

Université de Montréal

**Maternal history of early adversity and child emotional development: Investigating  
intervening factors**

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## Résumé

L'objectif de cette thèse était de contribuer à l'avancement des connaissances quant aux circonstances permettant une transmission intergénérationnelle du risque émanant de l'adversité maternelle et aux mécanismes sous-tendant cette transmission, dans quatre articles empiriques. Le premier visait à explorer la relation entre un historique d'adversité maternelle, la sécurité d'attachement mère-enfant et le tempérament de l'enfant. Les mères ont complété une entrevue semi-structurée portant sur leurs représentations d'attachement avec leurs parents, à 6 mois, et ont évalué le tempérament de leur enfant à 2 ans. La sécurité d'attachement fut également évaluée à 2 ans. Les résultats ont démontré que les enfants dont les mères rapportaient des niveaux supérieurs d'adversité présentaient de moins bons niveaux d'activité comportementale, uniquement lorsqu'ils avaient un attachement sécurisant avec leur mère. Ces résultats suggèrent une transmission intergénérationnelle des effets d'un historique d'adversité maternelle sur le tempérament des enfants.

Le deuxième article visait à investiguer si le transporteur de sérotonine (5-HTTLPR) module la transmission de risque intergénérationnelle de l'adversité maternelle sur le tempérament des enfants. L'historique d'adversité maternelle fut évalué en combinant deux mesures auto-rapportées. Les mères ont également évalué le tempérament de leur enfant à 18 et à 36 mois. Le génotype des enfants fut extrait à 36 mois. Les résultats ont révélé un effet d'interaction entre l'adversité maternelle et le génotype de l'enfant sur le tempérament, suggérant une transmission intergénérationnelle des effets de l'adversité maternelle sur le fonctionnement émotionnel des enfants.

Le troisième article visait à explorer la relation entre les difficultés d'adaptation psychosociale des mères, la sensibilité maternelle et les symptômes intériorisés de leurs

enfants. Les mères ont complété plusieurs questionnaires desquels un score composite de difficultés d'adaptation psychosociale fut extrait. La sensibilité maternelle fut observée à 12 mois. Les symptômes intériorisés des enfants furent évalués par les deux parents à 2 et à 3 ans. Les résultats ont démontré qu'une augmentation des difficultés maternelles d'adaptation psychosociale étaient associée à davantage de symptômes intériorisés chez les enfants, mais seulement chez ceux dont les mères étaient moins sensibles. Ces résultats ont été observés par les mères à 2 ans et par les deux parents à 3 ans. Ces résultats suggèrent que les enfants peuvent être différemment affectés par l'adaptation émotionnelle de leur mère tout en mettant l'emphase sur le rôle protecteur de la sensibilité maternelle.

Le quatrième article visait à investiguer les rôles médiateurs de la dépression et de la sensibilité maternelle dans la relation entre un historique d'adversité maternelle et le tempérament de l'enfant. L'historique d'adversité maternelle fut évalué en combinant deux mesures auto-rapportées. Les mères ont également rapporté leurs symptômes dépressifs à 6 mois. La sensibilité maternelle fut évaluée de façon concomitante. Les mères ont évalué le tempérament de leur enfant à 36 mois. Les résultats ont révélé une transmission intergénérationnelle des effets d'un historique d'adversité maternelle à la génération suivante suivant une médiation séquentielle passant d'abord par la dépression maternelle et ensuite par la sensibilité maternelle. Finalement, les résultats des quatre articles ont été intégrés dans la conclusion générale.

Mots-clés : Transmission intergénérationnelle du risque; historique d'adversité maternelle; lien d'attachement mère-enfant; tempérament; 5-HTTLPR; difficultés maternelles d'adaptation psychosociale; sensibilité maternelle; symptômes intériorisés; dépression maternelle.

## **Abstract**

The main goal of this dissertation was to document more extensively the circumstances under which intergenerational risk transmission of maternal adversity occurs and to identify underlying processes. The dissertation is comprised of four empirical articles. The first article examined the relation between maternal history of early adversity, mother-child attachment security, and child temperament. Mothers completed a semi-structured interview pertaining to their childhood attachment experiences with their parents at 6 months and rated their children's temperament at 2 years. Mother-child attachment was also assessed at 2 years. Results showed that children whose mothers received higher scores of early life adversity displayed poorer temperamental activity level outcomes but only when they also showed high concomitant levels of attachment security, suggesting intergenerational effects of maternal early life experiences on child temperament.

The second article examined the intergenerational effects of maternal childhood adversity on child temperament targeting the serotonin transporter polymorphism, 5-HTTLPR, as a potential moderator of those maternal influences. Maternal history of early adversity was assessed with an integrated measure derived from two self-report questionnaires. Mothers also rated their children's temperament at 18 and 36 months. Child genotyping was performed at 36 months. Results yielded a significant interaction effect of maternal childhood adversity and child 5-HTTLPR genotype on child temperament, suggesting intergenerational effects of maternal history of adversity on child emotional function.

The third article investigated the interactive effects of maternal psychosocial maladjustment and maternal sensitivity on child internalizing symptoms. Families took part in four assessments between ages 1 and 3 years. Mothers completed several questionnaires from

which a composite score of maternal psychosocial maladjustment was derived. Maternal sensitivity was rated by an observer at 12 months. Child internalizing symptoms were assessed by both parents at 2 and 3 years. Results revealed that increased maternal psychosocial maladjustment was related to more internalizing symptoms in children, however only among children of less sensitive mothers whereas children of more sensitive mothers appeared to be protected. This was observed with maternal reports at 2 years, and both maternal and paternal reports at 3 years. These results suggest that young children may be differentially affected by their parents' emotional adjustment, while highlighting the pivotal protective role of maternal sensitivity in this process.

Finally, the fourth article examined the mediating roles of maternal depression and maternal sensitivity in the relation between maternal history of early adversity and child temperament. Maternal history of early adversity was assessed with an integrated measure derived from two self-report questionnaires. Mothers also reported on their depression symptoms at 6 months. Maternal sensitivity was rated concurrently. Mothers also completed a questionnaire on their children's temperament at 36 months. Results suggested the intergenerational transmission of the effects of maternal childhood adversity to offspring occurs through a two-step, serial pathway, specifically through maternal depression, first, and, then, to maternal sensitivity. Finally, the results of the four articles were integrated into a general conclusion.

Keywords: Intergenerational risk transmission; maternal history of early adversity; mother-child attachment security; temperament; 5-HTTLPR; maternal psychosocial maladjustment; maternal sensitivity; internalizing symptoms; maternal depression.

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### List of abbreviations

°C	Degrees Celcius
μl	Microliters
μg	Micrograms
1 U Taq	One unit taq
1X	One time concentrated
43-bp	43 base pair
5' HEX	5 prime- HEX <sup>TM</sup> dye
5-HTT	Serotonin transporter
5-HTTLPR	Serotonin-transporter-linked polymorphic region
A	Adenosine
AAI	Adult Attachment Interview
AB 2720	Applied Biosystems® Thermal Cyclers model 2720
APGAR	American Pediatric Groos Assessment Record
AQS	Attachment Q-Sort
CBCL	Child Behavior Checklist
CES-D	Center for Epidemiologic Studies Depression Scale
CI	Confidence interval
CTQ	Childhood Trauma Questionnaire
DAS	Dyadic Adjustment Scale
DAS-4	Dyadic Adjustment Scale – 4 items version
DNA	Deoxyribonucleic acid
dNTP	Deoxynucleotide

DRD4	Dopamine receptor D4
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders - IV
DST	Differential susceptibility theory
DV	Dependent variable
ECBQ	Early Childhood Behaviour Questionnaire
EPDS	Edinburgh Postnatal Depression Scale
G	Guanine
GxE	Gene by environment interaction
Gms	Grams
HOME	Home Observation for the Measurement of the Environment
HPA	Hypothalamic-pituitary-adrenal
HWE	Hardy Weinberg Equilibrium
ICC	Intraclass correlation coefficient
IV	Independent variable
L	Long
Log	Logarithm
M	Mean
MAOA	Monoamine oxidase A
MAVAN	Maternal adversity, Vulnerability, and Neurodevelopment
MBI Fermentas	Company, now owned by Thermo Scientific
MBQS	Maternal Behavior Q-Set
MgCl <sub>2</sub>	Magnesiumchloride
mM	Millimol

Min	Minutes
mRNA	Messenger ribonucleic acid
MspI	Massive surface protein
MV	Mediator variable
N	Sample size
NE/BD	Negative emotionality/behavioural dysregulation
(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	Ammoniumsulfate
NS	Non significant
ON	Ontario
PBI	Parental Bonding Index
PCR	Polymerase chain reaction
PSI	Parenting Stress Index
S	Short
SD	Standard deviation
SDQ	Strengths and Difficulties Questionnaire
SE	Standard error
Sec	Seconds
SES	Socioeconomic status
SLC6A4	Serotonin transporter gene
SPSS	Statistical package of social sciences
SSP	Strange Situation Procedure
TBAQ	Toddler Behavioural Assessment Questionnaire
T1	Time 1



T2	Time 2
T3	Time 3
T4	Time 4
U	Unit

*À mon Grand-Papa, pour m'avoir montré à bousculer les obstacles.*

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## **Introduction**

This dissertation aims to investigate the environmental and genetic factors that underlie intergenerational risk transmission of maternal history of early adversity onto offspring emotional development.

Research has clearly established that early experience, even during the prenatal period, is associated with child socio-emotional development later in life (e.g., Maughan, Taylor, Caspi, & Moffitt, 2004; Thapar & Rutter, 2009). Although it is now well demonstrated that both prenatal (e.g., Rice et al., 2010) and early postnatal factors (e.g., Rothbart & Bates, 2006) affect child development, less is known about how both parent and child characteristics may amplify or dampen such transmission processes. As such, the present work aims to target for whom and under what circumstances intergenerational risk transmission of maternal history of early adversity occurs along with the potential mechanisms allowing such transmission.

### **Intergenerational risk transmission**

Maternal mood and stressful life experiences may impact the next generation's emotional development. For instance, maternal depression is related to child psychopathology (Pawlby, Hay, Sharp, Waters, & O'Keane, 2009; Seckl & Holmes, 2007; Talge, Neal, & Glover, 2007; Weissman et al., 2006; Weissman et al., 2005). Meta-analyses also confirm a relation between maternal depression and forms of child temperament that presage later psychopathology (Goodman et al., 2011). Furthermore, maternal anxiety is associated with offspring internalizing symptoms (Barker, Jaffee, Uher, & Maughan, 2011) and marital strain is also related to child emotional impairments (Cummings, Goeke-Morey, & Papp, 2003). Children of depressed mothers are at increased risk of suffering from later depression compared to those whose parents do not present with any mood disorder (Pawlby et al., 2009).

While genomic variations have been identified as transmission risk factors (e.g., Rutter, Moffitt, & Caspi, 2006), studies also suggest non-genomic effects of maternal psychosocial maladjustment features (Weissman et al., 2006; Weissman et al., 2005). Indeed, successful treatment of maternal depression significantly reduces the risk for psychopathology in offspring (Wickramaratne et al., 2011), which underlines the environmental contribution to this intergenerational transmission. Hence, intergenerational transmission of maternal psychosocial functioning has been well established.

Although less extensively documented than the above-mentioned examples, maternal history of early adversity has also been found to affect the next generation's emotional development. For instance, maternal history of childhood maltreatment is associated with subsequent offspring maltreatment (Berlin, Appleyard, & Dodge, 2011; Sidebotham & Heron, 2006). Furthermore, child emotional development has also been found to be impacted by maternal history of early adversity as evidenced by increased behavioural problems at ages 4 and 7 (Collishaw, Dunn, O'Connor, & Golding, 2007) and symptoms of disruptive behaviour in adolescence (Miranda, de la Osa, Granero, & Ezpeleta, 2011). It is also documented that parents who have suffered the loss of a close person during their childhood are at increased risk of developing disorganized attachment relationships with their children (Bernier & Meins, 2008).

Nonetheless, research investigating child outcomes associated with maternal history of early adversity remains scarce. As such, considering processes underlying the transmission of risk stemming from maternal history of psychosocial maladjustment, broadly, is a key milestone toward a better understanding of intergenerational transmission paradigms. Provided that the few already documented effect sizes are, at times, small (e.g., Groh, Roisman, Van

IJzendoorn, Bakermans-Kranenburg, & Fearon, 2012; McLeod, Weisz, & Wood, 2007a, 2007b) one may expect that moderating factors might be at play.

### **Intergenerational transmission and moderating factors**

Both risk and protection factors do not affect children to the same extent. Biological and relational factors influence the degree to which children are influenced by their environment, thereby underlying individual differences (e.g., Belsky, 1997; Belsky, Bakermans-Kranenburg, & Van IJzendoorn, 2007; Belsky & Pluess, 2009; Boyce & Ellis, 2005).

**Biological moderators.** Several biological characteristics have been targeted as moderating factors in the relation between environmental stressors and child developmental outcomes. For instance, El-Sheikh, Keller, and Erath (2007) showed that children with high skin conductance, suggesting greater autonomic reactivity, displayed increased internalizing problems between ages 9 – 11.5 when living in high-conflict families but also fewer internalizing problems when living in low-conflict families, as compared with their counterparts with low skin conductance. Likewise, high stress reactivity, as assessed with changes in both respiratory sinus arrhythmia and salivary cortisol, has been identified as a predictor of impaired outcomes such as increased externalizing symptoms and decreased prosocial behaviour, academic involvement, and school competence in children facing high adversity. However, high stress reactivity was also predictive of better outcomes in children facing low adversity, emphasizing its role as both a risk enhancer and a risk buffer (Obradović, Bush, Stamperdahl, Adler, & Boyce, 2010).

In addition to psychophysiological functioning, candidate genes have also been identified as moderators in the relation between environmental risks and psychosocial

outcomes. For instance, carriers of the low-expression allele in the MAOA gene presented with more antisocial behaviour when having a history of childhood maltreatment, but also less antisocial behaviour in the absence of such a maltreatment history, as compared with counterparts carrying the high-expression allele (Caspi et al., 2002). Carriers of the 7-repeat allele (associated with lower dopamine reception efficiency) of the DRD4 gene were at increased risk of having a disorganized attachment when their mother reported a grief or unresolved trauma, but significantly less so when their mother did not present with such a background as compared to their counterparts not carrying the 7-repeat allele (Bakermans-Kranenburg & Van IJzendoorn, 2006; Propper, Willoughby, Halpern, Carbone, & Cox, 2007).

A significant proportion of the literature encompassing genetic moderating factors has focused on a common variation in the serotonin transporter gene (5-HTTLPR) (Caspi et al., 2003; Van IJzendoorn, Belsky, & Bakermans-Kranenburg, 2012). Two functional alleles, long (L) and short (S), result from a 43-bp insertion/deletion in the promoter region of 5-HTT. The S, as opposed to the L allele, has been associated with a significantly reduced in vitro basal transcription of 5-HTT mRNA (Heils et al., 1996). The presence of the S allele has been identified as a moderating factor in the context of adversity. Indeed, individuals presenting with a history of early adversity are at greater risk for adulthood depression and other emotional impairments when also carrying an S allele, but not otherwise (Brown & Harris, 2008; Caspi et al., 2003; Lesch, 1996; Uher & McGuffin, 2008). Such findings along with other gene x environment studies investigating the moderating role of the 5-HTTLPR polymorphism (Belsky & Pluess, 2009; Pluess et al., 2011; Taylor et al., 2006) suggest that the 5-HTTLPR polymorphism influences child sensitivity to the environmental context.



Consequently, child 5-HTTLPR polymorphism was targeted as a potential moderator in an intergenerational risk transmission paradigm in the present dissertation.

**Relational moderators.** Certain environmental factors may also act as moderators of intergenerational risk transmission effects. However, research supporting such relations is far less abundant than that covering biological moderators. Maternal sensitivity is one of the most studied relational moderators to date. Maternal sensitivity, a core characteristic of high-quality parenting, involves the ability to identify, adequately understand, and promptly and appropriately respond to the child (Ainsworth, Bell, & Stayton, 1974). Correlates of maternal sensitivity include child language and cognitive development, attachment security, emotion regulation, and social competence (e.g., Bornstein, 2002; 2006).

The protective role of maternal sensitivity against both biological (Spangler, Johann, Ronai, & Zimmermann, 2009) and environmental adversity (Rochette & Bernier, 2014) has been identified. Importantly for the purpose of the current work, sensitivity also appears to play a protective function against suboptimal maternal characteristics.

For instance, harsh maternal discipline (as characterized by high rates of authoritarian rules and physical interference and low rates of positive reinforcement) has been longitudinally associated with increased frequency of aggressive behaviour, however only in children of relatively less sensitive mothers (Alink, Mesman, et al., 2009). Likewise, maternal assertive discipline has been related to increased children problematic behaviour but solely when mothers were also less emotionally responsive to their children (Towe-Goodman & Teti, 2008). Maternal use of physical disciplinary techniques has also been linked to impaired child behaviour but only for children of less emotionally supportive mothers (McLoyd & Smith, 2002). Furthermore, maternal sensitivity moderates the link between maternal prenatal anxiety

and infant mental development at 7 months. Indeed, high levels of maternal sensitivity buffer the risk stemming from maternal prenatal anxiety in relation to mental development (as assessed with the Bayley Scales of Infant Development II; Bayley, 1993) whereas infants of prenatally anxious women had poorer mental development scores when their mothers were also less sensitive (Grant, McMahon, Reilly, & Austin, 2010a). Similarly, maternal prenatal anxiety associates with distress and negative affect following a stressful episode in 7 months-old infants, but only for infants of less sensitive mothers whereas infants of highly sensitive mothers seem to be protected (Grant, McMahon, Reilly, & Austin, 2010b). Furthermore, optimal mother-child interactions, comparable to maternal sensitivity, have been identified as a risk buffer in the face of family conflicts (Alink, Cicchetti, Kim, & Rogosch, 2009) as well as in the context of inter-parental violence (Davies, Winter, & Cicchetti, 2006; Manning, Davies, & Cicchetti, 2014). Maternal sensitivity appears, thus, as a key construct to study when investigating intergenerational risk transmission, as it might act as a protective factor in the relation between maternal suboptimal functioning and child developmental outcomes.

**Attachment security.** Owing to the robust associations between maternal sensitivity and mother-child attachment security (e.g., De Wolff & Van IJzendoorn, 1997; Van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004), mother-child attachment security could be hypothesized to be another potentially important relational moderator. In fact, given that attachment security is a reliable predictor of child development trajectories (e.g., Fearon, Bakermans-Kranenburg, Van IJzendoorn, Lapsley, & Roisman, 2010) and that this construct is also key in the study of individual differences in emotion regulation and behaviour, attachment security appears like a promising potential moderator in the relation between maternal history of early adversity and child outcomes.

Attachment involves the continuing bond between an infant and his or her primary caregivers (Bowlby, 1982) and is a key indicator of socio-emotional development, as established by both animal and human literatures (Fox, Kimmerly, & Schafer, 1991; Moss et al., 2011; Van IJzendoorn, Bard, Bakermans-Kranenburg, & Ivan, 2009). When children manage to balance their needs for protection and comfort and their needs to explore the environment thanks to the attuned responsiveness of a primary caregiver, their relationship to that caregiver is defined as secure (Ainsworth, 1985). Attachment security has been established as a core protective factor for optimal child development such that children presenting with a secure attachment bond to their primary caregiver present with a lesser risk of developing emotional, social, and behavioural impairments (Fearon et al., 2010; Groh et al., 2012; Madigan, Atkinson, Laurin, & Benoit, 2012). Some authors suggest that promoting secure attachment bonds may be as effective as reducing exposure to adversity in reducing detrimental impacts (e.g., Drury, 2012). This view appears consistent with results stemming from intervention studies showing, for instance, that maltreated children presented with reduced internalizing and externalizing symptoms following an intervention program targeting maternal sensitivity and attachment security (Moss et al., 2011). Thus, one may expect attachment security to act as a moderating factor and buffer the risk stemming from a maternal history of early adversity onto offspring developmental outcomes.

Investigating the roles of both biological and relational moderating factors would allow for better understanding of the conditions surrounding intergenerational risk transmission, such as for whom and under which circumstances such transmission may or may not occur. Another line of inquiry for which research remains to be augmented concerns the transmission processes themselves and the underlying mechanisms at play. As such, examining potential

mediating factors in the relation between maternal history of early adversity and child developmental outcomes appears to be equally relevant.

### **Intergenerational risk transmission and mediating factors**

Childhood adversity strongly predicts the risk for mood disorders. Victims of childhood physical or sexual abuse as well as neglect are at considerable risk for depression and anxiety disorders (Famularo, Kinscherff, & Fenton, 1992; Katerndahl, Burge, & Kellogg, 2005; Kendler, Kuhn, & Prescott, 2004). Childhood trauma also influences the severity and chronicity of depression as well as treatment outcomes (Brown & Moran, 1994; Nanni, Uher, & Danese, 2012; Tanskanen et al., 2004). Likewise, persistent emotional neglect, family conflict, and conditions of harsh, inconsistent discipline increase the risk for depression and anxiety disorders (Shanahan, Copeland, Costello, & Angold, 2008; Van Brakel, Muris, Bögels, & Thomassen, 2006).

A history of early adverse experiences, including poor quality parenting, may also affect subsequent parenting practices (Lang, Gartstein, Rodgers, & Lebeck, 2010; Roberts, O'Connor, Dunn, Golding, 2004). For instance, parents presenting with a history of childhood abuse report feeling less confident in their own parenting skills, having less emotional control, having more difficulty in limit setting, acting more permissively, being more physical when interacting with their children, etc. (Banyard, 1997; DiLillo & Damashek, 2003; DiLillo, Tremblay, & Peterson, 2000; Ruscio, 2001). Furthermore, both human and animal literatures show that the quality of parenting a woman has received from her own mother is associated with the quality of parenting she will display towards her own children (Fairbanks, 1996; Francis, Diorio, Liu, & Meaney, 1999; Gonzalez, Lovic, Ward, Wainwright, & Fleming, 2001). As such, intergenerational continuity in parenting characteristics has been documented

(e.g., Belsky, Jaffee, Sligo, Woodward, & Silva, 2005; Neppl, Conger, Scaramella, & Ontai, 2009; Scaramella, Neppl, Ontai, & Conger, 2008), although some evidence also shows that not all parents will repeat the parenting they received as children (e.g., Belsky, Conger, & Capaldi, 2009).

Thus, maternal history of early adversity increases the risk for both later depression (e.g., Widom, DuMont, & Czaja, 2007) and impaired parenting skills when raising the next generation (e.g., Gonzalez et al., 2001). Moreover, both maternal depression (Pawlby et al., 2009; Weissman et al., 2006; Weissman et al., 2005) and impaired parenting skills, as evidenced, for instance, by low levels of maternal sensitivity, have been shown to jeopardize child emotional development (e.g., Hastings et al., 2008). Furthermore, maternal emotional adjustment (Koverola et al., 2005; Min, Singer, Minnes, Kim, & Short, 2012; Miranda, de la Osa, Granero, & Ezpeleta, 2013; Myhre, Dyb, Wentzel-Larsen, Grøgaard, & Thoresen, 2014) and parenting practices (Rijlaarsdam et al., 2014) are the most documented mediating factors between maternal history of adversity and child developmental outcomes. Preliminary evidence for sequential effects through maternal depression and, then, parenting has also been provided (Martinez-Torteya et al., 2014). These findings suggest an operative pathway that extends from maternal history of early adversity, defined by trauma and/or poor quality parent-child interactions, to impaired maternal emotional well-being, and, then, to forms of parenting that further relate to child emotional impairments.

Overall, these findings suggest that maternal adversity enhances both the risk for maternal depression as well as forms of parenting that then increase the risk for offspring suboptimal emotional development (Fleming et al., 2002; Meaney, 2001). The next step would then be to provide further evidence to clearly establish that this intergenerational transmission

pathway involves sequential effects (i.e., that maternal history of early adversity first affects maternal mood which then affects parenting) rather than parallel effects (i.e., that maternal history of early adversity affects both mood and parenting) onto offspring emotional development.

### **Child outcomes**

Core offspring developmental outcomes need to be targeted and studied to allow for a comprehensive understanding of the intergenerational risk transmission of maternal history of early adversity. A key variable to consider when examining the outcomes of such intergenerational transmission is child temperament. Indeed, given that early experience and environmental influences contribute to shaping child temperament as early as infancy and that early deviations in temperament characteristics predict later psychopathology (e.g., Compas, Connor-Smith, & Jaser, 2004), temperament appears as one of the main constructs to study as a potential early marker of offspring emotional development.

**Child temperament.** Temperament is a core component of emotional development. Temperament encompasses inter-individual behavioural differences that emerge very early in a child's life and that are partly inherited (Goldsmith et al., 1987). Shortly after birth, those behavioural features, typically used to describe temperament, allow for characterizing children's early emotional patterns. Those behavioural characteristics include emotionality, activity level, attention focusing/shifting, sociability, reactivity, irritability, etc. (Saudino, 2009). However, despite strong heritability, temperament is also affected by early life experiences (e.g., Lang et al., 2010). Indeed, environmental factors play an important role with regards to how temperament will be shaped, especially in early infancy (Rothbart & Derryberry, 1981; Rothbart & Bates, 2006). For instance, low parental involvement is

associated with reduced child attention and regulation functions (Lawson, Parrinello, & Ruff, 1992). Likewise, suboptimal parent-child interactions have been associated with increased fear levels in infants (Pauli-Pott, Mertesacker, & Beckmann, 2004) as well as lower regulation efficiency in children (Gartstein, Crawford, & Robertson, 2008). Furthermore, maternal depression is related to “difficult” temperament in children, which encompass deficits in biological functioning, slower adaptation to novel situations, increased withdrawal behaviour when facing unknown stimuli, and increased negative mood (Rothbart & Bates, 2006; Thomas, Chess, Birch, Hertzog, & Korn, 1963). Moreover, low levels of maternal social support are related to infant negative emotionality in low socioeconomic (SES) conditions (Fish, 1998). Interactive effects of maternal depression and family SES have also been documented in relation to infant positive and negative emotionality (NICHD, 1999). Hence, although temperament has long been considered as a strictly biological construct, literature has established a certain level of plasticity to the environment.

The importance of studying temperament in early childhood is suggested by numerous studies demonstrating that it can be used as an early marker of emotional development and, to some extent, as a proxy measure for later psychosocial deficits. For instance, increased withdrawal in children, which involves avoiding or escaping an unpleasant or uncertain situation (Bijttebier & Roeyers, 2009), has been related to an increased frequency of internalizing symptoms (Holzwarth & Meyer, 2006; Johnson, Turner, & Iwata, 2003). Moreover, low levels of approach, which refers to the act of going toward/pursuing incentives or rewards, have been related to later mood disorders (Holzwarth & Meyer, 2006). Behavioural inhibition, a dimension of temperament defined by increased vigilance and reduced motor activity toward novelty (Calkins, Fox, & Marshall, 1996) has been related to

internalizing disorders in later life (Hirshfeld-Becker et al., 2008). These documented links suggest that important variations in temperament components may be considered as early indicators of later emotional functioning, reinforcing the importance of studying temperament in early life.

**Negative emotionality.** Negative emotionality is one of those temperament components that has been identified as an early indicator of later adjustment problems such as depression (Hayden et al., 2010; Hyde, Mezulis, & Abramson, 2008; Weissman et al., 2006; Weissman et al., 2005). Negative emotionality is an early emerging, stable characteristic (Durbin, Hayden, Klein, & Olino, 2007) that encompass high levels of sub-components such as fear, frustration, and sadness (Hayden et al., 2010). High levels of childhood negative emotionality have been related to increased distress in situations involving novelty or frustration as well as strong startle responses to new or aversive stimuli (Mezulis, Pries, & Hyde, 2010). In youth, high levels of negative emotionality have been associated with reactions of dislike, avoidance, and distress in the context of novel situations (Belsky, Hsieh, & Crnic, 1996). Furthermore, this temperament component has been related to childhood, adolescent, and adult depression (Anthony, Lonigan, Hooe, & Phillips, 2002). Hence, negative emotionality emerges as a valuable outcome to consider in the study of child emotional development.

**Internalizing symptoms.** Another indicator of impaired emotional development is the presence of internalizing symptoms. Such symptoms include depression, anxiety, social withdrawal and somatic complaints (without medical explanation). Internalizing symptoms may be early emerging as shown by prevalence rates rising up to 28% in toddlers (e.g., Wilens et al., 2002). Internalizing symptoms have also been associated with increased prevalence of



later psychopathology (Bittner et al., 2007; Moffitt et al., 2007; Weissman et al., 2005) as well as difficulties with interpersonal relationships and academic performance, and heightened risk for substance abuse (Birmaher et al., 1996; Hammen & Rudolph, 2003). All in all, internalizing symptoms are core early markers of current and later psychosocial impairments. It is, thus, crucial to understand intervening factors associated with the early emergence of internalizing symptoms.

### **Summary**

Overall, research has unequivocally established that maternal characteristics, broadly, may have a significant impact on the next generation, as evidenced, for instance, by offspring suboptimal socio-emotional development. Such maternal characteristics may range from maternal sensitivity and behaviour (Barker et al., 2011; Fleming, O'Day, & Kraemer, 1999; Goeke-Morey, Cummings, & Papp, 2007; Goodman et al., 2011; Meaney, 2001) to psychosocial adjustment components (depression, anxiety, marital strain, etc.). However, the literature remains scarce in terms of intergenerational consequences of a maternal history of early adversity for the next generation. Likewise, less is known about intergenerational operative pathways, with meta-analytic data suggesting that the effect sizes of such relations are, at times, rather small, suggesting that moderating factors might be at play (e.g., Goodman et al., 2011). Besides, while mediating factors have been documented in the study of intergenerational risk transmission paradigms (e.g., Campbell, Matetic, von Stauffenberg, Mohan, & Kirchner, 2007; NICHD, 1999), very few studies, have attempted to investigate the joint contributions of such documented factors (e.g., maternal depression and sensitivity) within one single framework. As such, a broad, comprehensive overview of those transmission mechanisms and conditions appears needed.

## **Goals of the present dissertation**

In light of the current gaps in the literature pertaining to the intergenerational risk transmission of maternal history of early adversity and current psychosocial maladjustment, the present dissertation aims to document certain circumstances under which such transmission operates (i.e., for whom and under what conditions), and to identify the underlying processes and mechanisms at play, examining child outcomes at 2 and 3 years of age in two different community samples. Those aims will be worked upon by (1) investigating the modulating roles of both relational and biological factors in the relation between maternal history of early adversity and child temperament; (2) examining the potential protective role of maternal sensitivity in a risk transmission paradigm of maternal (postnatal) psychosocial maladjustment to child emotional maladjustment; and (3) extending current knowledge on factors that mediate the intergenerational effects of maternal history of early adversity onto child emotional development by investigating the mediating effects of both maternal depression and maternal sensitivity and determining whether these effects occur sequentially or in parallel.

The first article of the current dissertation explores the moderating role of mother-child attachment security in the relation between maternal history of early adversity and child temperament. This article has been published in *Psychologica Belgica*. The second article examines the moderating role of child 5-HTTLPR genotype in the association between maternal history of early adversity and child negative emotionality/behavioural dysregulation. This article has been published in *Genes, Brain, and Behaviour*. The third article examines the buffering role of maternal sensitivity in the relation between maternal psychosocial maladjustment and early child internalizing symptoms. This article has been published in the

*Journal of Abnormal Child Psychology*. The fourth article of this dissertation investigates the contribution of both maternal depression and maternal sensitivity as mediators of the effects of maternal history of early adversity onto child negative emotionality/behavioural dysregulation. This article has been submitted to the *British Journal of Psychiatry*.

## Article 1

Intergenerational transmission of psychosocial risk: Maternal childhood adversity, mother-child attachment, and child temperament

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Running head: MATERNAL ADVERSITY, ATTACHMENT, AND CHILD  
TEMPERAMENT

Intergenerational transmission of psychosocial risk: Maternal childhood adversity, mother-  
child attachment, and child temperament

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## Abstract

This study investigated the interactive effects of proximal and distal environmental influences on child temperament. Specifically, the relation between mothers' own early familial experiences, mother-child attachment security, and child temperament was examined. Sixty mothers completed a semi-structured interview pertaining to their childhood attachment experiences with their own parents when children were aged 6 months, and completed a questionnaire on their children's temperament at 2 years. Mother-child attachment security was also rated at 2 years. Children whose mothers received higher scores of early adverse caregiving experiences displayed poorer temperamental activity level outcomes only when they also showed high concomitant levels of attachment security. The results suggest the transgenerational effect of maternal early life experiences on temperamental characteristics in the offspring, describing a pathway that might contribute to the familial transmission of risk stemming from the early caregiving environment.

## Intergenerational transmission of psychosocial risk: Maternal childhood adversity, mother-child attachment, and child temperament

Epidemiological data and the perinatal programming hypothesis suggest that the effects of a maternal history of early adverse experiences may affect the next generation. It is, however, not clear how early some of these developmental changes are manifested. Moreover, whereas developmental research often assumes that children are equally affected by environmental factors, individual characteristics appear to modulate the influence of early life experiences. Hence, certain factors may influence the magnitude of both favourable and detrimental environmental effects (e.g., Belsky & Pluess, 2011). For instance, the distal risk stemming from a maternal history of childhood adversity may be modulated by more proximal factors such as relational influences.

Although infant temperament has a strong hereditary component (Saudino, 2009), it is also affected by early life experiences (Lang, Gartstein, Rodgers, & Lebeck, 2010). As such, it may be a key variable to consider when examining the outcomes of transmission processes. Indeed, measures of temperament are potential early markers in the developmental pathway to psychopathology (e.g., Compas, Connor-Smith, & Jaser, 2004). To date, several links between early temperament and later psychopathology have been documented. For instance, high levels of withdrawal in children, which is a subcomponent of temperament that refers to the act of pulling oneself out of an unrewarding or uncertain situation (Bijttebier & Roeyers, 2009), are associated with subsequent depression (Holzwarth & Meyer, 2006), eating disorders (Loxton & Dawe, 2001), anxiety (Johnson, Turner, & Iwata, 2003), and alcoholism (Sher & Trull, 1994). In contrast, low levels of withdrawal predict psychopathy in adulthood (Newman, Wallace, Schmitt, & Arnett, 1997). Furthermore, links have been found between high levels of

approach, which refers to approach toward and pursuit of incentives or rewards (Bijttebier & Roeyers, 2009), and substance use and abuse (Franken & Muris, 2006), eating disorders (Loxton & Dawe, 2001), and manic episodes (Holzwarth & Meyer, 2006). Low levels of approach, on the other hand, are related to depression (Holzwarth & Meyer, 2006). These associations suggest that significant deviations in temperamental characteristics may be considered as an early milestone in a pathway leading to psychopathology, thus underlining the importance of studying temperament early in life.

### **Intergenerational Risk Transmission**

Both typical and maladaptive processes may be familial. For instance, individual differences in parenting appear to be transmitted across generations, as shown in both animal and human literatures (Fleming, O'Day, & Kraemer, 1999; Maestripieri, 1999; Meaney, 2001; Steele & Steele, 1994). On the dark side, a plurality of mental disorders is also known to be familial. For instance, risk for depression and anxiety is known to be transmitted across generations (Eley, 1999) as are risky personality profiles and cognitive factors such as neuroticism, behavioural inhibition, and low self-esteem (Burt et al., 2005).

Intergenerational risk transmission also applies to maternal history of early adverse experiences. The results of the Avon Longitudinal Study of Parents and Children (Collishaw et al., 2007), for instance, confirm the need to study intergenerational transmission of maternal history of early adversity. Indeed, this longitudinal study targeted various maternal characteristics and history of early adverse experiences and their impact on offspring adjustment. Researchers found an association between mothers' ratings of their history of early adverse experiences and their offspring's adjustment, which suggests that mothers' perceptions of having experienced early adversity may, in and of itself, be a risk factor that



can be transmitted to the next generation. Besides, intergenerational transmission also applies to other maternal characteristics that do not necessarily entail severe adversity. In fact, maternal attitudes and behaviours vary across populations and individuals are influenced by multifaceted environmental and hereditary factors. Such maternal dispositions are known to affect the next generation. For instance, mothers with a secure attachment state of mind (i.e., displaying a coherent, balanced, and credible discourse when asked to describe their childhood relationships with their caregivers, whether positive or negative) are known to display higher mothering qualities than their insecure counterparts (for a review, see Whipple, Bernier, & Mageau, 2011). In turn, there is a great deal of research demonstrating that parenting quality bears critical importance for several spheres of child development (Borstein, 2002). In short, child development is impacted by the quality of parent-child interactions, which in turn are shaped, in part, by parents' own early life experiences (e.g., Carter, Garrity-Rokous, Chazan-Cohen, Little, & Briggs-Gowan, 2001; Rubin, Both, Zahn-Waxler, Cummings, & Wilkinson, 1991). Hence, there are many ways in which mothers' early caregiving experiences may be translated into an experience that will impact their children's social, emotional, and behavioural outcomes. As such, temperament is a key child outcome to study, as it is embedded in the development of these three domains and is a good early proxy measure of later functioning (Compas et al., 2004). One may therefore expect children whose mother presents a history of early adverse experiences to carry part of this risk, as evidenced in less optimal temperamental characteristics.

However, it is increasingly demonstrated that environmental and family factors do not affect children equally, and rather occur interactively with offspring factors (see Ellis, Boyce, Belsky, Bakermans-Kranenburg, & Van IJzendoorn, 2011). One such factor is attachment

security, which is a highly reliable predictor of child developmental trajectories (e.g., Fearon, Bakermans-Kranenburg, Van IJzendoorn, Lapsey, & Roisman, 2010). Attachment is also a key concept to the study of individual differences in emotional and behavioural regulation, and may function to modulate the effects of maternal early experiences on children's emotional and behavioural adjustment and, in the present context, child temperament.

### **Child Attachment**

Attachment encompasses the enduring bond between an infant and his or her primary caregivers (Bowlby, 1982) and is a key concept in the study of socio-emotional development, as evidenced in both animal and human literatures (Fox, Kimmerly, & Schafer, 1991; Moss et al., 2011, Van IJzendoorn, Bard, Bakermans-Kranenburg, & Ivan, 2009). An attachment relationship is qualified as secure when children are able to balance their needs for protection and comfort and their needs to explore their environment (Ainsworth, 1985). Numerous studies have shown that secure attachment is a central protective factor for child development, as evidenced for instance by meta-analytic studies showing that securely attached children are less likely to develop emotional, social, and behavioural difficulties (Fearon et al., 2010; Groh, Roisman, Van IJzendoorn, Bakermans-Kranenburg, & Fearon, 2012; Madigan, Atkinson, Laurin, & Benoit, 2012). In fact, owing to results from studies focusing on attachment security as a protective factor (e.g., McGoron et al., 2012), it has been argued that fostering secure attachment relationships may be as important in buffering the effects of an adverse environment as diminishing adversity itself (Drury, 2012). The results of a study conducted by Moss et al. (2011) support this idea: the authors found that both internalizing and externalizing symptoms of maltreated children significantly diminished following an intervention program focusing on maternal sensitivity and mother-child attachment. Hence, attachment security can

be viewed as a proximal protective factor that may serve as a buffer for the more distal risk stemming from a maternal history of negative early caregiving experiences.

## **Hypotheses**

The purpose of the present study was to investigate whether early child temperament reflects the interactive effects of proximal and distal environmental influences, such that the risk resulting from a maternal history of adverse experiences would be modulated by the more proximal influence of mother-child attachment. It was expected that mother-child attachment security and mothers' own early familial experiences would interact in the prediction of child temperament.

## **Method**

### **Participants**

Sixty mother-infant dyads living in a large Canadian metropolitan area participated in this study. Families were drawn from random birth lists of the Ministry of Health and Social Services. Criteria for participation were full-term pregnancy and the absence of any known disability or severe delay in the infant. Socio-demographic information was gathered when infants were 6 months old. At that time, mothers were between 22 and 44 years old ( $M = 31.1$ ), had 15.9 years of education on average (varying from 9 to 18 years), and all were living with their child's father (Refer to Table 1 for demographic information). Out of the 60 children under study, 36 were first-borns, 18 were the second child of their family, 5 were the third child, and 1 was the fourth.

### **Measures**

**Maternal history of early adversity.** The Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996; French version by Larose & Bernier, 2001) is a semi-structured

interview that was administered at when children were aged 6 months (T1). Mothers were asked to describe their childhood relationships with each of their parents, to support their general descriptions with specific memories or examples, to report on their parents' reactions when they were ill, upset or injured, and to reflect on how these experiences affected their development, their personality, and their current parenting behaviours. Mothers were also probed about potential experiences of trauma within or outside the family (e.g., physical or sexual abuse). Both validity and reliability properties of the AAI are well established (Bakermans-Kranenburg & Van IJzendoorn, 1993; Crowell et al., 1996; Sagi et al., 1994; see Hesse, 2008, for a review). Interviews were recorded, transcribed, and rated by certified coders following Main and Goldwyn's procedure (1998), which yields two sets of scale, namely states of mind and experiences.

In order to address the current research questions, we sought to obtain a reliable composite score constituting a measure of maternal history of early familial experiences. Accordingly, the ten experience scales (Love, Rejection, Role-Reversal, Pressure to Achieve, and Neglect, for each parent) along with the binary score of presence or absence of trauma, were submitted to a principal component analysis. One factor, which depicted maternal history of early adverse experiences and explained 28.63% of the variance of the twelve input variables, was retained. As depicted in Table 2, this factor was similar to those obtained in other studies (e.g., Tarabulsy et al., 2012), representing a history of adverse familial experiences, with high levels of reject and neglect and low levels of love by both parents, along with presence of trauma. Rotating the matrix solution did not affect the obtained solution. The resulting factor score was transformed into a regression score and used in all subsequent analyses as the index of maternal history of early adversity.

**Child security of attachment.** When children were 2 years of age (T2), mother-child attachment security was measured using the Attachment Behaviour Q-Sort (AQS; Waters, 1995). The AQS is comprised of 90 items describing potential child behaviours. Following a one-hour home visit, a trained assistant sorted these items into nine piles according to the degree to which each item is representative of the observed child's behaviour. Each pile then receives a score ranging from 1 (least representative of child) to 9 (most representative of child). The observed scores are then correlated with a prototypical score provided by the authors of the AQS. Hence, attachment security scores can vary from -1 (most insecure) to 1 (prototypically secure). Since the AQS measures attachment on a continuum, it was well suited for our low-risk sample. Inter-rater reliability was conducted for 17.7% of the dyads and yielded an intra-class correlation of .72 between raters' sorts. Meta-analytic data suggest that the observer-AQS shows excellent construct validity, with attachment scores converging with maternal sensitivity, attachment security assessed with the Strange Situation Procedure (SSP), and child adaptation (Van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004). In fact, several studies suggest that the observer-AQS is more closely related to child social and behavioural outcomes than the SSP (Van IJzendoorn et al., 2004). The observer-AQS is thus now considered one of the gold-standards of attachment research, and has been used with children aged between 1 and 6 years (Van IJzendoorn et al., 2004).

**Child temperament.** At T2, mothers were asked to complete the Toddler Behavioural Assessment Questionnaire (TBAQ; Goldsmith, 1996) assessing their perception of their child's temperament. This questionnaire assesses temperament in children aged 15 to 36 months. Three dimensions (Activity Level, Social Fearfulness, and Anger Proneness) were derived from the 55 items. Mothers answered on a Likert scale that ranged from 1 (never) to 7

(always). Each subscale has been validated separately on several samples and presents good psychometric properties (Goldsmith, 1996). Internal consistency for the current sample was satisfactory for all three subscales (Activity Level: Cronbach's alpha = .76; Anger Proneness: Cronbach's alpha = .84; Social Fearfulness: Cronbach's alpha = .69). Whereas conceptual implications of both anger proneness and social fearfulness are unequivocal, characteristics associated with activity level vary throughout developmental stages. During infancy and early childhood, high levels of temperamental activity level are associated with developmental maturity (Halverson, Kohnstamm, & Martin, 1994). Higher scores for Activity Level thus indicate favourable temperamental dispositions with the current sample of toddlers.

### **Procedure**

Two home visits were conducted at T1 and T2. At T1, mothers completed the AAI, described above. They were also asked to complete a questionnaire gathering socio-demographic information. T2 mainly consisted in the administration of child-centered tasks, along with a structured videotaped mother-child play sequence. Mothers were also asked to complete questionnaires, including the TBAQ described above, while children were not looked after by research assistants. Throughout this home visit, assistants trained following Pederson and Moran's (1995) guidelines observed child attachment behaviours and subsequently rated them with the AQS.

