.08 |
| 13. | Is irritated by demands of baby. (Note information from interview including comments on caregiving demands.) | 2.75 |
| 80. | Seldom speaks to the baby directly. | 2.67 |
| 84. | Sometimes seems to treat baby as an inanimate object when moving her around or adjusting her posture. | 2.67 |
| 19. | Perceives baby's negative behavior as rejection of her; takes misbehavior "personally". | 2.58 |
| 65. | Not skillful in dividing her attention between baby and competing demands; thus misses baby's cues. | 2.58 |
| 20. | Seems to resent baby's signals of distress or bids for attention. | 2.50 |
| 55. | Repeats series of interventions in search for best method to satisfy baby; often resorts to trial and error. | 2.42 |
| 78. | Nap times are determined by mother's convenience rather than the immediate needs of the baby. (Determine from interview) | 2.42 |
| 88. | Often seems to forget baby is present in the room during interaction with visitor. | 2.33 |

| | | |
|---|---|---|
| 11. | Sometimes is aware of baby's signals of distress, but ignores or does not respond immediately to these signals. | 2.25 |
| 62. | Preoccupied with interview – seems to ignore baby. | 2.17 |
| 71. | When baby is in a bad mood or cranky, often will place baby in another room so that she will not be disturbed. | 2.08 |
| 16. | Will often interfere with baby's ongoing appropriate behavior. | 2.00 |
| | *Low: Stands back and lets baby carry on with activity without interruption.* | |
| 3. | Often interprets baby's signals according to own wishes and moods. | 1.92 |
| 59. | Rough or intrusive in interactions with baby. | 1.75 |
| 28. | Teases baby beyond point where baby seems to enjoy it. | 1.67 |
| 52. | Fails to interrupt activity by her baby that is likely to be dangerous. | 1.67 |
| 74. | Often misses "slow down" or "back off" signals from baby during face-to-face play. | 1.58 |
| 73. | Content and pace of interactions with the baby seem to be set by mother rather than according to baby's responses. | 1.50 |
| 68. | Often appears to "tune out" and not notice distress or bids for attention. | 1.42 |

| | | |
|---|---|---|
| 4. | Response so delayed that baby cannot connect mother's response with the action that initiated it. | 1.33 |
| 8. | Responses to baby's communications are inconsistent and unpredictable. | 1.33 |
| 7. | Responds only to frequent, prolonged, or intense signals. | 1.25 |
| 57. | Subjects baby to constant and unphased barrage of stimulation; baby overwhelmed. | 1.25 |
| 2. | Unaware of or insensitive to baby's signs of distress. | 1.00 |

# Appendix B :

Maternal autonomy-support: coding system

Système de codification du soutien à l'autonomie

| Ne soutien pas l'autonomie | | Soutien moyennement l'autonomie | | Soutien beaucoup l'autonomie |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

## Souci du sentiment de compétence de l'enfant

**Définition :** Façon dont la mère gère la difficulté de la tâche par souci du sentiment de compétence de son enfant.

**5 - Soutien beaucoup l'autonomie:**

- *Mère intervient au moment approprié. Mère intervient seulement lorsque la tâche devient trop difficile pour l'enfant.*
  **ET**
- *Mère organise la tâche et/ou adapte la tâche de façon à ce que celle-ci présente un défi optimal pour son enfant, c'est-à-dire de façon à ce que celle-ci corresponde mieux au niveau d'habiletés de l'enfant.*

**3 – Soutien moyennement l'autonomie**

- *Mère intervient au moment approprié, mais n'organise pas ou n'adapte pas la tâche pour que celle-ci corresponde aux habiletés de l'enfant.*

**OU**

- *Mère organise et/ou adapte la tâche de façon à ce que celle-ci corresponde aux habiletés de l'enfant, mais elle ne le fait pas au moment approprié (trop tôt ou tard).*

