Maternal Psychopathology and Infant Attachment Security: A Meta-Analysis

by

Jennifer Barnes

A Thesis submitted to the Faculty of Graduate Studies of

The University of Manitoba

in partial fulfilment of the requirements of the degree of

MASTER OF ARTS

Department of Psychology

University of Manitoba

Winnipeg

Abstract

A mother's mental health is closely linked with the healthy development of her infant. Research has shown that mothers who are experiencing psychopathology are often unable to provide sensitivity and responsiveness to their infants, both of which are critical for the development of a secure attachment orientation. Thus, it is important to determine if maternal psychopathology is a risk factor for infants' development of non-secure attachment relationships. The objective of the current study was to provide a statistical, quantitative consensus on this relationship by performing a number of meta-analyses. Prevalence rates of non-secure attachments in infants of mothers with overall and specific psychopathologies were calculated, and these varied from 36-62%. Infants of mothers with psychopathology were also found to be at significantly increased risk for developing a non-secure attachment compared to infants of psychologically healthy mothers, and displayed significantly greater levels of attachment non-security. The relationship between maternal psychopathology symptomology and infant attachment non-security yielded a small but significant effect size. Moderator analyses were also run to determine if any study or sample variables moderated the strength of this relationship; infant gender, maternal racial background, sample source, and treatment status were found to significant. The results of this study indicate that it may be beneficial for clinicians to identify mother-infant dyads who may benefit from early interventions that focus on improving maternal mental health and enhancing child attachment. Futhermore, this study helps to identify gaps in the current literature surrounding this relationship.

Acknowledgments

Firstly, I would like to thank my advisor, Dr. Jennifer Theule, for her continuous guidance and encouragement. I would also like to thank my committee members, Dr. Melanie Soderstrom and Dr. Caroline Piotrowski, for providing helpful insight and recommendations. Thank you to all the members of the Family and Developmental Psychopathology Lab for their feedback. Special thanks especially to Kristene Cheung for always being happy to give me advice, and to Esthee Freynet for helping with various stages of the study.

I would like to thank my incredible cohort for always providing me with constant support and laughter; Brooke Beatie, Matthew Bernstein, Caitlin Blaney, Katherine Kenyon, Justine MacLean, and Karmen McDivitt – I wouldn't have wanted to go through these past two years with any other group. I would like to thank my husband, for moving out to Winterpeg with me so I could pursue this dream, and for helping me through every struggle. And thank you always to my mom, for forever believing in me and telling me I could do anything I wanted in life.

I would also like to acknowledge the following funding sources: Social Sciences and Humanities Research Council (SSHRC) Joseph-Armand Bombardier Canada Graduate Scholarships Program: Master's Scholarship, Faculty of Graduate Studies Tri-Council Top-Up Award, and the Psychology Department at the University of Manitoba. Thank you also to the Department of Psychology, the Faculty of Arts, and the Faculty of Graduate Studies at the University of Manitoba for providing financial support for conference travel to disseminate the results of this study.

Table of Contents

Maternal psychopathology and infant attachment security: a meta-analysis

Introduction

Attachment

Attachment theory explains how the early relationship developed between an infant and his/her primary caregiver shapes the infant's development and is a foundation for the later relationships in his/her life (Bowlby, 1982). Bowlby suggested in his influential writing on attachment theory that in the first critical stage of life, infants develop internal working models of their relationship with their primary caregiver (1982). Bowlby theorized that these models, which contain expectations for future interactions with others based on past interactions with primary caregivers, are highly resistant to change. More recent research has validated these findings, with attachment being found to remain moderately stable from infancy to adulthood (Ranson & Urichuck, 2008).

These internal working models of attachment are thought to develop based on the caregiver's reactions to the infant during critical times of need (Ainsworth, 1979). When an infant is distressed, he/she will display behaviours that are meant to signal to the caregiver a need for comfort. If the infant's distress is consistently met with responsiveness from his/her caregiver, through the internal working model they develop, they will come to expect and know that their caregiver will be there for them (Bowlby, 1982). This is considered to be the development of a secure attachment style (Ainsworth, 1979). However, not all infant-caregiver interactions result in secure attachment styles.

Ainsworth and colleagues in 1977 developed a procedure know as the Strange Situation Procedure (SSP), which can be used to classify children's attachment styles into four different orientations: secure (B), insecure anxious-avoidant (A), insecure anxious-ambivalent (C);

(Ainsworth, Blehar, Waters, & Wall, 1978) and, the more recently added category, disorganized (D); (Main & Soloman, 1990). The SSP is a structured procedure with a structured observation component. The SSP includes a separation episode (in which the parent leaves and the child is left alone with a stranger) and a reunion episode (in which the parent enters and attempts to comfort the child). The child's reactions are observed, and coded by blind observers through the watching of videotapes. Based on certain actions and characteristics of the child during this observation, they are classified into one of the four attachment categories. Secure children will use their mother as a secure base from which to explore, will be distressed when their mother leaves, and will be comforted by their mother upon her return. Insecure anxious-avoidant children will generally avoid or ignore their mother, and will show little sign of emotion about either her departure or her return. Children with an insecure anxious-ambivalent style will show distress even before their mother leaves, and will be clingy but difficult to comfort upon their mother's return. Children with disorganized attachment styles, a category added later, tend to show signs characteristic of their attachment system being flooded – for example, outright fear.

Implications for development and adulthood.