### **Results**

Table 3 presents the bivariate correlations between all study variables. Multiple hierarchical regressions were then performed to assess the interactive effects of maternal history of early adversity and child attachment security on child temperament at 2 years of age. The three dimensions of temperament were submitted to distinct regression equations. In

each equation, we controlled for maternal age and education as well as child gender, which are well-documented correlates of several child outcomes and may affect maternal reports. We thus inserted variables in the following order: Block 1, *child gender, maternal age, and maternal education*; Block 2, *maternal history of early adversity and offspring attachment security*; Block 3, the multiplicative interaction term of *maternal history of early adversity and offspring attachment security*. The results of the three regression models are shown in Tables 4 to 6. None of the demographic variables contributed to variation in child temperament. The analyses revealed a significant interaction effect of maternal history of early adversity and offspring attachment security on offspring temperamental activity level,  $\beta = -.70, t(6, 62) = -2.32, p < .05$ .

This interaction was explored both statistically, with post-hoc probing of moderation effects (Preacher, Curran, & Bauer, 2006) and graphically (Figure 1). The relation between maternal history of early adversity and child temperamental activity level was tested as a function of child attachment security. Fitted regression lines were plotted at high (+ 1 SD) and low (-1 SD) values of mother-child attachment security. The results revealed a significant and negative slope for children with relatively higher levels of attachment security ( $\beta = -.26, SE = .12, t = -2.19, p < .05$ ) whereas the slope for those with lower levels of attachment security was not significant ( $\beta = .12, SE = .12, t = 1.04, ns$ ). This indicates that a maternal history of more severe early adversity was (negatively) related to child temperamental activity level as expected, however only in children presenting relatively higher levels of attachment security. In order to determine specific levels of maternal adversity below which children with higher levels of attachment security showed better temperamental outcomes and above which they showed poorer outcomes than their less securely attached counterparts, analyses of regions of

significance were performed. The simple slope between child attachment and child activity level was significant outside the illustrated bounds (Figure 1). Hence, child attachment is significantly linked to child activity level when maternal adversity scores were below -2.03 or above .19.

The interaction between maternal history of early adversity and child attachment in the prediction of child social fearfulness was non-significant (Table 5). When predicting child anger proneness, the interaction was in the same direction as that reported above for activity level, although of marginal significance only (see Table 6), and therefore not explored further.

### **Discussion**

Aiming to investigate conditions under which intergenerational transmission of risk occurred, we examined whether the relation between maternal history of early negative life experiences and offspring temperament was moderated by child attachment security. The results revealed a significant negative relation between maternal history of early adversity and child temperamental activity level for children presenting high attachment security to their mother. Contrastingly, the relation was not significant for children who displayed low attachment security to their mother. During the first two years of life, high levels of temperamental activity are positively associated with developmental maturity. It is only in later childhood that this temperament component relates to negative outcomes such as hyperactivity and other externalizing behaviours (for a review, see Halverson, et al., 1994). Hence, more adverse caregiving experiences during mothers' own childhood were related to lower degrees of a desirable child outcome, namely early temperament activity level, only for children who were relatively more securely attached to their mother. These results provide preliminary support for transgenerational risk transmission of maternal history of early



adverse experiences onto offspring temperament. To determine the exact levels of adversity at which the two attachment groups differed in terms of their temperamental activity level scores, we performed analyses of regions of significance. Rather surprisingly, the regions of significance analysis suggested that in fact, attachment security's moderating role leaned more toward risk than protection. Indeed, high levels of early adverse experiences were not needed to transmit a negative impact onto children's temperament as a function of their attachment security (i.e., adversity score  $\geq .19$ ), whereas much higher levels of positive experiences (i.e., adversity score  $\leq -2.03$ ) were needed for children to display beneficial effects on their temperamental activity level as a function of their attachment security.

Although these results might, at first glance, seem somewhat counter-intuitive and do not concur with both common beliefs and initial hypotheses that attachment security may only serve as a protective factor, they are consistent with a differential-susceptibility model as described by Belsky and Pluess (2009). This theory posits that not only do individuals vary in the degree to which they are vulnerable to adverse environmental conditions, but also in the degree to which they are open to enriched, positive conditions (Pluess & Belsky, 2011). Indeed, children presenting with high attachment security had the lowest temperamental activity level scores at high levels of maternal history of early adversity, but also had the highest temperamental activity level scores at low levels of maternal history of early adversity, compared to counterparts presenting with low levels of attachment security. This suggests that mother-child attachment security may act both as a risk and a protective factor, at both ends of the spectrum of maternal history of early adverse experiences.

Such findings appear to contrast with prevailing views that it is rather risk factors (e.g., risk genes or biological reactivity) which make children more susceptible to environmental

influences (see Belsky & Pluess, 2009; Boyce & Ellis, 2005; Mesman et al., 2009; and van Aken, Junger, Verhoeven, van Aken, & Deković, 2007 for reviews), in that attachment security is generally conceptualized as a positive factor that serves only protective functions. However, one may argue that attachment security acts as a susceptibility (rather than necessarily protective) factor in that it allows children to freely explore their environments (Grossmann, Grossman, Kindler, & Zimmerman, 2008; Weinfeld, Sroufe, Egeland, & Carlson, 2008), thus potentially making them more open to both positive and negative environmental influences. Indeed, whereas insecurely attached children are believed to be reluctant to fully dedicate their resources to exploration with the fear that caregivers might not provide adequate support, securely attached children are conceptualized as more open to their environments and may thus be impacted by external factors, either positively or negatively, to a greater extent than their insecure counterparts. Furthermore, given that securely attached children are generally more open to their caregivers' influences, for instance showing greater responsiveness to them and increased emotional openness (McElwain, Holland, Engle, & Wong, 2012; Moss, Bureau, Cyr, Mongeau, & St-Laurent, 2004), they may show increased sensitivity to maternal care, which could make them more susceptible to their mothers' history and dispositions. Hence, the hypothesis is that attachment security, while being a very well documented protective factor, may paradoxically in some cases act as a risk factor by making children more open to non-optimal parental influences.

Maternal behaviour may partly account for the link uncovered between maternal history of early adversity and child temperament. There is evidence that maternal mood disorders (one of the well-known consequences of presenting with a history of early life negative experiences; Heim & Nemeroff, 2001) impact the quality of mother-child

interactions (Field, 2011; Fleming et al., 2002). For instance, depressed mothers display less sensitivity, less face-to-face interaction, and less vocalizing, imitative, and smiling behaviours (Field, Diego, & Hernandez-Reif, 2006; Murray, Fiori-Cowley, Hooper, & Cooper, 1996). They may also display more intrusive or passive behaviours (Malphurs, Raag, Field, Pickens, & Pelaez-Nogueras, 1996). In turn, such mothering behaviours relate to offspring increased behavioural inhibition, negative emotionality, and social withdrawal (Martins & Gaffan, 2000). Provided that child exploration, in the context of security of attachment, may prompt feelings of fear, suspicion, or distress depending on the faced encounters, maternal behaviour and sensitivity in response to these prompted feelings may play an especially potent role in child emotion regulation (Grossmann & Grossmann, 1991). Hence, it will be important for subsequent investigations to consider the role of parenting behaviour in the relation between maternal history of early adversity and offspring temperamental outcomes.

Another stimulating line of inquiry pertains to the different forms that the links between child temperament and attachment may take. Hence, whereas evidence for the existence of direct links between attachment security and temperament is quite scarce (Vaughn, Bost, & Van IJzendoorn, 2008), caregiving environments that facilitate the emergence of a secure mother-child attachment relationship are also associated with the development of neurophysiological components of behavioral inhibition and emotional regulation (Hane & Fox, 2006). The results of the current study suggest one more form of interplay between these two central indicators of child functioning: a secure attachment relationship may provide a facilitating context in which maternal predispositions, positive and negative, are more likely to have an impact on children's emotional development, as evidenced in their temperamental dispositions.

Recall, however, that a significant interaction was found only when predicting child activity level. It is unclear at this point why anger proneness and social fearfulness did not yield significant results as well. However, one should bear in mind that results were marginally significant for anger proneness (and in the same direction as those found for activity level), and thus that low statistical power may partly explain the inconclusive results, along with the lower reliability of the social fearfulness subscale.

Another limitation to this study is the use of maternal reports of offspring temperament, which increases the risk of shared method variance with self-reported early caregiving experiences. The use of this tool, however, has been associated to strengths not captured by observer reports or laboratory assessments (Rothbart & Hwang, 2002). For instance, maternal reports of offspring temperament allow gathering of information about the child in various contexts and at several points in time, which is challenging to achieve with observational measures. Nonetheless, it would have been interesting to gather objective temperamental data, including from earlier time points to assess the stability of these temperamental outcomes. Besides, it is important to note that the AQS does not provide classifications of insecure attachment as obtained with the SSP. As such, our results cannot discriminate between different types of insecure attachment as potential moderators of the effect of maternal history of early life experiences on child temperament. It is also critical to bear in mind that we only assessed mothers' retrospective accounts of their early caregiving experiences, which are likely to be tainted by intervening life experiences and memory processes. A very strong design would entail the longitudinal follow-up of children whose early experience would be documented objectively, up until they themselves become parents. Furthermore, our normative sample yielded mother-child attachment security scores that were

slightly above what is generally reported in the literature (e.g., Van IJzendoorn et al., 2004). Hence, the same study performed in a high-risk sample could potentially lead to different conclusions, although all normative samples are typically characterized by high mother-child attachment security scores.

Notwithstanding these limitations, this study is one of the first to show that mother-child attachment security may serve as a susceptibility factor that makes children more susceptible to both positive and negative factors. It also provides further support for the use of a dimensional analysis of the AAI to tap into maternal early life experiences. Future research should continue to investigate intergenerational transmission of maternal history of early adverse experiences and the contributing role of mother-child and other attachment relationships (e.g., father-child) to this transmission. Longitudinal studies will be invaluable in investigating the conditions under which such transmission results in actual psychopathology in the offspring, allowing for the development of well-targeted early prevention efforts such as preventive intervention programs aimed at enhancing parental sensitivity and infant attachment security (for a review, see Bakermans-Kranenburg, Van IJzendoorn, & Juffer, 2003).

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Table 1

*Means (standard deviation) of demographic variables, predictor variables, and outcome variables*

Sample size	60 (32) <sup>a</sup>
Maternal Age	31.08 (3.85)
Maternal Education <sup>b</sup>	15.89 (2.23)
Maternal Adversity	-.15 (.96)
Mother-child Attachment Security	.49 (.27)
Child Activity Level	3.58 (.63)
Child Social Fearfulness	3.34 (.84)
Child Anger Proneness	3.87 (.83)

<sup>a</sup>Number of girls; <sup>b</sup>Number of years of education

Note. Original temperament scores were transformed into z-scores.



Table 2

*Factor loadings for AAI's past experiences scales*

Scale	Factor Loadings
<i>Scales relative to experience with mother</i>	
Love	-.84
Rejection	.73
Role Reversal	.12
Pressure	.01
Neglect	.62
<i>Scales relative to experience with father</i>	
Love	-.80
Rejection	.59
Role Reversal	-.39
Pressure	-.13
Neglect	.62
Experienced Trauma	.51

Table 3

*Bivariate correlations between all study variables*

	1.	2.	3.	4.	5.	6.	7.	8.
1. Maternal Age	--	.38**	-.02	-.13	-.04	-.12	.00	.03
2. Maternal Education		--	-.06	-.09	-.15	-.18	.00	.06
3. Child Gender			--	.04	.25*	.18	.14	.20
4. Maternal Adversity				--	-.11	-.08	-.02	.12
5. Attachment Security					--	-.23	-.10	-.18
6. Child Activity Level						--	.24	.35**
7. Child Social Fearfulness							--	.31*
8. Child Anger Proneness								--

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

Table 4.

*Summary of regression analyses for interactive effects of maternal history of early adversity and mother-child attachment security onto child temperamental activity level*

Model and steps	b	t
1. Maternal Age	-.01	-.45
Maternal Education	-.04	-1.04
Child Gender	.22	1.35
2. Maternal Adversity Score (A)	-.10	-1.28
Mother-child Attachment Security (B)	-.81**	-2.76**
3. Interactive Term (AxB)	-.70*	-2.32*
R <sup>2</sup> (adj.)		.18
df		(6, 58)

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

Table 5

*Summary of regression analyses for interactive effects of maternal history of early adversity and mother-child attachment security onto child temperamental social fearfulness*

Model and steps	b	t
1. Maternal Age	.00	.11
Maternal Education	-.01	-.11
Child Gender	.26	1.16
2. Maternal Adversity Score (A)	-.03	-.27
Mother-child Attachment Security (B)	-.49	-1.15
3. Interactive Term (AxB)	-.07	-.15
R <sup>2</sup> (adj.)		.05
df		(6, 58)

Table 6

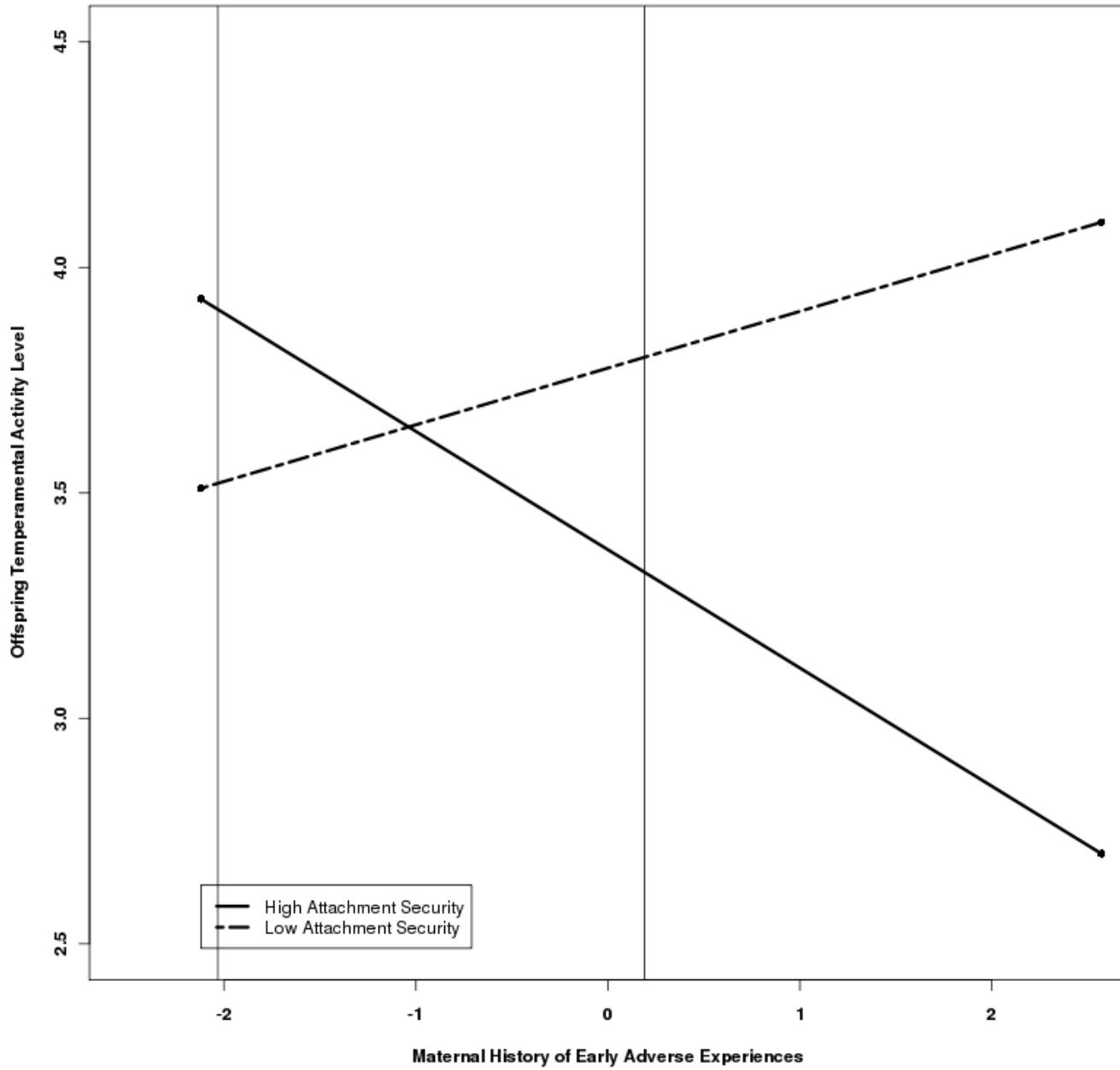
*Summary of regression analyses for interactive effects of maternal history of early adversity and mother-child attachment security onto child temperamental anger proneness*

Model and steps	b	t
1. Maternal Age	.01	.19
Maternal Education	.01	.26
Child Gender	.38 <sup>t</sup>	1.80 <sup>t</sup>
2. Maternal Adversity Score (A)	.07	.65
Mother-child Attachment Security (B)	-.78 <sup>t</sup>	-1.75 <sup>t</sup>
3. Interactive Term (AxB)	-.74 <sup>t</sup>	-1.76 <sup>t</sup>
R <sup>2</sup> (adj.)		.07
df		(6, 58)

<sup>t</sup> $p < .10$ ; \*  $p < .05$ ; \*\*  $p < .01$

Figure 1.

*Interactive effects and regions of significance of maternal history of early adversity and mother-child attachment security onto child temperamental activity level*



## Article 2

Maternal childhood adversity and child temperament: An association moderated by child 5-HTTLPR genotype

Bouvette-Turcot, A-A., Fleming, A. S., Wazana, A., Sokolowski, M. B., Gaudreau, H., Gonzalez, A., Deslauriers, J., Kennedy, J. L., Steiner, M., & Meaney, M. J., on behalf of the MAVAN Research Team (2015). Maternal childhood adversity and child temperament: An association moderated by child 5-HTTLPR genotype. *Genes, Brain and Behavior*, 14, 229-237, doi : 10.1111/gbb.12205

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Running head: RISK TRANSMISSION OF MATERNAL ADVERSITY

Maternal childhood adversity and child temperament: An association moderated by child 5-HTTLPR genotype

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## Abstract

We examined transgenerational effects of maternal childhood adversity on child temperament and a functional promoter polymorphism, 5-HTTLPR, in the serotonin transporter gene (*SLC6A4*) as potential moderators of such maternal influences in 154 mother–child dyads, recruited into a longitudinal birth cohort study. We examined the interactive effects of maternal childhood experience using an integrated measure derived from Childhood Trauma Questionnaire (CTQ) and Parental Bonding Index (PBI). Triallelic genotyping of 5-HTTLPR was performed. A measure of “negative emotionality/behavioural dysregulation” was derived from the Early Childhood Behaviour Questionnaire at 18 and 36 months. Negative emotionality/behavioural dysregulation was highly stable between 18 and 36 months and predicted psychosocial problems at 60 months. After controlling multiple demographics as well as both previous and concurrent maternal depression there was a significant interaction effect of maternal childhood adversity and offspring 5-HTTLPR genotype on child negative emotionality/behavioural dysregulation ( $\beta = 1.03$ ,  $t_{(11,115)} = 2.71$ ,  $p < .01$ ). The results suggest a transgenerational effect of maternal developmental history on emotional function in the offspring, describing a pathway that likely contributes to the familial transmission of vulnerability for psychopathology.

*Key words:* Maternal Adversity; Negative emotionality; *SLC6A4* genotype; Transgenerational transmission; Differential susceptibility.

## Maternal childhood adversity and child temperament: An association moderated by child 5-HTTLPR genotype

Child abuse or neglect increases the risk and chronicity of depression and anxiety disorders (Heim & Nemeroff, 2001, Kendler *et al.*, 2000, Molnar *et al.*, 2001, Stein *et al.*, 1996, Widom *et al.*, 2007) as well as treatment outcomes (Nanni *et al.*, 2012). Likewise, persistent emotional neglect, family conflict, and conditions of harsh, inconsistent discipline increase the risk for depression and anxiety disorders (e.g., Hill *et al.*, 2001; Shanahan *et al.*, 2008). Thus, cold, distant parent-child relationships as well as more overt forms of trauma associate with an increased risk of affective disorders as well as childhood endophenotypes, such as behavioural inhibition (Hane & Fox, 2006). These findings suggest that the influence of parental care on child development extends across a wide parent – child interactions and is not unique to more extreme forms of maltreatment (e.g., Hane & Fox, 2006).

The risk stemming from a maternal history of early adverse experiences may be transmitted to the next generation (Collishaw *et al.*, 2007). While studies of the transgenerational risk transmission of maternal history of early adversity are scarce, longitudinal analyses confirm the familial transmission of depression and related disorders (Weissman *et al.*, 2006). The offspring of depressed mothers are at a significantly increased risk for depression than are those of parents with no history of depression. While heritable, sequence-based genomic variations are inevitably an influence on future mental health, the results of treatment studies suggest non-genomic effects (Weissman *et al.*, 2006). Successful treatment of maternal depression reduces the risk for psychopathology in the offspring (Wickramaratne *et al.*, 2011).

Children of depressed mothers show an increase in forms of temperament, such as negative emotionality, that predict a greater risk for depression in later life (Caspi *et al.*, 2003, Weissman *et al.*, 2006). A recent meta-analysis confirmed the relation between maternal depression and negative emotionality (Goodman *et al.*, 2011), however, the effect size of the associations was small suggesting the importance of moderating variables. This conclusion is consistent with studies showing that the impact of early environmental influences is moderated by the genotype of the child (e.g., Belsky & Pluess, 2009; Caspi *et al.*, 2003). Indeed, it is increasingly apparent that vulnerability for depression emerges from the interaction of environmental influences, including genotype (Meaney, 2010, Rutter *et al.*, 2006).

Depression involves alterations in serotonergic synaptic transmission and there is evidence that variation in genes encoding for proteins that regulate serotonin metabolism and transmission, such as the serotonin transporter polymorphism (5-HTTLPR) that codes for the serotonin transporter gene, moderate the effects of environmental factors on both the risk for depression as well as on childhood expression of endophenotypes that associate with depression (Fox *et al.*, 2005, Pluess *et al.*, 2011). The most extensively characterized 5-HTTLPR genotype is that of 43 bp insertion/deletion in the promoter region that produces long (L) and short (S) variants in the serotonin-transporter-linked promoter region. The L and S functional alleles alter 5-HTTLPR transcription such that the S variant results in significantly reduced *in vitro* basal transcription of 5-HTT mRNA (Hu *et al.*, 2006). The S allele is associated with increased negative emotion, such as heightened anxiety, elevated neuroticism, harm avoidance and fear conditioning (see Homberg & Lesch, 2011, for a review). The S allele of 5-HTTLPR also associates with greater vulnerability for depression in children, adolescents, and young adults exposed to early-life stress, whereas in the same

context the L allele appears to be protective (Caspi *et al.*, 2003, Pluess *et al.*, 2011, Taylor, 2010). While these results have not been uniformly replicated, thorough analyses suggest that the failure to replicate is associated with differences in methodologies as opposed to the fidelity of the interaction effect on depression (Uher & McGuffin, 2008). It is important to note that a variant of the L allele, the L<sub>G</sub> allele (Hu *et al.*, 2006, and see below) also confers vulnerability to depression, which might explain some of the discordant results.

These findings suggest that maternal childhood adversity might compromise the emotional development of the child, an effect that may be moderated by the child genotype. We examined the relation between maternal childhood adversity and negative emotionality/behavioural dysregulation (NE/BD) in the offspring using data from a longitudinal birth cohort. We first derived a factor of NE/BD from the Early Childhood Behavioural Questionnaire (Putnam *et al.*, 2006). We hypothesized 1) a significant, positive relation between maternal adversity and NE/BD in the child, and 2) that the effect of maternal childhood adversity would be moderated by child 5-HTTLPR genotype.

## **Method**

### **Participants**

Our community sample consisted of 154 mothers recruited in Montréal (Québec) and Hamilton (Ontario) at 13-20 weeks gestation from antenatal care clinics at the time of routine ultrasound or through advertisements at hospitals. Participants were part of the Maternal Adversity, Vulnerability, and Neurodevelopment (MAVAN) study, a longitudinal descriptive study, which examines the development of individual differences in phenotypes associated with multiple forms of psychopathology. This group of mothers and children (Table 1) constitute a portion of the larger population of mothers that were part of MAVAN and whose

children had reached the age of 36 months at the time of this analysis. Eligibility criteria included age 18 or over, singleton gestation, and fluency in French or English and excluded women with severe chronic illness (other than hypertension, asthma, or diabetes) and other serious medical conditions (e.g., placenta previa). Only babies born at a gestational age of 37 weeks or later, above 2000 gms and with APGAR scores >7 were included in the cohort. Mothers were first assessed during their pregnancy (~ 26 weeks) and then followed at multiple time points that included both home visits and laboratory sessions. Written, informed consent was obtained from all participants. Ethics approval was obtained from the Douglas Mental Health University Institute (McGill University, Montreal) and St-Joseph Healthcare/McMaster University, Hamilton.

In terms of ethnicity, 88.7% of the sample was European/Caucasian, 8.1% was African descent/African American, and 3.2% was Hispanic/Latino.

## **Measures**

***Maternal Adversity.*** Maternal history of early adversity was assessed with a combination of the Childhood Trauma Questionnaire (CTQ; Bernstein *et al.*, 1994) and the Parental Bonding Instrument (PBI; Parker *et al.*, 1979). Whereas the CTQ assesses more severe instances of adversity, the PBI captures the subjects' perception of variation in parental experience across the normal range. The CTQ was administered to mothers during a home visit both prenatally and when children were aged 24 months. All five subscales (emotional neglect, emotional abuse, physical neglect, physical abuse, and sexual abuse) were used in our analyses. The PBI, which is highly stable over time (Wilhelm *et al.*, 2005), was administered during a home visit when the infants were aged 6 months. Only the maternal care scale of the

PBI was entered into the analytical models since it was the subscale scale that related to the construct under study and focused on maternal transmission.

We used a previously validated principal component analysis to derive one factor and reduce our measures of maternal childhood adversity (CTQ and PBI) (Mileva-Seitz *et al.*, 2011). This factor explained 52% of the total variance (eigenvalue = 3.134).

**Maternal Mood.** The depressive state of the mothers was assessed at 6 and 36 months postpartum with the Center for Epidemiologic Studies Depression Scale (CES-D), a self-report, 20-item measure (Radloff, 1997). CES-D scores were centered and standardized.

**Infant Genotype.** Buccal swabs were collected at 36 months. DNA extraction and 5-HTTLPR genotyping was performed at the Center for Addiction and Mental Health, in Toronto (Canada). For the 5-HTTLPR, 4  $\mu$ L total genomic DNA was combined with 1X MBI Fermentas PCR buffer containing  $(\text{NH}_4)_2\text{SO}_4$ , 1.5 mM  $\text{MgCl}_2$  (MBI Fermentas), 0.0325  $\mu$ g each primer (Cook *et al.* 1997; forward primer labeled with 5' HEX fluorescent tag), 0.16 mM each dNTP (MBI Fermentas) and 1 U Taq polymerase (MBI Fermentas) to a total volume of 25  $\mu$ L. The PCR reactions were subjected to an initial denaturation for 3 min at 95°C, followed by 40 cycles of amplification in an AB 2720 (ThermoFisher Scientific Burlington, ON) thermal cycler: denaturing for 30 sec at 95°C, annealing for 30 sec at 61°C and extension for 1 min at 71°C, and a final extension at 72°C for 10 min. Five microlitres of the PCR product was combined with 1X New England Biolabs Buffer 2, 10 U MspI restriction enzyme (New England Biolabs) in a total volume of 30  $\mu$ L was digested overnight at 37°C. Digested products were electrophoresed on an AB 3130-Avant Genetic Analyzer as per manufacturer's directions, and product sizes determined by comparison to GeneScan 500 ROX size standard using GeneMapper (version 4.0). 10% of samples were genotyped in duplicate. Error rate was

below 1%. Any discrepant genotypes were repeated with a new aliquot of stock DNA. Whichever genotype result the third result matched was retained as correct. If a new aliquot was not available, the genotype was removed.

When children were aged 36 months, buccal swabs were also collected for mothers. Maternal genotype was used in our analyses as a covariate.

There is evidence for two functional variants of the L allele ( $L_A$  and  $L_G$ ) result from a single nucleotide polymorphism ( $A \rightarrow G$ , rs25531) in the 5-HTTLPR region (Hu *et al.*, 2006, Uher & McGuffin, 2008). The  $L_A/L_A$  genotype is associated with a greater 5-HTT binding potential in human putamen (Praschak-Rieder *et al.*, 2005) and midbrain (Reimold *et al.*, 2007) as well as with higher mRNA expression *in vitro* (Hu *et al.*, 2006). We grouped the  $L_G$  and S alleles since these variants are functionally similar with respect to 5-HTT expression (Hu *et al.*, 2006). We compared  $L_A/L_A$  homozygote infants to S/ $L_G$  allele carriers.

***Negative emotionality/behavioural dysregulation.*** Infant NE/BD was measured using the Early Childhood Behaviour Questionnaire (ECBQ; Putnam *et al.*, 2006) at 18 and 36 months. The ECBQ is a maternal-report questionnaire comprised of 201 items grouped in 18 subscales (see Table 2) and is based on a 7-point Likert scale. A principal component analysis was performed to derive a NE/BD factor at both 18 and 36 months (see Results).

***Behavioural problems.*** The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) was administered at 60 months to validate ECBQ-derived measures. The SDQ is a parental report comprised of 25 items divided into 5 scales: emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behaviour. A total difficulties score is also obtained by summing all scores from all subscales except for the prosocial subscale. Respondents are asked to rate each item on a 3-point scale.

The validity of the SDQ as a screening measure for child psychopathology is well established (e.g., Goodman, 1997). The SDQ was administered to both mothers and fathers during a home visit, when children were aged 60 months.

## Results

***Negative emotionality/behavioural dysregulation.*** We first attempted to replicate a negative affectivity factor using the ECBQ (Putnam *et al.*, 2006) performing a principal axis factor analysis with an oblimin rotation. We were required to force a three-factor solution to obtain the same factor loadings as Putnam *et al.* (2006). We decided to derive our own construct without a predetermined number of factors. We entered the 18 ECBQ subscales into a principal component analysis. After excluding all items that loaded with a coefficient absolute value below .40, we obtained one factor termed “negative emotionality/behavioural dysregulation” that included discomfort, fear, frustration, and sadness, which are core negative emotionality/behavioural dysregulation components. The NE/BD factor explained 21% of the total variance in the ten remaining input variables (eigenvalue = 3.8). This factor was comprised of positive ratings of discomfort, fear, frustration, activity level, motor activation, and sadness, and of negative ratings of attentional focusing, cuddliness, inhibitory control, and soothability. The scores were normalized and centered for all further analyses. Rotating the matrix solution did not affect the solution. Since this factor included items that reflect cognitive and motor aspects not included in the Putnam *et al.* (2006) negative affectivity factor, notably inhibitory control, attentional focusing, activity level, and because such measures are not typically related to negative emotionality per se, we labeled our factor as “negative emotionality/behavioural dysregulation”. Our factor nevertheless correlated strongly with that of Putnam *et al.* (2006) ( $r = .73, p < .01$ ) (see Table 2 for factor loadings).



We derived a similar factor with the same variables obtained when infants were aged 18 months to assess the stability of our NE/BD measure. NE/BD scores at 18 and 36 months were strongly associated ( $r = .65, p < 0.01$ ; Cronbach's  $\alpha = .79$ ). This finding is consistent with a previous study demonstrating the longitudinal stability of the ECBQ (Putnam *et al.*, 2006). We then examined the predictive validity of our NE/BD scores by examining the relation with SDQ ratings obtained at 60 months of age for the sub-sample for which such scores were available ( $n = 70$  mothers;  $n = 55$  fathers). NE/BD scores at 36 months were positively associated with maternal reports of total difficulties ( $r = .47, p < .01$ ), emotional symptoms ( $r = .30, p < .01$ ), conduct problems ( $r = .21, p < .05$ ), hyperactivity ( $r = .32, p < .01$ ) and peer problems ( $r = .46, p < .01$ ), and negatively associated with pro-social scores ( $r = -.30, p < .01$ ). NE/BD scores at 36 months were also positively associated with paternal reports of total difficulties ( $r = .26, p < .05$ ), conduct problems ( $r = .26, p < .05$ ), hyperactivity ( $r = .25, p < .05$ ) and negatively associated with pro-social scores ( $r = -.42, p < .01$ ). However, paternal ratings were not associated with emotional symptoms and peer problems ( $p$ 's  $> .05$ ). These findings are consistent with those linking negative emotionality to phenotypes associated with an increased risk for depression (Anthony *et al.*, 2002, Caspi *et al.*, 1996). Finally, we found that children did not differ in NE/BD as a function of their 5-HTTLPR genotype ( $t_{(184)} = .62, ns$ ) nor that of their mother ( $t_{(206)} = .32, ns$ ).

**5-HTTLPR genotype frequencies and demographics.** Genotype was coded for the presence of the S allele: 0 = no copies of S or  $L_G$ ; 1 = one or two copies of S or  $L_G$ . The frequency of mothers and children with the  $L_A/L_A$  genotype (25%-30%; Table 3) is consistent with the literature with Caucasian populations (Hu *et al.*, 2006). Tests of Hardy Weinberg Equilibrium (HWE) were performed for each locus to verify that genotype frequencies in our

sample did not deviate from expected frequencies in the population. Three out of four comparisons did not deviate from expected values. For  $L_A$  and  $L_G$  alleles, offspring values were not in HWE ( $\chi^2=6.2$ ;  $n = 54$ ;  $p < .05$ ) whereas mothers' values were ( $\chi^2=.31$ ;  $n = 59$ ; *ns*). The fact that offspring values were not in HWE might be explained by a very small sample size in the  $L_G$  category. For L and S alleles, both offspring and mothers values were in HWE ( $\chi^2=.07$ ;  $n = 154$ ; *ns* and  $\chi^2=1.83$ ;  $n = 154$ ; *ns*, respectively) . Comparisons using *t*-tests, assuming equal variances, showed that the 5-HTTLPR genotype of the child was unrelated to maternal age, combined family income at intake into the study, gender of child, infant birth weight, maternal early adversity, or child NE/BD scores.

***Maternal childhood adversity and postpartum depression.*** We log-transformed values to normalize the maternal adversity measure, which tended to show a negative skew. Mothers did not differ in their history of childhood adversity as a function of their 5-HTTLPR genotype ( $t_{(142)} = .72$ , *ns*) or that of their offspring ( $t_{(152)} = 1.37$ , *ns*). Maternal childhood adversity was positively related to maternal depression at 6 ( $r = .38$ ,  $p < .01$ ) and 36 ( $r = .33$ ,  $p < .01$ ) months postpartum and, as expected, the depression scores at the two time points were inter-correlated (Table 4). Hence, we controlled for maternal depression at the 6- and 36-month time points in our analyses by using CES-D scores as covariates to assess the effects of maternal depression on ratings of NE/BD. The 36-month time point corresponds to a time of maternal report and permits an analysis of the influence of the potential of maternal mood, while the 6-month time point predates the time of the first maternal report (i.e., 18 months) and informs on maternal mood in the early postpartum period. Including these depression measures as covariates prior to the main adversity, genotype, and G X E values, allowed us to

determine whether the main predictors remained significant after accounting for previous and current maternal depression.

***Maternal childhood adversity and offspring 5-HTTLPR genotype.*** Multiple linear hierarchical regression analyses were performed to assess the influence of maternal childhood adversity and offspring 5-HTTLPR genotype on infant NE/BD at 36-months of age. We controlled for sample of origin recruitment differences as well as the effects of selected demographics, maternal depression, and maternal 5-HTTLPR genotype (see Table 4). We inserted variables in the following order: Step 1, *origin of subject, gender, birth weight corrected for gestational age, maternal 5-HTTLPR genotype, maternal age, and family income*; Step 2, *maternal depression at 6, and 36 months postpartum*; Step 3, *maternal adversity, offspring 5-HTTLPR genotype*; Step 4, the multiplicative interaction term of *maternal adversity and offspring 5-HTTLPR genotype*. Both the first full model and the reduced model are included in Table 4 and show the same basic outcome. None of the demographic variables with the exception of birth weight (corrected for gestational age) contributed to the variation in NE/BD ( $\beta = .01, t_{(11,115)} = 1.83, p < .10$ ; Table 5). Maternal depression at 6 months did not associate with NE/BD. In contrast depression at 36 months was associated with NE/BD ( $\beta = .36, t_{(11,115)} = 3.53, p < .01$ ). Nevertheless, accounting for the effects of demographics as well as both early (6 month) and concurrent (36 month) maternal depression, there remained a significant main effect of maternal childhood adversity on child NE/BD ( $\beta = -.62, t_{(11,115)} = -2.04, p < .05$ ) such that higher maternal adversity scores were significantly associated with higher NE/BD ratings. Furthermore, there was a significant interaction effect of maternal childhood adversity and offspring 5-HTTLPR genotype on child

NE/BD ( $\beta = 1.03$ ,  $t_{(11,115)} = 2.71$ ,  $p < .01$ ) such that NE/BD scores increased as a function of maternal adversity in S/L<sub>G</sub> allele carriers (Table 5).

This interaction was explored both statistically and graphically (Figure 1). We followed procedures for post-hoc probing of moderation effects described by Holmbeck (2002). First, the effects of adversity on child NE/BD were tested as a function of child 5-HTTLPR genotype. The results revealed a significant and positive slope for S/L<sub>G</sub> allele carriers ( $\beta = .26$ ,  $SE = .09$ ,  $p < .01$ ). The slope for L<sub>A</sub>/L<sub>A</sub> homozygotes was not significant ( $\beta = -.25$ ,  $SE = .14$ , *ns*).

We then explored the effects of child genotype on NE/BD at different levels of maternal adversity, which is the inverse of the previous post-hoc probe. At one standard deviation above the mean of maternal adversity, there were no statistically significant differences between the NE/BD scores between subgroups ( $\beta = .32$ ,  $SE = .09$ , *ns*). However, at 1.5 standard deviations above the mean, NE/BD scores were significantly higher in S/L<sub>G</sub> allele carriers than the L<sub>A</sub>/L<sub>A</sub> homozygotes group ( $\beta = .71$ ,  $SE = .32$ ,  $p < .05$ ). Interestingly, at one standard deviation below the mean in maternal adversity, S/L<sub>G</sub> allele carriers showed a significantly lower NE/BD scores ( $\beta = -.55$ ,  $SE = .24$ ,  $p < .05$ ). These findings reflect a cross-over interaction where children with the less functional 5-HTTLPR (S/L<sub>G</sub> allele carriers) alleles are significantly higher in NE/BD scores than L<sub>A</sub>/L<sub>A</sub> homozygotes at high levels of maternal adversity, but significantly lower in NE/BD scores than at low levels of maternal adversity. Indeed L<sub>A</sub>/L<sub>A</sub> homozygote children do not vary significantly in NE/BD as a function of maternal adversity. These interactive effects of maternal childhood adversity and child genotype were retained in the reduced regression analysis after removal of all non-predictive variables.

## Discussion

We examined the transgenerational influence of maternal childhood adversity on offspring NE/BD focusing and the potential moderation of such effects by offspring 5-HTTLPR genotype, independent of maternal depression. We found that maternal childhood adversity associated with increased NE/BD in 36 months-old children, suggesting a transgenerational effect. As hypothesized, this transgenerational effect was moderated by the offspring 5-HTTLPR genotype and independent of previous and concurrent maternal depression.

The findings are consistent with previous studies showing that the 5-HTTLPR moderates the influence of prenatal maternal anxiety (Pluess *et al.*, 2011), social support (Fox *et al.*, 2005) and attachment security (Kochanska *et al.*, 2009) on the childhood expression of phenotypes linked to depression, including negative emotionality. The influence of the 5-HTTLPR polymorphism in this study conforms to the criteria established for a ‘susceptibility factor’ (Belsky & Pluess, 2009a), since 5-HTTLPR status was unrelated to either the predictors (maternal adversity or maternal depression) or the outcome (negative emotionality/behavioural dysregulation). More compelling evidence for differential susceptibility is the finding of the cross-over interaction effect such that S/L<sub>G</sub> allele carrier whose mothers presented with a history of adversity showed significantly increased NE/BD compared to L<sub>A</sub>/L<sub>A</sub> homozygotes. In contrast, among the offspring of mothers with a more favourable developmental history, children carrying the same 5-HTTLPR genotype showed significantly reduced NE/BD compared to L<sub>A</sub>/L<sub>A</sub> homozygotes. These findings suggest that 5-HTTLPR genotype is a differential susceptibility factor for early emotional development (Belsky & Pluess, 2009a, Li *et al.*, In press).

Our analyses produced a derived measure of NE/BD in children using the ECBQ that was stable between 18 and 36 months. The inclusion of subscales associated with behavioural dysregulation is consistent with a definition formulated by Rothbart and Posner (2006) who viewed temperament as "... individual differences in reactivity and self-regulation, as observed in the domains of emotionality, motor activity, and attention." This assessment of child NE/BD is statistically more homogenous and thus potentially more focused than the ECBQ, which yields 18 different scale scores. The predictive validity of this measure is reflected in the strong correlation across multiple sub-scales of the SDQ (Goodman, 1997) administered at 60 months of age and evident in both maternal and paternal ratings. Temperament at this age predicts internalizing and externalizing problems, vulnerability for depression (Bruder-Costello *et al.*, 2007, Caspi *et al.*, 1996, Degnan *et al.*, 2010), and anxiety (Degnan *et al.*, 2010). We found that the influence of maternal adversity was moderated by 5-HTTLPR genotype. It is important to note that the interaction between maternal adversity and 5-HTTLPR genotype in the offspring may be specific to certain developmental outcomes, and should not suggest that  $L_A/L_A$  homozygote children are necessarily immune from the influence of maternal adversity across all developmental domains although differential susceptibility to specific environmental conditions may be both tissue- and function-specific (Li *et al.*, In press).

Our results suggest that the mental health of the offspring may reflect maternal childhood adversity. Although maternal depression was associated with child temperament, both the main effect of maternal childhood adversity and the significant interaction between maternal adversity and child genotype on NE/BD were significant even when controlling for maternal depression. The distinguishable effects of maternal adversity and maternal

depression on child temperament suggest independent pathways that influence emotional development (also see Hill *et al.*, 2001). Parenting is a candidate mediator of the relation between maternal developmental adversity and offspring temperament. Individual differences in parenting are transmitted from mother to daughter across a wide range of species (Belsky *et al.*, 2005, Francis *et al.*, 1999, Gonzalez *et al.*, 2001, Maestripieri & Mateo, 2009, Miller *et al.*, 1997). Mothers sexually abused in childhood are more likely to exhibit child neglect, diminished confidence in their parenting skills, heightened negative self-appraisal as a parent, greater use of physical punishment, and lack of emotional control in parenting situations (Roberts *et al.*, 2004). Childhood maltreatment associates with impaired attention and emotional regulation, and with less sensitive parenting (Belsky & Pluess, 2009b, Gonzalez *et al.*, 2012). Moreover, infant negative emotionality also affects the quality of the interactions that adults direct towards infants (Tronick & Reck, 2009). These findings suggest a cascade of influences that reinforce NE/BD along a vulnerability pathway.

One limitation to this study is the use of retrospective reports of maternal childhood adversity and maternal reports of NE/BD. However, both the CTQ and the PBI are well-established measures with good psychometric properties (Bernstein *et al.*, 1994, Wilhelm *et al.*, 2005). The inclusion of maternal depression at multiple time points, including a time that corresponds to the completion of the ECBQ (i.e., 36 months), also accounts for the potential confound of maternal affect as a reporting bias. Moreover, the fact that NE/BD was predictive of both maternal and parental ratings of psychosocial function at 60 months argue against shared method variance as does the fact that NE/BD ratings remained consistent and stable over a 3.5-year period. Finally, we showed that the effects reported here were independent of maternal 5-HTTLPR genotype. Thus, these findings appear to represent a transgenerational

effect of maternal childhood adversity on cognitive – emotional function in the offspring. The sample size of this study is consistent with multiple recent reports of G x E interactions. Nevertheless, the findings should be considered as preliminary pending replication and extension.