**1 – Soutien pas l'autonomie**

- *Mère n'intervient pas au moment approprié et elle n'adapte pas ou n'organise pas la tâche de façon à ce que celle-ci corresponde aux habiletés de l'enfant*

## Verbalisations de la mère envers son enfant

**Définition :** Instructions, suggestions, indices, questions et encouragements formulés par la mère.

**5 - Soutien beaucoup l'autonomie:**

- *Mère encourage son enfant dans la poursuite de la tâche (de façon constante).*
- *Mère félicite son enfant (de façon constante).*
- *Mère donne des instructions, indices ou suggestions adaptés aux besoins, ou suite à la demande de l'enfant.*
- *Mère emploie un ton qui communique qu'elle est une source d'aide pour son enfant.*

**4- Soutien l'autonomie**

- *Mère émet 3 de ces quatre sortes de verbalisations de manière constante.*

**3 – Soutien moyennement l'autonomie :**

- *Mère émet une de ces quatre sortes de verbalisations.*

***OU***

- *Mère émet 2 de ces quatre sortes de verbalisations, mais de façon inconstante.*

**2 – Soutien peu l'autonomie :**

- *Mère émet seulement une de ces quatre sortes de verbalisations de façon inconstante.*

**1 – Ne soutien pas l'autonomie :**

- *Mère n'émet aucune de ces quatre sortes de verbalisations.*

## Prendre la perspective de l'enfant et flexibilité

**Définition :** La mesure dans laquelle la mère démontre de la flexibilité versus rigidité dans la façon dont elle gère l'attention de son enfant à la tâche et la mesure dans laquelle elle prend la perspective de son enfant.

**5 - Soutien beaucoup l'autonomie :**

- *Mère démontre de la flexibilité dans ses efforts pour garder l'enfant centré sur la tâche.*
- *Elle prend la perspective de son enfant. Elle reconnaît les sentiments de son enfant, tout en recadrant son enfant vers la tâche.*

**3 – Soutien moyennement l'autonomie**

- *Mère présente un de ces deux éléments.*

**OU**

- *Mère présente les deux éléments, mais de façon inconstante.*

**1 – Ne soutien pas l'autonomie**

- *Mère ne présente aucun de ces éléments.*

*****Aucun score n'est donné à cette échelle si l'enfant ne dévie pas durant la tâche**

## Suivre l'enfant et offrir à l'enfant l'opportunité d'établir le rythme

**Définition :** Mesure dans laquelle l'enfant a l'opportunité d'être un acteur plutôt qu'observateur dans la résolution de tâche. Mesure dans laquelle la mère guide l'enfant tout en lui laissant le temps de faire des essais de façon à ce que celui-ci soit actif dans la tâche. Mesure dans laquelle la mère offre des choix à l'enfant plutôt que d'imposer les siens.

**5 - Soutien beaucoup l'autonomie :**

- *Mère respecte le rythme de l'enfant. L'enfant joue un rôle d'acteur dans l'interaction.*
- *Mère laisse l'enfant faire des choix (ex. quels crayon utiliser, quel morceau placer en premier, etc.). Le choix peut être explicite ou implicite.*

**4 – Soutien l'autonomie :**

- *Mère respecte le rythme, mais elle ne laisse pas l'enfant faire de choix.*

**3- Soutien moyennement l'autonomie**

- *Mère laisse l'enfant faire des choix (ex. quels crayon utiliser, quel morceau placer en premier, etc.), mais ne respecte pas son rythme.*

**OU**

- *Mère laisse l'enfant faire des choix et elle respecte son rythme, mais de façon inconstante, c'est-à-dire que l'enfant n'est pas toujours acteur.*

**1 – Ne soutien pas l'autonomie**

- *Mère ne respecte pas le rythme de l'enfant et elle ne lui laisse pas l'opportunité de faire des choix.*

***** Mère doit être active dans l'interaction (versus laissez-faire) pour obtenir un score élevé à cette échelle.**

# Appendix C:

Attachment Behavior Q-set (AQS; Waters, 1995)