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Table 1

*Means (standard deviation) of demographic variables, predictor variables and outcome variables in offspring by 5-HTTLPR genotype postpartum (36 months)*

	5-HTTLPR	
	L <sub>A</sub> /L <sub>A</sub>	S or L <sub>G</sub> carriers
Sample size	46	108
Maternal age <sup>a</sup>	31.7 (5.0)	33.0 (5.3)
Family income <sup>b</sup>	12.4 (4.1)	14.0 (3.2)
	(\$40-50,000)	(\$50-60,000)
Dual parenting <sup>c</sup>	38	105
Gender <sup>d</sup>	27	48
Birth weight (grams)	3,339.4 (555.1)	3,354.9 (551.0)
Maternal early adversity (log)	-0.2 (.6)	-0.3 (.6)
Negative emotionality/behavioural dysregulation	0.2(.8)	0.7 (1.2)
SDQ (mother) total difficulties	9.38 (4.63)	9.90 (4.58)
SDQ (mother) emotional symptoms	1.75 (1.83)	2.43 (1.93)
SDQ (mother) conduct problems	2.25 (1.75)	1.93 (1.44)
SDQ (mother) hyperactivity	4.38 (2.00)	3.81 (2.24)
SDQ (mother) peer problems	1.00 (1.41)	1.74 (1.74)
SDQ (mother) prosocial	9.25 (1.17)	8.10 (1.91)
SDQ (father) total difficulties	8.75 (6.11)	8.91 (4.28)
SDQ (father) emotional symptoms	2.38 (2.33)	2.45 (1.94)
SDQ (father) conduct problems	1.75 (1.49)	1.97 (1.53)
SDQ (father) hyperactivity	3.38 (2.33)	3.15 (1.96)
SDQ (father) peer problems	1.25 (1.04)	1.33 (.92)
SDQ (father) prosocial	8.25 (1.83)	8.15 (1.42)

<sup>a</sup>Postpartum (36 months)

<sup>b</sup>Combine family income at 36 months, where 0 = no revenue, 1 = less than \$5,000, 2 = at least \$5,000, 3 = less than \$10,000, 4 = at least \$10,000, 5 = less than \$15,000, 6 = at least \$15,000, 7 = less than \$20,000, 8 = at least \$20,000, 9 = less than \$30,000, 10 = at least \$30,000, 11 = less than \$40,000, 12 = at least \$40,000, 13 = between \$40,000 and \$50,000, 14 = between \$50,000 and \$60,000, 15 = between \$60,000 and \$80,000, 16 = between \$80,000 and \$100,000, and 17 = at least \$100,000.

<sup>c</sup>Information was available for only 147 of the 154 participants

<sup>d</sup>Number of females

Note. Differences between both genotype groups were not significant for all listed variables (all  $p$ 's > .05).



Table 2a

*Factor loadings for ECBQ negative emotionality/behavioural dysregulation related scales at 18 and 36 months*

Scales	Loadings
Activity level	.58
Attentional focusing	-.41
Cuddliness	-.42
Discomfort	.57
Fear	.42
Frustration	.74
Inhibitory control	-.68
Motor activation	.55
Sadness	.58
Soothability	-.63

Table 2b

*Factor loadings for maternal history of early adversity factor*

Instruments; scales	Loadings
CTQ; Physical neglect	.76
CTQ; Physical abuse	.75
CTQ; Emotional neglect	.73
CTQ; Emotional abuse	.85
CTQ; Sexual abuse	.72
PBI; Maternal care	-.48

Table 3a

*Offspring 5-HTTLPR genotype frequencies*

Genotype	L <sub>A</sub> /L <sub>A</sub>	L <sub>A</sub> /L <sub>G</sub>	L <sub>G</sub> /L <sub>G</sub>	S/L <sub>A</sub>	S/L <sub>G</sub>	S/S	Total
N	46	6	2	63	10	27	154
Frequencies	.30	.04	.01	.40	.07	.18	1.00

Note. Frequencies for S, L<sub>A</sub>, and L<sub>G</sub> alleles were as follows : .41, .52, and .07.

Table 3b

*Maternal 5-HTTLPR genotype frequencies*

Genotype	L <sub>A</sub> /L <sub>A</sub>	L <sub>A</sub> /L <sub>G</sub>	L <sub>G</sub> /L <sub>G</sub>	S/L <sub>A</sub>	S/L <sub>G</sub>	S/S	Total
N	48	10	1	60	6	29	154
Frequencies	.31	.07	.01	.38	.04	.19	1.00

Note. Frequencies for S, L<sub>A</sub>, and L<sub>G</sub> alleles were as follows : .40, .54, and .06.

Table 4

*Bivariate correlations between all study variables*

1. Mat. Age	2. .32**	3. .11*	4. -.15**	5. -.15*	6. -.03	7. -.24**	8. -.21	9. -.15	10. -.12	11. -.24*	12. -.01	13. -.18	14. -.28*	15. -.24	16. -.12	17. -.19	18. -.20	19. -.10
2. Family Income	--	.00	-.38**	-.35**	-.27**	-.27**	-.26*	-.13	-.20	-.19	-.20	-.02	-.16	.00	-.21	-.15	-.05	.00
3. Birth Weight	--	--	.03	.13*	.02	.06	-.12	-.19	-.16	-.05	.08	.21	.08	.11	.10	-.02	.06	.01
4. Mat. Depression (6m)	--	--	--	.57**	.40**	.36**	.50**	.20	.49**	.43**	.19	-.01	.11	-.07	.15	.14	.12	.05
5. Mat. Depression (36m)	--	--	--	--	.35	.42**	.37**	.28*	.29*	.22	.24*	-.21	.11	.01	.23	.00	.11	-.13
6. Maternal Adversity	--	--	--	--	--	.20	.20	.20	.09	.16	.07	-.04	.01	-.17	.10	.02	.15	.12
7. Child NE/BD	--	--	--	--	--	.20	.47**	.30*	.21	.32**	.46**	-.30*	.26	.04	.26	.25	.17	-.42**
8. SDQ (M)	--	--	--	--	--	--	--	.68**	.69**	.74**	.64**	-.38**	.52**	.34**	.40**	.36**	.32*	-.50*
Total Difficulties	--	--	--	--	--	--	--	--	.32**	.14	.37**	-.06	.32*	.50**	.17	.01	.20	-.09
9. SDQ (M) Emotional Difficulties	--	--	--	--	--	--	--	--	--	.48**	.17	-.32**	.51**	.30*	.51**	.31*	.26*	-.29*
10. SDQ (M) Conduct Problems	--	--	--	--	--	--	--	--	--	--	.30**	-.37**	.34**	-.09*	.26*	.53**	.15	-.49**
11. SDQ (M) Hyperactivity	--	--	--	--	--	--	--	--	--	--	--	-.33**	.19	.19	.13	.02	.22	-.41**
12. SDQ (M) Peer Problems	--	--	--	--	--	--	--	--	--	--	--	--	.19	.19	.13	.02	.22	-.41**
13. SDQ (M) Prosocial	--	--	--	--	--	--	--	--	--	--	--	--	-.13	.09	-.30*	-.11	-.06	.50**
14. SDQ (F)	--	--	--	--	--	--	--	--	--	--	--	--	--	.69**	.72**	.70**	.55**	-.33**
Total Difficulties	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.38**	.15	.33**	-.12
15. SDQ (F) Emotional Difficulties	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.34**	.24	-.20
16. SDQ (F) Conduct Problems	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.19	-.29*
17. SDQ (F) Hyperactivity	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-.33**
18. SDQ (F) Peer Problems	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-.33**
19. SDQ (F) Prosocial	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

Table 5

*Beta regression coefficients (t-statistics in brackets) for analyses predicting offspring negative emotionality/behavioural dysregulation at 36 months*

	5-HTTLPR	
	Full Model	Reduced Model
Site of origin	-.34 (-1.65)	-
Gender	-.21 (-1.12)	-
Birth weight (percentile)	.01 (1.83) <sup>~</sup>	.00 (.76)
Maternal 5-HTTLPR genotype	.07 (.29)	-
Maternal Age <sup>a</sup>	-.01 (-.53)	-
Family income <sup>b</sup>	-.03 (-.97)	-
Maternal depression at 6 months	.00 (.02)	-
Maternal depression at 36 months	.36 (3.53) <sup>**</sup>	.40 (5.18) <sup>**</sup>
Maternal adversity (E)	-.62 (-2.04) <sup>*</sup>	-.34 (-1.36)
Child 5-HTTLPR genotype (G)	.21 (.88)	.06 (.33)
G x E	1.03 (2.71) <sup>**</sup>	.62 (2.04) <sup>*</sup>
R <sup>2</sup> (adj.)	0.30	0.19
df	(11, 115)	(5, 149)

NOTE: The 'full model' contains several covariates whereas reduced model (contains only variables that contributed significantly to the model. Since an overall multiple imputation for missing data was not undertaken, differences in sample sizes reflect missing data on some of the demographic variables. <sup>\*</sup>  $p < .05$ , <sup>\*\*</sup>  $p < .01$ ; <sup>~</sup>  $p < .10$ ; <sup>a</sup> Postpartum (36 months); <sup>b</sup> Combine family income at 36 months, where 0 = no revenue, 1 = less than \$5,000, 2 = at least \$5,000, 3 = less than \$10,000, 4 = at least \$10,000, 5 = less than \$15,000, 6 = at least \$15,000, 7 = less than \$20,000, 8 = at least \$20,000, 9 = less than \$30,000, 10 = at least \$30,000, 11 = less than \$40,000, 12 = at least \$40,000, 13 = between \$40,000 and \$50,000, 14 = between \$50,000 and \$60,000, 15 = between \$60,000 and \$80,000, 16 = between \$80,000 and \$100,000, and 17 = at least \$100,000.

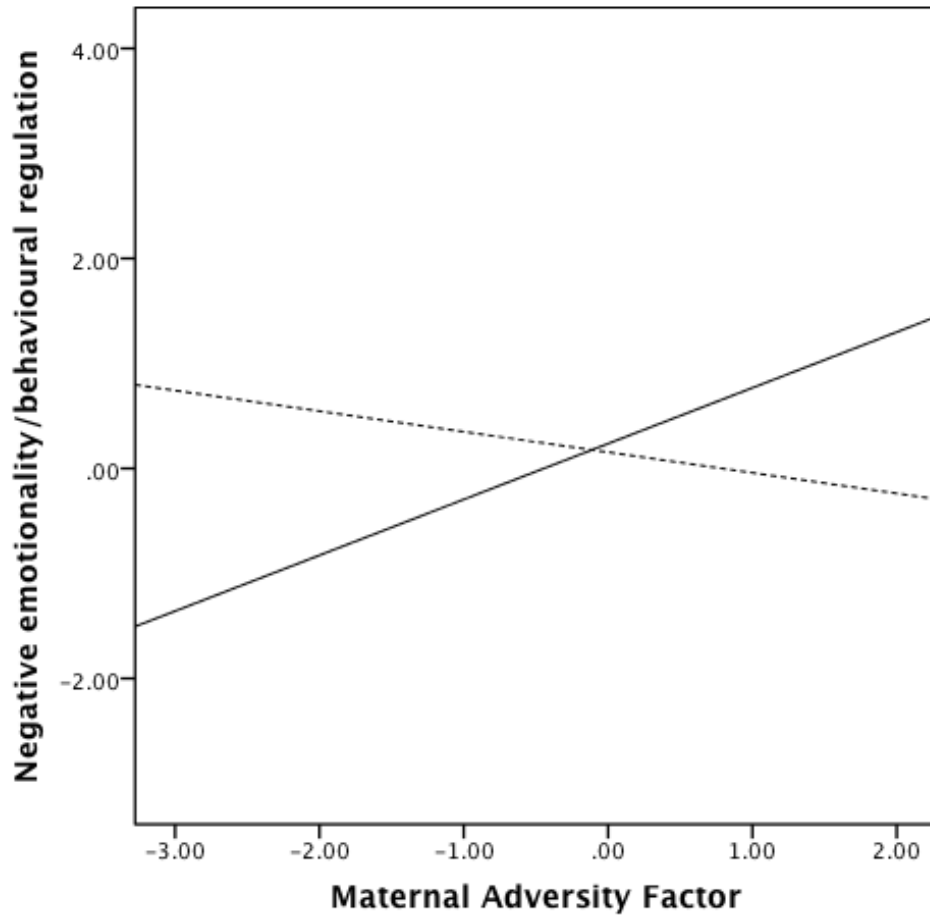


Figure 1. Interaction effect of maternal history of early adversity and offspring 5-HTTLPR genotype on offspring negative emotionality/behavioural regulation at 36 months, controlling for child birth weight and maternal depression at 36 months postpartum.

### Article 3

Maternal psychosocial maladjustment and child internalizing symptoms: Investigating the modulating role of maternal sensitivity

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Running head: MATERNAL ADAPTATION, SENSITIVITY, AND CHILD SYMPTOMS

Maternal psychosocial maladjustment and child internalizing symptoms: Investigating the  
modulating role of maternal sensitivity

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## Abstract

In light of evidence suggesting that maternal adaptation may impact early child emotional development, this study investigated the interactive effects of maternal psychosocial maladjustment and maternal sensitivity on child internalizing symptoms, with the aim of investigating the potentially protective function of maternal sensitivity. Families (N = 71 to 106 across measures, with gender spread almost evenly: number of boys = 31 to 51 across measures) took part in four assessments between child ages 1 and 3 years. Mothers completed measures of parental stress, psychological distress, and marital satisfaction when their children were between 12 and 15 months. A composite score of maternal psychosocial maladjustment was derived from these measures. Maternal sensitivity was rated by trained observers at 12 months following a home visit. Child internalizing symptoms were assessed by both parents when the child was 2 and 3 years old. Hierarchical regressions revealed that increased maternal psychosocial maladjustment was related to more internalizing symptoms in children, however only among children of less sensitive mothers. In contrast, children of more sensitive mothers appeared to be protected. This was observed with maternal reports at 2 years, and both maternal and paternal reports at 3 years. These results suggest that young children may be differentially affected by their parents' emotional adjustment, while highlighting the pivotal protective role of maternal sensitivity in this process.

Keywords: maternal psychosocial maladjustment; maternal sensitivity; child internalizing symptoms; buffer effects



## Maternal psychosocial maladjustment and child internalizing symptoms: Investigating the modulating role of maternal sensitivity

Emotional adjustment is a defining feature and a core component of healthy child development. One of the manifestations of impaired emotional adjustment is the presence of internalizing symptoms, which encompass features related to depression, anxiety, social withdrawal, and somatic complaints without medical explanation (Cicchetti & Toth, 1991). Research has demonstrated that internalizing symptoms can be detected in early childhood; for instance, symptoms of depression and anxiety show prevalence rates of up to 28% in toddlers (e.g., Wilens et al., 2002). Furthermore, longitudinal data have been used to investigate developmental trajectories of internalizing symptomatology. For instance, Côté et al. (2009) identified three different trajectory groups among children aged 1.5 to 5 years. Those groups included children with stable low symptom levels (29.9% of their sample), children with moderate but increasing levels (55.4% of their sample), and children with high and increasing levels of internalizing symptoms (14.7% of their sample). Internalizing symptoms have also been identified as predictors of increased risk for psychopathology later in life (Bittner et al., 2007; Moffitt et al., 2007; Weissman et al., 2005), and are associated with disturbances in several domains including interpersonal relationships, academic performance, and substance abuse (Birmaher et al., 1996; Hammen & Rudolph, 2003). Overall, research suggests that internalizing symptoms are common among very young children, are not often transient, and constitute risk factors for subsequent maladjustment. Hence, it is critical to understand the risk and protective factors involved in the emergence of internalizing symptoms, starting in infancy.

One such factor is parental psychosocial maladjustment. This term, used to characterize parental distress or impairments, is often operationalized by factors such as mood, stressors, or marital strain (e.g., Tietjen & Bradley, 1985), and is a well-documented predictor of child

emotional outcomes such as internalizing symptoms. For instance, children of depressed mothers are more likely to present with increased internalizing symptoms by middle childhood than those of non-depressed mothers (Goodman et al., 2011). Maternal anxiety is also related to offspring internalizing symptoms (Barker, Jaffee, Uher, & Maughan, 2011). Furthermore, both family conflict and family aggression are associated with impaired child emotional development (Handal, Tschannen, & Searight, 1998; Harachi et al., 2006; McCloskey, Figueredo, & Koss, 1995; Richmond & Stocker, 2006). In addition, poor marital relationship quality/satisfaction has been identified as a risk factor for child emotional problems, whereas positive marital characteristics have been associated with fewer offspring symptoms (Cummings, Goeke-Morey, & Papp, 2003; Goeke-Morey, Cummings, & Papp, 2007). There are, thus, documented associations between parental maladjustment and child maladjustment, notably internalizing symptoms.

Nonetheless, the size of these associations is, at times, rather small, suggesting that they may be moderated by other variables (Goodman et al., 2011). Biological variables have received the most attention as moderators. Studies suggest, for instance, that children with more optimal biological functioning are protected against the development of internalizing symptoms in the context of marital conflict (Koss et al., 2014) or maternal psychological maladjustment (Wetter & El-Sheikh, 2012). In contrast, few studies have investigated whether environmental factors can also play such a protective role. This appears likely however, especially with high-quality parenting, which meta-analytic data suggest is a robust protective factor against the development of internalizing problems in children (McLeod, Weisz, & Wood, 2007). Accordingly, high-quality parenting might also act as a moderator, and buffer the risk for child internalizing symptomatology otherwise associated with maternal maladjustment. Indeed, although maternal psychosocial maladjustment has often been shown to be detrimental to parenting behavior (see

Field, 2010, for a review), there is also evidence that some mothers are able to provide good-quality care to their children in spite of personal hardship (Campbell et al., 2004; Grant, McMahon, Reilly, & Austin, 2010a). What is less clear is whether such care is sufficient to offset the otherwise negative impact of maternal psychosocial maladjustment on child emotional outcomes.

Child development is reliably related to the quality of provided parental care (Sroufe, 2005). One aspect of high-quality parental care is maternal sensitivity, defined as mothers' capacity to recognize, correctly interpret, and quickly and adequately respond to their children's signals (Ainsworth, Bell, & Stayton, 1974). Sensitive parenting is associated, for instance, with child language and cognitive development, attachment security, emotion regulation, and social competence (Bornstein, 2002, 2006). Contrastingly, insensitive parenting is associated with negative child outcomes such as increased levels of child internalizing symptoms (Colder, Lochman, & Wells, 1997; Gershoff, 2002).

Furthermore, in addition to direct links, maternal sensitivity has begun to be identified as a risk buffer against biological (Spangler, Johann, Ronai, & Zimmerman, 2009) and environmental adversity (Rochette & Bernier, 2014). Importantly for our purposes, sensitivity also appears to play a protective function against suboptimal maternal characteristics. For instance, harsh maternal discipline has been found to relate to increased aggressive behavior in children, but only for those whose mothers also displayed low sensitivity (Alink, Mesman, et al., 2009). Moreover, maternal sensitivity has been found to modulate the link between maternal prenatal anxiety and infant mental development at 7 months of age, such that infants whose mothers were anxious displayed poorer mental development only when their mother was also less sensitive (Grant et al., 2010a). It was also reported that maternal prenatal anxiety was associated with increased child negative affect following a stressful episode at 7 months of age only for

infants of less sensitive mothers (Grant, McMahon, Reilly, & Austin, 2010b). Furthermore, supportive mother-child relationships have been identified as a protective factor in the context of family conflict (Alink, Cicchetti, Kim, & Rogosch, 2009) as well as in the presence of interparental violence (Davies, Winter, & Cicchetti, 2006; Manning, Davies, & Cicchetti, 2014). All in all, there is emerging evidence that maternal sensitivity may play not only a direct positive role in child emotional development, but also an indirect role, by attenuating the effects of otherwise negative maternal influences on child functioning. However, the potential protective effects of maternal sensitivity against child internalizing symptoms in the context of other negative maternal influences have yet to be investigated.

### **The current study**

Building and expanding on previous results (e.g., Alink, Cicchetti, et al., 2009; Alink, Mesman, et al., 2009; Grant et al., 2010a, b), the current study focused on child internalizing symptoms as assessed by both mothers and fathers at two different ages. Provided that components of maternal mental health (Goodman et al., 2011) and relational stress (Goeke-Morey et al., 2007; Richmond & Stocker, 2006) have both been previously associated with offspring socio-emotional development and given that maternal maladjustment has been found to be more strongly related to child internalizing symptoms than paternal maladjustment (see Connell & Goodman, 2002, for a review), the present study's objectives were 1) to assess the links between child internalizing symptoms at 2 and 3 years of age and a combination of facets of maternal maladjustment in the personal, parenting, and marital spheres, and 2) to investigate whether maternal sensitivity may buffer these associations. It was expected that high levels of observed maternal sensitivity would buffer the risk stemming from maternal psychosocial maladjustment in the prediction of child internalizing symptoms, as reported by mothers and fathers. Given that the mediating role of maternal sensitivity has already been widely explored in

the literature (e.g., Campbell, Matestic, von Stauffenberg, Mohan, & Kirchner, 2007; Miranda, de la Osa, Granero, & Ezpeleta, 2013), whereas research on the protective role of maternal sensitivity is still very scarce, the current study focused solely on moderation hypotheses.

## **Method**

### **Participants**

Our low-risk community sample was comprised of 71 to 106 families, across measures, living in a large Canadian metropolitan area. Maternal reports were available for 95 to 106 of those families (across time points). Paternal reports were available for 71 to 76 of those families (across time points). Only one mother was a single parent. Families were drawn from random birth lists of the Ministry of Health and Social Services. Criteria for participation were full-term pregnancy and the absence of any known disability or severe delay in the infant. Socio-demographic information was gathered when infants were 8 months old. At that time, mothers were between 22 and 45 years old ( $M = 31.7$ ), had 16.1 years of education on average (varying from 10 to 18 years), and their average family income lied in the \$60,000 to \$79,000 bracket, representative of the average family income in Canada for the years of data collection (i.e., \$74,600). Fathers were between 25 and 50 years old ( $M = 33.9$ ) and had 15.7 years of education on average (varying from 11 to 19). Both maternal and paternal education levels were similar to average education levels in the province of Quebec, with 63.5% of mothers and 62.8% of fathers having at least a college degree (63.3% of parents hold college degrees in Quebec). Offspring gender was spread almost evenly (51 boys and 55 girls). Most of the sample (95.7%) was Caucasian and the majority of the parents were either married or living together (86.8%). Finally, 19% of children had no siblings.

## **Procedure**

Data were collected in the family homes through four visits that each lasted an average of 90 minutes. When children were aged 12 months (T1), the home visit was modeled after the work of Pederson and Moran (1995), 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 response. Visits included a brief interview with the mother, a developmental assessment of the infant, and a 20-min free-play period. Observations performed throughout this home visit were used to assess maternal sensitivity, as described below. After this first visit (T1), as well as when children were aged 15 months (T2), 2 years (T3), and 3 years (T4), parents were given questionnaires that they later returned via mail (see measures below). Parents were invited to fill out these questionnaires independently, once the research assistant was gone, and were each provided with a prepaid envelope at each assessment. The parents of all participating children signed a consent form at the outset of the study that informed them on the nature and risks of participating and they received a toy for the child. Ethics approval was obtained.

## **Measures**

**Maternal psychosocial maladjustment.** At T1, mothers completed the Parenting Stress Index (PSI-Short Form; Abidin, 1995), which is a 36-item self-report questionnaire designed to assess parents' perceived stress in relation to their child and their parenting role. Items are rated on a Likert scale ranging from 0 to 5. The total average score was retained. The PSI shows excellent

internal consistency and convergent validity with respect to prenatal stress and to other indices of postnatal stress (Abidin, 1995; Teti, Nakagawa, Das, & Wirth, 1991). Internal consistency was also excellent for our sample (Cronbach's  $\alpha = .98$ ).

At T1 also, mothers completed the short version of the Psychiatric Symptoms Index (Ilfeld, 1976, 1978). This self-report questionnaire assesses psychological symptoms including depression, cognitive disturbance, anxiety, and anger, and yields one global score of psychological distress. Mothers completed the 14 items on a Likert scale ranging from 0 to 4. This instrument presents good internal consistency (Ilfeld, 1976; Prévile, Potvin, & Boyer, 1995) and content validity with DSM-IV diagnostic criteria (Okun, Stein, Bauman, & Silver, 1996) and with other instruments measuring depression and anxiety (Sakakibara, Miller, Orenczuk, & Wolfe, 2009). Internal consistency for our sample was very good (Cronbach's  $\alpha = .88$ ).

At T2, mothers completed the short Dyadic Adjustment Scale (DAS; Spanier, 1976; four-item version – DAS-4; Sabourin, Valois, & Lussier, 2005). The DAS-4 is a four-item questionnaire that assesses individuals' degree of satisfaction with regards to their current romantic relationship with a 1-6 Likert scale. As described by Sabourin et al. (2005), the DAS-4 shows very good internal consistency ( $\alpha$  consistently above .80), excellent temporal stability over a 1-year period for men ( $r = .87$ ) and women ( $r = .83$ ), and high predictive validity with regards to couple dissolution, and it is less subject to socially desirable responding than longer versions of the DAS. Internal consistency for our sample was also very good (Cronbach's  $\alpha = .88$ ).

Given the inter-correlations among these three measures ( $.28 < r < .40, p < .01$ ), a composite score of maternal psychosocial maladjustment was derived by standardizing and averaging the total scores of the three measures (reverse-coding marital satisfaction). This allowed for the use of a psychometrically stronger predictor, while reducing Type-I error

probability in the context of the examination of four dependent variables (maternal and paternal reports of child symptoms at 2 and 3 years).

**Maternal sensitivity.** Maternal sensitivity was assessed at T1 using the Maternal Behavior Q-Set (MBQS; Pederson & Moran, 1995), a 90-item measure designed to assess the quality of maternal behaviors during in-home mother-infant interactions. A trained research assistant noted maternal behaviors throughout the visit and rated the MBQS immediately afterward, based on the entire observation period. Items describing potential maternal behaviors were sorted into nine clusters, ranging from very similar to very unlike the observed mother's behaviors. The observer's sort was then correlated with a criterion sort representing the prototypically sensitive mother, which is provided by the developers of the instrument. Sensitivity scores can thus vary from -1 (least sensitive) to 1 (prototypically sensitive). The MBQS is significantly correlated with other measures of maternal behavior, such as the HOME Inventory and the Ainsworth scales (see Pederson & Moran, 1995), and shows good temporal stability (Behrens, Parker, & Kulkofsky, 2014; Tarabulsky et al., 2008). Its construct validity is demonstrated by meta-analytic data showing its excellent predictive capacity with respect to child attachment security (Van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004). MBQS scores also relate to subsequent child cognitive and socio-emotional functioning (Bernier, Carlson, Deschênes, & Matte-Gagné, 2012; Bordeleau, Bernier, & Carrier, 2012; Lemelin, Tarabulsky, & Provost, 2006).

To maximize the reliability of these observations, research assistants attended a 2-day training workshop, during which they reviewed several videotapes of mother–infant interactions so as to practice coding the MBQS. After the workshop, the assistants performed their first few home visits with a more experienced colleague, and they completed the MBQS together. When the junior home visitors were ready to rate maternal behavior, the first two or three visits were



followed by a debriefing session either with the Principal Investigator or with an experienced graduate student to review the salient elements of the visit before scoring the MBQS. The assistants then went on to rating the MBQS autonomously. Thirty percent of the visits were conducted by two research assistants who then completed the MBQS independently. In total, 10 different assistants coded maternal sensitivity. Inter-rater reliability was always estimated between two coders (i.e., the two assistants who conducted the home visit together for a given family). Mean agreement between the pairs of raters was very good,  $ICC = .87$ .

**Child internalizing symptoms.** At T3 and T4, mothers (N = 106 and 94, respectively) and fathers (N = 73 and 78, respectively) completed the internalizing problems subscale of the Child Behavior Checklist, 1.5-5 year version (CBCL; Achenbach & Rescorla, 2000). This subscale is comprised of 36 items, with possible scores ranging from 0 to 72. Test-retest reliability for this subscale is .90, inter-parent agreement is .59, and one-year stability is .76 (Achenbach & Rescorla, 2000). CBCL scores also show good convergent validity with other child socio-emotional ratings such as the Richman Behavior Checklist (Richman, 1977) and the Toddler Behavior Screening Inventory (Achenbach & Rescorla, 2000; Mouton-Simien, McCain, & Kelly, 1997). Internal consistency for overall internalizing problems was good for the current sample (Cronbach's  $\alpha = .78, .77, .71$ , and  $.83$  for maternal ratings at T3 and T4 and paternal ratings at T3 and T4, respectively). Maternal and paternal reports were positively correlated ( $r = .55$  at T3 and  $r = .52$  at T4,  $p$ 's  $< .01$ ). Child internalizing symptoms scores were normally distributed and did not require transformation. Mothers and fathers who did not return the CBCL questionnaire were not different from those who did in terms of socio-demographic characteristics (i.e., ethnicity, income, and education; all  $p$ 's  $> .10$ ). Moreover, mothers who did not return the CBCL questionnaires did not differ from mothers who did on sensitivity scores ( $p$

> .10). Means, standard deviations, and theoretical ranges for all main study variables are reported in Table 1.

Given that the independent variable (maternal maladjustment) was based solely on maternal reports, maternal and paternal CBCL scores were kept separate rather than composited, with the aim of examining the robustness of the results to shared method variance, with an outcome methodologically independent of maternal reports (i.e., father CBCL).

## **Results**

### **Preliminary analyses**

Table 2 presents the zero-order correlations among all variables. We first examined the correlations between potential confounding variables (i.e., child gender, maternal age, maternal education, paternal age, paternal education, and family income) and main study variables. Child gender and family income were the only demographic variables that were associated with some of the outcome measures (i.e., reports of child internalizing symptoms at ages 2 and 3). In each subsequent main analysis, we accounted for the covariates that were marginally or significantly associated with the outcome. Correlation analyses also revealed very few significant associations between maternal psychosocial maladjustment, maternal sensitivity, and child outcomes. These preliminary findings are discussed in the discussion section. T-tests revealed no significant differences between maternal and paternal ratings of child internalizing symptoms at either time point (both  $p$ 's > .05). No age-related differences (2 vs. 3 years) were found for either maternal or paternal ratings (both  $p$ 's > .05).

### **Main analyses**

Multiple hierarchical regressions were performed to assess the interactive effects of maternal psychosocial maladjustment and maternal sensitivity on child internalizing symptoms. Both variables were centered prior to the formation of the interactive term. Maternal and paternal

reports, at 2 and 3 years of age, were submitted to distinct regression equations. We inserted variables in the following order: Block 1, covariates (when appropriate); Block 2, maternal psychosocial maladjustment and maternal sensitivity; Block 3, the multiplicative interaction term of maternal psychosocial maladjustment by maternal sensitivity. The results of the four regression models are shown in Table 3. The analyses revealed significant interaction effects of maternal psychosocial maladjustment and maternal sensitivity on maternal reports of child internalizing symptoms at 2,  $\beta = -.23$ ,  $t(105) = -2.14$ ,  $p = .04$ , and 3 years,  $\beta = -.27$ ,  $t(94) = -2.34$ ,  $p = .02$ . The interaction between maternal psychosocial maladjustment and maternal sensitivity was also significant when predicting paternal reports of child internalizing symptoms at 3 years,  $\beta = -.26$ ,  $t(75) = -1.96$ ,  $p = .05$ , although not at 2 years,  $\beta = -.07$ ,  $t(70) = -.49$ , *ns*.

The significant interactions were explored both statistically, with post-hoc probing of moderation effects through analysis of simple slopes (Preacher, Curran, & Bauer, 2006), and graphically (Figures 1-3). The relations between maternal psychosocial maladjustment and child internalizing symptoms at 2 and 3 years were tested as a function of maternal sensitivity. Fitted regression lines were plotted at high (+ 1 SD) and low (-1 SD) values of maternal sensitivity. At 2 years, the results revealed a significant and positive slope for mother reports of offspring internalizing symptoms for children of less sensitive mothers,  $B = 1.44$ ,  $SE = 0.61$ ,  $t = 2.35$ ,  $p = .02$ , whereas the slope for children of more sensitive mothers was not significant,  $B = -0.44$ ,  $SE = 0.48$ ,  $t = -0.91$ , *ns*. Likewise, at 3 years, post-hoc analyses yielded a significant and positive slope for mother reports of offspring internalizing symptoms for children of less sensitive mothers,  $B = 1.92$ ,  $SE = 0.75$ ,  $t = 2.52$ ,  $p = .01$ , whereas the slope for children of more sensitive mothers was not significant,  $B = -0.49$ ,  $SE = 0.50$ ,  $t = -0.99$ , *ns*. Finally, at 3 years, post-hoc analyses yielded a significant and positive slope for father reports of offspring internalizing symptoms for children

of less sensitive mothers,  $B = 1.66$ ,  $SE = 0.80$ ,  $t = 2.08$ ,  $p = .04$ , whereas the slope for children of more sensitive mothers was not significant,  $B = -0.45$ ,  $SE = 0.54$ ,  $t = 0.83$ , *ns*.

In order to determine whether maternal psychosocial maladjustment and maternal sensitivity were associated with child internalizing symptoms at age 3, over and above 2-year symptoms, we conducted similar regression models, adding internalizing symptoms at 2 years as a control when predicting 3-year internalizing symptoms. Analyses yielded non-significant results with maternal reports,  $\beta = -.05$ ,  $t(80) = -.74$ , *ns* (Table 4). In contrast, there was a significant interaction effect when predicting change in paternal reports of child internalizing symptoms between ages 2 and 3,  $\beta = -.19$ ,  $t(53) = -2.30$ ,  $p = .03$  (Table 4). Decomposition of this interaction effect (Figure 4) revealed that maternal psychosocial maladjustment was positively related to an increase in child internalizing symptoms as rated by their fathers, but again, only for children of less sensitive mothers,  $B = 1.67$ ,  $SE = 0.75$ ,  $t = 2.24$ ,  $p = .03$ , whereas the relation for children of more sensitive mothers was not significant,  $B = -0.45$ ,  $SE = 0.49$ ,  $t = -0.92$ , *ns*.

Taken together, the results indicate that maternal psychosocial maladjustment was generally related to higher child internalizing symptoms, however only among children of less sensitive mothers.

## Discussion

Aiming to investigate familial characteristics likely to precipitate or impede the early development of internalizing symptoms, we examined whether the relation between maternal psychosocial maladjustment and toddlers' internalizing symptoms was moderated by maternal sensitivity. The results revealed significant positive relations between maternal psychosocial maladjustment and child internalizing symptoms for children of less sensitive mothers, as reported by mothers when children were aged 2 years and by both parents when children were aged 3 years. Contrastingly, the relations were not significant for children whose mothers were

rated as relatively more sensitive. Hence, poor maternal adjustment was related to increased levels of internalizing symptoms in children as early as 2 and 3 years of age, for children of less sensitive mothers; in contrast, children of more sensitive mothers appeared to be protected. Furthermore, when looking at changes between the ages of 2 and 3, results revealed that worse maternal psychosocial maladjustment during infancy was related to a subsequent increase in children's internalizing symptoms as reported by their fathers, again only for children of less sensitive mothers.

The current results are consistent with a growing body of literature targeting interaction effects and the suggestion that negative child outcomes are most likely due to a combination of risk factors rather than the presence of a single one (e.g., McMahon, Barnett, Kowalenko, & Tennant, 2006; Sameroff, Gutman, & Peck, 2003). In fact, most developmental theorists agree that the factors which influence child development are intertwined in complex ways, with general consensus that the nature of the interplay between these factors is interactive (Bronfenbrenner, 1979; Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000). The current results suggest that children may be differentially affected by their parents' own emotional adjustment, according to the quality of care they receive. Indeed, maternal psychosocial maladjustment and offspring internalizing symptoms were not related for children whose mothers were relatively more sensitive.

This is consistent with existing literature showing links between high levels of maternal sensitivity and optimal child outcomes in the domains of self-regulation (Grossmann & Grossmann, 1991; Kopp, 1982; Sroufe, 1995) and socio-emotional functioning (Leerkes, Blankson, & O'Brien, 2009). The protective effect observed here might occur through the promotion of competent emotion regulation by highly sensitive mothers. Indeed, while young children have limited capacity to efficiently self-regulate, responsive and sensitive mothering

entails efficient external regulation of child negative affect, which progressively provides young children with the opportunity to internalize the regulatory skills initially taught by the caregiver, and gradually, to become able to use them independently (Calkins, 2004). In this way, highly sensitive caregivers support the development of emotion regulatory skills in the child, which can act as a protective factor in the face of environmental stress/adversity, in this case that triggered by maternal psychosocial difficulties and its familial consequences (Cole, Martin, & Dennis, 2004). Mothers who manage to maintain high levels of sensitive care despite presenting with psychosocial difficulties can reasonably be presumed to be skilled at effective self-regulation, and might promote this capacity in their children through competent external regulation.

Contrastingly, and consistent with dual-risk theory (e.g., Sameroff, 1983), mothers presenting with both higher levels of psychosocial maladjustment and lower levels of sensitivity might expose their children to cumulative risk factors that might be sufficient to affect their children's levels of internalizing symptoms, even in a low-risk sample.

Other potential mechanisms underlying the current results may include the fostering of secure attachment bonds via high levels of maternal sensitivity. Indeed, responsive and sensitive behaviors from the caregiver favor the development of secure attachment (DeWolff & Van IJzendoorn, 1997), which in turn is a well-documented protective factor against child internalizing problems (Groh, Roisman, Van IJzendoorn, Bakermans-Kranenburg, & Fearon, 2012). Overall, mothers who manage to remain highly sensitive to their child despite poor psychosocial adjustment might favor the development of key relational and emotional skills in their child, hence protecting children against the development of emotional difficulties.

Contrastingly, less sensitive mothers are likely to see their child develop insecure attachment ties, and may fail to provide successful external regulation in response to their child's distress during

stressful situations, thereby impeding children's capacity to learn appropriate emotion-regulation tools that would protect them against internalizing problems.

Furthermore, the current results support the idea that maternal sensitivity is an important protective factor for children not only in stressful environmental circumstances, broadly, but also in the face of maternal struggles (and, in this specific context, psychosocial maladjustment). Several factors might explain why mothers' maladjustment may affect their offspring. One core hypothesis is that of genetic transmission. Indeed, over and above the risk conveyed by environmental and relational factors, research has identified a genetic basis to emotional maladjustment. For instance, children of depressed or anxious mothers are more likely to develop mood disorders, and this is partly accounted for by shared genetic characteristics (see Eley, 1999 for a review). Furthermore, children presenting with certain genetic profiles are at increased risk of developing early signs of emotional disturbances when living in detrimental environmental contexts (Gotlib, Joorman, Minor, & Hallmayer, 2008; Pluess et al., 2011). Based on those transmission paradigms, most often derived from mid/high-risk samples, we assumed that similar transmission processes could apply to low-risk samples such as ours, and would allow us to test our hypotheses pertaining to individual differences within normal ranges of emotional dysregulation. Although the current study cannot tease apart environmental from genetic transmission of emotional difficulties, it does suggest that when mothers manage to show high sensitivity to their child in spite of their own emotional struggles, such high-quality parenting is a key environmental element that can offset the otherwise likely transmission of emotional difficulties from mother to child, at least in low-risk samples.

One noteworthy aspect of the findings is that significant results were found with mother reports at both 2 and 3 years, but only at 3 years for father reports. One may argue that lower mood (although assessed several months earlier) altered mothers' perceptions and led them to

overestimate their child's internalizing symptoms, thus creating spurious relations between measures. However, no significant differences were found between maternal and paternal ratings of internalizing symptoms at either time point (refer to Table 1 for means and standard deviations). A different explanation pertains to our sample size, which was considerably smaller for father than mother reports (especially at 2 years), thus necessitating a greater population-level effect size for the interaction to be detected as significant with our study parameters. Another potential explanation is that mothers typically spend more time with their child during their first few years of life than fathers do. This might make mothers more aware of their child's non-verbal or ambiguous cues, compared to fathers. As toddlers become more verbally sophisticated, and able to express their emotional states through language (i.e., between 2 and 3 years of age in the current context), fathers might more easily pick up on those early signs of internalizing symptoms. Such greater awareness may be facilitated further by fathers' increased parental involvement across toddlerhood (Bailey, 1994). Thus, one might speculate that the phenomenon may have been present at 2 years already, but more easily detected by fathers at age 3, given toddlers' growing capacity to describe their feelings verbally, along with many fathers' enhanced involvement and thus familiarity with their child. This might also explain why analyses pertaining to changes between the ages of 2 and 3 years revealed significant interactive effects for father reports only.

Another noteworthy aspect of the findings is the fact that among less sensitive mothers, maternal maladjustment, although assessed prior to child outcomes and early in the children's life (i.e., at 12 and 15 months), was associated with toddlers' internalizing symptoms later on (i.e., ages 2 and 3). Although the current correlational design does not allow for causal inference, these longitudinal results raise the possibility of lingering effects of maternal psychological maladjustment onto the development of early childhood internalizing symptoms, and reiterate the



importance of studying such relations very early on. Furthermore, maternal sensitivity was also rated prior to child outcomes, which suggests that a maladaptation cascade, stemming from the combination of poor maternal psychological adjustment and low sensitivity, might unfold over early childhood, and perhaps have increasingly deleterious consequences as children fail to acquire age-appropriate emotion regulation strategies. Indeed, a key principle of developmental psychopathology is that successfully mastered developmental tasks provide children with tools to negotiate the developmental tasks that become salient at later ages (Sroufe & Rutter, 1984). Longer-term longitudinal designs are needed to test the speculation that what was observed here is the beginning of a developmental cascade entailing the development of emotional difficulties among children whose mothers suffer from psychosocial maladjustment and have difficulty providing sensitive care.

Besides, one may notice the lack of direct associations between our three main variables in the overall sample: maternal psychosocial maladjustment, maternal sensitivity, and child internalizing symptoms. Those results are, however, less unexpected than they may seem. For instance, it is not unusual in the literature to find non-significant associations between maternal maladjustment and maternal sensitivity, especially among community samples (Kaitz, Maytal, Devor, Bergman, & Mankuta, 2010; van Doesum, Hosman, Riksen-Walraven, & Hoefnagels, 2007). Likewise, reported associations between maternal psychosocial maladjustment and child internalizing symptoms vary substantially in magnitude (Elgar, McGrath, Waschbusch, Stewart, & Curtis, 2003; Gravener et al., 2012; Mezulis, Hyde, & Clark, 2004), as do the links between maternal sensitivity and child internalizing symptoms (Ciciolla, Gerstein, & Crnic, 2014; Gershoff, 2002). Several explanations might account for those discrepancies. Community samples generally present with less variability in the lower end of maternal psychosocial adjustment, maternal sensitivity, and/or child emotional adjustment. Low correlations might be

reflective of such low variability. Moreover, discrepancies may also be due to methodological differences between studies, such as measures or child age. Finally, other moderators might be at play, for instance chronicity of maternal maladjustment or other social (notably, paternal) influences.

This study is not without limitations. First, only parental reports were used for both predictor and outcome variables. However, this limitation is partially compensated for by the fact that measurements were not taken at the same time points and in fact, maternal reports of predictor and outcome variables were not correlated (hence ruling out shared method variance as a key hypothesis). Moreover, the dependent variables were measured with the CBCL, which is a widely used, reliable tool that is well established in both research and clinical domains. Nonetheless, non-parental reports of child internalizing symptoms (e.g., by daycare providers) would have provided rich independent information. As mentioned above, the design did not allow for teasing apart genetic and environmental factors in the mother-child transmission of emotional maladjustment that was observed in dyads with a relatively less sensitive mother; genetically-informed designs entailing careful observational assessment of sensitivity are needed to investigate this question. One should also keep in mind the correlational nature of the design, which entails that results could potentially be interpreted in alternative ways, for instance that maternal optimal psychosocial adjustment protects children of less sensitive mothers against the development of child internalizing symptoms, or that higher levels of child internalizing symptoms influence maternal psychosocial maladjustment in mothers with lower sensitivity.

Furthermore, given the low-risk status of this community sample, the current results may not generalize to higher-risk populations. Indeed, a good deal of research suggests that mothers presenting with significantly higher levels of maladjustment than those found in this sample (e.g., clinically depressed mothers) may not be able to display high levels of sensitivity (e.g., Field,

2010). It may be the case that in the current sample, many mothers characterized as “relatively less sensitive” were still fairly sensitive, compared to mothers suffering from clinical levels of maladjustment. However, one may speculate that in high-risk samples, where levels of maternal sensitivity are expected to be lower, low sensitivity would remain a risk-enhancing variable when combined to low maternal adjustment. Nonetheless, the current results also suggest that individual variations within the normal range for both maternal psychosocial maladjustment and maternal sensitivity might be sufficient to associate, to some extent, with early internalizing symptoms.

Additionally, the current results should be interpreted with caution provided the relatively low proportion of variance that was explained by the models, meaning that other factors come into play. Hence, future research should continue to investigate additional moderators that might intervene. One such candidate variable is child gender, whose effect was not possible to disentangle in this current study due to statistical power considerations. One may expect boys and girls to be differentially affected by their mothers’ levels of psychosocial maladjustment and sensitivity. Furthermore, future research should target additional relational moderators that can act as buffers of early environmental risk, including paternal sensitivity and other proximal caregiving markers (e.g., attachment security). This appears to be an important endeavor, given convincing data showing that parental sensitivity and parent-child attachment security can be enhanced by relatively brief, evidence-based intervention (for a review, see Bakermans-Kranenburg, Van IJzendoorn, & Juffer, 2003). Such interventions have, in fact, been found to increase maternal sensitivity even among mothers presenting with very high levels of psychosocial maladjustment (Moss et al., 2011). Thus, regardless of the degree of genetic and environmental contributions involved in the mother-child transmission of emotional maladjustment, the current results combined with those of intervention studies suggest that

parental sensitivity might be a key, malleable vehicle through which the transmission could be attenuated, thus contributing to break the intergenerational cycle of maladjustment.

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Table 1

*Descriptive statistics*

Variable	Mean	SD	Score Range
Parental Stress Index global total score	2.90	1.10	0 – 5
Psychiatric Symptom Index total score	1.77	.45	1 – 4
Dyadic Adjustment Scale total score	4.02	.89	1 – 6
Maternal psychosocial maladjustment composite	-.06	1.52	N/A
Maternal sensitivity	.64	.27	-1.00 – 1.00
Child internalizing symptoms at 2 years - Mother	6.99	5.22	0-72
Child internalizing symptoms at 3 years - Mother	7.85	5.28	0-72
Child internalizing symptoms at 2 years - Father	7.17	5.55	0-72
Child internalizing symptoms at 3 years - Father	7.05	5.55	0-72

*Note.* SD = Standard deviation.

Table 2

*Bivariate correlations among all study variables*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Child gender <sup>a</sup>	--														
2. Maternal age	.05	--													
3. Maternal education	-.08	.38**	--												
4. Paternal age	.04	.60**	.17**	--											
5. Paternal education	.00	.29**	.62**	.20**	--										
6. Family income	-.08	.44**	.59**	.29**	.53**	--									
7. Maternal PSI total score	.22 <sup>t</sup>	.01	-.27*	-.10	.53**	-.18	--								
8. Maternal DAS total score	-.03	-.11	.05	.03	.06	.08	-.37**	--							
9. Maternal Ifield total score	-.08	-.12	-.15	.03	-.14	-.32**	.36**	-.35**	--						
10. MPM composite score	.04	-.14	-.27**	-.02	-.09	-.18	.70**	.47**	.42**	--					
11. Maternal sensitivity	-.02	.20**	.22**	.07	.20**	.24**	-.03	-.01	.01	-.06	--				
12. CBCL 2 years - Mother	.14 <sup>t</sup>	.04	-.04	-.01	-.02	-.12	.07	-.23 <sup>t</sup>	.31*	.12	-.24**	--			
13. CBCL 3 years - Mother	.01	-.08	-.08	-.08	-.08	-.12	.13	-.24*	.30*	.24*	.02	.58**	--		
14. CBCL 2 years - Father	.19*	-.09	-.08	-.09	-.09	-.10*	-.05	-.08	.30*	.19	.19	.44**	.55**	--	
15. CBCL 3 years - Father	.03	-.01	-.19	-.02	-.07	-.06	.12	-.17	.19	.12	-.05**	.54**	.52**	.67**	--

Note. CBCL = Child Behavior Checklist - Child internalizing symptoms scores; PSI = Parental Stress Index; DAS = Dyadic Adjustment Scale;

Ifield = Psychiatric Symptoms Index; MPM = Maternal Psychosocial Maladjustment; <sup>a</sup>Boys = 1, Girls = 2.

<sup>t</sup> $p < .10$ . \* $p < .05$ . \*\* $p < .01$ .

Table 3

*Summary of regression analyses for interactive effects of maternal psychosocial maladjustment and maternal sensitivity onto maternal and paternal reports of child internalizing symptoms at 2 and 3 years*

Model and steps	$\beta$	$t$
<i>Maternal reports of child internalizing symptoms at 2 years</i>		
1. Child gender	.16	1.64
2. Maternal psychosocial maladjustment	.15	1.52
Maternal sensitivity	-.01	-.14
3. Maladjustment x Sensitivity	-.23	-2.14*
R <sup>2</sup> (adj.)		.06
df		(4, 105)
<i>Maternal reports of child internalizing symptoms at 3 years</i>		
1. Family income	-.16	-1.63
Child gender	.14	1.45
2. Maternal psychosocial maladjustment	.20	1.84 <sup>t</sup>
Maternal sensitivity	-.02	-.19
3. Maladjustment x Sensitivity	-.27	-2.34*
R <sup>2</sup> (adj.)		.11
df		(5, 94)
<i>Paternal reports of child internalizing symptoms at 2 years</i>		
1. Maternal psychosocial maladjustment	.26	2.12*
Maternal sensitivity	.20	1.42
2. Maladjustment x sensitivity	-.07	-.49
R <sup>2</sup> (adj.)		.04
df		(4, 70)
<i>Paternal reports of child internalizing symptoms at 3 years</i>		
1. Maternal psychosocial maladjustment	.18	1.46
Maternal sensitivity	.13	1.00
2. Maladjustment x Sensitivity	-.26	-1.96 <sup>~</sup>
R <sup>2</sup> (adj.)		.02
df		(3, 75)

<sup>t</sup> $p < .10$ . \* $p < .05$ . <sup>~</sup> $p = .05$ .

Table 4

*Summary of regression analyses for interactive effects of maternal psychosocial maladjustment and maternal sensitivity onto maternal and paternal reports of child internalizing symptoms at 3 years when controlling for child internalizing symptoms at 2 years*

Model and steps	$\beta$	$t$
<i>Maternal reports of child internalizing symptoms at 3 years</i>		
1. Family income	-.02	-.15
Child gender	.41	3.11**
Maternal reports of child internalizing symptoms at 2 years	.54	6.36**
2. Maternal psychosocial maladjustment	.06	1.01
Maternal sensitivity	-.04	-.62
3. Maladjustment x sensitivity	-.05	-.74
R <sup>2</sup> (adj.)		.79
df		(6, 80)
<i>Paternal reports of child internalizing symptoms at 3 years</i>		
1. Paternal reports of child internalizing symptoms at 2 years	.86	13.03**
2. Maternal psychosocial maladjustment	.10	1.38
Maternal sensitivity	.01	.18
3. Maladjustment x sensitivity	-.19	-2.30*
R <sup>2</sup> (adj.)		.81
df		(4, 53)

\*  $p < .05$ . \*\*  $p < .01$ .

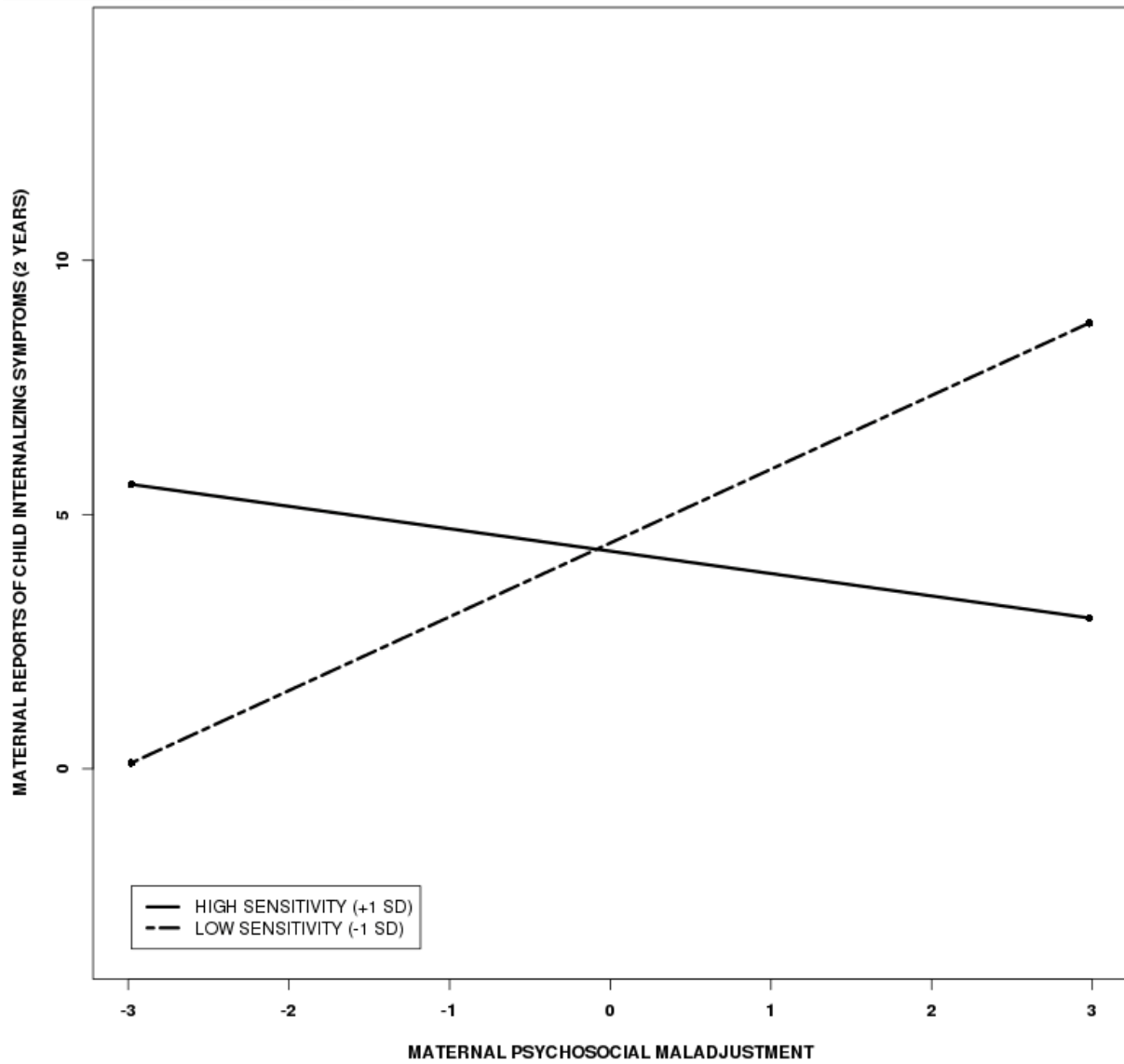


Figure 1. Interactive effects of maternal psychosocial maladjustment and maternal sensitivity onto maternal reports of child internalizing symptoms at 2 years

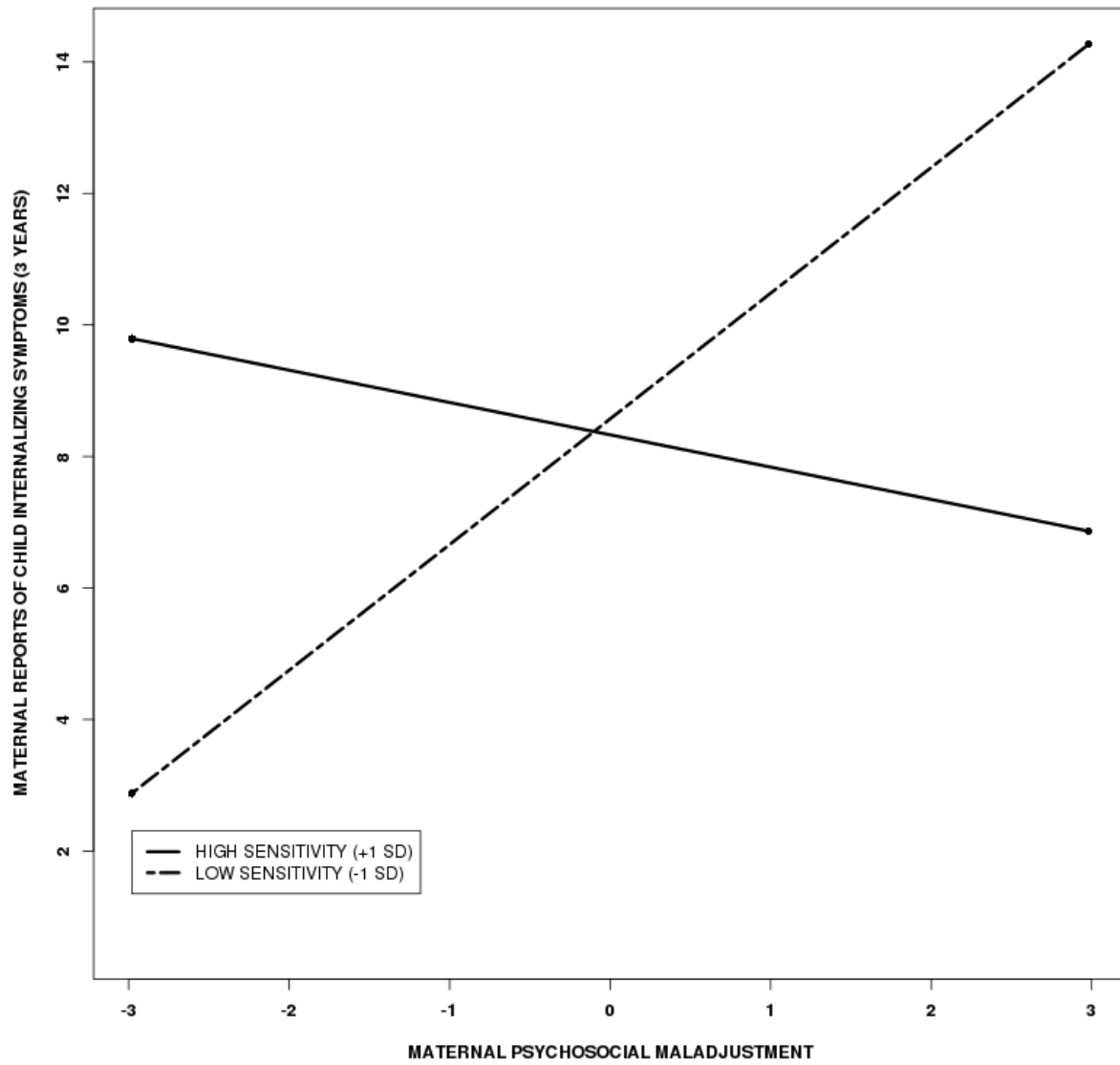


Figure 2. Interactive effects of maternal psychosocial maladjustment and maternal sensitivity onto maternal reports of child internalizing symptoms at 3 years

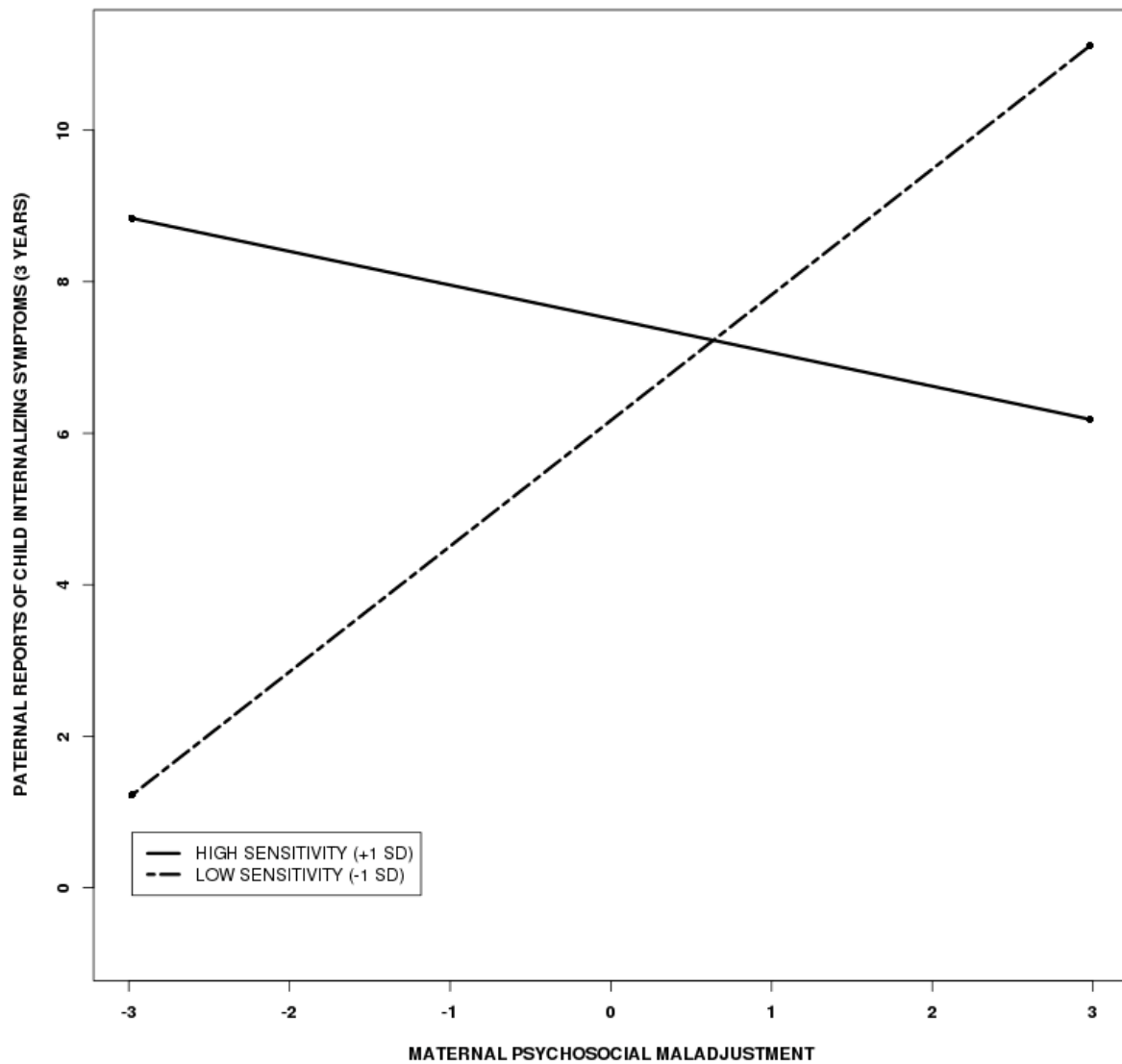


Figure 3. Interactive effects of maternal psychosocial maladjustment and maternal sensitivity onto paternal reports of child internalizing symptoms at 3 years

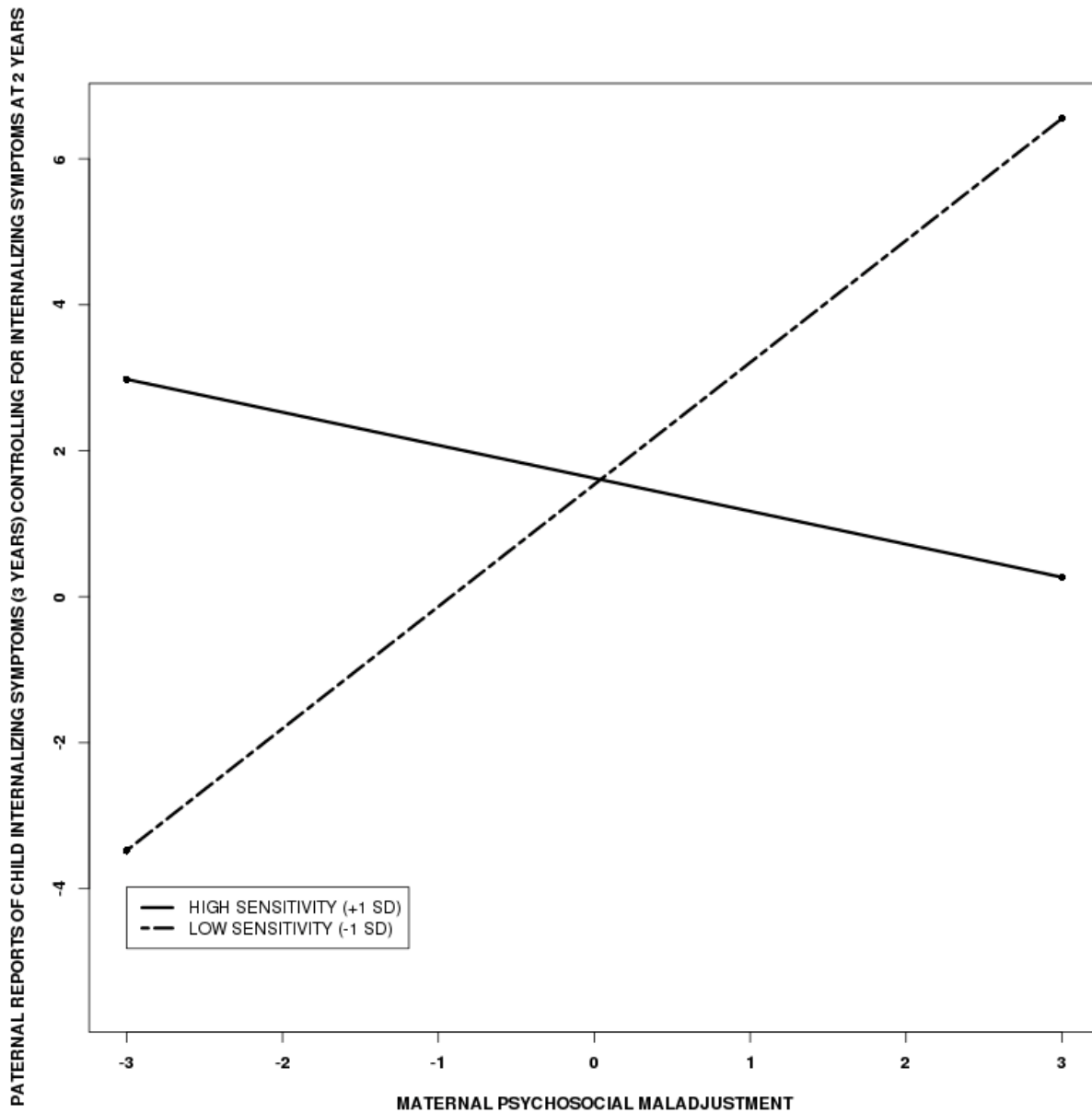


Figure 4. Interactive effects of maternal psychosocial maladjustment and maternal sensitivity onto paternal reports of child internalizing symptoms at 3 years controlling for child internalizing symptoms at 2 years



#### Article 4

Maternal depression and sensitivity mediate the relation between maternal history of early adversity and child temperament: The inheritance of circumstance

Bouvette-Turcot, A-A., Fleming, A. S., Unternaehrer, E., Gonzalez, A., Atkinson, L., Gaudreau, H., Steiner, M., & Meaney, M. J., on behalf of the MAVAN research team (Under review).

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**Maternal depression and sensitivity mediate the relation between maternal history of early adversity and child temperament: The inheritance of circumstance**

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**Running head:** RISK TRANSMISSION OF MATERNAL ADVERSITY

**Key words:** Maternal adversity; Maternal depression; Maternal sensitivity; Negative emotionality/behavioural dysregulation; Intergenerational risk transmission.

## **Abstract**

**Background:** We examined maternal depression and maternal sensitivity as mediators of the association between maternal childhood adversity and child temperament in 239 mother-child dyads from a longitudinal, birth cohort study.

**Methods:** We used an integrated measure of maternal childhood adversity that included the Childhood Trauma Questionnaire (CTQ) and the Parental Bonding Index (PBI). Maternal depression was assessed with the Edinburgh Postnatal Depression Scale (EPDS) at 6 months postpartum. Maternal sensitivity was assessed with the Ainsworth maternal sensitivity scales at 6 months. A measure of “negative emotionality/behavioural dysregulation” was derived from the Early Childhood Behaviour Questionnaire (ECBQ) administered at 36 months.

**Results:** Bootstrapping-based mediation analyses revealed that maternal depression mediated the effect of maternal childhood adversity on offspring negative emotionality/behavioural dysregulation (95%-confidence interval: 0.026 to 0.144). We also found a serial, indirect effect of maternal childhood adversity on child negative emotionality/behavioural mediated first by maternal depression and then by maternal sensitivity (95%-CI: 0.031 – 0.156).

**Conclusion:** Results suggest the intergenerational transmission of the effects of maternal childhood adversity to the offspring occurs through a two-step, serial pathway, involving maternal depression and maternal sensitivity.

Childhood maltreatment increases the risk of multiple forms of psychopathology (e.g., 1-3). Likewise, persistent emotional neglect, family conflict, and conditions of harsh, inconsistent discipline increase the risk for mood disorders (4, 5). Hill *et al.* (6) found that low maternal care and childhood sexual abuse contribute independently to the risk of depression in adult women, suggesting distinct influences of trauma and parenting. Thus, cold, distant parent-child relationships as well as trauma predict an increased risk of affective illness as well as childhood endophenotypes, such as behavioural inhibition, for mood disorders (7, 8). These findings suggest that the influence of parental care on child development extends across a wide range of parent – child interactions and is not unique to extreme forms of maltreatment (e.g., 8).

Longitudinal analyses confirm the familial transmission of depression and related disorders (9-11). The offspring of depressed mothers are at increased risk for depression compared to those of non-depressed parents. Studies showing improved mental health outcomes for children of mothers successfully treated for depression suggest non-genomic influences (e.g., 12) and are consistent with the idea that maternal emotional well-being affects parenting that then influences the mental health of the offspring (e.g., 13-15). Likewise, maternal childhood adversity, which increases the risk for depression, associates with an increased risk for psychopathology in the offspring (14-23). There is evidence for the importance of both depression and parenting as mediators of the relation between maternal childhood adversity and child development (14-23). Mothers sexually abused in childhood or depressed are more likely to exhibit diminished confidence in their parenting, greater use of physical punishment, lack of emotional control in parenting situations, and neglect (17, 24 and see 25, 26) suggesting that parenting mediates the relation between maternal childhood adversity and developmental outcomes in the offspring. The existing evidence suggests a sequential pathway that extends from maternal maltreatment through maternal depression/PTSD and, then, parenting to infant

behavioural regulation (14). Likewise, parental hostility and harsh discipline were found to mediate the association between maternal childhood maltreatment and both internalizing and externalizing problems in the offspring (19). These findings suggest that maternal childhood adversity compromises maternal mental health and thus promotes forms of parenting that influence the risk for depression in the offspring. It is currently unknown whether this pathway is unique to overt maltreatment or includes a broader range of maternal childhood familial experience. Parenting that includes authoritarian or overly permissive styles, low proactive, and unsupportive parenting, harsh/inconsistent discipline and parental rejection all associate with increased risk for affective illness such that the influence of parental care on child development extends across a wide range of parent – child interactions and is not unique to extreme maltreatment. These findings suggest that a broad range of maternal childhood adversity might associate with the mental health of the offspring.

We reported that maternal childhood adversity predicts increased negative emotionality/behavioural dysregulation in the offspring (23). That study (23) defined adversity using a measure that integrated reports of both childhood trauma (the Childhood Trauma Questionnaire - CTQ; 27) as well as the quality parental care (the Parental Bonding Index - PBI; 7) to capture a wider range of maternal childhood experience. This approach provides a continuous measure of maternal adversity that reflects both endangering (childhood trauma/poor quality maternal care) and protective (high quality maternal care) influences to capture a wider range of relevant child experience than is normally used in studies of extreme adversity. In the current study, we extended these findings to examine the importance of maternal sensitivity as a candidate mediator for the relation between maternal childhood adversity and childhood outcomes. We generated two alternative hypotheses: 1) that both maternal symptoms of depression and maternal sensitivity would independently mediate the relation between maternal

history of early adversity and offspring negative emotionality/behavioural dysregulation (parallel mediation) and 2) that the association between maternal childhood adversity and offspring negative emotionality/behavioural dysregulation would be mediated by maternal symptoms of depression and in turn, that the effects of maternal depression on offspring negative emotionality/behavioural dysregulation would act through maternal sensitivity (serial mediation). Our findings suggest the intergenerational transmission effects of maternal childhood experience over a wide range through sequential influences of maternal mood and sensitivity. We emphasize that these findings emerge from a community, as opposed to a high-risk sample and with values of maternal depressive symptoms across the normal range. These findings underscore the importance of intervention programs targeting parent – child interactions.

## **Method**

### **Participants**

Our community sample consisted of 239 mother-child dyads (114 girls) recruited in Montreal (Quebec) and Hamilton (Ontario) at 13-20 weeks gestation from antenatal care clinics or through advertisements at hospitals as part of the Maternal Adversity, Vulnerability, and Neurodevelopment (MAVAN) project, a longitudinal birth-cohort study that examines the developmental origins of individual differences in phenotypes associated with multiple forms of psychopathology (28). Mothers were first assessed during their pregnancy (~ 26 weeks) and then followed at multiple time points that included both home visits and laboratory sessions. The mothers and children (Table 1) constitute a portion of the MAVAN sample whose children had reached the age of 36 months. T-tests revealed that participants included in the current sample did not differ from those excluded due to missing data (all  $p$ 's > .05) except for maternal age

(included mothers:  $M = 33.5$ ,  $SD = 4.65$ ; excluded mothers:  $M = 32.2$ ,  $SD = 5.39$ ). Eligibility criteria included age 18 or over, singleton gestation, and fluency in French or English and excluded women with severe physical chronic illness (other than hypertension, asthma, or diabetes) or psychosis. Only babies born at a gestational age of 37 weeks or later, above 2000 gms and with APGAR scores  $>7$  were included in the cohort. Written, informed consent was obtained from all participants. Ethics approval was obtained from the Douglas Mental Health University Institute (McGill University) and St-Joseph Healthcare/McMaster University. The sample was comprised of 88.7% European/Caucasian, 8.1% African descent/African American, and 3.2% Hispanic/Latino ethnicities, a distribution consistent with that of Central Canada. The sample included 100 primiparous (42%) and 19 (8%) single mothers.

## **Measures**

***Maternal Adversity.*** Maternal childhood adversity was assessed using a derived measure that integrated data from the CTQ (27) and PBI (7). Whereas the CTQ assesses more severe instances of adversity, the PBI captures the perception of parental care across the normal range. The CTQ was administered to mothers during a home visit prenatally and when children were aged 24 months. All five subscales (emotional neglect, emotional abuse, physical neglect, physical abuse, and sexual abuse) were used in our analyses. The PBI, which is highly stable over time (29), was administered during a home visit when the infants were aged 6 months. Only the maternal care scale of the PBI was entered into the analytical models since it was the subscale scale that related to the construct under study and focused on maternal transmission. We used a previously validated principal component analysis to derive one factor and reduce our measures of maternal childhood adversity (CTQ and PBI; 23, 30). This factor explained 52% of the total variance (eigenvalue = 3.134) and provides a single measure of maternal adversity.



***Maternal symptoms of depression.*** The Edinburgh Postnatal Depression Scale (EPDS; 31) was administered at 6 months to assess maternal symptoms of depression. The scale consists of 10 short statements with four possible answers corresponding to how the mother has felt during the past week. Responses are scored 0, 1, 2, and 3 based on the seriousness of the symptom. A higher total sum score indicates more severe symptoms of depression. The EPDS has shown good psychometric properties (32). Given the low-risk nature of the current sample, only 28 mothers scored above the provided clinical threshold (i.e.,  $\geq 13$ ).

***Maternal sensitivity.*** A 20-minute, non-feeding mother-infant interaction was videotaped during a home-visit at 6 months postpartum. Mothers were asked to freely interact/play with their child. A single rater coded the videos for maternal sensitivity following the Ainsworth maternal sensitivity instrument (33) comprised of four subscales: accessibility, acceptance, cooperation, and sensitivity. A global score was also obtained averaging the four subscales. Scores range from 1 to 9. Inter-rater reliability was high (intra-class correlation = .88 for mean sensitivity rating;  $N = 28$ ). The global maternal sensitivity score was retained for our analyses.

***Negative emotionality/behavioural dysregulation.*** Child negative emotionality/behavioural dysregulation was measured using a composite score derived from the Early Childhood Behaviour Questionnaire (ECBQ; 34) at 36 months. The ECBQ is a maternal-report questionnaire comprised of 201 items grouped in 18 subscales: activity level/energy, attentional focusing, attentional shifting, cuddliness, fear, frustration, discomfort, high-intensity pleasure, impulsivity, inhibitory control, low-intensity pleasure, motor activation, perceptual sensitivity, positive anticipation, sadness, shyness, sociability, and soothability. The ECBQ items were entered into a principal component analysis to obtain one factor we termed “negative emotionality/behavioural dysregulation” comprised of positive ratings of discomfort, fear,

frustration, activity level, motor activation, and sadness, and negative ratings of attentional focusing, cuddliness, inhibitory control, and soothability, as previously validated (23; see Table 1 for mean and standard deviation). This factor associates with socio-emotional characteristics such as emotional symptoms, conduct problems, hyperactivity, peer problems, and prosocial behaviours (23).

### *Statistical analyses*

Zero-order correlations were performed between socio-demographic variables and child negative emotionality/behavioural dysregulation to identify potential confounding factors (see Table 2 for bivariate correlations between all study variables). Mediation analyses were performed using an IBM SPSS Macro (Andrew F. Hayes, School of Communication, The Ohio State University, Release 2.15, 2016), which tests total indirect and specific indirect effects by bootstrapping confidence intervals (CI) (35). A limitation is that this software does not allow for fitting parameters of the mediation models to statistically compare the two mediation models. The model parameters were set to give 95% confidence intervals and to run 10,000 bootstrap resamples. We tested our alternative hypotheses by examining the mediating effects of maternal symptoms of depression and maternal sensitivity on the association between maternal history of early adversity and child negative emotionality/behavioural dysregulation in a parallel and a serial mediation model. We included covariates as identified from the zero-order correlations (Table 2). The comparison of model fit was conducted using R version 3.2.0 (36).

## **Results**

Maternal age and child gender were significantly associated with child negative emotionality/behavioural dysregulation ( $r = -.15$ ;  $p < .01$  and  $r = .11$ ;  $p < .05$  respectively; Table

2) and were thus included as covariates in all analyses. As expected, the preliminary bivariate analyses showed that child negative emotionality/behavioural dysregulation was predicted by maternal childhood adversity ( $r = .12; p < .05$ ), maternal symptoms of depression ( $r = .33; p < .01$ ) as well as maternal sensitivity ( $r = -.19; p < .01$ ) (Table 2). Likewise, maternal childhood adversity predicted both maternal symptoms of depression ( $r = .25; p < .01$ ) and marginally predicted maternal sensitivity ( $r = -.11; p < .10$ ). These findings confirm the associations that form the basis for our mediational analysis. In the direct model (Figure 1A), we found a significant total effect of maternal childhood adversity on child negative emotionality/behavioural dysregulation ( $R^2 = .065$ ). In a first step, we examined whether inclusion of maternal symptoms of depression and maternal sensitivity would improve the fit of the model. Indeed, the residual sum of squares (RSS) decreased from  $RSS = 226.90$  (total effect model) to  $RSS = 203.09$  after inclusion of maternal symptoms of depression ( $F(1, 234) = 27.44; p < .01$ ) and to  $RSS = 219.49$  after inclusion of maternal sensitivity ( $F(1, 234) = 7.56; p < .01$ ). Finally, inclusion of both maternal symptoms of depression and sensitivity showed the smallest  $RSS = 199.49$  and was significantly better than both models including only one of the mediators (addition of maternal symptoms of depression:  $F(1, 233) = 23.731; p < .01$ ; addition of maternal sensitivity:  $F(1, 233) = 4.202; p < .05$ ). These findings are consistent with the expected contribution of maternal depression and maternal care on child socio-emotional function.

We then tested our first hypothesis that this association between maternal childhood adversity and child negative emotionality/behavioural dysregulation would act through maternal symptoms of depression and sensitivity in two, parallel pathways (parallel mediation, Figure 1B). We found a significant total mediation through both mediators (95%-CI: 0.028 – 0.156), while the specific indirect effects were only significant for maternal symptoms of depression (95%-CI: 0.026 – 0.144), but not for maternal sensitivity (95%-CI: -0.003 – 0.047). Thus, our first

hypothesis could only be confirmed for maternal symptoms of depression as a mediator in the association between maternal childhood adversity and child negative emotionality/behavioural dysregulation, but not for maternal sensitivity. The model explained 17.8% of variation in child negative emotionality/behavioural dysregulation ( $F(5, 233) = 10.11$ ).

We then examined the second, alternative hypothesis, which proposed that the effect of maternal history of early adversity on child negative emotionality/behavioural dysregulation was mediated *sequentially* by maternal symptoms of depression and sensitivity (serial mediation, Figure 1C). We again found a significant total indirect effect of maternal childhood adversity on child negative emotionality/behavioural dysregulation via maternal symptoms of depression and sensitivity together (95%-CI: 0.031 – 0.156). The specific indirect effects were significant for maternal childhood adversity on negative emotionality/behavioural dysregulation via maternal symptoms of depression (95%-CI: 0.026 – 0.142) and for maternal childhood adversity on child negative emotionality/behavioural dysregulation via maternal symptoms of depression and maternal sensitivity (95%-CI: 0.001 – 0.017), but not for maternal childhood adversity on child negative emotionality/behavioural dysregulation via maternal sensitivity alone (95%-CI: -0.006 – 0.037). The model still explained 17.8% of variation in child negative emotionality/behavioural dysregulation ( $F(5, 233) = 10.11$ ). Our second hypothesis was, thus, confirmed, despite the fact that the effect maternal sensitivity only showed a partial mediation effect. All coefficients, standard errors, t- and p-values, as well as 95% confidence intervals are depicted in Table 3 and path coefficients are illustrated in Figure 1.

## Discussion

We examined maternal depression and maternal sensitivity as mediators of the association between maternal childhood adversity and negative emotionality/behavioural dysregulation in the offspring. Maternal depression mediated the effects of maternal childhood adversity on offspring

negative emotionality/behavioural dysregulation. We then showed that maternal sensitivity mediated the relation between maternal depressive symptoms and child negative emotionality/behavioural dysregulation, suggesting a serial pathway. Increasing levels of maternal childhood adversity associated with higher maternal depression scores that were then associated with lower maternal sensitivity, which, in turn, related to increased levels of negative emotionality/behavioural dysregulation in the offspring. Hence, our results suggest that maternal depression and maternal sensitivity act in a serial manner to define the transmission pathway between maternal childhood adversity and child negative emotionality/behavioural dysregulation.

Our results are consistent with studies of the intergenerational consequences of maternal childhood adversity (15, 16, 20-23). The association between the maternal childhood maltreatment and that of her offspring is mediated by maternal depression (16), which may explain why an intergenerational experience of maltreatment is not universally apparent (25, 26). This finding is also consistent with the influence of maternal depression on child mental health development (37). Maternal history of childhood maltreatment is associated with increased risk for offspring antisocial behaviour (16, 22). Path analysis (13) reveals that offspring experience of child maltreatment mediated the association between exposure to maternal depression in pregnancy and offspring psychopathology. These findings are consistent with the findings of the current study revealing that maternal childhood experience, maternal mental health and parent – child interactions operate serially to influence the mental health of the offspring.

One limitation to this study is the use of retrospective reports of maternal childhood adversity and maternal reports of negative emotionality/behavioural dysregulation. However, both the CTQ and the PBI are measures with good psychometric properties (7, 27, 29) and strong predictive validity for psychopathology. Moreover, as noted above, the software used for these analyses did not allow for fitting parameters of the mediation models to statistically compare the

two mediation models. Also, our analyses included only a single measure of maternal depression. However, symptoms of depression or anxiety appear relatively stable over the perinatal period (e.g., 38). Parental reports of child temperament, although not as objective as observational/laboratory measures, allow for information about the child in various real-life contexts at several points over development. The independent, observational assessment of maternal sensitivity reinforces the design. Moreover, since maternal sensitivity was rated by an external observer whereas maternal depression was self-reported, we minimized the risk of shared method variance for those two constructs.

Our findings suggest an intergenerational influence of maternal childhood experience that extends beyond more extreme forms of adversity, such as forms of maltreatment, to include measures of the quality of parental care. Moreover, the influence of maternal depressive symptoms and its mediation by maternal sensitivity was apparent in a community sample, suggesting that the influence of maternal depressive symptoms cuts across the population and is not unique to instances of clinical psychopathology. This conclusion is consistent with the findings from neuroimaging studies showing that the levels of depressive symptoms across the population associate with alterations in the structure and connectivity of corticolimbic regions implicated in mood disorders (e.g., 39). Our findings also underscore the importance of maternal sensitivity for child mental health. There is convincing evidence for the idea that parental sensitivity and parent-child attachment security is enhanced by relatively brief, evidence-based intervention (40). Such interventions increase maternal sensitivity even among mothers presenting with very high levels of psychosocial maladjustment (41). Taken together these findings also suggest that maternal childhood adversity is a factor to be integrated into the assessment of vulnerability of individual children for later psychopathology.

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Table 1

*Descriptive statistics*

Variable	Mean	Standard Deviation
Maternal age <sup>a</sup>	33.53	4.65
Family income <sup>b</sup>	13.92	3.35
	(\$40-50,000)	
Child birth weight (gms)	3,400.93	457.06
Maternal early adversity (centered)	0.01	1.03
Maternal sensitivity	5.69	1.85
Maternal depression	6.56	4.92
Child NE/BD	0.00	0.99

<sup>a</sup>Postpartum (36 months)

<sup>b</sup>Combined family income at 36 months, where 0 = no revenue, 1 = less than \$5,000, 2 = at least \$5,000, 3 = less than \$10,000, 4 = at least \$10,000, 5 = less than \$15,000, 6 = at least \$15,000, 7 = less than \$20,000, 8 = at least \$20,000, 9 = less than \$30,000, 10 = at least \$30,000, 11 = less than \$40,000, 12 = at least \$40,000, 13 = between \$40,000 and \$50,000, 14 = between \$50,000 and \$60,000, 15 = between \$60,000 and \$80,000, 16 = between \$80,000 and \$100,000, and 17 = at least \$100,000.

Table 2

*Bivariate correlations among all study variables*

	1.	2.	3.	4.	5.	6.
1. Child gender <sup>a</sup>	--	.05	-.06	-.04	.05	.11 <sup>*</sup>
2. Maternal age		--	-.09	.06	-.06	-.15 <sup>**</sup>
3. Maternal adversity			--	-.11 <sup>t</sup>	.25 <sup>**</sup>	.12 <sup>*</sup>
4. Maternal sensitivity				--	-.17 <sup>**</sup>	-.19 <sup>**</sup>
5. Maternal depression					--	.33 <sup>**</sup>
6. Child NE/BD						--

<sup>a</sup>Girls = 1, Boys = 2.

<sup>t</sup> $p < .10$ . <sup>\*</sup> $p < .05$ . <sup>\*\*</sup> $p < .01$ .

Table 3

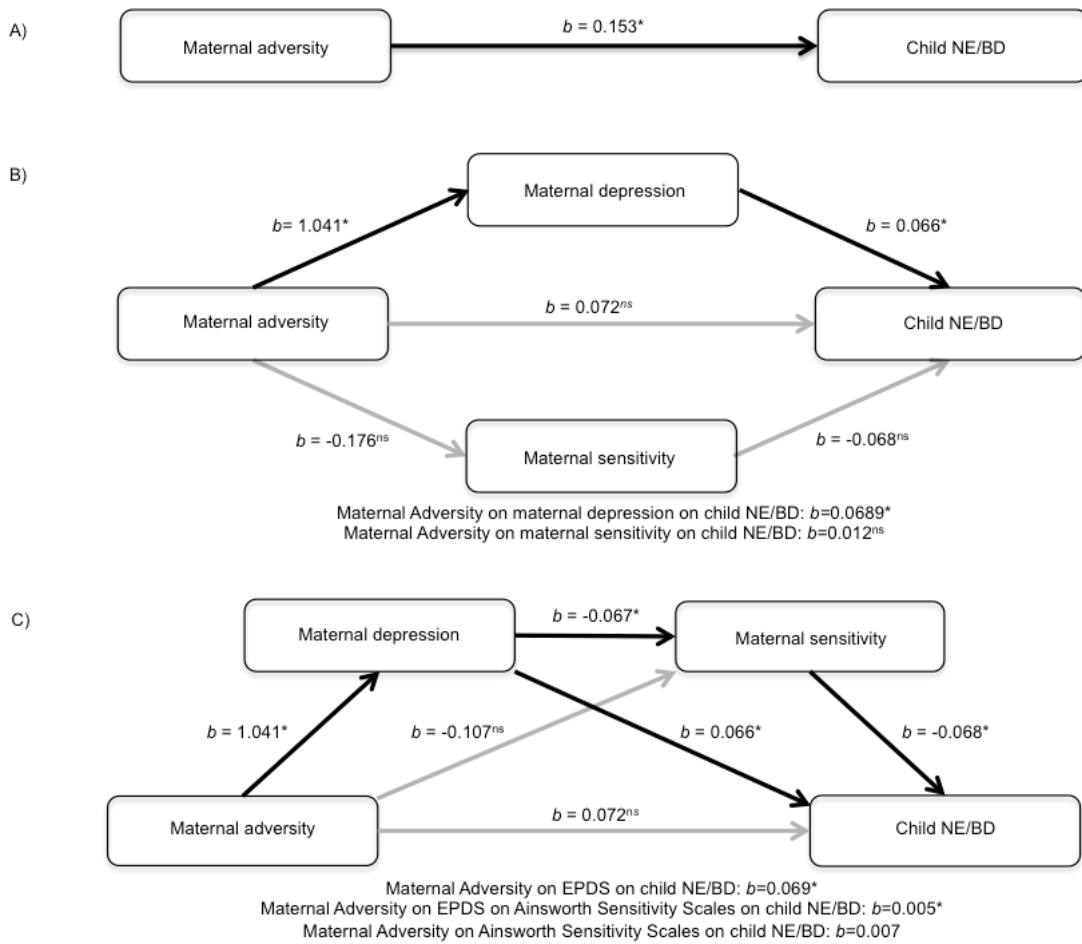
*Mediation analyses of maternal history of early adversity (IV) on child NE/BD (DV) through maternal depression (MV) and maternal sensitivity (MV) controlling for child gender and maternal age. Depicted are path coefficients, total, direct, and indirect effects.*

	Coefficient	SE	t	p-value	95% CI
<b>Hypothesis 1: Parallel Mediation</b>					
Total effect IV on DV					
Maternal Adversity on Child NE/BD	0.153	0.066	2.316	0.021	
Direct effects IV on MV					
Maternal Adversity on EPDS	1.041	0.303	3.436	0.001	
Maternal Adversity on Ainsworth Sensitivity Scales	-0.176	0.124	-1.417	0.158	
Direct effects MV on DV					
EPDS on Child NE/BD	0.066	0.014	4.872	<0.0001	
Ainsworth Sensitivity Scales on Child NE/BD	-0.068	0.033	-2.050	0.042	
Direct effect IV on DV					
Maternal Adversity on Child NE/BD	0.072	0.064	1.132	0.259	
Indirect effects					
Total indirect effect	0.081	0.031			0.028 - 0.156
Indirect effect via EPDS	0.069	0.028			0.026 - 0.144
Indirect effect via Ainsworth Sensitivity Scales	0.012	0.012			-0.003 - 0.047
<b>Hypothesis 2: Serial Mediation</b>					
Total effect IV on DV					
Maternal Adversity on Child NE/BD	0.153	0.076	2.024	0.044	
Direct effects IV on MV					
Maternal Adversity on EPDS	1.041	0.389	2.680	0.008	
Maternal Adversity on Ainsworth Sensitivity Scales	-0.107	0.127	-0.842	0.401	
Direct effect MV on DV					
EPDS on Ainsworth Sensitivity Scales	-0.067	0.027	-2.455	0.015	
	146				

Direct effects MV on DV				
EPDS on Child NE/BD	0.066	0.016	4.082	0.000
Ainsworth Sensitivity Scales on Child NE/BD	-0.068	0.034	-2.012	0.045
Direct effect IV on DV				
Maternal Adversity on Child NE/BD	0.072	0.065	1.112	0.267
Indirect effects				
Total Indirect effect	0.081	0.032		0.031 - 0.156
Maternal Adversity on EPDS on Child NE/BD	0.069	0.029		0.026 - 0.142
Maternal Adversity on EPDS on Ainsworth Sensitivity Scales on child NE/BD	0.005	0.004		0.001 - 0.017
Maternal Adversity on Ainsworth Sensitivity Scales on Child NE/BD	0.007	0.010		-0.006 - 0.037

Abbreviations: EPDS: Edinburgh Postnatal Depression Scale; DV: Dependent variable; IV: Independent variable; MV: Mediator variable; NE/BD: Negative emotionality/behavioural dysregulation.