## Attachment Behavior Q-set (AQS; Waters, 1995)

| Item | | Score |
|---|---|---|
| 21. | Child keeps track of mother's location when he plays around the house. Calls to her now and then; notices her go from room to room. Notices if she changes activities.<br><br>*Middle: Child isn't allowed or doesn't have room to play away from mom.*<br><br>*Low: Doesn't keep track.* | 8.8 |
| 36. | Child clearly shows a pattern of using mother as a base from which to explore. Moves out to play; returns of plays near her; moves out to play again, etc.<br><br>*Low: Always away unless retrieved, or always stays near.* | 8.8 |
| 71. | If held in mother's arms, child stops crying and quickly recovers after being frightened or upset.<br><br>*Low: Not easily comforted.* | 8.8 |
| 18. | Child follows mother's suggestions readily, even when they are clearly suggestions rather than orders.<br><br>*Low: Ignores or refuses unless ordered.* | 8.5 |
| 41. | When mother says to follow her, child does so. (Do not count refusals or delays that are playful or part of a game unless they clearly become disobedient.) | 8.5 |

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| 53. | Child puts his arms around mother of puts his hand on her shoulder when she picks him up.<br><br>*Low: Accepts being picked up, but doesn't especially help or hold on.* | 8.5 |
| 60. | If mother reassures him by saying, "It's OK," or, "It won't hurt you," child will approach or play with things that initially made him cautious or afraid.<br><br>*Middle: Never cautious or afraid.* | 8.5 |
| 80. | Child uses mother's facial expressions as a good source of information when something looks risky or threatening.<br><br>*Low: makes up his own mind without checking mother's expressions first.* | 8.5 |
| 90. | If mother moves very far, child follows along and continues play in the area she has moved to.<br><br>*Middle: Child isn't allowed or doesn't have room to play away from mom.* | 8.3 |
| 42. | Child recognizes when mother is upset. Becomes quiet or upset himself. Tries to comfort her; asks what is wrong, etc.<br><br>*Low: Doesn't recognize; continues play; behaves toward her as if she were OK.* | 8.2 |

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| 1. | Child readily shares with mother or lets her hold things if she asks to.<br><br>*Low: Refuses.* | 8.0 |
| 70. | Child quickly greets his mother with a big smile shen she enters the room. (Shows her a toy, gestures, or says, "Hi, Mommy.")<br><br>*Low: Doesn't greet mother unless she greets him first.* | 8.0 |
| 14. | When child finds something new to play with, he carries it to mother or shows it o her from across the room.<br><br>*Low: Plays with the new object quietly, or goes where he won't be interrupted.* | 7.8 |
| 15. | Child is willing to talk to new people, show them toys, or show them what he can do if mother asks him to. | 7.7 |
| 19. | When mother tells child to bring or give her something, he obeys. (Do not count refusals that are playful or part of a game unless they clearly become disobedient.)<br><br>*Low: Mother has to take the object or raise her voice to get it away from him.* | 7.7 |
| 44. | Child asks for mother to and enjoys having her hold, hug, and cuddle him.<br><br>*Low: Not especially eager for this. Tolerates it, but doesn't seek it; or wiggles to be put down.* | 7.7 |

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| 77. | When mother asks child to do something, he readily understands what she wants. (May or may not obey.) | 7.7 |
| | *Middle: Child is too young to understand.* | |
| | *Low: Sometimes puzzled or slow to understand what mother wants.* | |
| 11. | Child often hugs or cuddles against mother without her asking or inviting him to do so. | 7.5 |
| | *Low: Child doesn't hug or cuddle much, unless mother hugs him first or asks him to give her a hug.* | |
| 28. | Child enjoys relaxing in mother's lap. | 7.5 |
| | Middle: Child never sits still. | |
| | Low: Prefers to relax on the floor or on furniture. | |
| 85. | Child is strongly attracted to new activities and new toys. | 7.5 |
| | *Low: New things do not attract him away from familiar toys or activities.* | |
| 32. | When mother says "no" or punishes him, child stops misbehaving (at least at that time). Doesn't have to be told twice. | 7.2 |