Figure 1  
 Illustration of mediation models that were tested. A) Direct effects model; B) Parallel mediation model; C) Serial mediation model ( $*p < .05$ ).





## Conclusion

### Summary of goals and results

The main goal of the present dissertation was to document more extensively the circumstances under which intergenerational risk transmission of maternal adversity occurs (i.e., for whom and in what conditions) and to identify underlying processes.

First, this dissertation examined the modulating roles of both relational and biological factors in the relation between maternal history of early adversity and child temperament, in two distinct articles looking at two independent samples. The results of Article 1 shed light onto the moderating role of mother-child attachment security in the relation between maternal adversity and child temperament. Indeed, maternal history of early adversity was related to child temperamental activity level but only for children presenting with higher levels of mother-child attachment security. Conversely, children with lower levels of attachment security to their mother did not appear to be affected by their mothers' history of early adversity. Those results are consistent with *Differential Susceptibility Theory* (DST; Bakermans-Kranenburg & Van IJzendoorn, 2007; Belsky, 1997; Belsky et al., 2007; Belsky & Pluess, 2009). This theory posits that certain factors, for instance, personality (Aron, Aron, & Jagiellowicz, 2012), cortisol reactivity (Obradović et al., 2010), genes (Belsky & Pluess, 2009), and childhood socialization factors (e.g., Feldman, Greenbaum, & Yirmiya, 1999; Kochanska, Aksan, & Joy, 2007) may increase an individual's general susceptibility to the environment, not only enhancing the detrimental impacts of adverse environments, but also the positive effects of supportive settings. In line with this, children presenting with high levels of attachment security had the lowest temperamental activity level ratings when their mothers reported higher levels of early adversity, but also had the highest temperamental

activity level scores when their mothers reported lower levels of early adversity. In contrast, there was no such relation among their counterparts presenting with low levels of attachment security. This suggests that mother-child attachment security may act as both a risk and a protective factor for both lower and higher levels of maternal history of early adversity.

Article 2, conducted with an independent community sample, established that the effects of maternal history of early adversity onto child negative emotionality/behavioural dysregulation (NE/BD), another core temperament component, were moderated by the offspring's 5-HTTLPR genotype. Indeed, children carrying either one or two copies of the short (S) 5-HTTLPR allele displayed higher levels of NE/BD when their mothers reported high levels of childhood adversity and lower levels of NE/BD when their mothers reported low levels of childhood adversity, as opposed to their counterparts homozygous for the long (L) allele for whom no such relation was found. Importantly, those effects were significant over and above previous and concurrent reports of maternal depression and were independent of maternal 5-HTTLPR genotype, which emphasizes a distinct contribution of child genotype.

These findings were also consistent with DST, with children carrying either one or two copies of the S allele being more affected, either positively, by lower levels of maternal adversity, or negatively, by higher levels of maternal adversity, whereas children homozygous for the L allele did not appear to be susceptible to their environment as measured with mother reports of childhood adversity. These results also provide further evidence for the moderating role of the 5-HTTLPR polymorphism in the relation between maternal psychological maladjustment and child emotional functioning (Fox et al., 2005; Kochanska, Philibert, & Barry, 2009; Pluess et al., 2011). These findings also complement the above-mentioned ones that targeted mother-child attachment security as a relational moderator in the

intergenerational risk transmission pathway between maternal history of early adversity and child temperament (Article 1). This puts forward the idea of distinguishable operative pathways from maternal childhood adversity to child emotional development considering the influence of both relational and biological/genetic moderators.

Besides, results from both articles (1 and 2) might potentially appear as contradictory with regards to the way child activity level was conceptualized. Indeed, while activity level was considered a favourable outcome in Article 1, it was, nonetheless, negatively correlated with anger proneness, which is an indicator of a more “difficult” temperament. Furthermore, activity level loaded positively within the negative emotionality/behavioural dysregulation factor in Article 2. While, at first glance, child activity level may seem to have been conceptualized differently in the two studies, one may hypothesize that this construct plays different roles depending on the context. For instance, certain temperament characteristics such as increased activity level may represent a challenge for the child’s family while being an asset for that child in other settings. One should also bear in mind that activity level was measured at two different times (i.e., 24 months in Article 1 and 36 months in Article 2). Those constructs should, hence, be compared cautiously across those two studies.

As a second goal, the dissertation investigated the potential protective role of maternal sensitivity in a risk transmission paradigm of maternal (concurrent) psychosocial maladjustment to child emotional maladjustment. Results from the third article revealed that maternal psychosocial maladjustment interacted with maternal sensitivity in the prediction of toddlers’ internalizing symptoms. Children of less sensitive mothers displayed higher levels of internalizing symptoms as a function of increasing levels of maternal psychosocial

maladjustment, whereas children whose mothers were more sensitive appeared to be protected from the influence of maternal psychosocial maladjustment.

These findings suggest that the effects of maternal psychosocial maladjustment may be modulated by the quality of care mothers manage to provide, since maternal psychosocial maladjustment was not associated with child internalizing symptoms for children of more sensitive mothers. This reinforces the protective role of high levels of maternal sensitivity in various developmental spheres (Grossmann & Grossmann, 1991; Leerkes, Blankson, & O'Brien, 2009). One may hypothesize that such a buffering effect might occur, at least partially, through teaching and modelling of efficient self-regulation. Indeed, mothers who manage to maintain high levels of sensitive care despite presenting with psychosocial difficulties can reasonably be presumed to be skilled at effective self-regulation, and might promote this capacity in their children through competent external regulation. Contrastingly, and consistent with dual-risk theory (e.g., Sameroff, 1983), mothers presenting with both higher levels of psychosocial maladjustment and lower levels of sensitivity might expose their children to cumulative risk factors that might be sufficient to affect their children's levels of internalizing symptoms, even in a low-risk sample.

Finally, the dissertation aimed to extend current knowledge on factors that mediate the intergenerational transmission effects of maternal adversity onto child emotional development by investigating the mediating effects of both maternal depression and maternal sensitivity and determining whether these effects occur sequentially or in parallel. Article 4 showed that maternal depression mediated the effects of maternal history of early adversity on offspring NE/BD and that maternal sensitivity further mediated the relation between maternal depression and child NE/BD, suggesting intergenerational effects through a serial pathway.

Indeed, reported increasing levels of maternal history of early adversity associated with higher maternal depression scores that further associated with lower maternal sensitivity scores, which, in turn, related to increased levels of NE/BD in the offspring. Thus, rather than exerting distinct effects onto child NE/BD, maternal depression and maternal sensitivity act in a serial manner to shape the transmission pathway between maternal childhood adversity and child NE/BD. Importantly, while research has clearly established that maternal history of early adversity is related to both later depression (e.g., Famularo et al., 1992; Katerndahl et al., 2005; Kendler et al., 2004) and more insensitive parenting (e.g., Lang et al., 2010; Roberts et al., 2004) and that both maternal depression (e.g., Cicchetti & Toth, 1995; Goodman et al., 2011; Pawlby et al., 2009) and insensitive parenting (e.g., Hastings et al., 2008) are related to impaired child emotional development, literature examining the respective and combined contributions of both factors within the same design is still scarce. This emphasizes the importance of reconciling all of those associations within one single framework and to examine their contributions. Although moderating factors remain to be integrated within such a comprehensive framework, the results of Article 4 appear to be a key step toward this ambitious goal. Besides, although maternal mental health, parenting characteristics, and family type have been identified as mediators in the relation between maternal history of childhood adversity and offspring emotional and behavioural problems (Martinez-Torteya et al., 2014; Min et al., 2012; Miranda et al., 2013; Myhre et al., 2014; Rijlaarsdam et al., 2014; Roberts et al., 2004) the current model is one of the first to explore those mediating variables for a broad range of maternal childhood experiences (i.e., targeting individual variations mostly within the normal range).

## **Integration of results**

Intergenerational risk transmission of maternal adversity is a complex phenomenon that involves a plethora of intervening factors (Lang et al., 2010; Plant, Barker, Waters, Pawlby, & Pariante, 2013; Trickett, Nott, & Putnam, 2011). Likewise, factors that impact child emotional development are numerous (e.g., Pauli-Pott et al., 2004) and their effects are frequently modulated by individual characteristics (Obradović et al., 2010; Wetter & El-Sheikh, 2012). Thus, investigating the intervening factors involved in the intergenerational risk transmission of maternal adversity and the consequences on child emotional development requires considering both moderating and mediating factors that encompass environmental/parental features as well as child characteristics. The present dissertation aimed to take into account relational and biological moderators as well as mother-related mediators. The conceptual model presented in Figure 1 (see page 163) proposes a visual integrative summary regrouping the findings from all four articles comprised within this dissertation. It illustrates that the effects of maternal adversity onto child emotional development are modulated by mother-child attachment security, child genotype, and maternal sensitivity, and that these effects are also mediated by maternal depression and maternal sensitivity. As such, this model first suggests that the effects of maternal history of early adversity onto child emotional development are modulated by mother-child attachment security (Article 1). Second, the model indicates that these intergenerational effects are also modulated by the child 5-HTTLPR genotype (Article 2). Third, the model shows that maternal sensitivity also moderates the association between maternal concurrent maladjustment and child emotional development (Article 3). Lastly, the model displays the mediating effects of both maternal

depression and maternal sensitivity in the intergenerational risk transmission of maternal history of early adversity on child emotional development (Article 4).

Hence, this model proposes, on the one hand, a two-step operative pathway through maternal depression, first, and then maternal sensitivity. This is consistent with the available literature, albeit scarce, that targeted maternal behaviour and mental health features as mediators in the relation between maternal history of childhood abuse and offspring emotional adjustment (Collishaw et al., 2007; Martinez-Torteya et al., 2014; Min et al., 2012; Miranda et al., 2013; Myhre et al., 2014; Rijlaarsdam et al., 2014; Roberts et al., 2004). The fact that the current results were, however, obtained with a community sample suggests that normative variations of maternal mental health and maternal sensitivity are sufficient to act as risk transmission mechanisms.

On the other hand, the summary model of the current dissertation also proposes a differential risk transmission paradigm that emphasizes the importance of individual differences. Indeed, although developmental research often assumes that most children are equally affected by the same environmental factors, a growing number of studies provide evidence that individual characteristics modulate the influence of early life experiences, consistently with DST, as described previously (Belsky & Pluess, 2009). Accordingly, children appeared to be differentially affected by their mothers' history of early adversity according to their attachment security (Article 1) or their 5-HTTLPR genotype (Article 2). Indeed, children carrying such susceptibility factors were not only negatively affected by higher levels of maternal history of early adversity, as expressed through impaired temperament characteristics, but were also positively affected by lower levels of maternal

adversity whereas children who did not carry such susceptibility factors were not affected in either way.

Thus, children appear to be differentially affected by distal environmental characteristics (such as their mothers' history of early adversity) according to their genetic makeup and certain characteristics of their own socio-emotional functioning. This emphasizes the existence of a differential risk transmission pathway as well as the importance of individual differences in the face of suboptimal environments. Evidently, more comprehensive designs encompassing varied relational and biological moderators within single frameworks are needed to further support and document this hypothesis.

Furthermore, the model suggests that maternal sensitivity also modulates the relation between maternal adversity (as operationalized with maternal psychosocial maladjustment) and child internalizing symptoms. Those results embed well within already supported views stating that impaired developmental outcomes are often due to an amalgamation of risk factors (e.g., McMahon, Barnett, Kowalenko, & Tennant, 2006; Sameroff, Gutman, & Peck, 2003). Besides, one noteworthy aspect of those results is that maternal sensitivity was not found to be a susceptibility factor according to DST criteria (Belsky et al., 2007; Roisman et al., 2012), but instead conformed to a diathesis-stress model (e.g., Roisman et al., 2012). According to this view, individuals who carry a given vulnerability factor (e.g., low levels of maternal sensitivity, in the present case) are more likely to be impacted by negative experiences/settings (Roisman et al., 2012).

Hence, this dissertation allowed identifying three moderators in the intergenerational risk transmission of maternal adversity onto child emotional development. Two of those moderators, namely mother-child attachment security and child 5-HTTLPR genotype, were



also identified as differential susceptibility markers whereas the third one, i.e., maternal sensitivity did not meet all criteria for DST. These findings are consistent with numerous studies that have identified maternal sensitivity solely as a risk buffer, as opposed to a differential susceptibility factor (Alink, Cicchetti, et al., 2009; Alink, Mesman, et al., 2009; Davies et al., 2006; Grant et al., 2010a, 2010b; Manning et al., 2014; McLoyd & Smith, 2002; Rochette & Bernier, 2014; Towe-Goodman & Teti, 2008).

Moreover, although the fact that mother-child attachment security and child 5-HTTLPR genotype acted as differential susceptibility factors whereas maternal sensitivity did not might seem surprising at first, we should bear in mind that maternal sensitivity is a maternal characteristic whereas the other two constructs are either a mother-child relational characteristic or strictly a child feature. Therefore, although mother-child attachment security and maternal sensitivity are well associated (e.g., Van IJzendoorn et al., 2004), attachment security and child genotype are individual characteristics that describe aspects of the child, and thus may influence his or her susceptibility to the environment, while maternal sensitivity is more of a proxy measure of the child's environment itself, and thus may not be a plausible differential susceptibility factor.

All in all, the present dissertation allowed identifying intervening factors in the intergenerational risk transmission paradigm of maternal adversity onto child emotional development. Increasing levels of maternal adversity were found to relate to increased maternal depressive symptomatology and to lower maternal sensitivity. Those effects then extended to suboptimal child emotional development. However, children appeared to be differentially affected by this risk cascade. Indeed, mother-child attachment security, child 5-HTTLPR genotype, and maternal sensitivity each modulated the above-mentioned effects.

This emphasizes the complex nature of intergenerational risk transmission and stresses the necessity of broad, comprehensive designs investigating both moderating and mediating variables within the same paradigm.

### **Limitations**

Nonetheless, the current dissertation provides only partial support for the integrative model proposed in Figure 1. Indeed, as mentioned in the discussion sections of the four articles, each study entailed some limitations. First, both samples were community samples within which participants were mostly Caucasian and from relatively high socioeconomic backgrounds. As such, generalizing the obtained results to higher-risk samples or to other cultures is not possible. Moreover, descriptive analyses of each of the measures in use confirmed the low-risk nature of both samples, with most of the collected data capturing individual variations within the normal range rather than pathological score deviations. Another limitation to this dissertation is the use of maternal reports of offspring temperament and internalizing symptoms, which increases the risk of shared method variance with self-reported early adverse experiences and psychosocial maladjustment. Although Articles 2 and 3 used subsamples of father reports of child outcomes to corroborate maternal reports, sample sizes for father ratings were modest. Furthermore, one may bear in mind that only retrospective accounts of maternal history of early adversity were used. Even though most of the used self-report measures have been found to be quite stable over time (e.g., Wilhelm, Niven, Parker, & Hadzi-Pavlovic, 2005), the retrospective nature of the data still raises the possibility that intervening life experiences and memory processes may have tainted those early adversity ratings (Henry, Moffitt, Caspi, Langley, & Silva, 1994). Besides, the designs that were used did not allow for teasing apart genetic and environmental factors in the

intergenerational risk transmission models that were explored. Moreover, all designs that were used were correlational in nature, which prevents from making any causal inferences. Sample sizes were also at times modest, which may have limited statistical power. Finally, only early child emotional outcomes were studied; hence, the intergenerational risk transmission pathways that were uncovered from maternal adversity may not generalize to child outcomes other than early emotional development. Likewise, only a limited number of intervening factors were studied. Thus, the proposed integrative model, although informative, may lack the influence of other elements such as, for instance, social support, acute and chronic stressors, and, importantly, paternal characteristics.

### **Future research**

Overall, all of the obtained results and the above-mentioned limitations may serve to orient future research. First, to thoroughly document intergenerational risk transmission of parental adversity over time, a longitudinal follow-up of children whose early experience would be documented objectively, up until they themselves become parents, would be ideal. Second, integrating both mediating and moderating variables within one single framework would allow investigating unique and cumulative contributions leading to a broader comprehension of individual differences. Third, and as mentioned in the previous section, other intervening variables should be examined. For instance, one may expect paternal characteristics to modulate the relation between maternal adversity and child emotional development. Indeed, it has been demonstrated that infants presenting with a secure attachment relationship with one of their parents were less at risk for childhood behaviour problems than those characterized by insecure attachment bonds with both of their parents (Kochanska & Kim, 2013). Similarly, father involvement has been identified as a buffering

factor for the risk stemming from maternal depression when predicting child behaviour problems (Mezulis, Hyde, & Clark, 2004). An earlier study also reported a protective effect of father-adolescent relationship quality onto behaviour problems when mothers were depressed (Tannenbaum & Forehand, 1994). Provided this realm of literature, one may wonder to what extent the buffering effect of fathering against maternal depression may also apply to normative populations. Furthermore, paternal history of early adversity should also be investigated in order to determine if child outcomes vary depending on whether their mother, their father, or both of their parents experienced early life adversity.

Fourth, in the current dissertation, mother-child attachment security (Article 1) was measured using the Attachment Behaviour Q-Sort (AQS; Waters, 1995). This measure does not provide classifications of insecure and disorganized attachment as obtained with the Strange Situation Procedure (SSP). Therefore, it would be interesting that future research uses the SSP to discriminate between different types of insecure attachment and to investigate disorganized attachment, in particular, as a potential moderator of the effects of maternal adversity on child emotional development. Indeed, given that attachment disorganization has been associated with later behaviour problems and psychopathology (e.g., Van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999), one may expect this construct to exacerbate the risk stemming from maternal adversity. Fifth, non-parental reports of child outcome (for instance, observational measures of temperament and/or daycare providers' ratings of internalizing symptoms) would provide rich, independent validation of parental reports that might be, at times, biased.

Sixth, other child outcomes such as cognitive and executive functioning would be interesting to study in order to determine whether the current findings only apply to early child

emotional development or also extend to other spheres of child development. Extending outcome investigation to offspring brain function would also be important as depression models suggest that children of depressed mothers are more likely to present with altered brain morphology (e.g., Chen et al., 2010). Likewise, individuals with a history of childhood abuse and neglect present with altered brain areas such as the amygdala and the hippocampus (Heim, Shugart, Craighead, & Nemeroff, 2010). Seventh, to disentangle the contributions of genetic and environmental intervening variables, genetically-informed designs would be key. Furthermore, it would be interesting to extend the biological investigations to neurobiological mechanisms such as hypothalamic-pituitary-adrenal (HPA) axis activity, DNA methylation, etc. (Meaney, 2010, see also Nemeroff & Binder, 2014). Last but not least, replicating and expanding the current results to higher-risk samples is of importance to allow for a broader understanding and greater generalizability.

### **Potential applications to clinical work**

Results from this dissertation could offer valuable clinical guidance. Notably, the identification of moderating factors such as maternal sensitivity emphasizes the importance of early prevention efforts such as intervention programs aimed at enhancing parental sensitivity (for a review, see Bakermans-Kranenburg, Van IJzendoorn, & Juffer, 2003). In fact, research shows that parental sensitivity can be enhanced by relatively brief, evidence-based interventions (Bakermans-Kranenburg et al., 2003). Hence, regardless of the degree of genetic and environmental contributions involved in the intergenerational risk transmission of maternal adversity, the results from the current dissertation combined with those of intervention studies suggest that parental sensitivity might be a key, malleable vehicle through

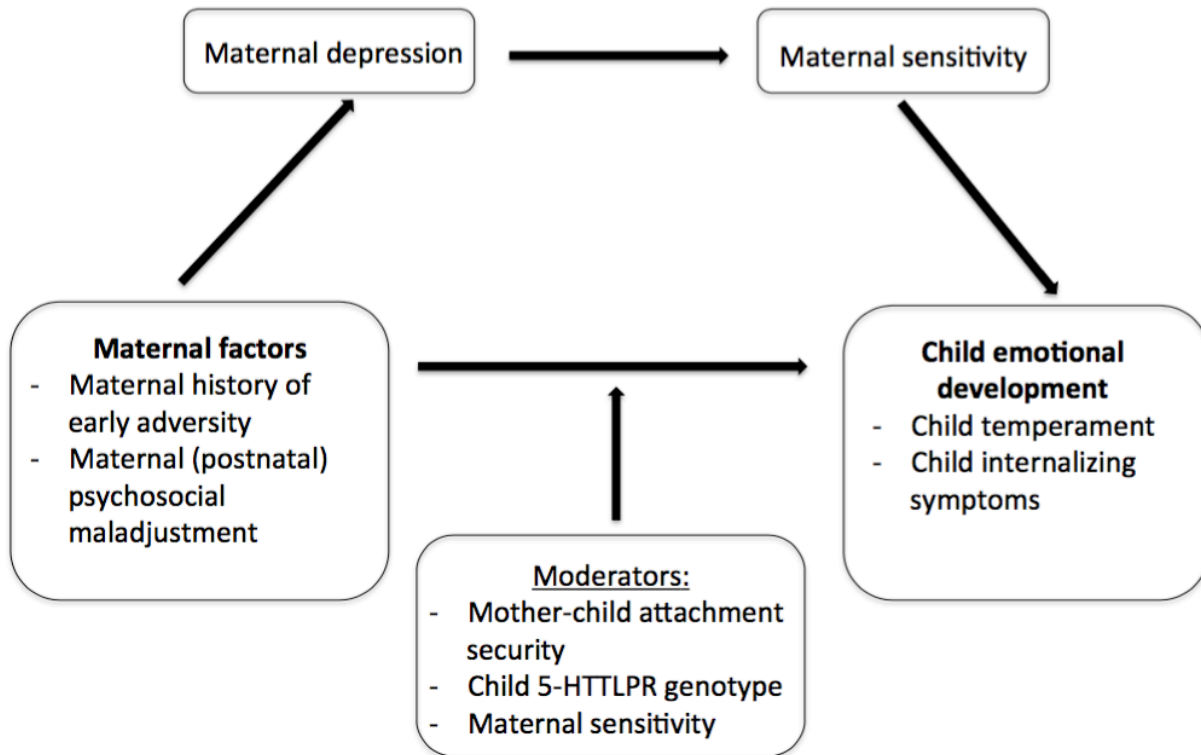
which the transmission could be attenuated, thus contributing to break the intergenerational cascade of risk transmission.

Moreover, the results of this dissertation were based on very young children (i.e., aged 2-3 years). This suggests not only that children can be at risk from a very young age, but also that this risk pathway could potentially be interrupted very early on, which supports early prevention initiatives targeting infants and toddlers, especially provided that high levels of internalizing problems show prevalence rates up to 28% in toddlers (e.g., Wilens et al., 2002).

Studies such as those presented in this dissertation bear the promise of more effectively identifying at-risk children early in life. Overall, this dissertation suggests that maternal history of early adversity, as well as maternal current psychosocial functioning, are important factors to be integrated into the assessment of developmental vulnerability.

Figure 1

Integrative model of the dissertation's main results



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## APPENDIX A

### **Adult Attachment Interview (AAI)**

George, C., Kaplan, N., & Main, M. (1996). *Adult Attachment Interview Protocol*. University of California at Berkeley.



## **Adult Attachment Interview (AAI)**

### INTERVIEW OF PARENT'S EXPERIENCES

**In this project, one of the aspects that we are interested in concerns the relationship that children develop with their parents.**

**In this context, one of the things that we are exploring concerns what the parents themselves have to say about their own childhood experiences with their parents, and the effects that these experiences might have had on who they are today, as adults.**

**For example, often parents have had a certain amount of positive experiences with their own parents, which in turn have helped them to be parents themselves. Other adults have had experiences with their parents that were less positive, but they have learned from these experiences, and they are trying to do things differently with their own children.**

**I will therefore mainly ask you questions about your parents and your childhood, but we will also touch upon the years that followed this period as well as what is going on now.**

**It is possible that you find certain questions to be a little difficult or that you feel sad at certain points of the interview. Please do not hesitate to tell me if you would prefer to not answer certain questions. Usually, this interview takes about one hour, or one hour and a half. It varies a lot from one person to another.**

## INTERVIEW PROTOCOL

**1. Could you start by helping me get oriented to your early family situation?**

**1.1.-- For example, where were you born?**

**1.2.-- Where did you live during your childhood?**

**1.3.-- Did you move around much?**

**1.4.--What did your parents do at various times for a living?**

If raised by people other than parents,

**-- Who would you say mainly raised you?**

**1.5 --Did you see much of your grandparents when you were little?**

If passed away during her lifetime,

**-- How old were you at that time?**

If she'd never met them,

**-- Did they pass away before you were born?**

**-- How old was your mother/father at the time, do you know?**

**-- Did your mother/father tell you much about this grandparent?**

**1.6 -- Did you have brothers and sisters living in the house, or anybody besides your parents?**

**1.7 --Are they living nearby now or do they live elsewhere?**

**2. I'd like you to try to describe your relationship with your parents as a young child, starting as far back as you can remember, let's say around 4 or 5 years old, or at least before age 12. Globally, how would you describe it?**

**❖ Could you talk about your mother and father separately a little bit more?**

If short answer,

**-- How were things between you two?**

3. Now I'd like to ask you to choose five adjectives or words that reflect your early relationship with your mother starting from as far back as you can remember in early childhood - - as early as you can go, I am thinking age 5 to 12 years. I know this may take a bit of time, so go ahead and think for a minute...I will write each of them down and then I'll ask you why you chose them.

If less than 5 words,

**--do you have another word?**

If after more thought, still less than 5 words,

**-- We will start with the ones we have, but you can tell me anytime if other ones come to mind?**

❖ For each adjective,

**You described your childhood relationship with your mother as (or, « your second adjective was », or « the second word you used was ») \_\_\_\_\_. Can you think of a memory or an incident that would illustrate why you chose \_\_\_\_\_ to describe the relationship?**

If silence gets too long,

**-- Just take another minute and see if anything comes to mind.**

And if she still maintain her silence,

**-- Well, that's fine, let's take the next one, then.**

If the adjective is redefined by a second one, repeat the first one,

**-- Can you think of a specific memory that would illustrate how your relationship was \_\_\_\_\_?**

If she doesn't understand the meaning implied by a specific memory,

**-- I'm wondering if there was a particular time that happened, that made you think about it as \_\_\_\_\_?**

If the memory reported happened after age 12,

**-- Do you have another memory of that when you were younger?**

If her response is at a semantic level or too general,

**-- I wonder if there is something more specific that happened that made you think of this way of qualifying your relationship?**

If the response is still too general,

-- accept it and go on.

If the specific memory given is not detailed enough or happened after age 12,

-- ask briefly for a second memory.

#### **4. Same questions for the FATHER.**

**1. Now I wonder if you could tell me, to which parent did you feel the closest when you were young, that is around 4 or 5, and why?**

❖ **Why isn't there this feeling with the other parent?**

#### **6. When you were upset as a child, what would you do?**

If participant asks what we mean by "upset",

**-- meaning that you didn't feel well, something was wrong?**

##### **6.1 When you were upset emotionally when you were little, what would you do?**

❖ **Can you think of a specific time that happened?**

##### **6.2 Can you remember what would happen when you were hurt, physically?**

❖ **Again, do any specific incidents (or, do any other incidents) come to mind?**

##### **6.3 Were you ever ill when you were little?**

❖ **Do you remember what would happen?**

**Do you remember a particular time?**

At the end of these three situations, if the participant did not mention being held by the parents,

❖ **I was wondering, do you remember being held by either of your parents at any of these times - - I mean, when you were upset, or hurt, or ill?**

Check for both parents.

**7. What is the first time you remember being separated from your parents?**

If was never separated,

**-- It didn't have to be a long separation, it could have been the first day of school, a stay at camp or a trip that your parent made without you.**

-- As a last resort, ask about spending the night at a friend's home or a short stay at an uncle or an aunt's house.

**7.1 How did you respond?**

**7.2 Do you remember how your parents responded?**

**7.3 How was it when you were reunited?**

**7.4 Are there any other separations that stand out in your mind?**

**8. Did you ever feel rejected as a young child?**

If answer is no (or cannot remember)

**-- Of course, looking back on it now, you may realize it wasn't really rejection, but what I'm trying to ask about here is whether you remember ever having felt rejected in childhood.**

If spontaneous answer involves school,

**-- And in your family, did you ever feel that way?**

**8.1 How old were you when you first felt this way?**

**-- What happened (what did you do)?**

**-- How did you respond?**

**8.2 Why do you think your parent did those things?**

**Do you think he/she realized that he/she was rejecting you?**

**8.3 a Did you ever feel pushed away or ignored?**

**8.3b Did you ever feel that your physical needs were being ignored or neglected?**

**8.4 Where you ever frightened or worried as a child?**

**-- Did you talk about it to your parents?**

**-- How did they react?**

If don't understand the question,

**-- Just in general, was there ever a time when you felt very worried or very afraid when you were young? Did you talk about it to your parents? How did they react?**

If she asks "in general or specifically regarding my parents?",

**-- I'm asking the question more so regarding your relationship with your parents but it could involve something that scared you in a more general way.**

**9. Were your parents ever threatening with you in any way - - maybe for discipline, or even jokingly? (answer)**

**9.1 Some people have told us for example that their parents would threaten to leave them or send them away from home. Did that ever happen to you? (answer).**

**9.2 Some people have told us that their parents would use the silent treatment. Did this ever happen with your parents? (answer).**

**9.3 Some people have memories of threats or of some kind of behavior that was physically abusive. Did anything like this ever happen to you, or in your family?**

If yes,

**-- How old were you at the time?**

**-- Can you tell me a little bit more about what happened?**

**-- Did it happen frequently?**

**-- Did it happen over a long period? (if not mentioned)**

**-- Did it sometimes leave marks on your body? (if not mentioned)**

**-- Did it frighten you? (if not mentioned)**

**-- Do you feel this experience affects you now as an adult?**

**-- Does it influence your approach with your own child?**

**9.4 Do you remember being hit when you were a child?**

**❖ Were you ever spanked as a form of discipline?**

If yes,

**-- How old were you?**

-- **How often?**

**Did it sometimes leave marks on your body? (if not mentioned)**

**9.5 Some people have memories of some kind of behaviour that was sexually abusive. Did anything like this ever happen to you, or in your family?**

If yes,: Do you mind if I ask you a few questions about that?

-- **How old were you at the time?**

-- **Did it happen frequently?**

-- **Did it happen over a long period? (if not mentioned)**

-- **Do you feel this experience affects you now as an adult?**

-- **Does it influence your approach with your own child?**

**9.6 Did you have any such experiences involving people outside your family?**

If yes, same question as 9.5 (age, frequency, affects, influence).

WARNING:

If participant mentioned being abused earlier in the interview (or another word with that meaning) and doesn't come back to it in this part of the interview,

-- **Earlier, you told me about being abused (or other word) by .... Can you tell me a little bit more about it?**

-- start the questions again...

**10. In general, how do you think your overall experiences with your parents, have affected your adult personality?**

If the question is not fully understood, say:

-- **How did they affect what you have become as a person.**

❖ **Are there any aspects of your early experiences that you feel were a set-back to your development?**

If the question is not fully understood, say:

-- **Well, not everybody uses terms like set-back for what I mean here. I mean, was there anything about your early experiences, or any parts of your early experiences, that you think might have held your development back, or had a negative effect on the way you turned out?**

If response is yes and participant gave examples

**-- Is there anything else about your early experiences that you think might have held your development back, or had a negative effect on the way you turned out?**

If response is no,

**-- Is there anything in your early experiences that might, in your opinion, have limited you or had a negative effect on the way you turned out?**

If participant said they've already answered that question

**-- Just to clarify, can you tell me if your experiences with your parents hindered you in any way?**

**11. Why do you think your parents behaved as they did during your childhood?**

If response is focused on only one parent's behaviour toward the other parent,

**-- Why do you think they behaved the way they did toward you when you were young?**

**12. Were there any other adults who were close to you, like parents, as a child?**

❖ **Or any other adults who were especially important to you, even though not parental?**

❖ **Further investigation:**

**-- How old were you at that time?**

**-- Was he/she/they living with you?**

**-- Did they take care of you?**

**-- To what extent were they important to you?**

**13. Did you experience the loss of a parent or other close loved one while you were a young child? For example, a sibling, or a close family member?**

**13.1 How old were you at the time?**

**13.2 Could you tell me about the circumstances?**

**13.3 Was this death sudden or was it expected?**

**13.4 How did you respond at the time?**



**13.5 Can you recall your feelings at that time?**

**13.6 Have your feelings regarding this death changed much over time?**

**13.7 If not already mentioned,**

**❖ Did you attend the funeral, and what was that like for you?**

**13.8 Loss of sibling or parent,**

**❖ What would you say was the effect on your (other parent) and on your household, and how did this change over the years?**

**13.9 Would you say this loss has had an effect on your adult personality?**

**13.10 How does it affect your approach with your own child?**

**13a. Did you lose any other important persons during your childhood?**

If yes, repeat same set of questions. (13.1 to 13.10).

**13b. Have you lost other close persons, in your adult years or since you were a teenager?**

If yes, repeat same set of questions. (13.1 to 13.10).

If participant mentioned at the beginning of the interview the death of a grandparent, a parent or someone significant, but doesn't get back to it on question 13,

**-- When we talked about,.... you mentioned the death of ....., can you tell me a little bit more about that? Then, start questions again.**

**14. Other than any difficult experiences you've already described, have you had any other experiences which you would regard as potentially traumatic?**

If necessary,

**-- I mean, any experience that was overwhelmingly and immediately terrifying.**

**15. Now I'd like to ask you a few more questions about your relationship with your parents. Were there many changes in your relationship with your parents (or remaining parent) after childhood? We'll get to the present in a moment, but right now I mean changes occurring roughly between your childhood and your adulthood?**

Other way of saying it,

**-- I mean things that changed between your childhood and your adulthood.**

**16. Now I'd like to ask you, what is your relationship with your parents (or remaining parent) like for you now as an adult? Here I am asking about your current relationship.**

**16.1 Do you have much contact with your parents at present?**

**16.2 What would you say the relationship with your parents is like currently?**

**16.3 Could you tell me about any (or any other) sources of dissatisfaction in your current relationship with your mother?**

**16.4 With your father?**

**16.5 Any special (or any other) sources of satisfaction with your mother?**

**16.6 Satisfaction with your father?**

**17. Now, I'd like to move on to a different sort of question - - it's not about your relationship with your parents, instead it's about an aspect of your current relationship with (specific child of special interest to the researcher, or all the participant's children considered together). How do you respond now, in terms of feelings, when you separate from your child/children?**

**❖ Do you ever feel worried about (child)?**

**❖ What do you worry about?**

**18. If you had three wishes for your child twenty years from now, what would they be?**

**❖ I'm thinking partly of the kind of future you would like to see for your child. I'll give you a minute or two to think about this one.**

**19. Is there any particular thing that you feel you learned from your childhood experiences? I'm thinking here of something you feel you might have gained from the kind of childhood you had.**

Other way of formulating it,

Well, do you feel like there is something in particular you may have taken away from your childhood?

**20. We've been focusing a lot on the past in this interview, but I'd like to end by looking quite a ways into the future. We've just talked about what you think you may have learned from your own childhood experiences. I'd like to end by asking you what you would hope your child (or, your imagined child) might have learned from his/her experiences of being parented by you?**

If not understood,

**-- What would you like your child to remember or learn from being in your care?**

### CONCLUSION

**That is about it for the questions that I wanted to ask you today. Is there anything else that you would like to add?**

**These are not questions that we think about everyday; I really appreciate you accepting to answer them. If you should need to communicate with me, you can reach me at ...**

**At all times, in case of distress:**

**I feel like it may be hard for you to talk about it; would you prefer that we stop here for this question?**

## **APPENDIX B**

### **Attachment Q-Set (AQS) : Coding system**

Waters, E. (1995). Appendix A: The Attachment Q-SET (Version 3.0). *Monographs of the Society for Research in Child Development*, 60, 234-246.

## Attachment Q-Sort (AQS) : Coding system

1.	<p>Child readily shares with mother or lets her hold things if she asks to.</p> <p><i>Low : Refuses.</i></p>
2.	<p>When child returns to mother after playing, he is sometimes fussy for no clear reason.</p> <p><i>Low : Child is happy or affectionate when he returns to mother between or after playtimes.</i></p>
3.	<p>When he is upset or injured, child will accept comforting from adults other than mother.</p> <p><i>Low : Mother is the only one he allows to comfort him.</i></p>
4.	<p>Child is careful and gentle with toys and pets.</p>
5.	<p>Child is more interested in people than in things.</p> <p><i>Low : More interested in things than people.</i></p>
6.	<p>When child is near mother and sees something he wants to play with, he fusses or tries to drag mother over to it.</p> <p><i>Low : Goes to what he wants without fussing or dragging mother along.</i></p>
7.	<p>Child laughs and smiles easily with a lot of different people.</p> <p><i>Low : Mother can get him to smile or laugh more easily than anyone else.</i></p>
8.	<p>When child cries, he cries hard.</p> <p><i>Low : Weeps, sobs, doesn't cry hard, or hard crying never lasts very long.</i></p>
9.	<p>Child is lighthearted and playful most of the time.</p> <p><i>Low : Child tends to be serious, sad, or annoyed a good deal of the time.</i></p>
10.	<p>Child often cries or resists when mother takes him to bed for naps or at night.</p>
11.	<p>Child often hugs or cuddles against mother without her asking or inviting him to do so.</p> <p><i>Low : Child doesn't hug or cuddle much, unless mother hugs him first or asks him to give her a hug.</i></p>

12.	<p>Child quickly gets used to people or things that initially made him shy or frightened him.</p> <p><i>Middle : Never shy or afraid.</i></p>
13.	<p>When the child is upset by mother's leaving, he continues to cry or even gets angry after she is gone.</p> <p><i>Middle : Not upset by mom leaving.</i></p> <p><i>Low : Crying stops right after mom leaves.</i></p>
14.	<p>When child finds something new to play with, he carries it to mother or shows it to her from across the room.</p> <p><i>Low : Plays with the new object quietly, or goes where he won't be interrupted.</i></p>
15.	<p>Child is willing to talk to new people, show them toys, or show them what he can do if mother asks him to.</p>
16.	<p>Child prefers toys that are modeled after living things (e.g., dolls, stuffed animals).</p> <p><i>Low : Prefers balls, blocks, pots and pans, etc.</i></p>
17.	<p>Child quickly loses interest in new adults if they do anything that annoys him.</p>
18.	<p>Child follows mother's suggestions readily, even when they are clearly suggestions rather than orders.</p> <p><i>Low : Ignores or refuses unless ordered.</i></p>
19.	<p>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.)</p> <p><i>Low : Mother has to take the object or raise her voice to get it away from him.</i></p>
20.	<p>Child ignores most bumps, falls, or startles.</p> <p><i>Low : Cries after minor bumps, falls, or startles.</i></p>
21.	<p>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.</p> <p><i>Middle : Child isn't allowed or doesn't have room to play away from mom.</i></p> <p><i>Low : Doesn't keep track.</i></p>

22.	<p>Child acts like an affectionate parent toward dolls, pets, or infants.</p> <p><i>Middle : Child doesn't play with or have dolls, pets, or infants around.</i></p> <p><i>Low : Plays with them in other ways.</i></p>
23.	<p>When mother sits with other family members or is affectionate with them, child tries to get mom's affection for himself.</p> <p><i>Low : Lets her be affectionate with others. May join in, but not in a jealous way.</i></p>
24.	<p>When mother speaks firmly or raises her voice at him, child becomes upset, sorry, or ashamed about displeasing her. (Do not score high if child is simply upset by the raised voice or afraid of getting punished.)</p>
25.	<p>Child is easy for mother to lose track of when he is playing out of her sight.</p> <p><i>Middle : Never plays out of sight.</i></p> <p><i>Low : Talks and calls when out of sight. Easy to find; easy to keep track of what he is playing with.</i></p>
26.	<p>Child cries when mother leaves him at home with baby-sitter, father, or grandparent.</p> <p><i>Low : Doesn't cry with any of these.</i></p>
27.	<p>Child laughs when mother teases him.</p> <p><i>Middle : Mother never teases child during play or conversations.</i></p> <p><i>Low : Annoyed when mother teases him.</i></p>
28.	<p>Child enjoys relaxing in mother's lap.</p> <p><i>Middle : Child never sits still.</i></p> <p><i>Low : Prefers to relax on the floor or on furniture.</i></p>
29.	<p>At times, child attends so deeply to something that he doesn't seem to hear when people speak to him.</p> <p><i>Low : Even when deeply involved in play, child notices when people speak to him.</i></p>
30.	<p>Child easily becomes angry with toys.</p>
31.	<p>Child wants to be the center of mother's attention. If mom is busy or talking to someone, he interrupts.</p> <p><i>Low : Doesn't notice or doesn't mind not being the center of mother's attention.</i></p>

32.	When mother says “no” or punishes him, child stops misbehaving (at least at that time). Doesn’t have to be told twice.
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. <i>Low : Always ready to go play by the time he signals mother to put him down.</i>
34.	When child is upset about mother leaving him, he sits right where he is and cries. Doesn’t go after her. <i>Middle : never upset by her leaving.</i> <i>Low : Actively goes after her if he is upset or crying.</i>
35.	Child is independent with mother. Prefers to play on hi own; leaves mother easily when he wants top play away from mother. <i>Middle : Not allowed or not enough room to play away from mother.</i> <i>Low : Prefers paying with or near mother.</i>
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. <i>Low : Always away unless retrieved, or always stays near.</i>
37.	Child is very active. Always moving aground. Prefers active games to quiet ones.
38.	Child is demanding and impatient with mother. Fussess and persists unless she does what he wants right away.
39.	Child is often serious and businesslike when playing away from mother or alone with his toys. <i>Low : Often silly or laughing when playing away from mother or alone with his toys.</i>
40.	Child examines new objects or toys in great detail. Tries to use them in different ways or to take them apart. <i>Low : First look at new objects or toys is usually brief. (May return to them later, however.)</i>
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.)



42.	<p>Child recognizes when mother is upset. Becomes quiet or upset himself. Tries to comfort her; asks what is wrong, etc.</p> <p><i>Low : Doesn't recognize; continues play; behaves toward her as if she were OK.</i></p>
43.	<p>Child stays closer to mother or returns to her more often than the simple task of keeping track of her requires.</p> <p><i>Low : Doesn't keep close track of mother's location or activities.</i></p>
44.	<p>Child asks for mother to and enjoys having her hold, hug, and cuddle him.</p> <p><i>Low : Not especially eager for this. Tolerates it, but doesn't seek it; or wiggles to be put down.</i></p>
45.	<p>Child enjoys dancing or singing along with music.</p> <p><i>Low : Neither likes nor dislikes music.</i></p>
46.	<p>Child walks and runs around without bumping, dropping, or stumbling.</p> <p><i>Low : Bumps, drops, or stumble happen throughout the day (even if no injuries result).</i></p>
47.	<p>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.</p> <p><i>Low : Child gets upset, even if mother indicates the sound or activity is safe or fun.</i></p>
48.	<p>Child readily lets new adults hold or share things he has, if they ask to.</p>
49.	<p>Runs to mother with a shy smile when new people visit the home.</p> <p><i>Middle : Child doesn't run to mother at all when visitors arrive.</i></p> <p><i>Low : Even if he eventually warms up to visitors, child initially runs to mother with a fret or a cry.</i></p>
50.	<p>Child initial reaction when people visit the home is to ignore or avoid them, even if he eventually warms up to them.</p>
51.	<p>Child enjoys climbing all over visitors when he plays with them.</p> <p><i>Middle : He won't play with visitors.</i></p> <p><i>Low : Doesn't seek close contact with visitors when he plays with them.</i></p>

52.	Child has trouble handling small objects or putting small things together. <i>Low : Very skillful with small objects, pencils, etc.</i>
53.	Child puts his arms around mother or puts his hand on her shoulder when she picks him up. <i>Low : Accepts being picked up, but doesn't especially help or hold on.</i>
54.	Child acts like he expects mother to interfere with his activities when she is simply trying to help him with something. <i>Low : Accepts mother's help readily, unless she is in fact interfering.</i>
55.	Child copies a number of behaviors or ways of doing things from watching mother's behavior. <i>Low : Doesn't noticeably copy mother's behavior.</i>
56.	Child becomes shy or loses interest when an activity looks like it might be difficult. <i>Low : Thinks he can do difficult tasks.</i>
57.	Child is fearless. <i>Low : Child is cautious or fearful.</i>
58.	Child largely ignores adults who visit the home. Finds his own activities more interesting. <i>Low : Finds visitors quite interesting, even if he is a bit shy at first.</i>
59.	When child finishes with an activity or toy, he generally finds something else to do without returning to mother between activities. <i>Low : When finished with an activity or toy, he returns to mother for play, affection, or help finding more to do.</i>
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. <i>Middle : Never cautious or afraid.</i>
61.	Plays roughly with mother. Bumps, scratches, or bites during active play. (Does not necessarily mean to hurt mom.) <i>Middle : Play is never very active.</i>

	<i>Low : Plays active games without injuring mother.</i>
62.	When child is in a happy mood, he is likely to stay that way all day. <i>Low : Happy moods are very changeable.</i>
63.	Even before trying things himself, child tries to get someone to help him.
64.	Child enjoys climbing all over mother when they play. <i>Low : Doesn't especially want a lot of close contact when they play.</i>
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.)
66.	Child easily grows fond of adults who visit his home and are friendly to him. <i>Low : Doesn't grow fond of new people very easily.</i>
67.	When the family has visitors, child wants them to pay a lot fo attention to him.
68.	On the average, child is a more active type person than mother. <i>Low : On the average, child is a less active type person than mother.</i>
69.	Rarely asks mother for help. <i>Middle : Child is too young to ask.</i> <i>Low : Often asks mother for help.</i>
70.	Child quickly greets his mother with a big smile shen she enters the room. (Shows her a toy, gestures, or says, "Hi, Mommy.") <i>Low : Doesn't greet mother unless she greets him first.</i>
71.	If held in mother's arms, child stops crying and quickly recovers after being frightened or upset. <i>Low : Not easily comforted.</i>
72.	If visitors laugh at or approve of something the child does, he repeats it again and again. <i>Low : visitors' reactions don't influence child this way.</i>
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.)

	<i>Low Can take such things or leave them, or has none at all.</i>
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.) <i>Low ; Waits a reasonable time, as if he expects mother will shortly do what he asked.</i>
75.	At home, child gets upset or cries when mother walks out of the room. (May or may not follow her.) <i>Low : Notices her leaving; may follow, but doesn't get upset.</i>
76.	When given a choice, child would rather play with toys than with adults. <i>Low : Would rather play with adults than toys.</i>
77.	When mother asks child to do something, he readily understands what she wants. (May or may not obey.) <i>Middle : Child is too young to understand.</i> <i>Low : Sometimes puzzled or slow to understand what mother wants.</i>
78.	Child enjoys being hugged or held by people other than his parents and/or grandparents.
79.	Child easily becomes angry at mother. <i>Low : Doesn't become angry at mother unless she is very intrusive or he is very tired.</i>
80.	Child uses mother's facial expressions as a good source of information when something looks risky or threatening. <i>Low : makes up his own mind without checking mother's expressions first.</i>
81.	Child cries as a way of getting mother to do what he wants. <i>Low : Mainly cries because of genuine discomfort (tired, sad, afraid, etc.).</i>
82.	Child spends most of his playtime with just a few favorite toys or activities.
83.	When child is bored, he goes to mother looking for something to do. <i>Low : Wanders around, or just does nothing for a while, until something comes up.</i>

84.	Child makes at least some effort to be clean and tidy around the house. <i>Low : Spills and smears things on himself and on floors all the time.</i>
85.	Child is strongly attracted to new activities and new toys. <i>Low : New things do not attract him away from familiar toys or activities.</i>
86.	Child tries to get mother to imitate him or quickly notices and enjoys it when mom imitates him on her own.
87.	If mother laughs at or approves of something the child has done, he repeats it again and again. <i>Low : child is not particularly influenced this way.</i>
88.	When something upsets the child, he stays where he is and cries. <i>Low : goes to mother when he cries. Doesn't wait for mom to come to him.</i>
89.	Child's facial expressions are strong and clear when he is playing with something.
90.	If mother moves very far, child follows along and continues play in the area she has moved to. <i>Middle : Child isn't allowed or doesn't have room to play away from mom.</i>

## APPENDIX C

### **Toddler Behavioural Assessment Questionnaire (TBAQ)**

Goldsmith, H. H. (1996). Studying temperament via construction of the Toddler Behavior Assessment Questionnaire. *Child Development, 67*, 218-235. doi: 10.1111/j.1467-8624.1996.tb01730.x

## Toddler Behavioural Assessment Questionnaire (TBAQ)

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Toddler Behavior Assessment Questionnaire – 16 to 36 Months

Child's name: \_\_\_\_\_ Child's birthdate: Month: \_\_\_ Day: \_\_\_ Yr: \_\_\_

Today's date: Month: \_\_\_ Day: \_\_\_ Yr: \_\_\_ Child's age: \_\_\_ Years, \_\_\_ Months

Parent Completing (circle): Mom Dad Sex of Child (circle one): Male Female

**INSTRUCTIONS: Please read carefully before starting.**

As you read each description of the child's behavior below, please indicate how often the child did this during the last month by circling one of the numbers in the left column. These numbers indicate how often you observed the behavior described during the last month.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
(NA)						
Never	Very	Less than	About half	More than	Almost	Always
Does	Rarely	half the time	the time	half the time	always	not
apply						

The "Not Applicable" column (NA) is used when you did not see the child in the situation described during the last month. For example, if the situation mentions the child going to the doctor and there was no time during the last month when the child went to the doctor, circle the (NA) column. "Does Not Apply" (NA) is different from "Never" (1). "Never" is used when you saw the child in the situation but the child never engaged in the behavior mentioned during the last month. Please be sure to circle a number or NA for every item.

### FIRST ARE SOME QUESTIONS CONCERNING YOUR CHILD'S BEHAVIOR WHILE PLAYING.

When playing inside the house or apartment (for example, because of bad weather) how often did your child:

- 1). 1 2 3 4 5 6 7 NA run through the house?
- 2). 1 2 3 4 5 6 7 NA climb over furniture?

When playing on a movable toy, such as a tricycle, how often did your child:

3). 1 2 3 4 5 6 7 NA attempt to go as fast as s/he could?

When s/he saw other children while in the park or playground, how often did your child:

4). 1 2 3 4 5 6 7 NA approach and immediately join in play?

5). 1 2 3 4 5 6 7 NA join in the laughing and giggling?

While playing alone in a sandbox or playing with dolls, how often did your child:

6). 1 2 3 4 5 6 7 NA remain interested for 30 minutes or longer?

7). 1 2 3 4 5 6 7 NA remain interested for 10 minutes or longer?

8). 1 2 3 4 5 6 7 NA remain interested for less than 10 minutes?

When you removed something your child should not have been playing with, how often did s/he:

9). 1 2 3 4 5 6 7 NA scream?

10). 1 2 3 4 5 6 7 NA try to grab the object back?

11). 1 2 3 4 5 6 7 NA follow your request without signs of anger?

When making a discovery (such as fitting two Lego pieces together, learning to stack blocks, or learning to turn a light switch on and off), how often did your child:

12). 1 2 3 4 5 6 7 NA smile?

13). 1 2 3 4 5 6 7 NA seem pleased?

When your child was asked to share her/his toys, how often did s/he:

14). 1 2 3 4 5 6 7 NA protest in a whining tone of voice?

15). 1 2 3 4 5 6 7 NA follow the request without signs of anger?

While coloring by her/himself, how often did your child:

16). 1 2 3 4 5 6 7 NA continue to color alone for 20 minutes or more?

17). 1 2 3 4 5 6 7 NA continue to color alone for 10-20 minutes?

When in a shopping mall or store, how often did your child:

18). 1 2 3 4 5 6 7 NA seem eager to explore the store?



When another child took away a favorite toy that your child was playing with, how often did s/he:

- 19). 1 2 3 4 5 6 7 NA object?  
20). 1 2 3 4 5 6 7 NA find something else to play with?  
21). 1 2 3 4 5 6 7 NA try to hit, kick or bite the other child?

When playing quietly with one of her/his favorite toys, how often did your child:

- 22). 1 2 3 4 5 6 7 NA smile?  
23). 1 2 3 4 5 6 7 NA sound happy?

When your child wanted to play outside but you said "no", how often did s/he:

- 24). 1 2 3 4 5 6 7 NA protest by crying loudly?  
25). 1 2 3 4 5 6 7 NA protest in a whining tone of voice?  
26). 1 2 3 4 5 6 7 NA pout, frown, sulk, or look mad?

When looking at picture books by her/himself, how often did your child:

- 27). 1 2 3 4 5 6 7 NA continue to look at the pictures by her/himself?  
28). 1 2 3 4 5 6 7 NA lose interest or get bored quickly?

When your child joined in an active game with other children, (for example, one that involved running or jumping), how often did s/he:

- 29). 1 2 3 4 5 6 7 NA keep up with the most energetic and active children?

How often did your child play alone with her/his favorite toy for:

- 30). 1 2 3 4 5 6 7 NA 30 minutes or longer?  
31). 1 2 3 4 5 6 7 NA 10 minutes or longer?  
32). 1 2 3 4 5 6 7 NA less than 10 minutes?

If you or someone else in your family is tickling, wrestling, or playfully chasing your child, how often did he/she:

- 33). 1 2 3 4 5 6 7 NA smile?

- 34). 1 2 3 4 5 6 7 NA laugh?  
 35). 1 2 3 4 5 6 7 NA ask for more?

When you told your child that s/he would have to play alone for a short time, how often did  
 36). 1 2 3 4 5 6 7 NA s/he require constant encouragement to continue  
 playing alone?

- 37). 1 2 3 4 5 6 7 NA just one activity or object keep her/him busy?

How often during the past month did your child:

- 38). 1 2 3 4 5 6 7 NA play games which involved running around,  
 banging, or dumping out toys?  
 39). 1 2 3 4 5 6 7 NA play quiet games that did not involve moving,  
 such as looking at books or arranging toys?

While playing with a detailed or complicated toy (such as a big doll house or toy garage), how  
 often did your child:

- 40). 1 2 3 4 5 6 7 NA explore the toy thoroughly?  
 41). 1 2 3 4 5 6 7 NA become easily bored or restless?  
 42). 1 2 3 4 5 6 7 NA only give the toy a quick try?

NOW, PLEASE ANSWER SOME QUESTIONS  
 ABOUT EATING, DRESSING, BATHING, AND GOING TO BED.

When your child was given something to eat or drink that s/he did not like, how often did s/he:

- 43). 1 2 3 4 5 6 7 NA cry?  
 44). 1 2 3 4 5 6 7 NA accept the food or drink without sign of anger or  
 protest?  
 45). 1 2 3 4 5 6 7 NA push the plate away?

When your child wanted to eat something sweet before dinner was finished but did not get it,  
 how often did s/he:

- 46). 1 2 3 4 5 6 7 NA protest by crying loudly?  
47). 1 2 3 4 5 6 7 NA refuse to eat the rest of dinner?

When in the bathtub, how often did your child:

- 48). 1 2 3 4 5 6 7 NA laugh?  
49). 1 2 3 4 5 6 7 NA babble or talk happily?  
50). 1 2 3 4 5 6 7 NA sit quietly?  
51). 1 2 3 4 5 6 7 NA splash or kick?  
  
52). 1 2 3 4 5 6 7 NA play with toys with a lot of energy? (If the child never has toys in the bath, mark "NA").

When being dressed or undressed, how often did your child:

- 53). 1 2 3 4 5 6 7 NA squirm or try to get away?  
54). 1 2 3 4 5 6 7 NA lie or sit quietly long enough for you to get her/him ready?

When your child was having her/his hair brushed or face washed, how often did s/he:

- 55). 1 2 3 4 5 6 7 NA try to play with you?

When being gently rocked or hugged, how often did your child:

- 56). 1 2 3 4 5 6 7 NA smile?  
57). 1 2 3 4 5 6 7 NA giggle?

When it was time for bed or a nap and your child did not want to go, how often did s/he:

- 58). 1 2 3 4 5 6 7 NA protest by crying loudly?  
59). 1 2 3 4 5 6 7 NA physically resist or struggle?

NEXT ARE SOME QUESTIONS ABOUT MANY  
DIFFERENT ASPECTS OF YOUR CHILD'S BEHAVIOR.

When your child was involved in a game or activity by her/himself and you interrupted the game because it was mealtime or time for an outing, how often did your child:

60). 1 2 3 4 5 6 7 NA easily move on to what you needed him/her to do?

When given a wrapped package or a new toy in a bag, how often did your child:

61). 1 2 3 4 5 6 7 NA remain neutral (for example, not smile)?

62). 1 2 3 4 5 6 7 NA squeal with joy?

63). 1 2 3 4 5 6 7 NA laugh?

While reading a story of average length to your child, how often did s/he:

64). 1 2 3 4 5 6 7 NA pay attention to your reading during the entire story?

65). 1 2 3 4 5 6 7 NA become restless or bored after the first few pages or minutes?

When at the doctor's office or a clinic how often did your child:

66). 1 2 3 4 5 6 7 NA cling or hold on to you and not want to let go?

67). 1 2 3 4 5 6 7 NA seem unconcerned and comfortable?

68). 1 2 3 4 5 6 7 NA cry or struggle when the doctor tried to touch her/him?

When the child needed to sit still, as in church, a waiting room, or a restaurant, how often did s/he:

69). 1 2 3 4 5 6 7 NA try to climb out of the chair?

70). 1 2 3 4 5 6 7 NA play quietly?

71). 1 2 3 4 5 6 7 NA try to climb all over other chairs?

72). 1 2 3 4 5 6 7 NA remain still and calm even though other children started to giggle or laugh?

If a stranger came to your home or your apartment, how often did your child:

- 73). 1 2 3 4 5 6 7 NA allow her/himself to be picked up without protest?
- 74). 1 2 3 4 5 6 7 NA abandon or walk away from you and go to the stranger?
- 75). 1 2 3 4 5 6 7 NA "warm up" to the stranger within 10 minutes?

While watching a favorite children's television program such as Sesame Street, how often did your child:

- 76). 1 2 3 4 5 6 7 NA pay attention to the whole show?
- 77). 1 2 3 4 5 6 7 NA watch only the first few minutes of the show before showing signs of restlessness?

When placed in a car seat or stroller, how often did your child:

- 78). 1 2 3 4 5 6 7 NA kick?
- 79). 1 2 3 4 5 6 7 NA squirm?
- 80). 1 2 3 4 5 6 7 NA sit still?

When the child knew the parents were about to leave her/him at home, how often did your child:

- 81). 1 2 3 4 5 6 7 NA cry?
- 82). 1 2 3 4 5 6 7 NA cling to the parent?
- 83). 1 2 3 4 5 6 7 NA show no sign of being upset?

When one of the parents' friends who does not have daily contact with your child visited the home, how often did your child:

- 84). 1 2 3 4 5 6 7 NA look at you to see if it was okay?
- 85). 1 2 3 4 5 6 7 NA talk much less than usual?
- 86). 1 2 3 4 5 6 7 NA enthusiastically greet them?
- 87). 1 2 3 4 5 6 7 NA squeal with joy?
- 88). 1 2 3 4 5 6 7 NA smile?
- 89). 1 2 3 4 5 6 7 NA babble or talk happily?

While shopping, if you did not agree to buy your child a toy that s/he wanted, how often did s/he:

- 90). 1 2 3 4 5 6 7 NA protest in a whining tone of voice?  
91). 1 2 3 4 5 6 7 NA physically struggle if you tried to separate her/him from the toy?

When you were going out and your child did not want to stay with the regular sitter, how often did s/he:

- 92). 1 2 3 4 5 6 7 NA pout or frown?  
93). 1 2 3 4 5 6 7 NA show no signs of anger?

How often did interesting outdoor sights (such as water sprinklers, birds, or traffic) hold your child's attention for:

- 94). 1 2 3 4 5 6 7 NA 5 minutes or longer?  
95). 1 2 3 4 5 6 7 NA less than 5 minutes?

When you did not allow your child to do something for her/himself (for example, dressing, or getting into the carseat), how often did your child:

- 96). 1 2 3 4 5 6 7 NA show signs of anger because s/he wanted to do it her/himself?  
97). 1 2 3 4 5 6 7 NA try to push you away?

If you were not able to give immediate attention to your child because you were busy (for example, you were cooking dinner or talking on the phone) how often did your child:

- 98). 1 2 3 4 5 6 7 NA cry loudly?  
99). 1 2 3 4 5 6 7 NA find something else to do until you were free?

While a story was being read to your child, how often did s/he:

- 100). 1 2 3 4 5 6 7 NA sit quietly?  
101). 1 2 3 4 5 6 7 NA get restless?

When first visiting a babysitting co-op, daycare center, or church nursery, how often did your child:

102). 1 2 3 4 5 6 7 NA cry when not being held by the parent and resist being put down?

103). 1 2 3 4 5 6 7 NA feel at ease within 10 minutes?

104). 1 2 3 4 5 6 7 NA immediately begin to explore?

When your child was approached by a stranger when you and she/he were out (for example, shopping) how often did your child:

105). 1 2 3 4 5 6 7 NA babble or talk?

106). 1 2 3 4 5 6 7 NA show distress or cry?

107). 1 2 3 4 5 6 7 NA avoid possible danger by looking to parent for assurance?

When you turned off the television set (because it was bedtime, dinnertime, or time to leave), how often did your child:

108). 1 2 3 4 5 6 7 NA throw a tantrum or get really mad?

When it was time to leave a friend's house and your child did not want to go, how often did s/he:

109). 1 2 3 4 5 6 7 NA follow you without signs of anger?

When your child was playing alone and a friend or relative (not in the immediate family) came into the room, how often did s/he:

110). 1 2 3 4 5 6 7 NA at first pay no attention to the visitor and continue playing?

When you or another person were visibly upset, how often did your child:

111). 1 2 3 4 5 6 7 NA smile or laugh?

**THANK YOU!**

## APPENDIX D

### **Parenting Stress Index (PSI – Short form)**

Abidin, R. R. (1995). *Parenting Stress Index: Professional manual* (3rd ed.). Odessa, FL: Psychological Assessment Resources.



## Parenting Stress Index (PSI – Short form)

### PARENTAL STRESS

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#### Instructions :

This questionnaire contains 36 statements. Read each statement carefully. For each statement, please focus on the child participating in this study, and circle the response which best represents your opinion. While you may not find a response that exactly states your feelings, please circle the response that comes closest to describing how you feel. **YOUR FIRST REACTION TO EACH QUESTION SHOULD BE YOUR ANSWER.**

Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
1	2	3	4	5

*Example:* “I enjoy going to the movies.” 1 (2) 3 4 5  
If you sometimes enjoy going to the movies, you would circle “2” in response to the following statement.

Circle only one response for each statement, and respond to all statements. **DO NOT ERASE!** If you need to change an answer, make an “X” through the incorrect answer and circle the correct response.

*Example:* I enjoy going to the movies. 1 2 3 ~~4~~ (5)

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**Circle the response which best represents your opinion :**

	<b>Strongly agree</b>	<b>Agree</b>	<b>Not Sure</b>	<b>Disagree</b>	<b>Strongly disagree</b>
1. I often have the feeling that I cannot handle things very well.	1	2	3	4	5
2. I find myself giving up more of my life to meet my children's needs than I ever expected.	1	2	3	4	5
3. I feel trapped by my responsibilities as a parent.	1	2	3	4	5
4. Since having this child, I have been unable to do new and different things.	1	2	3	4	5
5. Since having a child, I feel that I am almost never able to do things that I like to do.	1	2	3	4	5
6. I am unhappy with the last purchase of clothing I made for myself.	1	2	3	4	5
7. There are quite a few things that bother me about my life.	1	2	3	4	5
8. Having a child has caused more problems than I expected in my relationship with my spouse (male/female friend).	1	2	3	4	5
9. I feel alone and without friends.	1	2	3	4	5
10. When I go to a party, I usually expect not to enjoy myself.	1	2	3	4	5
11. I am not as interested in people as I used to be.	1	2	3	4	5
12. I don't enjoy things as I used to.	1	2	3	4	5
13. My child rarely does things for me that make me feel good.	1	2	3	4	5
14. Most times I feel that my child likes me and wants to be close to me.	1	2	3	4	5
15. My child smiles at me much less than I expected.	1	2	3	4	5
16. When I do things for my child, I get the feeling that my efforts are not appreciated very much.	1	2	3	4	5

**Circle the response which best represents your opinion :**

	Strongly agree	Agree	Not Sure	Disagree	Strongly disagree
17. When playing, my child doesn't often giggle or laugh.	1	2	3	4	5
18. My child doesn't seem to learn as quickly as most children.	1	2	3	4	5
19. My child doesn't seem to smile as much as most children.	1	2	3	4	5
20. My child is not able to do as much as I expected.	1	2	3	4	5
21. It takes a long time and it is very hard for my child to get used to new things.	1	2	3	4	5
<b>For statement 22, choose from choices 1 to 5 below.</b>					
22. I feel that I am:					
1. a very good parent					
2. a better than average parent	1	2	3	4	5
3. an average parent					
4. a person who has some trouble being a parent					
5. not very good at being a parent					
23. I expected to have closer and warmer feelings for my child than I do and this bothers me.	1	2	3	4	5
24. Sometimes my child does things that bother me just to be mean.	1	2	3	4	5
25. My child seems to cry or fuss more often than most children.	1	2	3	4	5
26. My child generally wakes up in a bad mood.	1	2	3	4	5
27. I feel that my child is very moody and easily upset.	1	2	3	4	5
28. My child does a few things which bother me a great deal.	1	2	3	4	5

**Circle the response which best represents your opinion :**

	Strongly agree	Agree	Not Sure	Disagree	Strongly disagree
29. My child reacts very strongly when something happens that my child doesn't like.	1	2	3	4	5
30. My child gets upset easily over the smallest thing.	1	2	3	4	5
31. My child's sleeping or eating schedule was much harder to establish than I expected.	1	2	3	4	5

**For statement 32, choose from choices 1 to 5 below.**

32. I have found that getting my child to do something or stop doing something is:					
1. much harder than I expected	1	2	3	4	5
2. somewhat harder than I expected					
3. about as hard as I expected					
4. somewhat easier than I expected					
5. much easier than I expected					

**For statement 32, choose from choices 1 to 5 below.**

33. Think carefully and count the number of things which your child does that bothers you. For example: dawdles, refuses to listen, overactive, cries, interrupts, fights, whines, etc. Please circle the number which includes the number of things you counted.	1	2	3	4	5
1. 1-3					
2. 4-5					
3. 6-7					
4. 8-9					
5. 10+					
34. There are some things my child does that really bother me a lot.	1	2	3	4	5
35. My child turned out to be more of a problem	1	2	3	4	5

than I had expected.

36. My child makes more demands on me than most children.

**1**

**2**

**3**

**4**

**5**

## APPENDIX E

### Psychiatric Symptoms Index

Ilfeld, F. W. (1976). Further validation of a Psychiatric Symptom Index in a normal population. *Psychological Reports, 39*, 1215-1228.

## Psychiatric Symptoms Index

### PERSONAL STATE

---

#### Instructions:

The way you felt during the last week may be somewhat different than the way you felt during the last year. Based on the way you felt LAST WEEK, please indicate to what extent the statements below apply. You can circle the corresponding number on the scale.

**HERE IS THE RESPONSE SCALE: # 1 CORRESPONDS TO A STATE OF MIND THAT NEVER CORRESPONDS TO THE WAY YOU FELT, WHILE # 4 INDICATES A STATE THAT IS FREQUENT.**

---

Never 1	Once in a while 2	Often 3	Very often 4
------------	----------------------	------------	-----------------

1. Did you feel hopeless about the future?	1	2	3	4
2. Did you feel lonely?	1	2	3	4
3. Did you have your mind go blank?	1	2	3	4
4. Did you feel downhearted or blue?	1	2	3	4
5. Did you feel tense or under pressure?	1	2	3	4
6. Did you lose your temper?	1	2	3	4
7. Did you feel bored or have little interest in things?	1	2	3	4
8. Did you feel fearful or afraid?	1	2	3	4
9. Did you have trouble remembering things?	1	2	3	4
10. Did you cry easily or feel like crying?	1	2	3	4
11. Did you feel nervous or shaky inside?	1	2	3	4
12. Did you feel critical of others?	1	2	3	4
13. Did you feel easily annoyed or irritated?	1	2	3	4
14. Did you get angry over things that are not too important?	1	2	3	4

## APPENDIX F

### **Dyadic Adjustment Scale (DAS-4; Four-item version)**

Sabourin, S., Valois, P., & Lussier, Y. (2005). Development and validation of a brief version of the Dyadic Adjustment Scale with a nonparametric item analysis model.

*Psychological Assessment, 17*, 15-27.



**Dyadic Adjustment Scale (DAS-4; Four-item version)**

**BRIEF DYADIC ADJUSTMENT SCALE  
(DAS-4)**

This questionnaire deals with your own perception of you and your partner's life together. Your responses will therefore reflect your personal opinion. Don't be concerned with what your partner's responses may or might be. For each question, please indicate your response by circling the appropriate number.

---

	All the time	Most of the time	More often than not	Occasionally	Rarely	Never
1. How often do you discuss or have you considered divorce, separation, or terminating your relationship?	0	1	2	3	4	5
2. In general, how often do you think that things between you and your partner are going well?	5	4	3	2	1	0
3. Do you confide in your mate?	5	4	3	2	1	0
4. The descriptions on the following line represent different degrees of happiness in your relationship. The middle point, "happy" represents the degree of happiness of most relationships. Please circle the number, which best describes the degree of happiness, all things considered, of your relationship.						
Extremely unhappy	Fairly unhappy	A little unhappy	Happy	Very happy	Extremely happy	Perfect
0	1	2	3	4	5	6

---

© Spanier (1976). Adaptation Sabourin, Valois, & Lussier (2002).

## APPENDIX G

### **Maternal Behavior Q-Set (MBQS): Coding system**

Pederson, D. R., & Moran, G. (1995). A categorical description of infant–mother relationship in the home and its relation to Q-sort measures of infant–mother interaction.

*Monographs of the Society for Research in Child Development, 60*, 111–145.

### Maternal Behavior Q-Set (MBQS): Coding system

1.	Notices when her baby smiles and vocalizes
2.	Unaware of or insensitive to baby's signs of distress.
3.	Often interprets baby's signals according to own wishes and moods.
4.	Response so delayed that baby cannot connect mother's response with the action that initiated it.
5.	Notices when baby is distressed, cries, fusses, or whimpers.
6.	Interactions appropriately vigorous and exciting as judged from baby's responses.
7.	Responds only to frequent, prolonged, or intense signals.
8.	Responses to baby's communications are inconsistent and unpredictable.
9.	Responds consistently to baby's signals. <i>Low : Responses are unpredictable or arbitrary.</i>
10.	Greets baby when reentering room.
11.	Sometimes is aware of baby's signals of distress, but ignores or does not respond immediately to these signals.
12.	Interprets cues correctly as evidenced by baby's response.
13.	Is irritated by demands of baby. (Note information from interview including comments on caregiving demands.)
14.	Scolds baby.
15.	Aware of how her moods affect baby.
16.	Will often interfere with baby's ongoing appropriate behavior. <i>Low : Stands back, and lets baby carry on with activity without interruption.</i>
17.	Worried about spoiling; has lots of "shoulds" about baby's care.
18.	Structures environment considering baby's <i>and</i> own needs. ( <i>Consider the balance in this item.</i> )

19.	Perceives baby's negative behavior as rejection of her; takes misbehavior "personally".
20.	Seems to resent baby's signals of distress or bids for attention.
21.	Is delighted over baby.
22.	Resolves negative feelings about baby; that is, has some negative feeling about baby but can set these aside in interacting with baby.
23.	Respects baby as individual, that is, able to accept baby's behavior even if it is not consistent with her ideal.
24.	Knows a lot about her baby; good informant.
25.	Idealizes baby – does not acknowledge negative aspects.
26.	Critical in her descriptions of baby.
27.	Seems "long suffering" in her attitude about her maternal duties.
28.	Teases baby beyond point where baby seems to enjoy it.
29.	Slows pace down; waits for baby's response in face-to-face interactions.
30.	Plays games with baby such as peek-a-boo, patty cake.
31.	Makes an effort to take baby on "outings" such as shopping, visiting friends.
32.	Provides age-appropriate toys.
33.	Creates interesting environment.
34.	Seeks face-to-face interactions.
35.	Points to and identifies interesting things in baby's environment.
36.	Predominantly positive mood about baby.
37.	Comments are generally positive when speaking about baby
38.	Displays affection by touching.

39.	When holding, cuddles baby as a typical mode of interaction; molds baby to self.
40.	Praise directed toward baby.
41.	Flat affect when interacting with baby.
42.	Is animated in social interactions with baby.
43.	Kisses baby on head as major mode of expressing affection.
44.	Balances task and baby's activities when changing diapers.
45.	Encourages baby's initiatives in feeding.
46.	Cues baby, and waits for response in feeding.
47.	Balances task and baby's activities in feeding.
48.	Provides nutritional snacks.
49.	Environment is safe, "baby proofed".
50.	Sometimes will interfere with appropriate activity if it is likely to get baby messy or soiled.
51.	Disturbed by baby becoming messy during feeding; these concerns sometimes interfere with feeding.
52.	Fails to interrupt activity by her baby that is likely to be dangerous.
53.	Well-resolved interaction with baby – interaction ends when baby is satisfied. <i>(Also consider termination of ongoing interactions that baby is enjoying.)</i>
54.	Interactions revolve around baby's tempo and current state.
55.	Repeats series of interventions in search for best method to satisfy baby; often resorts to trial and error.
56.	Very concerned that baby is well dressed and attractive at all times.
57.	Subjects baby to constant and unphased barrage of stimulation; baby overwhelmed.
58.	Aware of baby's moods and fluctuations in state.

59.	Rough or intrusive in interactions with baby.
60.	When baby is distressed, is able to quickly and accurately identify the source.
61.	Seems to be aware of baby even when not in the same room.
62.	Preoccupied with interview – seems to ignore baby.
63.	Monitors and responds to baby even when engaged in some other activity such as cooking or having a conversation with visitor.
64.	Responds immediately to cries/whimpers.
65.	Not skillful in dividing her attention between baby and competing demands; thus misses baby's cues.
66.	Arranges her location so that she can perceive baby's signals.
67.	When in the same room as baby, provides baby with unrestricted access to her.
68.	Often appears to "tune out" and not notice distress or bids for attention.
69.	Seems overwhelmed, depressed.
70.	Responds accurately and promptly to signals of distress, but often ignores (is unresponsive to) signals of positive affect.
71.	When baby is in a bad mood or cranky, often will place baby in another room so that she will not be disturbed.
72.	At first glance, home shows little evidence of presence of infant.
73.	Content and pace of interactions with the baby seem to be set by mother rather than according to baby's responses.
74.	Often misses "slow down" or "back off" signals from baby during face-to-face play.
75.	Attempts to involve baby in games or activities that are obviously beyond the child's current capability.
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.

77.	Often "parks" the baby in front of the television in an attempt to keep her entertained.
78.	Nap times are determined by mother's convenience rather than the immediate needs of the baby. (Determine from interview)
79.	Frequently repeats words carefully and slowly to the baby as if teaching meaning or labeling an activity or object.
80.	Seldom speaks to the baby directly.
81.	Makes frequent use of playpen in order to permit carrying out normal household chores.
82.	Feels at ease leaving the child with a baby-sitter in the evening.
83.	Leaves the room without any sort of "signal" or "explanation" to the baby (e.g. "I'll be back in just a minute").
84.	Sometimes seems to treat baby as an inanimate object when moving her around or adjusting her posture.
85.	Is very reluctant to leave the baby with anyone other than husband or close relative. (Determine from interview).
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!")
87.	Seems awkward and ill at ease when interacting directly with the baby face to face.
88.	Often seems to forget baby is present in the room during interaction with visitor.
89.	Very alert to "dirty diaper"; seems to change diapers as soon as indication of need.
90.	Often brings toy or other object within baby's reach and attempts to interest her in it.

## APPENDIX H

### Child Behavior Checklist (CBCL)

Achenbach, T. M., & Rescorla, L. A. (2000). *Manual for the ASEBA preschool forms and profiles*. Burlington: University of Vermont Department of Psychiatry.



## Child Behavior Checklist (CBCL)

Please fill out this form to reflect your view of the child's behavior even if other people might not agree.  
Be sure to answer all items.

Below is a list of items that describe children. For each item that describes the child **now or within the past 2 months**, please circle the 2 if the item is very true or often true of the child. Circle the 1 if the item is somewhat or sometimes true of the child. If the item is not true of the child, circle the 0. Please answer all items as well as you can, even if some do not seem to apply to the child.

**0 = Not True (as far as you know)      1 = Somewhat or Sometimes True**  
**2 = Very True or Often True**

0	1	2	Aches or pains (without medical cause; do not include stomach or headaches)
0	1	2	Acts too young for age
0	1	2	Afraid to try new things
0	1	2	Avoids looking others in the eye
0	1	2	Can't concentrate, can't pay attention for long
0	1	2	Can't sit still, restless, or hyperactive
0	1	2	Can't stand having things out of place
0	1	2	Can't stand waiting; wants everything now
0	1	2	Chews on things that aren't edible
0	1	2	Clings to adults or too dependent
0	1	2	Constantly seeks help
0	1	2	Constipated, doesn't move bowels (when not sick)
0	1	2	Cries a lot
0	1	2	Cruel to animals
0	1	2	Defiant
0	1	2	Demands must be met immediately
0	1	2	Destroys his/her own things
0	1	2	Destroys things belonging to his/her family or other children
0	1	2	Diarrhea or loose bowels (when not sick)
0	1	2	Disobedient
0	1	2	Disturbed by any change in routine
0	1	2	Doesn't want to sleep alone
0	1	2	Doesn't answer when people talk to him/her
0	1	2	Doesn't eat well
0	1	2	Doesn't get along with other children
0	1	2	Doesn't know how to have fun; acts like a little adult
0	1	2	Doesn't seem to feel guilty after misbehaving
0	1	2	Doesn't want to go out of home
0	1	2	Easily frustrated

0	1	2	Easily jealous
0	1	2	Eats or drinks things that are not food -don't include sweets
0	1	2	Fears certain animals, situations, or places
0	1	2	Feelings are easily hurt
0	1	2	Gets hurt a lot, accident-prone
0	1	2	Gets in many fights
0	1	2	Gets into everything
0	1	2	Gets too upset when separated from parents
0	1	2	Has trouble getting to sleep
0	1	2	Headaches (without medical cause)
0	1	2	Hits others
0	1	2	Holds his/her breath
0	1	2	Hurts animals or people without meaning to
0	1	2	Looks unhappy without good reason
0	1	2	Angry moods
0	1	2	Nausea, feels sick (without medical cause)
0	1	2	Nervous movements or twitching
<b>0 = Not True (as far as you know)</b>			<b>1 = Somewhat or Sometimes True</b>
<b>2 = Very True or Often True</b>			
0	1	2	Nervous, highstrung, or tense
0	1	2	Nightmares
0	1	2	Overeating
0	1	2	Overtired
0	1	2	Shows panic for no good reason
0	1	2	Painful bowel movements (without medical cause)
0	1	2	Physically attacks people
0	1	2	Picks nose, skin, or other parts of body
0	1	2	Plays with own sex parts too much
0	1	2	Poorly coordinated or clumsy
0	1	2	Problems with eyes (without medical cause)
0	1	2	Punishment doesn't change his/her behavior
0	1	2	Quickly shifts from one activity to another
0	1	2	Rashes or other skin problems (without medical cause)
0	1	2	Refuses to eat
0	1	2	Refuses to play active games
0	1	2	Repeatedly rocks head or body
0	1	2	Resists going to bed at night
0	1	2	Resists toilet training
0	1	2	Screams a lot
0	1	2	Seems unresponsive to affection
0	1	2	Self-conscious or easily embarrassed
0	1	2	Selfish or won't share
0	1	2	Shows little affection toward people
0	1	2	Shows little interest in things around him/her

0	1	2	Shows too little fear of getting hurt
0	1	2	Too shy or timid
0	1	2	Sleeps less than most children during day and/or night
0	1	2	Smears or plays with bowel movements
0	1	2	Speech problem
0	1	2	Stares into space or seems preoccupied
0	1	2	Stomachaches or cramps (without medical cause)
0	1	2	Rapid shifts between sadness and excitement
0	1	2	Strange behavior
0	1	2	Stubborn, sullen, or irritable
0	1	2	Sudden changes in mood or feelings
0	1	2	Sulks a lot
0	1	2	Talks or cries out in sleep
0	1	2	Temper tantrums or hot temper
0	1	2	Too concerned with neatness or cleanliness
0	1	2	Too fearful or anxious
0	1	2	Uncooperative
0	1	2	Underactive, slow moving, or lacks energy
0	1	2	Unhappy, sad, or depressed
0	1	2	Unusually loud
0	1	2	Upset by new people or situations
0	1	2	Vomiting, throwing up (without medical cause)
0	1	2	Wakes up often at night
0	1	2	Wanders away
0	1	2	Wants a lot of attention
0	1	2	Whining
0	1	2	Withdrawn, doesn't get involved with others
0	1	2	Worries

## APPENDIX I

### Childhood Trauma Questionnaire (CTQ)

Bernstein, D. P., Fink, L., Handelsman, L., Foote, J., Lovejoy, M., Wenzel, K., Sapareto, E. & Ruggiero, J. (1994). Initial reliability and validity of a new retrospective measure of child abuse and neglect. *American Journal of Psychiatry*, *151*, 1132-1136.

## Childhood Trauma Questionnaire (CTQ)

Subject # : \_\_\_\_\_

Date : \_\_\_\_\_

RA Name: \_\_\_\_\_

DCC ID : \_\_\_\_\_

### CTQ Questionnaire (24 months)

**Instructions :** These questions ask about some of your experiences growing up as a child and a teenager (feelings, thoughts, and behavior). Although these questions are of a personal nature, please try to answer as honestly as you can. For each question, circle number that best describes how you feel. There are no right or wrong answers. If you wish to change your response, put an **X** through it and circle your new choice.

Never True	Rarely true	Sometimes True	Often True	Very Often True
1	2	3	4	5

#### When I was growing up, ...

- |                                                                                                |   |   |   |   |   |
|------------------------------------------------------------------------------------------------|---|---|---|---|---|
| 1. I didn't have enough to eat.                                                                | 1 | 2 | 3 | 4 | 5 |
| 2. I knew that there was someone to take care of me and protect me.                            | 1 | 2 | 3 | 4 | 5 |
| 3. People in my family called me things like "stupid", "lazy", or "ugly".                      | 1 | 2 | 3 | 4 | 5 |
| 4. My parents were too drunk or high to take care of the family.                               | 1 | 2 | 3 | 4 | 5 |
| 5. There was someone in my family who helped me feel that I was important or special.          | 1 | 2 | 3 | 4 | 5 |
| 6. I had to wear dirty clothes.                                                                | 1 | 2 | 3 | 4 | 5 |
| 7. I felt loved.                                                                               | 1 | 2 | 3 | 4 | 5 |
| 8. I thought that my parents wished I had never been born.                                     | 1 | 2 | 3 | 4 | 5 |
| 9. I got hit so hard by someone in my family that I had to see a doctor or go to the hospital. | 1 | 2 | 3 | 4 | 5 |
| 10. There was nothing I wanted to change about my family.                                      | 1 | 2 | 3 | 4 | 5 |
| 11. People in my family hit me so hard that it left me with bruises or marks.                  | 1 | 2 | 3 | 4 | 5 |

<b>Never True</b>	<b>Rarely true</b>	<b>Sometimes True</b>	<b>Often True</b>	<b>Very Often True</b>	
1	2	3	4	5	
12.I was punished with a belt, a board, a cord, or some other hard object.	1	2	3	4	5
13.People in my family looked out for each other.	1	2	3	4	5
14.People in my family said hurtful or insulting things to me.	1	2	3	4	5
15.I believe that I was physically abused.	1	2	3	4	5
16.I had the perfect childhood.	1	2	3	4	5
17.I got hit or beaten so badly that it was noticed by someone like a teacher, neighbor, or doctor.	1	2	3	4	5
18.I felt that someone in my family hated me.	1	2	3	4	5
19.People in my family felt close to each other.	1	2	3	4	5
20.Someone tried to touch me in a sexual way, or tried to make me touch them.	1	2	3	4	5
21.Someone threatened to hurt me or tell lies about me unless I did something sexual with them.	1	2	3	4	5
22. I had the best family in the world.	1	2	3	4	5
23.Someone tried to make me do sexual things or watch sexual things.	1	2	3	4	5
24.Someone molested me.	1	2	3	4	5
25.I believe that I was <u>emotionally abused</u> (= verbal assaults on a child's sense of worth or well-being, or any humiliating, demeaning, or threatening behavior directed toward a child by an older person).	1	2	3	4	5
26.There was someone to take me to the doctor if I needed it.	1	2	3	4	5
27.I believe that I was sexually abused.	1	2	3	4	5
28.My family was a source of strength and support.	1	2	3	4	5

## APPENDIX J

### Parental Bonding Instrument (PBI)

Parker, G., Tupling, H., & Brown, L. B. (1979). A parental bonding instrument. *British Journal of Medical Psychology*, 52, 1-10.

## Parental Bonding Instrument (PBI)

Subject no \_\_\_\_\_

DCC ID: \_\_\_\_\_

RA name: \_\_\_\_\_

Date: \_\_\_\_\_

### The parental bonding instrument (PBI)

This questionnaire lists various attitudes and behaviors of parents. As you remember your **mother** in the **first 16 years of your life**, please mark the most appropriate response to each statement.

	very true	rather true	rather untrue	very untrue
1. Spoke to me with a warm and friendly voice.	( )	( )	( )	( )
2. Did not help me as much as I needed.	( )	( )	( )	( )
3. Let me do those things that I liked doing.	( )	( )	( )	( )
4. Seemed emotionally cold to me.	( )	( )	( )	( )
5. Appeared to understand my problems and worries.	( )	( )	( )	( )
6. Was affectionate to me.	( )	( )	( )	( )
7. Wanted me to make my own decisions.	( )	( )	( )	( )
8. Did not want me to grow up.	( )	( )	( )	( )
9. Tried to control everything I did.	( )	( )	( )	( )
10. Invaded my privacy.	( )	( )	( )	( )
11. Enjoyed talking things over with me.	( )	( )	( )	( )
12. Frequently smiled at me.	( )	( )	( )	( )
13. Tended to baby me.	( )	( )	( )	( )



	very true	rather true	rather untrue	very untrue
14. Did not seem to understand what I needed or wanted.	( )	( )	( )	( )
15. Let me decide things for myself.	( )	( )	( )	( )
16. Made me feel I wasn't wanted.	( )	( )	( )	( )
17. Could make me feel better when I was upset.	( )	( )	( )	( )
18. Did not talk to me very much.	( )	( )	( )	( )
19. Tried to make me dependent on her.	( )	( )	( )	( )
20. Felt I could not look after myself unless she was around.	( )	( )	( )	( )
21. Gave me as much freedom as I wanted.	( )	( )	( )	( )
22. Was overprotective of me.	( )	( )	( )	( )
23. Did not praise me.	( )	( )	( )	( )
24. Let me dress in any way I wanted.	( )	( )	( )	( )

As you remember your **father** in the **first 16 years of your life**, please mark the most appropriate response to each statement..

	very true	rather true	rather untrue	very untrue
25. Spoke to me with a warm and friendly voice.	( )	( )	( )	( )
26. Did not help me as much as I needed.	( )	( )	( )	( )
27. Let me do those things that I liked doing.	( )	( )	( )	( )
28. Seemed emotionally cold to me.	( )	( )	( )	( )
29. Appeared to understand my problems and worries.	( )	( )	( )	( )
30. Was affectionate to me.	( )	( )	( )	( )
31. Wanted me to make my own decisions.	( )	( )	( )	( )
32. Did not want me to grow up.	( )	( )	( )	( )
33. Tried to control everything I did.	( )	( )	( )	( )
34. Invaded my privacy.	( )	( )	( )	( )
35. Enjoyed talking things over with me.	( )	( )	( )	( )
36. Frequently smiled at me.	( )	( )	( )	( )
37. Tended to baby me.	( )	( )	( )	( )
38. Did not seem to understand what I needed or wanted.	( )	( )	( )	( )
39. Let me decide things for myself.	( )	( )	( )	( )
40. Made me feel I wasn't wanted.	( )	( )	( )	( )
41. Could make me feel better when I was upset.	( )	( )	( )	( )
42. Did not talk to me very much.	( )	( )	( )	( )

	very true	rather true	rather untrue	very untrue
43. Tried to make me dependent on him.	( )	( )	( )	( )
44. Felt I could not look after myself unless he was around.	( )	( )	( )	( )
45. Gave me as much freedom as I wanted.	( )	( )	( )	( )
46. Was overprotective of me.	( )	( )	( )	( )
47. Did not praise me.	( )	( )	( )	( )
48. Let me dress in any way I wanted.	( )	( )	( )	( )

## APPENDIX K

### Center for Epidemiologic Studies Depression Scale (CES-D)

Radloff, L. S. (1997). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385-401.