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| 47. | Child will accept and enjoy loud sounds or being bounced around in play if mother smiles and shows that it is supposed to be fun.<br><br>*Low: Child gets upset, even if mother indicates the sound or activity is safe or fun.* | 7.2 |
| 55. | Child copies a number of behaviors or ways of doing things from watching mother's behavior.<br><br>*Low: Doesn't noticeably copy mother's behavior.* | 7.0 |
| 64. | Child enjoys climbing all over mother when they play.<br><br>*Low: Doesn't especially want a lot of close contact when they play.* | 7.0 |
| 66. | Child easily grows fond of adults who visit his home and are friendly to him.<br><br>*Low: Doesn't grow fond of new people very easily.* | 7.0 |
| 9. | Child is lighthearted and playful most of the time.<br><br>*Low: Child tends to be serious, sad, or annoyed a good deal of the time.* | 6.5 |

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| 22. | Child acts like an affectionate parent toward dolls, pets, or infants.<br><br>*Middle: Child doesn't play with or have dolls, pets, or infants around.*<br><br>*Low: Plays with them in other ways.* | 6.5 |
| 40. | Child examines new objects or toys in great detail. Tries to use them in different ways or to take them apart.<br><br>*Low: First look at new objects or toys is usually brief. (May return to them later, however.)* | 6.5 |
| 83. | When child I bored, he goes to mother looking for something to do.<br><br>*Low: Wanders around, or just does nothing for a while, until something comes up.* | 6.5 |
| 86. | Child tries to get mother to imitate him or quickly notices and enjoys it when mom imitates him on her own. | 6.5 |
| 89. | Child's facial expressions are strong and clear when he is playing with something. | 6.5 |
| 5. | Child is more interested in people than in things.<br><br>*Low: More interested in things than people.* | 6.3 |

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| 27. | Child laughs when mother teases him. | 6.3 |
| | *Middle: Mother never teases child during play or conversations.* | |
| | *Low: Annoyed when mother teases him.* | |
| 49. | Runs to mother with a shy smile when new people visit the home. | 6.3 |
| | *Middle: Child doesn't run to mother at all when visitors arrive.* | |
| | *Low: Even if he eventually warms up to visitors, child initially runs to mother with a fret or a cry.* | |
| 4. | Child is careful and gentle with toys and pets. | 6.2 |
| 12. | Child quickly gets used to people or things that initially made him shy or frightened him. | 6.0 |
| | *Middle: Never shy or afraid.* | |
| 48. | Child readily lets new adults hold or share things he has, if they ask to. | 6.0 |
| 87. | If mother laughs at or approves of something the child has done, he repeats it again and again. | 5.8 |
| | *Low: child is note particularly influenced this way.* | |

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| 46. | Child walks and runs around without bumping, dropping, or stumbling. | 5.7 |
| | *Low: Bumps, drops, or stumble happen throughout the day (even if no injuries result).* | |
| 62. | When child is in a happy mood, he is likely to stay that way all day. | 5.5 |
| | *Low: Happy moods are very changeable.* | |
| 16. | Child prefers toys that are modeled after living things (e.g., dolls, stuffed animals). | 5.2 |
| | *Low : Prefers balls, blocks, pots and pans, etc.* | |
| 45. | Child enjoys dancing or singing along with music. | 5.2 |
| | *Low: Neither likes nor dislikes music.* | |
| 73. | Child has a cuddly toy or security blanket that he carries around, takes to bed, or holds when upset. (do not include bottle or pacifier if child is under 2 years old.) | 5.2 |
| | *Low: Can take such things or leave them, or has none at all.* | |
| 68. | On the average, child is a more active type person than mother. | 5.0 |
| | *Low: On the average, child is a less active type person than mother.* | |

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| 84. | Child makes at least some effort to be clean and tidy around the house. | 5.0 |
| | *Low: Spills and smears things on himself and on floors all the time.* | |
| 3. | When he is upset or injured, child will accept comforting from adults other than mother. | 4.8 |
| | *Low: Mother is the only one he allows to comfort him.* | |
| 37. | Child is very active. Always moving aground. Prefers active games to quiet ones. | 4.8 |
| 39. | Child is often serious and businesslike when playing away from mother or alone with his toys. | 4.7 |
| | *Low: Often silly or laughing when playing away from mother or alone with his toys.* | |
| 43. | Child stays closer to mother or returns to her more often than the simple task of keeping track of her requires. | 4.7 |
| | Low: Doesn't keep close track of mother's location or activities. | |
| 51. | Child enjoys climbing all over visitors when he plays with them. | 4.7 |
| | *Middle: He won't play with visitors.* | |
| | *Low: Doesn't seek close contact with visitors when he plays with them.* | |

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| 24. | When mother speaks firmly or raises her voice at him, child becomes upset, sorry, or ashamed bout displeasing her. (Do not score high if child is simply upset by the raised voice or afraid of getting punished.) | 4.5 |
| 72. | If visitors laugh at or approve of something the child does, he repeats it again and again.<br><br>*Low: visitors' reactions don't influence child this way.* | 4.5 |
| 78. | Child enjoys being hugged or held by people other than his parents and/or grandparents. | 4.5 |
| 7. | Child laughs and smiles easily with a lot of different people.<br><br>*Low: Mother can get him to smile or laugh more easily than anyone else.* | 4.3 |
| 29. | At times, child attends so deeply to something that he doesn't seem to hear when people speak to him.<br><br>*Low Even when deeply involved in play, child notices when people speak to him.* | 4.3 |
| 35. | Child is independent with mother. Prefers to play on his own; leaves mother easily when he wants to play away from mother.<br><br>*Middle: Not allowed or not enough room to play away from mother.*<br><br>*Low: Prefers paying with or near mother.* | 4.3 |

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| 20. | Child ignores most bumps, falls, or startles. | 4.2 |
| | *Low: Cries after minor bumps, falls, or startles.* | |
| 57. | Child is fearless. | 4.0 |
| | *Low: Child is cautious or fearful.* | |
| 67. | When the family has visitors, child wants them to pay a lot of attention to him. | 4.0 |
| 82. | Child spends most of his playtime with just a few favorite toys or activities. | 4.0 |
| 52. | Child has trouble handling small objects or putting small things together. | 3.8 |
| | *Low : Very skillful with small objects, pencils, etc.* | |
| 59. | When child finishes with an activity or toy, he generally finds something else to do without returning to mother between activities. | 3.8 |
| | *Low: When finished with an activity or toy, he returns to mother for play, affection, or help finding more to do.* | |
| 17. | Child quickly loses interest in new adults if they do anything that annoys him. | 3.5 |
| 50. | Child initial reaction when people visit the home is to ignore or avoid them, even if he eventually warms up to them. | 3.5 |

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| 8. | When child cries, he cries hard. | 3.3 |
| | *Low: Weeps, sobs, doesn't cry hard, or hard crying never lasts very long.* | |
| 26. | Child cries when mother leaves him at home with baby-sitter, father, or grandparent. | 3.3 |
| | *Low: Doesn't cry with any of these.* | |
| 58. | Child largely ignores adults who visit the home. Finds. His own activities more interesting. | 3.2 |
| | *Low: Finds visitors quite interesting, even if he is a bit shy at first.* | |
| 76. | When given a choice, child would rather play with toys than with adults. | 3.2 |
| | *Low: Would rather play with adults than toys.* | |
| 13. | When the child is upset by mother's leaving, he continues to cry or even gets angry after she is gone. | 2.7 |
| | *Middle: Not upset by mom leaving.* | |
| | *Low: Crying stops right after mom leaves.* | |