**Center for Epidemiologic Studies Depression Scale (CES-D)**

**The following statements describe different ways you may have felt, and different things you may have done IN THE PAST 7 DAYS. Please tell me how often these statements have applied to you DURING THE PAST WEEK, using the following scale: (SCALE M).**

1. I was bothered by things that usually don't bother me.

<b>1</b> -----	<b>2</b> -----	<b>3</b> -----	<b>4</b>
<b>Rarely or None</b> of the time ( < once a week)	<b>Some or A little</b> of the time ( 1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time ( 3-4 days)	<b>Most or All</b> of the time ( 5-7 days a week)

6. DNK [ ]  
8. Refusal [ ]

2. I did not feel like eating; my appetite was poor.

<b>1</b> -----	<b>2</b> -----	<b>3</b> -----	<b>4</b>
<b>Rarely or None</b> of the time ( < once a week)	<b>Some or A little</b> of the time ( 1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time ( 3-4 days)	<b>Most or All</b> of the time ( 5-7 days a week)

6. DNK [ ]  
8. Refusal [ ]

3. I felt that I could not shake off the blues, even with the help of friends and family.

<b>1</b> -----	<b>2</b> -----	<b>3</b> -----	<b>4</b>
<b>Rarely or None</b> of the time ( < once a week)	<b>Some or A little</b> of the time ( 1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time ( 3-4 days)	<b>Most or All</b> of the time ( 5-7 days a week)

6. DNK [ ]  
8. Refusal [ ]

4. I felt that I was just as good as other people.

<b>1</b> ----- <b>2</b> ----- <b>3</b> ----- <b>4</b>			
<b>Rarely or None</b> of the time ( < once a week)	<b>Some or A little</b> of the time (1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time (3-4 days)	<b>Most or All</b> of the time (5-7 days a week)

6. DNK [ ]  
8. Refusal [ ]

5. I had trouble keeping my mind on what I was doing.

<b>1</b> ----- <b>2</b> ----- <b>3</b> ----- <b>4</b>			
<b>Rarely or None</b> of the time ( < once a week)	<b>Some or A little</b> of the time (1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time (3-4 days)	<b>Most or All</b> of the time (5-7 days a week)

6. DNK [ ]  
8. Refusal [ ]

6. I felt depressed.

<b>1</b> ----- <b>2</b> ----- <b>3</b> ----- <b>4</b>			
<b>Rarely or None</b> of the time ( < once a week)	<b>Some or A little</b> of the time (1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time (3-4 days)	<b>Most or All</b> of the time (5-7 days a week)

6. DNK [ ]  
8. Refusal [ ]

7. I felt that everything I did was an effort.

<b>1</b> ----- <b>2</b> ----- <b>3</b> ----- <b>4</b>			
<b>Rarely or None</b> of the time ( < once a week)	<b>Some or A little</b> of the time (1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time (3-4 days)	<b>Most or All</b> of the time (5-7 days a week)

6. DNK [ ]  
8. Refusal [ ]

8. I felt hopeful about the future.

<b>1</b> ----- <b>2</b> ----- <b>3</b> ----- <b>4</b>			
<b>Rarely or None</b> of the time ( < once a week)	<b>Some or A little</b> of the time (1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time (3-4 days)	<b>Most or All</b> of the time (5-7 days a week)

6. DNK [ ]  
8. Refusal [ ]

9. I thought that my life had been a failure.

<b>1</b> ----- <b>2</b> ----- <b>3</b> ----- <b>4</b>			
<b>Rarely or None</b> of the time ( < once a week)	<b>Some or A little</b> of the time (1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time (3-4 days)	<b>Most or All</b> of the time (5-7 days a week)

6. DNK [ ]  
8. Refusal [ ]

10. I felt fearful.

<b>1</b> ----- <b>2</b> ----- <b>3</b> ----- <b>4</b>			
<b>Rarely or None</b> of the time ( < once a week)	<b>Some or A little</b> of the time (1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time (3-4 days)	<b>Most or All</b> of the time (5-7 days a week)

6. DNK [ ]  
8. Refusal [ ]

11. My sleep was restless.

<b>1</b> ----- <b>2</b> ----- <b>3</b> ----- <b>4</b>			
<b>Rarely or None</b> of the time ( < once a week)	<b>Some or A little</b> of the time (1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time (3-4 days)	<b>Most or All</b> of the time (5-7 days a week)

6. DNK [ ]  
8. Refusal [ ]

12. I was happy.

1-----	2-----	3-----	4
<b>Rarely or None</b> of the time ( $<$ once a week)	<b>Some or A little</b> of the time (1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time (3-4 days)	<b>Most or All</b> of the time (5-7 days a week)
6. DNK	[ ]		
8. Refusal	[ ]		

13. I talked less than usual.

1-----	2-----	3-----	4
<b>Rarely or None</b> of the time ( $<$ once a week)	<b>Some or A little</b> of the time (1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time (3-4 days)	<b>Most or All</b> of the time (5-7 days a week)
6. DNK	[ ]		
8. Refusal	[ ]		

14. I felt lonely.

1-----	2-----	3-----	4
<b>Rarely or None</b> of the time ( $<$ once a week)	<b>Some or A little</b> of the time (1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time (3-4 days)	<b>Most or All</b> of the time (5-7 days a week)
6. DNK	[ ]		
8. Refusal	[ ]		

15. People were unfriendly.

1-----	2-----	3-----	4
<b>Rarely or None</b> of the time ( $<$ once a week)	<b>Some or A little</b> of the time (1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time (3-4 days)	<b>Most or All</b> of the time (5-7 days a week)
6. DNK	[ ]		
8. Refusal	[ ]		



16. I enjoyed life.

1-----	2-----	3-----	4
<b>Rarely or None</b> of the time ( < once a week)	<b>Some or A little</b> of the time (1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time (3-4 days)	<b>Most or All</b> of the time (5-7 days a week)
6. DNK	[ ]		
8. Refusal	[ ]		

167. I had crying spells.

1-----	2-----	3-----	4
<b>Rarely or None</b> of the time ( < once a week)	<b>Some or A little</b> of the time (1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time (3-4 days)	<b>Most or All</b> of the time (5-7 days a week)
6. DNK	[ ]		
8. Refusal	[ ]		

18. I felt sad.

1-----	2-----	3-----	4
<b>Rarely or None</b> of the time ( < once a week)	<b>Some or A little</b> of the time (1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time (3-4 days)	<b>Most or All</b> of the time (5-7 days a week)
6. DNK	[ ]		
8. Refusal	[ ]		

19. I felt people disliked me.

1-----	2-----	3-----	4
<b>Rarely or None</b> of the time ( < once a week)	<b>Some or A little</b> of the time (1-2 days a week)	<b>Occasionally or</b> a moderate amount of the time (3-4 days)	<b>Most or All</b> of the time (5-7 days a week)
6. DNK	[ ]		
8. Refusal	[ ]		

20. I could not get going.

<b>1-----</b>	<b>2-----</b>	<b>3-----</b>	<b>4</b>
<b>Rarely or None</b> of the time ( < once a week )	<b>Some or A little</b> of the time ( 1-2 days a week )	<b>Occasionally or</b> a moderate amount of the time ( 3-4 days )	<b>Most or All</b> of the time ( 5-7 days a week )

6. DNK [ ]

8. Refusal [ ]

## APPENDIX L

### Early Childhood Behaviour Questionnaire (ECBQ)

Putnam, S. P., Gartstein, M. A. & Rothbart, M. K. (2006). Measurement of fine-grained aspects of toddler temperament: the early childhood behavior questionnaire. *Infant Behavior and Development, 29*, 386-401.

# Early Childhood Behaviour Questionnaire (ECBQ)

## Early Childhood Behavior Questionnaire (18 months)

RA's name: \_\_\_\_\_ Child's birth date: Mo: \_\_\_\_ Day: \_\_\_\_ Yr: \_\_\_\_

Date: \_\_\_\_\_ DCC ID: \_\_\_\_\_

Subject number: \_\_\_\_\_ Sex of child (circle one):      Male      Female

**INSTRUCTIONS: Please read carefully before starting.**

As you read each description of the child's behavior below, please indicate how often the child did this during the last two weeks by circling one of the numbers in the right column. These numbers indicate how often you observed the behavior described during the last two weeks.

<u>never</u>	<u>very rarely</u>	<u>less than half the time</u>	<u>about half the time</u>	<u>more than half the time</u>	<u>almost always</u>	<u>always</u>	<u>does not apply</u>
1	2	3	4	5	6	7	NA

The "Does Not Apply" column (NA) is used when you did not see the child in the situation described during the last two weeks. For example, if the situation mentions the child going to the doctor and there was no time during the last two weeks when the child went to the doctor, circle the (NA) column. "Does Not Apply" (NA) is different from "NEVER" (1). "Never" is used when you saw the child in the situation but the child never engaged in the behavior mentioned in the last two weeks. Please be sure to circle a number or NA for every item.

**When told that it was time for bed or a nap, how often did your child**

- |                            |   |   |   |   |   |   |    |
|----------------------------|---|---|---|---|---|---|----|
| 1. react with anger?.....1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 2. get irritable?.....1    | 2 | 3 | 4 | 5 | 6 | 7 | NA |

**When approached by an unfamiliar person in a public place (for example, the grocery store), how often did your child**

- |                                          |   |   |   |   |   |   |    |
|------------------------------------------|---|---|---|---|---|---|----|
| 3. remain calm? .....1                   | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 4. pull back and avoid the person?.....1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 5. cling to a parent?.....1              | 2 | 3 | 4 | 5 | 6 | 7 | NA |

**During everyday activities, how often did your child**

- |                                                                                             |   |   |   |   |   |   |    |
|---------------------------------------------------------------------------------------------|---|---|---|---|---|---|----|
| 6. startle at loud noises (such as a fire engine siren)? .....1                             | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 7. tap or drum with fingers on tables or other objects?.....1                               | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 8. get irritated by scratchy sounds?.....1                                                  | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 9. become uncomfortable when his/her socks were not aligned properly on his/her feet?.....1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

**After getting a bump or scrape, how often did your child**

- |                                             |   |   |   |   |   |   |    |
|---------------------------------------------|---|---|---|---|---|---|----|
| 10. forget about it in a few minutes?.....1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |
|---------------------------------------------|---|---|---|---|---|---|----|

**While playing outdoors, how often did your child**

- |                                                                                       |   |   |   |   |   |   |    |
|---------------------------------------------------------------------------------------|---|---|---|---|---|---|----|
| 11. like making lots of noise?.....1                                                  | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 12. enjoy sitting quietly in the sunshine?.....1                                      | 2 | 3 | 4 | 5 | 6 | 7 | NA |
| 13. want to climb to high places (for example, up a tree or on the jungle gym)?.....1 | 2 | 3 | 4 | 5 | 6 | 7 | NA |

<u>never</u>	<u>very rarely</u>	<u>less than half the time</u>	<u>about half the time</u>	<u>more than half the time</u>	<u>almost always</u>	<u>always</u>	<u>does not apply</u>
1	2	3	4	5	6	7	NA

**During the last two weeks:**

**When s/he was carried, how often did your child**

14. like to be held?.....1	2	3	4	5	6	7	NA
15. push against you until put down?.....1	2	3	4	5	6	7	NA
16. squirm?.....1	2	3	4	5	6	7	NA
17. struggle to get away?.....1	2	3	4	5	6	7	NA
18. snuggle up next to you?.....1	2	3	4	5	6	7	NA

**While having trouble completing a task (e.g., building, drawing, dressing), how often did your child**

19. get easily irritated?.....1	2	3	4	5	6	7	NA
20. become sad?.....1	2	3	4	5	6	7	NA

**When a familiar child came to your home, how often did your child**

21. engage in an activity with the child?.....1	2	3	4	5	6	7	NA
22. seek out the company of the child?.....1	2	3	4	5	6	7	NA

**When offered a choice of activities, how often did your child**

23. stop and think before deciding?.....1	2	3	4	5	6	7	NA
24. decide what to do very quickly and go after it?.....1	2	3	4	5	6	7	NA
25. seem slow and unhurried about what to do next?.....1	2	3	4	5	6	7	NA

**When asked NOT to, how often did your child**

26. run around your house or apartment anyway?.....1	2	3	4	5	6	7	NA
27. touch an attractive item (such as an ornament) anyway?.....1	2	3	4	5	6	7	NA
28. play with something anyway?.....1	2	3	4	5	6	7	NA

**During daily or evening quiet time with you and your child,**

**how often did your child**

29. enjoy just being quietly sung to?.....1	2	3	4	5	6	7	NA
30. smile at the sound of words, as in nursery rhymes?.....1	2	3	4	5	6	7	NA
31. enjoy just being talked to?.....1	2	3	4	5	6	7	NA
32. enjoy rhythmic activities, such as rocking or swaying?.....1	2	3	4	5	6	7	NA

**During everyday activities, how often did your child**

33. become distressed when his/her hands were dirty and/or sticky?.....1	2	3	4	5	6	7	NA
34. notice that material was very soft (cotton) or rough (wool)?.....1	2	3	4	5	6	7	NA
35. notice low-pitched noises such as the air-conditioner, heater, or refrigerator running or starting up?.....1	2	3	4	5	6	7	NA

<u>never</u> 1	<u>very rarely</u> 2	<u>than half the time</u> 3	<u>less half the time</u> 4	<u>about than half the time</u> 5	<u>more almost always</u> 6	<u>always</u> 7	<u>does not apply</u> NA
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**During the last two weeks:**

36. blink a lot? .....1 2 3 4 5 6 7 NA  
 37. get very enthusiastic about the things s/he was going to do?.....1 2 3 4 5 6 7 NA

**While at home, how often did your child**

38. show fear at a loud sound (blender, vacuum cleaner, etc.)?.....1 2 3 4 5 6 7 NA  
 39. seem afraid of the dark?.....1 2 3 4 5 6 7 NA

**When visiting the home of a familiar adult, such as a relative or friend, how often did your child**

40. want to interact with the adult?.....1 2 3 4 5 6 7 NA

**While bathing, how often did your child**

41. sit quietly?.....1 2 3 4 5 6 7 NA  
 42. splash, kick, or try to jump?.....1 2 3 4 5 6 7 NA

**While playing outdoors, how often did your child**

43. look immediately when you pointed at something?.....1 2 3 4 5 6 7 NA  
 44. choose to take chances for the fun and excitement of it?.....1 2 3 4 5 6 7 NA  
 45. not like going down high slides at the amusement park or playground?.....1 2 3 4 5 6 7 NA

**When s/he was upset, how often did your child**

46. change to feeling better within a few minutes?.....1 2 3 4 5 6 7 NA  
 47. soothe only with difficulty?.....1 2 3 4 5 6 7 NA  
 48. stay upset for 10 minutes or longer?.....1 2 3 4 5 6 7 NA

**When engaged in play with his/her favorite toy, how often did your child**

49. play for 5 minutes or less?.....1 2 3 4 5 6 7 NA  
 50. play for more than 10 minutes?.....1 2 3 4 5 6 7 NA  
 51. continue to play while at the same time responding to your remarks or questions?.....1 2 3 4 5 6 7 NA

**When approaching unfamiliar children playing, how often did your child**

52. watch rather than join? .....1 2 3 4 5 6 7 NA  
 53. approach slowly?.....1 2 3 4 5 6 7 NA  
 54. seem uncomfortable?.....1 2 3 4 5 6 7 NA

<u>never</u>	<u>very rarely</u>	<u>less than half the time</u>	<u>about half the time</u>	<u>more than half the time</u>	<u>almost always</u>	<u>always</u>	<u>does not apply</u>
1	2	3	4	5	6	7	NA

**During the last two weeks:**

**During everyday activities, how often did your child**

55. complain about odors on others, such as perfume?.....1	2	3	4	5	6	7	NA
56. seem to be bothered by bright light?.....1	2	3	4	5	6	7	NA
57. move quickly from one place to another?.....1	2	3	4	5	6	7	NA
58. notice the smoothness or roughness of objects s/he touched?.....1	2	3	4	5	6	7	NA
59. become sad or blue for no apparent reason?.....1	2	3	4	5	6	7	NA

**After having been interrupted, how often did your child**

60. return to a previous activity?.....1	2	3	4	5	6	7	NA
61. have difficulty returning to the previous activity?.....1	2	3	4	5	6	7	NA

**While watching TV or hearing a story, how often did your child**

62. seem frightened by 'monster' characters?.....1	2	3	4	5	6	7	NA
----------------------------------------------------	---	---	---	---	---	---	----

**When you suggested an outdoor activity that s/he really likes, how often did your child**

63. respond immediately?.....1	2	3	4	5	6	7	NA
64. run to the door before getting ready?.....1	2	3	4	5	6	7	NA

**When told that loved adults would visit, how often did your child**

65. get very excited?.....1	2	3	4	5	6	7	NA
66. become very happy?.....1	2	3	4	5	6	7	NA

**When taking a quiet, warm bath, how often did your child**

67. seem to relax and enjoy him/herself?.....1	2	3	4	5	6	7	NA
------------------------------------------------	---	---	---	---	---	---	----

**When s/he couldn't find something to play with, how often did your child**

68. get angry?.....1	2	3	4	5	6	7	NA
----------------------	---	---	---	---	---	---	----

**During sleep, how often did your child**

69. toss about in the bed?.....1	2	3	4	5	6	7	NA
70. sleep in one position only?.....1	2	3	4	5	6	7	NA

**During quiet activities, such as reading a story, how often did your child**

71. swing or tap his/her foot?.....1	2	3	4	5	6	7	NA
72. fiddle with his/her hair, clothing, etc.?.....1	2	3	4	5	6	7	NA
73. show repeated movements like squinting, hunching up the shoulders, or twitching the facial muscles?.....1	2	3	4	5	6	7	NA

<u>never</u>	<u>very rarely</u>	<u>less than half the time</u>	<u>about half the time</u>	<u>more than half the time</u>	<u>almost always</u>	<u>always</u>	<u>does not apply</u>
1	2	3	4	5	6	7	NA

**During the last two weeks:**

**While playing indoors, how often did your child**

74. like rough and rowdy games?.....1	2	3	4	5	6	7	NA
75. enjoy playing boisterous games like 'chase'?.....1	2	3	4	5	6	7	NA
76. enjoy vigorously jumping on the couch or bed?.....1	2	3	4	5	6	7	NA

**In situations where s/he is meeting new people, how often did your child**

77. turn away?.....1	2	3	4	5	6	7	NA
78. become quiet?.....1	2	3	4	5	6	7	NA
79. seem comfortable?.....1	2	3	4	5	6	7	NA

**When being gently rocked or hugged, how often did your child**

80. seem eager to get away?.....1	2	3	4	5	6	7	NA
81. make protesting noises?.....1	2	3	4	5	6	7	NA

**When encountering a new activity, how often did your child**

82. sit on the sidelines and observe before joining in?.....1	2	3	4	5	6	7	NA
83. get involved immediately?.....1	2	3	4	5	6	7	NA

**When visiting the home of a familiar child, how often did your child**

84. engage in an activity with the child?.....1	2	3	4	5	6	7	NA
85. seek out the company of the child?.....1	2	3	4	5	6	7	NA

**When another child took away his/her favorite toy, how often did your child**

86. scream with anger?.....1	2	3	4	5	6	7	NA
87. <u>not</u> become angry?.....1	2	3	4	5	6	7	NA
88. sadly cry?.....1	2	3	4	5	6	7	NA
89. <u>not</u> react with sadness?.....1	2	3	4	5	6	7	NA

**When engaged in an activity requiring attention, such as building with blocks, how often did your child**

90. move quickly to another activity?.....1	2	3	4	5	6	7	NA
91. stay involved for 10 minutes or more?.....1	2	3	4	5	6	7	NA
92. tire of the activity relatively quickly?.....1	2	3	4	5	6	7	NA

**During everyday activities, how often did your child**

93. pay attention to you right away when you called to him/her?.....1	2	3	4	5	6	7	NA
94. seem to be disturbed by loud sounds?.....1	2	3	4	5	6	7	NA
95. stop going after a forbidden object (such as a VCR) when you used a toy to distract her/him?.....1	2	3	4	5	6	7	NA



<u>never</u>	<u>very rarely</u>	<u>less than half the time</u>	<u>about half the time</u>	<u>more than half the time</u>	<u>almost always</u>	<u>always</u>	<u>does not apply</u>
1	2	3	4	5	6	7	NA

**During the last two weeks:**

96. notice small things, such as dirt or a stain, on his/her clothes?.....1 2 3 4 5 6 7 NA

**While in a public place, how often did your child**

97. seem uneasy about approaching an elevator or escalator?.....1 2 3 4 5 6 7 NA

98. cry or show distress when approached by an unfamiliar animal?.....1 2 3 4 5 6 7 NA

99. seem afraid of large, noisy vehicles?.....1 2 3 4 5 6 7 NA

100. show fear when the caregiver stepped out of sight?.....1 2 3 4 5 6 7 NA

**When playing outdoors with other children, how often did your child**

101. seem to be one of the most active children?.....1 2 3 4 5 6 7 NA

102. sit quietly and watch?.....1 2 3 4 5 6 7 NA

**During daily or evening quiet time with you and your child, how often did your child**

103. want to be cuddled?.....1 2 3 4 5 6 7 NA

**During everyday activities, how often did your child**

104. seem frightened for no apparent reason?.....1 2 3 4 5 6 7 NA

105. seem to be irritated by tags in his/her clothes?.....1 2 3 4 5 6 7 NA

106. notice when you were wearing new clothing?.....1 2 3 4 5 6 7 NA

107. react to beeping sounds (such as when the microwave or oven is done cooking)?.....1 2 3 4 5 6 7 NA

108. show repeated movements like squinting, hunching up the shoulders, or twitching the facial muscles?.....1 2 3 4 5 6 7 NA

**When being dressed or undressed, how often did your child**

109. squirm and try to get away?.....1 2 3 4 5 6 7 NA

110. stay still?.....1 2 3 4 5 6 7 NA

**When told “no”, how often did your child**

111. stop an activity quickly?.....1 2 3 4 5 6 7 NA

112. stop the forbidden activity?.....1 2 3 4 5 6 7 NA

113. ignore your warning?.....1 2 3 4 5 6 7 NA

114. become sadly tearful?.....1 2 3 4 5 6 7 NA

**Following an exciting activity or event, how often did your child**

115. calm down quickly?.....1 2 3 4 5 6 7 NA

116. have a hard time settling down?.....1 2 3 4 5 6 7 NA

<u>never</u>	<u>very rarely</u>	<u>less than half the time</u>	<u>about half the time</u>	<u>more than half the time</u>	<u>almost always</u>	<u>always</u>	<u>does not apply</u>
1	2	3	4	5	6	7	NA

**During the last two weeks:**

117. seem to feel down or blue?.....1 2 3 4 5 6 7 NA  
 118. become sadly tearful?.....1 2 3 4 5 6 7 NA

**When given something to eat that s/he didn't like, how often did your child**

119. become angry?.....1 2 3 4 5 6 7 NA

**During everyday activities, how often did your child seem able to**

120. easily shift attention from one activity to another?.....1 2 3 4 5 6 7 NA  
 121. do more than one thing at a time (such as playing with a toy while watching TV)?.....1 2 3 4 5 6 7 NA

**While playing indoors, how often did your child**

122. run through the house?.....1 2 3 4 5 6 7 NA  
 123. climb over furniture?.....1 2 3 4 5 6 7 NA  
 124. not care for rough and rowdy games?.....1 2 3 4 5 6 7 NA  
 125. enjoy activities such as being spun, etc.?.....1 2 3 4 5 6 7 NA

**When playing alone, how often did your child**

126. become easily distracted?.....1 2 3 4 5 6 7 NA  
 127. play with a set of objects for 5 minutes or longer at a time?.....1 2 3 4 5 6 7 NA  
 128. scratch him/herself?.....1 2 3 4 5 6 7 NA  
 129. tear materials close at hand?.....1 2 3 4 5 6 7 NA

**Before an exciting event (such as receiving a new toy), how often did your child**

130. get so worked up that s/he had trouble sitting still?.....1 2 3 4 5 6 7 NA  
 131. get very excited about getting it?.....1 2 3 4 5 6 7 NA  
 132. remain pretty calm?.....1 2 3 4 5 6 7 NA  
 133. seem eager to have it right away?.....1 2 3 4 5 6 7 NA

**When s/he asked for something and you said "no", how often did your child**

134. become frustrated?.....1 2 3 4 5 6 7 NA  
 135. protest with anger?.....1 2 3 4 5 6 7 NA  
 136. have a temper tantrum?.....1 2 3 4 5 6 7 NA  
 137. become sad?.....1 2 3 4 5 6 7 NA

**While playing or walking outdoors, how often did your child**

138. notice sights or sounds (for example, wind chimes or water sprinklers)?.....1 2 3 4 5 6 7 NA  
 139. notice flying or crawling insects?.....1 2 3 4 5 6 7 NA

<u>never</u>	<u>very rarely</u>	<u>less than half the time</u>	<u>about half the time</u>	<u>more than half the time</u>	<u>almost always</u>	<u>always</u>	<u>does not apply</u>
1	2	3	4	5	6	7	NA

**During the last two weeks:**

**When you gave your child an attractive toy, how often did your child**

140. grab the object as soon as it was set down?.....1	2	3	4	5	6	7	NA
141. look the object over before touching it?.....1	2	3	4	5	6	7	NA

**When asked to wait for a desirable item (such as ice cream), how often did your child**

142. seem unable to wait for as long as 1 minute?.....1	2	3	4	5	6	7	NA
143. go after it anyway?.....1	2	3	4	5	6	7	NA
144. wait patiently?.....1	2	3	4	5	6	7	NA
145. whimper and cry?.....1	2	3	4	5	6	7	NA

**When being gently rocked, how often did your child**

146. smile?.....1	2	3	4	5	6	7	NA
147. make sounds of pleasure?.....1	2	3	4	5	6	7	NA

**While visiting relatives or adult family friends s/he sees infrequently, how often did your child**

148. stay back and avoid eye contact?.....1	2	3	4	5	6	7	NA
149. hide his/her face?.....1	2	3	4	5	6	7	NA
150. "warm up" to the person within a few minutes?.....1	2	3	4	5	6	7	NA

**When you removed something s/he should not have been playin with, how often did your child**

151. become sad?.....1	2	3	4	5	6	7	NA
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**During everyday activities, how often did your child**

152. become bothered by sounds while in noisy environments?.....1	2	3	4	5	6	7	NA
153. become bothered by scratchy materials like wool?.....1	2	3	4	5	6	7	NA
154. notice changes in your appearance (such as wet hair, a hat, or jewelry)?.....1	2	3	4	5	6	7	NA
155. appear to listen to even very quiet sounds?.....1	2	3	4	5	6	7	NA
156. seem full of energy, even in the evening?.....1	2	3	4	5	6	7	NA

**When interrupted during a favorite TV show, how often did your child**

157. immediately return to watching the TV program?.....1	2	3	4	5	6	7	NA
158. <u>not</u> finish watching the program?.....1	2	3	4	5	6	7	NA

<u>never</u> 1	<u>very rarely</u> 2	<u>less than half the time</u> 3	<u>about half the time</u> 4	<u>more than half the time</u> 5	<u>almost always</u> 6	<u>always</u> 7	<u>does not apply</u> NA
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**During the last two weeks:**

**While being held on your lap, how often did your child**

159. pull away and kick?.....1	2	3	4	5	6	7	NA
160. seem to enjoy him/herself?.....1	2	3	4	5	6	7	NA
161. mold to your body?.....1	2	3	4	5	6	7	NA
162. seek hugs and kisses?.....1	2	3	4	5	6	7	NA

**While a story was being read to your child, how often did s/he**

163. enjoy listening to the story?.....1	2	3	4	5	6	7	NA
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**When hearing about a future family outing (such as a trip to the playground), how often did your child**

164. become very enthusiastic?.....1	2	3	4	5	6	7	NA
165. look forward to it?.....1	2	3	4	5	6	7	NA
166. remain pretty calm?.....1	2	3	4	5	6	7	NA

**While looking at picture books on his/her own, how often did your child**

167. stay interested in the book for 5 minutes or less?.....1	2	3	4	5	6	7	NA
168. stay interested in the book for more than 10 minutes at a time?.....1	2	3	4	5	6	7	NA
169. become easily distracted?.....1	2	3	4	5	6	7	NA
170. enjoy looking at the books?.....1	2	3	4	5	6	7	NA

**When tired after a long day of activities, how often did your child**

171. become easily frustrated?.....1	2	3	4	5	6	7	NA
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**When a familiar adult, such as a relative or friend, visited your home, how often did your child**

172. want to interact with the adult?.....1	2	3	4	5	6	7	NA
---------------------------------------------	---	---	---	---	---	---	----

**When asked to do so, how often was your child able to**

173. stop an ongoing activity?.....1	2	3	4	5	6	7	NA
174. lower his or her voice?.....1	2	3	4	5	6	7	NA
175. be careful with something breakable?.....1	2	3	4	5	6	7	NA

**When visiting a new place, how often did your child**

176. <u>not</u> want to enter?.....1	2	3	4	5	6	7	NA
177. go right in?.....1	2	3	4	5	6	7	NA

**While you were showing your child how to do something, how often did your child**

178. jump into the task before it was fully explained?.....1	2	3	4	5	6	7	NA
--------------------------------------------------------------	---	---	---	---	---	---	----

<u>never</u> 1	<u>very rarely</u> 2	<u>less than half the time</u> 3	<u>about half the time</u> 4	<u>more than half the time</u> 5	<u>almost always</u> 6	<u>always</u> 7	<u>does not apply</u> NA
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**During the last two weeks:**

**While you were talking with someone else, how often did your child**

179. easily switch attention from speaker to speaker?.....1 2 3 4 5 6 7 NA

**During everyday activities, how often did your child**

180. become irritated when his/her clothes were tight?.....1 2 3 4 5 6 7 NA

181. notice smells from cooking?.....1 2 3 4 5 6 7 NA

182. rock back and forth while sitting?.....1 2 3 4 5 6 7 NA

183. notice sirens from fire trucks or ambulances at a distance?.....1 2 3 4 5 6 7 NA

**When you mildly criticized or corrected her/his behavior, how often did your child**

184. get mad?.....1 2 3 4 5 6 7 NA

185. have hurt feelings?.....1 2 3 4 5 6 7 NA

**When s/he was upset, how often did your child**

186. cry for more than 3 minutes, even when being comforted?.....1 2 3 4 5 6 7 NA

187. cheer up within a minute or two when being comforted?.....1 2 3 4 5 6 7 NA

188. become easily soothed?.....1 2 3 4 5 6 7 NA

**When you were busy, how often did your child**

189. find another activity to do when asked?.....1 2 3 4 5 6 7 NA

**While playing outdoors, how often did your child**

190. want to jump from heights?.....1 2 3 4 5 6 7 NA

191. want to go down the slide in unusual ways (for example, head first)?.....1 2 3 4 5 6 7 NA

192. enjoy being pushed fast on a wheeled vehicle?.....1 2 3 4 5 6 7 NA

193. enjoy sitting down and playing quietly?.....1 2 3 4 5 6 7 NA

**When playing alone, how often did your child**

194. chew his/her lower lip?.....1 2 3 4 5 6 7 NA

195. stick out his/her tongue when concentrating?.....1 2 3 4 5 6 7 NA

196. move from one task or activity to another without completing any?.....1 2 3 4 5 6 7 NA

197. have trouble focusing on a task without guidance?.....1 2 3 4 5 6 7 NA

**When given a wrapped present, how often did your child**

198. become extremely animated?.....1 2 3 4 5 6 7 NA

<u>never</u>	<u>very</u>	<u>less</u>	<u>about</u>	<u>more</u>	<u>almost</u>		<u>does not</u>
1	2	3	4	5	6	7	NA

**During the last two weeks:**

**When around large gatherings of familiar adults or children, how often did your child**

199. want to be involved in a group activity?.....1	2	3	4	5	6	7	NA
200. enjoy playing with a number of different people?.....1	2	3	4	5	6	7	NA

**When s/he was asked to share his/her toys, how often did your child**

201. become sad?.....1	2	3	4	5	6	7	NA
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## **APPENDIX M**

### **Strengths and Difficulties Questionnaire (SDQ)**

Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, 38, 581-586.

## Strengths and Difficulties Questionnaire (SDQ)

### Strengths and Difficulties Questionnaire

For each item, please mark the box for “Not true “, “Somewhat True” or “Certainly True”. It would help us if you answered all items as best you can even if you are not absolutely certain. Please give your answers on the basis of your child’s behavior over the last six months.

Your child’s name : \_\_\_\_\_

Male/Female

Date of birth : \_\_\_\_\_

	<b>Not True</b>	<b>Somewhat True</b>	<b>Certainly True</b>
Considerate of other people’s feelings			
Restless, overactive, cannot stay still for long			
Often complains of headaches, stomach-aches or sickness			
Shares readily with other children for example toys, treats, pencils			
Often loses temper			
Rather solitary, tends to play alone			
Generally well-behaved, usually does what adults request			
Many worries or often seems worried			
Helpful if someone is hurt, upset or feeling ill			
Constantly fidgeting or squirming			
Has at least one good friend			
Often fights with other children or bullies them			
Often unhappy, depressed or tearful			
Generally liked by other children			
Easily distracted, concentration wanders			



Nervous or clingy in new situations, easily loses confidence			
Kind to younger children			
Often lies or cheats			
Picked on or bullied by other children			
Often offers to help others (parents, teachers, other children)			
Thinks things out before acting			
Steals from home, school or elsewhere			
Gets along better with adults than with other children			
Many fears, easily scared			
Good attention span, sees chores or homework through to the end			

Do you have any other comments or concerns?

Overall, do you think that your child has difficulties in any of the following areas : emotions, concentration, behavior or being able to get along with other people?

No	Yes Minor difficulties	Yes Definite difficulties	Yes Severe difficulties
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you have answered "Yes", please answer the following questions about these difficulties :

➤ How long have these difficulties been present?

Less than a month	1-5 months	6-12 months	Over a year
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

➤ Do the difficulties upset or distress your child?

Not at all	A little	A medium amount	A great deal
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

➤ Do the difficulties interfere with your child's everyday life in the following areas?

	Not at All	A little	A medium amount	A great deal
HOME LIFE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FRIENDSHIPS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CLASSROOM LEARNING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LEISURE ACTIVITIES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

➤ Do the difficulties put a burden on you or the family as a whole?

	Not at all	A little	A medium amount	A great deal
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Signature ..... Date

.....  
Mother/Father/Other (please specify)

**Thank you very much for your help**

## APPENDIX N

### **Edinburgh Postnatal Depression Scale (EPDS)**

Cox, J. L., Holden, J. M., Sagovsky, R. (1987). Detection of postnatal depression.

Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry*, 150, 782-6.

## Edinburgh Postnatal Depression Scale (EPDS)

Subject no \_\_\_\_\_  
\_\_\_\_\_

DCC ID:

RA name: \_\_\_\_\_  
\_\_\_\_\_

Date:

### EDINBURGH POSTNATAL DEPRESSION SCALE (EPDS)

As you have recently had a baby, we would like to know how you are feeling. Please UNDERLINE the answer which comes closest to how you have felt **IN THE PAST 7 DAYS**, not just how you feel today.

Here is an example, already completed:

I have felt happy:

Yes, all the time

Yes, most of the time

No, not very often

No, not at all

This would mean: "I have felt happy most of the time" during the past week. Please complete the other questions in the same way.

#### In the past 7 days:

1. I have been able to laugh and see the funny side of things
  - a) As much as I always could
  - b) Not quite so much now
  - c) Definitely not so much now
  - d) Not at all
  
2. I have looked forward with enjoyment to things
  - a) As much as I ever did
  - b) Rather less than I used to
  - c) Definitely less than I used to
  - d) Hardly at all
  
3. I have blamed myself unnecessarily when things went wrong
  - a) Yes, most of the time

- b) Yes, some of the time
  - c) Not very often
  - d) No, never
4. I have been anxious or worried for no good reason
- a) No, not at all
  - b) Hardly ever
  - c) Yes, sometimes
  - d) Yes, very often
5. I have felt scared or panicky for no very good reason
- a) Yes, quite a lot
  - b) Yes, sometimes
  - c) No, not much
  - d) No, not at all
6. Things have been getting on top of me
- a) Yes, most of the time I haven't been able to cope at all
  - b) Yes, sometimes I haven't been coping as well as usual
  - c) No, most of the time I have coped quite well
  - d) No, I have been coping as well as ever
7. I have been so unhappy that I have had difficulty sleeping
- a) Yes, most of the time
  - b) Yes, sometimes
  - c) Not very often
  - d) No, not at all
8. I have felt sad or miserable
- a) Yes, most of the time
  - b) Yes, quite often
  - c) Not very often
  - d) No, not at all
9. I have been so unhappy that I have been crying
- a) Yes, most of the time
  - b) Yes, quite often
  - c) Only occasionally
  - d) No, never
10. The thought of harming myself has occurred to me
- a) Yes, quite often
  - b) Sometimes
  - c) Hardly ever
  - d) Never

## APPENDIX O

### **Ainsworth maternal sensitivity scales: Coding system**

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

## **Ainsworth maternal sensitivity scales: Coding system**

### **Scale 1: Sensitivity vs. Insensitivity to the Baby's Signals**

This variable deals with the mother's ability to perceive and to interpret accurately the signals and communications implicit in her infant's behavior, and given this understanding, to respond to them appropriately and promptly. Thus the mother's sensitivity has four essential components: (a) her awareness of the signals; (b) an accurate interpretation of them; (c) an appropriate response to them; and (d) a prompt response to them. Let us consider each of these in turn.

The mother's awareness of her baby's signals and communications has two aspects. The first is the same as the issue covered in the scale "accessibility versus ignoring and neglecting." In other words, the mother must be reasonably accessible to the baby's communications before she can be sensitive to them. Accessibility is a necessary condition for sensitive awareness. It is not a sufficient condition, however, for a mother can maintain the "baby" in her field of awareness without fulfilling the other condition for sensitive awareness. The second aspect of awareness may be described in terms of "thresholds." The most sensitive mother--the one with the lowest threshold--is alert to the baby's most subtle, minimal, understated cues. Mothers with higher thresholds seem to perceive only the most blatant and obvious communications, Mothers with the highest thresholds seem often oblivious, and are, in effect, highly inaccessible. This second aspect is very closely related to the question of interpretation of the baby's signals, or, usually the mother who is alert to minimal cues also interprets them correctly. This is not invariably the case, however. For example, some mothers are alert to the slightest mouth movements, and sometimes incorrectly interpret them as hunger -- or they notice minimal tensions or restlessness and incorrectly interpret them as fatigue.

The mother's ability to interpret accurately her baby's communications has three main components (a) her awareness, as previously discussed, (b) her freedom from distortion, and (c) her empathy. An inattentive, "ignoring" mother is, of course, often unable to interpret correctly the baby's signals when they break through her obliviousness, for she has been unaware of the prodromal signs and of the temporal context of the behavior. But even a mother who is highly aware and accessible may misinterpret signals because her perception is distorted by projection, denial, or other marked defensive operations. Mothers who have distorted perceptions tend to bias their "reading" of their babies according to their own wishes, moods, and fantasies. For example, a mother not wishing to attend to her baby might interpret his fussy bids for attention as fatigue and, therefore, put him to bed' she in a hurry, might perceive any slowing down in the rate of feeding as a sign of satiation. Similarly, a mother who is somewhat rejecting of her infant might perceive him as rejecting and aggressive towards herself. Mothers who least distort their perceptions of their babies have some insight as to their own wishes and moods, and thus can more realistically judge the baby's behavior. Furthermore, they are usually aware of how their own behavior and moods affect their infant's behavior. The mother must be able to empathize with her baby's feelings and wishes before she can respond with sensitivity. That is, a mother might be quite aware of and understand accurately the baby's behavior and the circumstances leading to her baby's distress or

demands, but because she is unable to empathize with him--unable to see things from the baby's point of view--she may tease him back in to good humor, mock him, laugh at him, or just ignore him. The mother's egocentricity and lack of empathy may also lead to detached, intellectual responses to the baby rather than to warm, sensitive interactions with the baby.

A high threshold of awareness and inaccurate perceptions certainly leads to insensitive responses. Nevertheless, the mother may be highly aware and accurate in her interpretation and still be insensitive. Therefore, in the last analysis, the appropriateness and promptness of the mother's response to communications are the hallmarks of sensitivity.

The quality of the mother's interaction with her infant is probably the most important index of her sensitivity. It is essential that the mother's responses be appropriate to the situation and to the baby's communications. Often enough, at least in the first year of life, the sensitive mother gives the baby what his communications suggest he wants. She responds socially to his attempts to initiate social interaction, playfully to his attempts to initiate play. She picks him up when he seems to wish it, and puts him down when he wants to explore. When he is distressed, she knows what kind and degree of soothing he requires to comfort him--and she knows that sometimes a few words or a distraction will be all that is needed. When he is hungry she sees that he soon gets something to eat, perhaps giving him a snack if she does not want to give him his regular meal right away. On the other hand, the mother who responds inappropriately tries to socialize with the baby when he is hungry, play with him when he is tired, or feed him when he is trying to initiate social interaction.

In play and social interaction, the mother who responds appropriately to her child does not over-stimulate him by interacting in too intense, too vigorous, too prolonged, or too exciting a manner. She can perceive and accurately interpret the signs of over-excitement, undue tension, or incipient distress and shifts the tempo or intensity before things have gone too far. Similarly, she is unlikely to under-stimulate the child, because she picks up and responds to the signals he gives when he is bored or when he wants more interaction than has heretofore been forthcoming.

In the second year of life, and sometimes also toward the end of the first year, it is maximally appropriate for the mother to respond to the baby's signals not so much in accordance with what he ostensibly wants as in terms of a compromise between this and what will make him feel most secure, competent, comfortable etc. in the long run. This is a tricky judgment to make for so much that is done "for the baby's own good" is done both contrary to his wishes and according to the mother's convenience, whim, or preconceived standards. Nevertheless there are situations in which limit-setting, even in the first year, clears the air even though it is initially contrary to the baby's wishes. Similarly there are situations in which the baby's signals might lead the mother to increase the tempo of interaction to the point of discomfort for him, and in which it is appropriate gradually to diminish intensity. Therefore, there is a fine point of balance at which the mother can begin to show the baby that she is not an instrument of his will, but a cooperative partner whose participation must be elicited appropriately. In such instances the mother will slightly frustrate the baby's imperious demands but warmly encourage (and reward) behaviors which are inviting or requesting rather than demanding. Nevertheless in such interactions the sensitive mother acknowledges the



baby's wishes even though she does not unconditionally accede to them. The chief point is that a sensitive, appropriate response does not invariably imply complete compliance to the baby's wish -- although very frequently compliance may be the most appropriate response.

The final feature of appropriate interaction is that it is well-resolved or well-rounded and completed. For example, when the baby seeks contact the sensitive mother holds him long enough to satisfy him, so that when he is put down he does not immediately seek to be picked up again. When he needs soothing, she soothes him thoroughly, so he is quite recovered and cheerful. When he seeks social interaction she enters into a more or less prolonged exchange with him, after which, often enough, he is content to entertain himself. In contrast, the responses of some mothers with low sensitivity seem to be fragmented and incomplete. These mothers may try a series of interventions as though searching for the best method or solution. Highly sensitive mothers have completed, easily and well resolved interactions.