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| 23. | When mother sits with other family members of is affectionate with them, child tries to get mom's affection for himself. | 2.7 |
| | *Low: Lets her be affectionate with others. May join in, but not in a jealous way.* | |
| 56. | Child becomes shy or loses interest when an activity looks like it might be difficult. | 2.7 |
| | *Low: Thinks he can do difficult tasks.* | |
| 31. | Child wants to be the center of mother's attention. If mom is busy or talking to someone, he interrupts. | 2.5 |
| | *Low: Doesn't notice or doesn't mind not being the center of mother's attention.* | |
| 10. | Child often cries or resists when mother takes him to bed for naps or at night. | 2.3 |
| 30. | Child easily becomes angry with toys. | 2.3 |
| 69. | Rarely asks mother for help. | 2.3 |
| | *Middle: Child is too young to ask.* | |
| | *Low: Often asks mother for help.* | |

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| 6. | When child is near mother and sees something he wants to play with, he fusses or tries to drag mother over to it.<br><br>*Low: Goes to what he wants without fussing or dragging mother along.* | 2.2 |
| 25. | Child is easy for mother to lose track of when he is playing out of her sight.<br><br>*Middle: Never plays out of sight.*<br><br>*Low: Talks and calls when out of sight. Easy to find; easy to keep track of what he is playing with.* | 2.0 |
| 63. | Even before trying things himself, child tries to get someone to help him. | 2.0 |
| 2. | When child returns to mother after playing, he is sometimes fussy for no clear reason.<br><br>*Low: Child is happy or affectionate when he returns to mother between or after playtimes.* | 1.8 |
| 61. | Plays roughly with mother. Bumps, scratches, or bites during active play. (Does not necessarily mean to hurt mom.)<br><br>*Middle: Play is never very active.*<br><br>*Low: Plays active games without injuring mother.* | 1.8 |

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|---|---|---|
| 65. | Child is easily upset when mother makes him change from one activity to another (Even if the new activity is something the child often enjoys). | 1.8 |
| 81. | Child cries as a way of getting mother to do what he wants.<br><br>*Low: Mainly cries because of genuine discomfort (tired, sad, afraid, etc.).* | 1.8 |
| 54. | Child acts like he expects mother to interfere with his activities when she is simply trying to help him with something.<br><br>*Low: Accepts mother's help readily, unless she is in fact interfering.* | 1.5 |
| 74. | When mother doesn't do what child wants right away, he behaves as if mom were not going to do it at all. (Fusses, gets angry, walks off to other activities, etc.)<br><br>*Low; Waits a reasonable time, as if he expects mother will shortly do what he asked.* | 1.5 |
| 33. | Child sometimes signals mother (or gives the impression) that he wants to be put down and then fusses or wants to be picked right back up.<br><br>*Low: Always ready to go play by the time he signals mother to put him down.* | 1.3 |

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|---|---|---|
| 34. | When child is upset about mother leaving him, he sits right where he is and cries. Doesn't go after her.<br><br>*Middle: never upset by her leaving.*<br><br>*Low: Actively goes after her if he is upset or crying.* | 1.2 |
| 38. | Child is demanding and impatient with mother. Fusses and persists unless she does what he wants right away. | 1.2 |
| 75. | At home, child gets upset or cries when mother walks out of the room. (May or may not follow her.)<br><br>*Low: Notices her leaving; may follow, but doesn't get upset.* | 1.2 |
| 88. | When something upsets the child, he stays where he is and cries.<br><br>*Low: goes to mother when he cries. Doesn't wait for mom to come to him.* | 1.2 |
| 79. | Child easily becomes angry at mother.<br><br>*Low: Doesn't become angry at mother unless she is very intrusive or he is very tired.* | 1.0 |