Finally, there is the issue of the promptness of the mother's response to the baby's communication. A response, however appropriate, which is so delayed that it cannot be perceived by the baby as contingent upon his communication cannot be linked by him to his own signal. We assume that it is a good thing for a baby to gain some feeling of efficacy--and eventually to feel cumulatively a "sense of competence" in controlling his social environment. Thus it seems a part of sensitivity to acknowledge the baby's signals in some effective way and to indicate that one is at least preparing to accede to them. During the first quarter of the first year, a mother's sensitivity is most easily judged by her latency in response to the baby's distress signals such as hunger. However during the last quarter, the mother's prompt response to the baby's social communication and signals is probably a more critical measure. A mother is inevitably insensitive when she fails to respond to the baby's out-stretched arms, to his excited greeting, or simply to his smile or gentle touch.

An issue which cuts across the various components of sensitivity concerns the timing of routine activities and playing. In general, arbitrary or very rigid timing of major interactions cannot but be insensitive to the infant's signals, moods, and rhythms. The mother who arranges and organizes day by day activities with her infant in order to most convenience herself, or the mother who thinks by the clock, has little or no consideration of the infant's tempo and current state.

In summary, the most sensitive mothers are usually accessible to their infants and are aware even of their more subtle communications, signals, wishes, and moods. In addition, these mothers accurately interpret their perceptions and show empathy with their infants. The sensitive mother, armed with this understanding and empathy, can time her interactions well and deal with her baby so that her interactions seem appropriate--appropriate in kind as well as in quality - and prompt. In contrast, mothers with low sensitivity are not aware of much of their infant's behavior, either because they ignore the baby or they fail to perceive in his activity the more subtle and hard-to-detect communications. Furthermore, insensitive mothers often do not understand those aspects of their infant's behavior of which they are aware or else they distort it. A mother may have somewhat accurate perceptions of her infant's activity and moods but may be unable to empathize with him. Through either lack of understanding or empathy, mothers with low sensitivity improperly time their responses, either in terms of

scheduling or in terms of promptness to the baby's communications. Further, mothers with low sensitivity often have inappropriate responses in kind as well as quantity (i.e., interactions that are fragmented and poorly resolved).

### **The Sensitivity vs. Insensitivity Scale**

**9. Highly sensitive.** This mother is exquisitely attuned to B's signals; and responds to them promptly and appropriately. She is able to see things from B's point of view; her perceptions of his signals and communications are not distorted by her own needs and defenses. She "reads" B's signals and communications skillfully, and knows what the meaning is of even his subtle, minimal, and understated cue. She nearly always gives B what he indicates that he wants, although perhaps not invariably so. When she feels that it is best not to comply with his demands--for example, when he is too excited, over-imperious, or wants something he should not have-- she is tactful in acknowledging his communication and in offering an acceptable alternative. She has "well-rounded" interactions with B, so that the transaction is smoothly completed and both she and B feel satisfied. Finally, she makes her responses temporally contingent upon B's signals and communications.

**7. Sensitive.** This mother also interprets B's communications accurately, and responds to them promptly and appropriately but with less sensitivity than mothers with higher ratings. She may be less attuned to B's more subtle behaviors than the highly sensitive mother. Or, perhaps because she is less skillful in dividing her attention between B and competing demands, she may sometimes "miss her cues". B's clear and definite signals are, however, neither missed nor misinterpreted. This mother empathizes with B and sees things from his point of view; her perceptions of his behavior are not distorted. Perhaps because her perception is less sensitive than that of mothers with higher ratings, her responses are not as consistently prompt or as finely appropriate. But although there may be occasionally little "mismatches", M's interventions and interactions are never seriously out of tune with B's tempo, state and communications.

**5. Inconsistently sensitive.** Although this mother can be quite sensitive on occasion, there are some periods in which she is insensitive to B's communications. M's inconsistent sensitivity may occur for any one of several reasons, but the outcome is that she seems to have lacunae in regard to her sensitive dealings with B--being sensitive at some times or in respect to some aspects of his experience, but not in others. Her awareness of B may be intermittent--often fairly keen, but sometimes impervious. Or her perception of B's behavior may be distorted in regard to one or two aspects although it is accurate in other important aspects. She may be prompt and appropriate in response to his communications at times and in most respects, but either inappropriate or slow at other times and in other respects. On the whole, however, she is more frequently sensitive than insensitive. What is striking is that a mother who can be as sensitive as she is on so many occasions can be so insensitive on other occasions.

**3. Insensitive.** This mother frequently fails to respond to B's communications appropriately and/or promptly, although she may on some occasions show capacity for sensitivity in her responses to and interactions with B. Her insensitivity seems linked to inability to see things from B's point of view. She may be too frequently preoccupied with other things and therefore

inaccessible to his signals and communications, or she may misperceive his signals and interpret them inaccurately because of her own wishes or defenses. Or she may know well enough what B is communicating but be disinclined to give him what he wants--because it is inconvenient or she not in the mood for it, or because she is determined not to "spoil" him. She may delay an otherwise appropriate response to such an extent that it is no longer contingent upon his signal, and indeed perhaps is no longer appropriate to his state or mood. Or she may respond with seeming appropriateness to B's communications but break off the transactions before B is satisfied, so that their interactions seem fragmented and incomplete or her responses perfunctory, half-hearted, or impatient. Despite such clear evidence of insensitivity, however, this mother is not consistently or pervasively insensitive as mothers with even lower ratings. Therefore, when the baby's own wishes, moods, and activity are not too deviant from the mother's wishes, moods, and household responsibilities or when the baby is truly distressed or otherwise very forceful and compelling in his communication, this mother can modify her own behavior and goals and, at this time, can show some sensitivity in her handling of the child.

**1. Highly insensitive.** The extremely insensitive mother seems geared almost exclusively to her own wishes, moods, and activity. That is M's interventions and initiations of interaction are prompted or shaped largely by signals within herself; if they mesh with B's signals, this is often no more than coincidence. This is not to say that M never responds to B's signals; for sometimes she does if the signals are intense enough, prolonged enough, or often enough repeated. The delay in response is in itself insensitive. Furthermore, since there is usually a disparity between one's own wishes and activity and B's signals, M who is geared largely to her own signals routinely ignores or distorts the meaning of s behavior. Thus, when M responds to B's signals, her response is inappropriate in kind or fragmented and incomplete.

## **Scale 2: Cooperation vs. Interference With Baby's Ongoing Behavior**

The central issue of this scale is the extent to which the mother's interventions are initiations of interaction break into, interrupt or cut cross the baby's ongoing activity rather than being geared in both timing and quality of the baby's state, mood and current interests. The degree of interference may be assessed in accordance with two considerations: (a) the extent of actual physical interference with the baby's activity, and (b) the sheer frequency of interruptions.

Some mothers are highly interfering in an overwhelming physical sense. Such a mother snatches the baby up, moves him about, confines him, and, indeed, releases him with utter disregard for his activity-in-progress. When she restricts and restrains his movements it tends to be by direct physical intervention or force. She may also try to use force in instances in which the baby's cooperation is required if the intervention is to be effective--for example, in feeding, in play, and (although this usually comes later) in toilet training. Other mothers, whose interference does not so conspicuously emphasize physical force nevertheless must be considered highly interfering because they are "at" the baby most of the time--instructing, training, eliciting, directing, controlling.

In either case it is clear that the highly interfering mother has no respect for her baby as a separate, active, and autonomous person, whose wishes and activities have a validity of their

own. The underlying dynamics of such an attitude are various; some examples follow. An obsessive-compulsive woman, for example, tends to require a tight control over other people in order to control her own anxieties; such a mother may become anxious and angry when the baby does not do exactly what she wants him to do, when she wants him to do it, and in the way she wants him to do it. Another kind of dynamic behind interference is shown by the woman whose baby continues to be a narcissistic extension of herself; such a woman tends to treat him as her possession, her creature, hers. When she is in a mood to play, she may find the baby charming, provided that he cooperates and plays; when she tires of him she puts him aside; in either case it does not seem to occur to her to attribute any validity to how the baby feels. A third kind of dynamic behind interference is an emphasis on training. The mother feels that she can shape the baby to fit her own concept of a good baby, whether through a determined attempt to elicit behavior she considers desirable or by punishing behavior that she considers undesirable. These three examples do not exhaust the possibilities, but it is hoped that they serve to illustrate the essentials of the underlying attitude--which is that the interfering mother feels that the baby is hers and that she has a perfect right to impose her will on him. She tends to treat him almost as an inanimate possession that she can move about as she wishes--or perhaps, as a more appropriate analogy, as a small child treats a pet kitten, to be handled, petted, fed, teased, carried, and put aside with complete lack of regard for the kitten's needs and wishes.

Mothers at the other end of this continuum seem to guide rather than to control the baby's activity. Such a mother integrates her wishes, moods, and household responsibilities with the baby's wishes, moods, and ongoing activity. Their interactions and shifts of activity seem co-determined. Rather than interrupting an activity that the baby has in progress, she delays her intervention until a natural break in his activity occurs. Or through mediating activities, often of a playful sort, she can gradually divert him from what he is doing toward something she wants him to do. Such a mother uses mood-setting techniques. At bed-time, for example, she gradually slows down the pace and vigor of their interaction until he is relaxed and calm and more ready for bed than he could have been at the peak of excited play. She invites him to come and cooperate with what she has in mind rather than imposing it on him.

A type of interference (less forceful than direct physical intervention) may be seen in play and vocalization. An interfering mother tends to play entirely or almost entirely by doing something to the baby, or by getting him to do something she wishes. Such mothers instruct the baby in tricks or stereotyped games, persisting even when the baby is in an unresponsive mood. Once the baby has learned the tricks or games to some degree, the mother subsequently plays by attempting to elicit them. Or, as an alternative, she does something playful to the baby, for example tickling him or whirling him about. (These examples are not intended to imply that tickling or whirling are in themselves criteria of an interfering approach, but merely that they can be modes of play which are not co-determined, and often enough, together with "eliciting" or instructing, the only modes available to the interfering mother. Similarly, with vocalization. The interfering mother persistently tries to elicit specific vocalizations (or gestures) regardless of the baby's current interest in vocalizing or lack of it.

In contrast, a "co-determining" mother capitalizes on spontaneity. She responds to the baby's vocalizations, and does a minimum of trying to elicit specific sounds. She tends to pick up

something the baby does as the beginning of a play sequence, and responds to his initiations of play. She may attempt to initiate play, but if the baby does not respond, she either desists, or shifts her approach. Most mothers undertake some kind of instruction, and on one occasion or another deliberately elicit something the baby has learned, so rating is a matter of balance between eliciting and instructing on one hand and spontaneity on the other--and also a matter of appropriateness of context and meshing with the baby's mood.

The extremes of physical interference are to be seen most usually in pick-up and put-down situations and when the baby is free on the floor. The highly interfering mother is likely to keep pulling the baby back from places she does not want him to go, perhaps interspersing direct control with multiple commands, "no-no's," and perhaps slaps. Of course, even a usually non-interfering mother will intervene abruptly and forcibly if the baby's activity threatens physical harm to him, for example, if he is headed toward unguarded stairs or if he is about to swallow some small object. But it is characteristic of the non-interfering mother to "baby-proof" the house and its contents so that physical intervention is rarely necessary--by placing gates across the stairways, by putting away objects which could harm the baby or which she does not want him to have, and the like.

Restraint may sometimes be considered a form of interference, but there is a distinction to be made between forcible physical restraint, such as pinioning the baby's hands when there is a direct physical confrontation between mother and baby and impersonal restraints such as playpens and the straps of a highchair. Restraint that involves physical confrontation will be considered interference. Impersonal restraints will not be considered interfering, except insofar as the manner and timing of imposing the restraint itself constitutes an interference. Thus strapping the baby in a highchair is not an interference, but if, when the baby has been refusing to sit, the mother jerks him down and straps him in, this would be considered an interference. Similarly, placing the baby in the playpen would not be considered an interference per se, but picking him up unceremoniously when he is in the midst of active exploration and dumping him down in the playpen would.

One difficulty with this rating scale is how to rate mothers who have been highly interfering in the past 'and whose babies have become passive' as a result. Such babies may now not try to reach the bottle; it is no longer necessary to pinion their arms. Such babies when placed on the floor may not explore vigorously so it is not necessary to interfere. Even in instances where it is known that present generalized or situation-specific passivity is correlated with past restraints and interferences, the mother will be rated on the basis of positive evidence of interference (or conversely cooperation) which she now shows. It is assumed that ratings of earlier periods, when undertaken, will tell the story, if, indeed, the mother now gives little evidence of interference.

Routines--feeding, changing, bathing, and bed-time--may be the occasion for interference, just as they may be the situations in which cooperation and co-determination is most clearly illustrated. The general rule of thumb is when interference is a matter of direct physical control it will be considered interference; but when it is a matter of tactful control or accepted impersonal restraint it will not be so considered. In between the two extremes come the milder interferences of verbal commands and prohibitions. Thus, for example, the mother who slaps

or holds the baby's hands to prevent him from touching food would be considered interfering; the mother who scolds and warns without physical intervention would be considered interfering to a milder degree, The mother who gives no finger foods would not be considered interfering, unless she slaps, holds, scolds, or verbally prohibits. The mother who tussles or slaps an active child while changing him would be considered interfering. The mother who gives him something to manipulate or who holds his attention by talking to him playfully and thus does not need to interfere physically would be considered non-interfering. The mother who interrupts an active or excited or unsleepy baby and puts him to bed abruptly would be considered interfering. But the mother who plays gentle games, or holds and rocks, and who generally gets the baby into a nap-accepting mood will be considered cooperative. The timing of routines per se, will not, however, be taken into account in rating this variable. (Timing will be reflected in the scale dealing with the mother's sensitivity to the baby's communications and signals.)

This present 'scale, although not entirely orthogonal to scales of ignoring and rejecting, is certainly not in one-to-one relationship with them. Some interfering mothers alternate interfering transactions with periods of ignoring the baby; others are clearly aware of the baby at all times and are by no means inaccessible.

### **The Cooperation vs. Interference Scale**

**9. Conspicuously cooperative.** This mother views her baby as a separate, active, autonomous person, whose wishes and activities have validity of their own. Since she respects his autonomy, she avoids situations in which she might have to impose her will on his, and shows foresight in planning ahead--by arranging the physical environment of the house or by her timing her own household routines--in such a way as to minimize the need for interference and for direct control.

She avoids interrupting an activity the baby has in progress. When it is desirable to intervene for a routine or to 'shift' his activity, she truly engages his cooperation, by mood-setting, by inviting him, by diverting him, and by engaging him in reciprocal activity of some sort, often enough vocalization or play. In activity-shifting and indeed also in play, she capitalizes on spontaneity, picking up cues from the baby to help her present what she wants him to do as something that is also congenial to him.

Even a conspicuously cooperative mother inevitably will instruct her baby to some extent or attempt to elicit particular behaviors, but these, mildly controlling interactions both constitute a small proportion of their total interaction and are themselves appropriate enough to the baby's mood and activity-in-progress to be considered co-determined.

Except in rare emergency situations this mother never interferes with the baby abruptly and with physical force. Verbal commands and prohibitions across distance are an inevitable corollary of giving the baby freedom to explore and to learn, but the "conspicuously cooperative" mother manages to structure the freedom-to-explore situation so that she needs to command but rarely. In other words, to be co-determining does not imply either over-permissiveness or a "laissez-faire" attitude.

**7. Cooperative.** This mother does not have as conspicuous a respect for her baby's autonomy and ongoing activity as do mothers with higher ratings. Higher ratings but on the whole she is cooperative and non-interfering. She shows less foresight than mothers with higher ratings do in arranging the physical environment and her own routine so as to avoid the need for interference. Consequently, there are more occasions in which she feels it necessary to interrupt or to exert control. Although she may give more verbal commands or prohibitions than mothers with higher ratings, she tries to avoid undue frequency of interference, and rarely, if ever, intervenes in direct, abrupt, physical ways.

Nevertheless, she seeks the baby's cooperation in routines and in shifts of activity by mood-setting and other techniques mentioned above. She may, however, be somewhat less skillful than mothers in higher ratings in capitalizing on spontaneity and thus achieving optimum cooperation. Although the balance is in favor of spontaneity in play and in exchanges of vocalization, she may be somewhat more frequently instructive or "eliciting" than mothers with higher ratings.

**5. Mildly interfering.** This mother is not so much an interfering or controlling person as she is inconsiderate of the baby's wishes and activities. Consequently she interrupts and interferes more frequently than do mothers with higher rating. On the whole her interference tends to be mild, however, rather than being direct, abrupt, and physically forceful. She tends to issue more verbal commands and prohibitions to control the baby cross a distance than do mothers with higher ratings. She tends to rely more on instructive eliciting modes of play and interaction and is less spontaneous than they are. Perhaps the most conspicuous difference from those with higher ratings, however, is in regard to routine-interventions and shifts of activity. She pays much less attention to mood-setting and to other techniques that aid smooth transitions from one activity to another. She tends to be matter fact. When she judges that a changing, a nap, a feeding, or merely a shift of locus or activity is desirable she acts accordingly, apparently disregarding the fact that her intervention may break in to the baby's activity-in-progress or the fact that the activity she proposes may be alien to the baby's present mood.

**3. Interfering.** In distinguishing the mother with a "3" rating from one with an even lower rating, a judgment about arbitrariness is crucial. Like mothers with lower ratings, these interfering mothers display either direct, forceful, physical interference or frequent milder interferences or both. But usually the "3" mother has some kind of rationale for her actions which is perceivable to the observer (even though it may seem far from desirable); the interference is not obviously arbitrary. The mother may be focused on the desirability of undertaking a specific routine at this time; or she may be a "training" kind of mother who is determined to shape the baby to her way of doing things. There is, however, a reason for most of her interruptions or interferences, whereas the "1" mother is more frequently arbitrary, seeming to interfere for no reason at all. (It is assumed that the totally arbitrary interferences are as incomprehensible to the baby as they are to the observer, and that those that have some "reason" may have some thread of consistency which makes them easier for the baby to adapt to.) In distinguishing the "3" mother from those with higher ratings, it is merely necessary to say that she is substantially more interfering either in frequency or in quality or both. She

more frequently displays physical interference or restraint, or she much more frequently interferes mildly--instructing, eliciting, prohibiting, and commanding--or both. Perhaps even more important than the absolute amount of interfering is the proportion of mother-infant transactions that are interfering. The "3" mother is interfering in a greater proportion of her transactions than the "5" or "4" mother.

**1. Highly interfering.** This mother has no respect for her baby as a separate, active, and autonomous person, whose wishes and activities have a validity of their own. She seems to assume that the baby is hers and that she has a perfect right to do with him what she wishes, imposing her will on his, or shaping him to her standards, or merely following her own whims without regard to his moods, wishes, or activities. There is an arbitrariness about the interference that is striking. Much (although not all) of it is "for no apparent reason". Some highly interfering mothers are conspicuous for the direct, physical, forcefulness of their interruptions or restraints Others are conspicuous for the extreme frequency of interruption of the baby's activity-in-progress, so that they seem "at" the baby most of the time--instructing, training, eliciting, directing, controlling. But the "1" mother tends to combine both types of interference, even though she may emphasize one type more than the other.

Regardless of the balance between physical man-handling and milder interruptions, these mothers have in common an extreme lack of respect for the baby's autonomy, and an obtuseness which permits them to break into what the baby is doing without any need to explain to others or even to justify to themselves the reason for the interruption.

### **Scale 3: Physical and Psychological Availability vs. Ignoring and Neglecting**

The central issue of this scale is the mother's accessibility to the baby, with emphasis upon her responsiveness to him. Although the essential component of psychological accessibility is that the mother be aware of the baby, she is not truly accessible unless she also actively acknowledges and responds to him.

A highly accessible mother has her baby in her field of perceptual awareness at all times so that he is within reach, at least, through distance receptors. She can divide her attention between the baby and other persons, things, and activities without losing awareness of the baby. She is never too preoccupied with her own thoughts and feelings or with her other activities and interactions to have him in the background of her awareness and to sense where he is and what he is doing. When he is in another room she is quick to perceive any sounds he may make, and she takes precautions not to have him so far away or so closed off that she cannot hear a sound as loud as a cry.

The highly accessible mother not only is aware of her baby's activity and signals, but she responds to him readily. She can switch her attention to him easily if he needs her supervision or protection or if he approaches or tries to catch her attention. To be accessible, the mother does not necessarily understand and interpret the baby's behaviour nor does she necessarily respond appropriately to the baby's signals - nevertheless, the accessible mother is perceptually alert and responsive to her baby most of the time.



An inaccessible mother ignores her baby and in this sense she neglects him. "Neglect" in this context does not necessarily imply physical neglect. The neglect is psychological for the most part - although mothers in inaccessible moods may sometimes show surprising lapses in failing to protect the baby from danger. There are two major types of women who can be described as inaccessible, ignoring, and neglecting. First, there are mothers who are unaware of much of the baby's behaviour; they do not perceive his signals and communications and therefore cannot respond to them. Second, there are mothers who perceive the baby's signals well enough, but do not acknowledge or respond to them, and hence must be to the baby just as inaccessible as if they had been unaware.

Let us first consider mothers who are frequently imperceptive and unaware of their baby's signals. Two main types have been observed. The dynamics of the first type seem the more pathological. Such a mother seems to teeter on the brink of depression and/or fragmentation and disintegration. She finds the demands implicit in the baby's signals an intolerable threat to her precarious balance. It is necessary, in order to hold herself together, to "tune out" the baby's signals. The baby may simply be blotted out of awareness for long periods of time. If he cries, she does not hear him; if he greets her she does not see him. If the baby's signals do break through the mother's defensive barrier, she tends to fall back on a second line of defense, somehow removing from the stimuli emanating from the baby their signal quality. The baby is perceived as making happy sounds rather than crying, or, if he is perceived as crying, the mother cannot imagine what the cause might be and, since she does not know what to do, she does nothing. Whatever the mechanism, the baby's signal is so distorted in the process of reception that it loses any power to impel his mother to respond. Such a mother rarely attends to the baby as a consequence of his behaviour, however much the baby may clamour for attention -- and often enough her baby learns the futility of trying to break through such a barrier and does not clamour. Such a mother tends to attend to her baby according to her own programming as though she reminded herself: "Now is the time to attend to the baby." It seems that her caretaking is a response to the thought of him -- to the concept of baby -- rather than to her perception of him and his signals. When the baby is out of sight, he tends to be out of mind, except that the mother can talk about him, discuss her plans for him, or her policies in managing him. She may give information about him, but often this is meagre because she has not observed his behavior closely enough to give much detail. It is as though her concept of the baby is more real than the baby as he actually exists.

The second major type of mother who is frequently imperceptive and unaware has dynamics that seem less pernicious than those of the first, because the mother is not rendered quite so impervious to the baby's signals and communications. This mother creates a barrier against the baby's demands, but, since she does not back this up by a distortion of perception of his signals, he can, if he signals intensely enough or persistently enough, break through. These mothers tend to be somewhat compulsive. They get preoccupied with their own activities, whether work or conversations, or they ruminate, lost in their own thoughts and worries. While they are preoccupied thus, the baby may go unnoticed. Such women are one-track-minded, and find it difficult to switch from one set of activities to another -- from housekeeping to mothering, for example. Sometimes they bolster up their need to be uninterrupted by arranging the physical environment so that the baby will not impinge upon them while they are engaged in something else -- work, napping, or adult sociability. They may put the baby away in another

room, preferably one far enough away or soundproofed so that they will not be interrupted by him, or they may arrange to turn him over to someone else -- a housekeeper or perhaps another member of the family. They often seem as inaccessible as women who are more defensively unaware, but the critical difference is that, provided the baby is within signal range, she is not completely impervious.

Whatever the mother's reasons for putting the baby away--whether rejecting or not--it may be argued that a mother is more or less ignoring and neglecting under either of the following circumstances: (a) when the baby is having a long "nap" while the mother is talking to the visitor or doing other things and the baby is too far away to have any signals heard and the mother makes no effort to "check" on him; (b) when the mother could be accessible to the baby (i.e. is at home) but turns him over to a housekeeper, another member of the family, or even to the visitor, and busies herself with something else, has a nap, or goes out on an unessential errand, thus making herself inaccessible to the baby, and perhaps even making it impossible for her to be aware of any signals he might make. Under such circumstances the mother has either arranged matters (deliberately or not) so that the responsibility for responding to any signals he makes. When such conditions occur, the rater may shift his rating to a point on the scale somewhat lower than would be suggested by the mother's behavior when she is with the baby or it accepting responsibility for him. The rater will, however, take into account qualifying features such as the mother's attitude and how usual or unusual these circumstances seem to be.

Let us now consider mothers who are inaccessible despite being perfectly well aware of the baby's signals and interpreting them correctly. Such a mother is merely unresponsive to the baby and his signals. She ignores them deliberately -- whether through policy, for discipline, or through pique. Sometimes it may seem incomprehensible to the observer that the mother can note the baby's behavior, that she can comment upon and correctly interpret the reason for his fuss, and still continue to ignore him. These women do not have distorted perception, but somehow they are not sufficiently able to see things from the baby's point of view -- or perhaps to feel things from his point of view -- to want to intervene. They are too impersonal and objective; in their failure to acknowledge the baby they must seem as inaccessible to the baby as if they did not perceive him.

Throughout this discussion emphasis has been placed upon the mother's failure to perceive and/or to be responsive to the baby's signals. Inaccessibility is most obvious when the baby is, in fact, signalling, and the mother does not respond. There are, however, babies who make few demands--perhaps because they have become accustomed to being ignored. The relative lack of frequency, intensity, or persistence of signalling behavior of the part of the baby may make it all the easier for his mother to ignore him, but the rater should not be misled into over-rating the mother's accessibility on this account. If she can go for long periods without seeming to notice the baby or to acknowledge him she is a candidate for a low rating regardless of whether or not the baby is making obvious demands.

In summary, an accessible mother is aware of her baby and of his behavior most of the time and usually acknowledges his presence, his signals and his communications. A mother is judged to be inaccessible if she frequently or perhaps for prolonged periods does not

acknowledge the baby or respond to him--whether she is aware of his behavior or not, and, indeed, whether she is in the same room or not.

This scale does not take into account the quality of care that the mother gives the baby or the quality of her interaction with him. Some mothers are constantly aware of the baby and responsive to his signals, and yet they respond inappropriately or even sadistically. It is the bare fact of the mothers acknowledgement of his real presence that is important of this scale--not the quality of her response to him.

Note: This variable is similar to Scale MC-1 of the first quarter ratings scales--mother's availability to the baby. The previous scale was, however, concerned with the issue of the limited availability of the part-time mother. This present scale is concerned only with the mother's accessibility when she is at home. The working mother will, therefore, be rated only on the basis of her behavior when she returns home from work.

### **The Availability vs. Ignoring and Neglecting Scale**

**9. Highly accessible.** M arranges things so that she can be accessible to B and B to her. She keeps him close enough so that she can be aware of his states, signals, and activities. She is very alert to his whereabouts and doings. Even when he is napping in his room she has a selective filter tuned in to any sounds he might make. She is capable of distributing her attention between B and other people and things, and is rarely so preoccupied that she is unaware of B and unresponsive to what he is doing. She rarely, if ever, ignores any active approach or demand of B's, even though she may not do what he seems to want her to do. She does not even pretend to ignore him, but rather acknowledges his presence and his overtures or demands in some way. She rarely, if ever, enters a room without giving B some acknowledgement that she is aware of him.

**7. Usually accessible.** M is usually accessible psychologically. There may be brief periods during which other demands and other activities may prevent her from being aware of B and what he is doing, but most usually her attention is "tuned in" to him. She is not as smooth about dividing her attention between competing demands as are women with higher ratings, but rather tends to alternate. Nevertheless, she can fairly easily switch her attention to B. She may sometimes be preoccupied enough with her own activities -- including activities concerned with B's care -- that she fails to acknowledge B, perhaps going in and out of the room without seeming to see B's interest in her presence. For the most part, however, she acknowledges B when she enters a room, especially if they have been apart for more than a few moments. (Mothers may be given this rating also if they habitually and deliberately ignore B under one set of circumstances -- for example, ignoring any crying B may do when he is put down for a nap -- and yet are highly accessible at most other times.)

**5. Inconsistently accessible.** M is inconsistent in her accessibility to B. Fairly long periods of close attention alternate with periods of seeming obliviousness to B, during which M is occupied with other things despite B's presence and perhaps even despite his attempts to catch her attention. The inaccessibility of some mothers may be quite unpredictable because of a tendency to become easily preoccupied with their own activities and thoughts; other mothers

may regularly and routinely plan prolonged periods of unavailability such as during those hours when they do their household chores. During these planned or unplanned periods, M may ignore B when she enters a room, even after a considerable absence, being concerned with other things. She may become so caught up in a conversation, activity, or thought that she seemingly forgets about B and ignores what he is doing -- responding neither to his attention-getting behavior, nor to dangerous or "naughty" behavior which ordinarily would evoke an intervention. Nevertheless, this mother is more often accessible than inaccessible, and during her periods of accessibility, she is highly responsive to B.

**3. Often inaccessible, ignoring, or neglecting.** M occasionally seems responsive to B's behavior and to the signals implicit in it, but she is more frequently inaccessible than accessible to him. She may be too preoccupied with her own thoughts or activities to notice him, or she may notice and correctly interpret his signals without being moved to acknowledge them. She typically enters and leaves the room without acknowledging B or his signals, whether they are conspicuous, subtle, or muted. Although she frequently ignores him, she is not entirely oblivious. If B signals strongly enough or persistently enough, M may respond to him -- and in this she differs from mothers with even lower ratings. On the other hand, if the baby is an undemanding baby, and tends not to signal frequently or strongly, the mother's accessibility must be judged in accordance with the extent to which she does acknowledge him, whether he demands it or not. The mother with this rating -- and also and even to a greater extent mothers with lower ratings -- tends to give B attention with her own programming rather than in accordance with his, although she may give him intense attention in the occasions when she decides to attend to him at all.

**1. Highly inaccessible, ignoring or neglecting.** M is so preoccupied with her own thoughts and activities for most of the time that she simply does not notice B. She enters the room without even looking at him, let alone acknowledging him; his smiles are not returned. When B is elsewhere she seems to forget his existence. B's sounds do not seem to filter through to her. She may talk about B, but it seems that the baby as conceptualized is more real than the baby upstairs crying, or the baby across the room who may be rocking, or playing or even actively demanding her attention. This mother only responds to B when she deliberately turns her attention to do something to or for B -- making a project of it. In fact, M rarely "responds" to B in the sense of giving care and social attention contingent upon B's behavior. Rather, M is often so completely unaware of B's signals that her interventions are characteristically at her own whim and convenience.

#### **Scale 4: Acceptance vs. Rejection of the Baby's Needs**

This scale deals with the balance between the mother's positive and negative feelings about her baby -- about having a baby and about this particular one -- and with the extent to which she has been able to integrate these conflicting feelings or to resolve the conflict. At the positive pole there is love and acceptance over-riding frustrations, irritations, and limitations -- or perhaps more accurately, encompassing and de-fusing the negative feelings. At the negative pole anger, resentment, hurt, or irritation conflict conspicuously with and limit positive feelings and result in more or less overt rejection of the baby. It is assumed that the arrival of a baby poses a potentially ambivalent situation -- and that for all mothers there are positive and

negative aspects. Among the negative aspects is the fact that the new baby impinges on and limits the mother's own autonomy and interferes with other activities which are important to her in one way or another. Furthermore, there are inevitable irritations and frustrations in interacting with this particular baby from day to day. Among the positive aspects is the undeniable appeal a baby makes to his mother -- evoking tenderness, protectiveness, and other positive reactions.

It is assumed that there are positive and negative elements in all mother-infant relationships. We are concerned with how the mother, given her present life situation, has been able to balance them. It is assumed that at the desirable, accepting, positive end of this continuum negative components are not so much absent as somehow subsumed within the context of the positive relationship. It is also assumed that at the undesirable, rejecting, "negative" end of this continuum positive components are not so much lacking as they are not integrated with the negative, rejecting components, so that there is an alternation between tenderness, nurturance, and delight on the one hand, and anger, resentment, irritation, hurt, and rejection on the other, without any adequate meshing of the two together. There is a good and lovable baby and a bad and infuriating baby, but the real baby as he actually exists is somehow lost between the two.

The assessment of the balance between positive and negative is not easy. The social norm is that mothers love their babies and do not reject them. The angry, rejecting, negative components of the mother's relations with the baby tend, therefore, to be suppressed or repressed. The positive components are, of course, more acceptable, and the mother usually feels free to express positive feelings openly. She may even feel impelled to put on a show of affection in excess of her real feelings. To complicate things further a baby has much appeal even to an essentially rejecting mother, and she may be genuine in her positive expressions while trying to hide (perhaps even from herself) her negative feelings. Finally, it is acknowledged to be healthy for a person -- even a mother-- to give vent to angry feelings rather than trying to submerge them with the consequence that they may simmer for long periods of time during which they color the tone of behavior and interfere with positive feelings. Momentary outbursts of anger or irritation must not be given undue weight if they are embedded in an otherwise clearly positive, warm, loving relationship. On the other hand, the rater must be alert to signs of submerged resentment in the case of the woman who finds it very difficult to acknowledge anger, and must give them due weight.

Some mothers clearly have positive feelings uppermost; they express them frequently and spontaneously and without any apparent striving to play a loving role, to make a good impression, or even to be kind to the baby. They acknowledge the baby's exploratory interests, and do not feel hurt when they lead him away from her. They sense and respect the baby's budding desire for autonomy and mastery and understand his anger when he is frustrated; therefore they did not view early conflicts of interests as struggles for power in which they must be aggressive or else be overwhelmed. These are women whose love-hate impulses are well enough integrated that they can feel almost wholly positive toward their babies without danger of repressed hostility. Such a mother, perhaps because she is able to empathize with the baby, does not interpret instances of disruptive, annoying behavior as an indication of a potential character defect in the baby which must be "nipped in the bud." Although sometimes the baby may seem clearly angry at her, she interprets neither such episodes, nor episodes of

more diffusely uncooperative or annoying behavior, as adequate reason for her to feel hurt or to institute retaliative measures. She may feel a brief surge of annoyance, but she does not consider the baby himself as a suitable target on which to focus her anger. She may acknowledge his anger. She may openly express her own exasperations. She may discourage the behavior in question. She may deal with her own momentary irritability by some means which gives her a chance to "cool off" before resuming her interaction with the baby. But she does not harbour resentment or hurt, and because she does not "take it out" on the baby, he is unlikely to feel rejected, especially if momentary irritation or behavior-directed disapproval is embedded in general warm acceptance.

Some outwardly accepting mothers are more rejecting than those, described above, who can give brief, healthy, situation-specific vent to annoyance. The pseudo-accepting mothers comply with the baby's demands, but in a way which is in itself inappropriate. They comply masochistically, and in a pseudo-patient, long-suffering way, and usually underneath this type of compliance lies much repressed aggression -- which is usually deep-seated and of long standing, and which has little to do with the baby except as his behavior may serve to activate this repressed aggression and threaten the defenses against it. Such a mother cannot give healthy vent to the anger occasioned by the baby's behavior. She smothers it, and tries to be patient. Her very defenses against expressing her anger make it impossible for her to be truly responsive to the baby, and hence he tends to find her compliance unsatisfying. Both this and the often inappropriate outbursts of irritation which inevitably break through the defenses add up to rejection.

Clear-cut, overt rejection is unmistakable. Some highly rejecting mothers are quite open in their rejection. Such a mother may say that she wishes that the child had never been born, or she may be less open but nevertheless say what a nuisance he is and how he interferes with her life. Or she may complain more specifically, pointing out the baby's defects and shortcomings, and dwelling on her problems with him. To be sure, to talk with the observer about concerns and problems does not necessarily imply substantial rejection, but to emphasize these constantly rather than the baby's good points and the pleasure he yields suggests at least an undercurrent of rejection. (In fact, it is well known that damaged or handicapped babies, who obviously present more problems than 'normal' babies do, tend also to activate more rejection in their mothers. Therefore, whether or not the "problem" has an adequate realistic basis is irrelevant for our purposes.) Another way in which a mother may voice rejecting attitudes, without actually saying that she rejects the baby, is to say, often in a heavy-handed "joking" manner, all sorts of uncomplimentary things to the baby while she is interacting with him -- "stinkpot," fatso," "stupe," and the like -- or to comment to the observer, in an apparently "objective" way that this is an ugly baby, uglier than its siblings, or that it has a flat head, protruding teeth, or a nasty temper (just like his father's) and the like. (Such uncomplimentary remarks should be distinguished -- although this is sometimes difficult -- from "tough" comments made by an essentially accepting mother to disguise from the world just how crazy she is about this baby.)

Rejection is of course expressed in behavior as well as verbally. When it is overt, it is unmistakable. The highly rejecting mother may show her rejection by constantly opposing the baby's wishes, by a generally pervasive atmosphere of irritation or scolding, by jerking him

about with ill-concealed anger, and by joining battle with him whenever he seems to challenge her power. Less obvious -- and perhaps less highly reflecting -- is chronic impatience, or a punitive or retaliatory putting of the baby away or deliberately ignoring his overtures, as though the mother were trying to say to the baby: "You snubbed me, didn't do what I wanted you to do, rejected my overtures, and now I will 'show you!'" Teasing is sometimes a less obvious way of expressing negative feeling-components. Even when the baby responds positively to teasing, there seems to be some negative aggressive component in the teaser's behavior -- and in extremes teasing is obviously sadistic, even though the sadism may be veiled by seeming warmth and good humour.

This scale is related to the previous scale "A-3--Mother's Acceptance of the Baby--which dealt with the mother's acceptance-rejection in terms of the degree to which the baby is felt to interfere with her own autonomy. This emphasis seemed appropriate during the first three months when the chief issue of acceptance seemed to be one of the mother's autonomy. In the latter part of the first year, however, the baby has emerged as more of a person in the mother's eyes--a person who can be sometimes entrancing or appealing and sometimes irritating and even infuriating. The present scale therefore focuses chiefly on the balance between positive and negative feelings. Nevertheless the previous issue of the mother's acceptance or resentment of the degree to which the baby infringes on her own autonomy is still relevant and will be taken into consideration.

The chief difficulty in rating is expected to occur in trying to distinguish rejection as defined by this scale from ignoring and neglecting, which is dealt with in another scale. The rater is referred to the discussion of this point in the introduction to the other scale. A rule of thumb was suggested. If the baby is in the same room with his mother, and if it is clear that her ignoring of his signals is deliberate, then the instance in question will be considered rejection--especially if there is evidence that the mother is motivated by an angry or "hurt" desire to punish or to retaliate. (Similarly, the mother who arbitrarily puts the baby away--for a nap or gives him to someone else--will be considered rejecting, especially if there is evidence that she is irritated by his behavior or tired of him.) It is assumed that somehow the baby can perceive rejection under these circumstances. If, however, the baby is in another room--as for example, when he is crying when put down for a nap or waking from a nap--the mother's failure to respond will be considered ignoring. It is emphasized that this is only a rule of thumb. Ignoring in the sense of being oblivious to the baby and failing to perceive his signals may be a special case of rejection, and may have similar motivation, although the implication is that the negative component is more completely repressed than in rejection. Indeed some mothers may be both rejecting and ignoring, alternating more or less overt rejecting with the covert rejection implicit in ignoring. It nevertheless seems worthwhile to distinguish these two variables because it seems likely that babies respond differentially to the two patterns of behavior, and that certain patterns of infant behavior may be associated with relatively overt rejection in which the angry component can be more clearly sensed than to the covert rejection implicit in ignoring.

Furthermore, the positive ends of the two scales--accessibility and acceptance--may be distinguished. Some mothers are accessible in the sense of being clearly aware of the baby and yet behave in a rejecting way. Other mothers may be on balance positive in their feelings, and

hence fairly accepting, and yet may become involved in other activities to the extent that their accessibility is fairly frequently low.

### **The Acceptance vs. Rejection of Baby's Needs Scale**

**9. Highly accepting.** M is highly accepting of B and his behavior, even of behaviors which other mothers find hurtful or irritating. She values the fact that baby has a will of his own, even when it opposes hers. She is pleased to observe his interest in other people or in exploring the world, even though this may on occasion lead him to ignore her overtures. She even finds his anger worthy of respect. She can, on rare occasions, be irritated or frustrated by B's behaviour, but this tends to be brief--soon over and done with--and it does not occur to her to feel that B himself is a worthy target upon which to focus her anger. She not only loves B, but she respects him as an individual. At the same time she accepts the responsibility for caring for him, and does not chafe against the bonds which tie her down temporarily and which restrict her from activities in which she would otherwise enjoy participating.

**7. Accepting.** The balance of feeling is still clearly toward the positive, and accepting, loving side, and irritation and resentment are infrequent in comparison. This mother does not show as much respect for the baby as a separate, autonomous person as do mothers with higher ratings, and she may not show as much obvious acceptance of the fact that he has a will of his own, that he is often interested in other people and things, and that he can get angry. She is generally patient with B, and her patience seems a matter of genuine acceptance of his demands and inefficiencies rather than over-compliant, long-suffering, pseudo-patience. She seems to suppress (or repress) relatively little of her feelings toward B, perhaps chiefly because there is relatively little undercurrent of negative feelings, especially toward him. Moreover she generally accepts the limitations to her own autonomy presented by B and her care of him.

**5. Ambivalent.** M seems chiefly positive in her feelings toward B, and on occasion she obviously enjoys him; nevertheless resentment or hurt may break through in inappropriate ways. The inappropriateness is largely a matter of M taking some behavior of the baby's--angry, frustrated behavior, or assertion of will, or momentary preference for other people or things--as a deep-seated mother-directed hostility, opposition or rejection, and this leads her to retaliate with behavior that is essentially rejecting behavior. Or, M may be somewhat impatient and irritable with the baby at times, rejecting him when he ceases to be compliant or endearing, and yet there is enough positive interaction to preclude a lower rating. Or M may point out either frequently or inaccurately that B rejects her, in that he seems to prefer someone else or will not come to her readily; her dwelling upon behavior that she interprets as rejection seems likely to imply an undercurrent of rejecting B. Or M may tease B when he is upset, angry, or otherwise difficult -- and the teasing, of course, aggravates the difficulty. For a rating of "5" the expressions of negative feeling must not be predominant over positive, mutually enjoyable interaction, whatever the assessment of underlying dynamics; if they are, the rating should be lower.



**3. Substantially rejecting.** M's negative responses, veiled or open, are frequent enough to outweigh expressions of positive feelings toward B--although she is neither as openly nor as strongly rejecting as women with lower ratings. Ways in which her anger or resentment toward B may be expressed are as follows: (a) by putting him away from her when he does not do what she wants -- or by deliberately ignoring him as a retaliation -- and this is not merely a matter of insensitivity but a clear rejection of him; (b) by dwelling in conversation on B's bad points and the problems he occasions rather than upon his good points, accomplishments, and the pleasure he yields; (c) by saying critical, uncomplimentary, nasty things to and about B in his presence even though these are "joking" (although it is difficult, these should be distinguished from "tough" comments designed to conceal strong positive feelings); (d) by a veiled irritation with B which underlies a long-suffering, pseudo-patient compliance to his demands (which are perfunctory compliances and hence not satisfying ) and which occasionally becomes overt in impatient, rejecting behavior; (e) marked impatience; (f) a sadistic undercurrent which is largely concealed but which comes out in little ways. Also here one might classify the mother who shows hurt, retaliatory behavior more frequently or more strongly than the "5" or "4" mother.

**1. Highly rejecting.** M is clearly rejecting of B and her positive feelings toward him are frequently overwhelmed by her resentful, angry, rejecting feelings. This may be manifest in any one or a combination of different ways. She may openly voice an attitude of rejection, saying that she is sorry that she ever had him. Or she may somewhat less openly voice her rejection by implying that he is a great nuisance, and that he interferes substantially in her life and with what she would like to be able to do. Or she may complain about B more specifically, pointing out his defects and shortcomings. Even though she may refrain from verbalizing her rejection of B, she may manifest it by a constant opposition to his wishes, by a generally pervasive atmosphere of irritation and scolding, by jerking him about with ill-concealed anger, and by joining battle with him whenever he seems to challenge her power. There may be positive aspects in her relationship with B which suggest that she can enjoy B, but these are rare and isolated in their manifestations.

\* Difficulties have been encountered in rating highly defended mothers who seem bland or emotionally detached, and who give evidence neither of positive acceptance as defined by scale points 9 and 7 nor of the hostile components of feelings or behavior as specified by the other scale points. It seems best to rate such women 5, despite the fact that they do not show the expressions of negative feeling specified in the definition of that scale point. It is understood that the intermediate points 4 or 6 may also be used, depending upon the tendency for either negative or positive feelings to break through the generally emotionless facade. It is further understood that there may be enough veiled rejection in a seemingly "matter of fact", emotionless mother to justify a rating of 3 as the rating point is presently defined.