These attachment orientations have implications for later development. Non-secure attachment styles have been linked to a variety of issues in a child's development and into adulthood, and have been found to have a strong relationship with both child and adult psychopathology (Jones, 1996). Non-secure attachment orientations have been found to be a risk factor in the development of externalizing disorders (Guttmann-Steinmetz & Crowell, 2006), including conduct disorder (Pasalich, Dadds, Hawes, & Brennan, 2012), oppositional defiant disorder (Speltz, DeKlyen, & Greenberg, 1999), and attention deficit hyperactivity disorder (ADHD) (Finzi-Dottan, Manor, & Tyano, 2006). The relationship between non-secure

attachment styles and internalizing disorders in children has been found to have a small to moderate effect size (Madigan, Atkinson, Laurin, & Benoit, 2013). For example, a moderately strong relationship has been shown between non-secure attachment style and child anxiety (Colonnesi et al., 2011), even when corrected for maternal anxiety and termperament (Warren, Huston, Egeland, & Sroufe, 1997). Strong links have been found between non-secure attachment and adolesent depression (Brumariu & Kerns, 2010). This risk factor also extends further into the lifespan, with non-secure attachment orientations being linked to poor peer relationships (Groh et al., 2014), criminal behaviours (Ogilvie, Newman, Todd, & Peck, 2014), sexual offending (Baker, Beech, & Tyson, 2006), and increased suicidal ideation (Armsden, McCauley, Greenberg, Burke, & Mitchell, 1990).

Etiology of non-secure attachment.

There are many possible risk factors that go into the creation of a non-secure attachment relationship between an infant and their mother. These risk factors include mothers not being responsive to their infan'ts needs, being rejecting of their infant, and having poor timing in response to infant distress. Particularly for infants with disorganized attachment patterns, risk factors can also include high-risk home environments, encompassing elements such as abuse, neglect, and poverty (Kennedy & Kennedy, 2004). The factor that has been most strongly supported to be linked with attachment, and is also consistent across the above risk factors, is a mother's sensitivity (De Wolff & van Ijzendoorn, 1997), which is a mother's ability to perceive her infant's signals and respond to them appropriately. Research has shown that non-secure attachment is mainly determined by shared environmental factors, not non-shared environmental factors or genetic factors, and is most strongly related to maternal sensitivity (Moran, Pederson, & Krupka, 2005).

Maternal Psychopathology

A great deal of research has been conducted examining the influence of maternal psychopathology on offspring outcomes. The overwhelming conclusion has been that maternal psychological distress, regardless of form, has a prevalent and enduring influence on infant and child development (Kingston, Tough, & Whitfield, 2012). There has been evidence to support the idea that mental disorders have an impact on a mother's interactions with her child (Wan & Green, 2009).

Depressive disorders.

Depressive disorders are characterized by mood that is sad, empty, or irritable, and is usually accompanied by both cognitive and somatic changes that impact on the person's everday functioning (APA, 2013). Major depressive disorder (MDD) is defined as a pervasive and persistent low mood that is accompanied by low self-esteem and a loss of interest or pleasure in normally enjoyable activities. The association between maternal depression and a range of adverse child development outcomes has been documented in many individual studies and systematic reviews. Maternal depression has been shown to have links to significantly elevated levels of child psychopathology, including both internalizing and externalizing disorders, as well as increased negative affect and behaviour and decreased positive affect and behaviour (Goodman et al., 2011). A meta-analysis examining the relationship between post-partum depression and mother-infant interactions found a moderate to large effect size (Beck, 1995). Research has consistently shown that mothers suffering from (epecially postpartum) depression display less affectionate contact behaviour with their infant, are less responsive to the cues of their infant, and are withdrawn with flatness of affect (Tompson et al., 2010). Children of depressed mothers tend to show consistent interaction patterns as well (Beck, 1995); tending to

be more fussy, showing fewer positive facial expressions, and being more discontent and avoidant overall. Despite the vast literature supporting the connection between maternal depression and child outcomes, several studies have been conducted that found little to no effect for this association (e.g., Bosquet & Egeland, 2001; Demulder & Radke-Yarrow, 1991).

Bipolar disorder.

The DSM-5 defines bipolar disorder as a mood disorder that includes alternating episodes of depression and mania or hypomania (APA, 2013). A substantial body of research has examined the effects of having a mother with bipolar disorder on children's development and outcomes. These children often have higher rates of clinical referrals, and there have been some reports of serious attachment disturbances (Radke-Yarrow, Cummings, Kuczynski, & Chapman, 1985). Bipolar disorder has also been found to be the mental disorder (other than depression) most susceptible to childbirth-triggered episodes. Post-partum onset of bipolar disorder, or increased episodes in those already diagnosed with bipolar, is a huge potential risk factor for the disruption of the relationship between mother and child (Jones, Chandra, Dazzan, & Howard, 2014).

Anxiety disorders.

The DSM-5 defines anxiety disorders as those disorders that include elements of excessive fear and related behavioural disturbances (APA, 2013); this covers a wide range of disorders including phobias, social anxiety, panic disorder and generalized anxiety disorders. For the purpose of this study, post-traumatic stress disorder (PTSD) was also considered in this category; PTSD is referred to as a "Trauma and Stressor-related Disorder" in DSM-V (APA, 2013), but was considered an anxiety disorder in previous versions of the DSM (APA, 2000), and has many commonalities with anxiety disorders (Etkin & Wager, 2007). Anxiety in mothers

in the post-partum stage have been shown to be linked to disrupted mother-infant relationships, bonding, and attachment (Dawson, Ashman, & Carver, 2000). Despite this fact, most research on the relationship between maternal psychopathology and attachment has focused on depression. However, a large body of research does exist concerning the effects of maternal anxiety, including specifically postnatal anxiety, on a variety of other child development outcomes. A systematic review (Glasheen, Richardson, & Fabio, 2010) provided strong evidence of the many negative effects of maternal anxiety on child somatic and psychological outcomes. Several studies suggest a link between maternal anxiety and a variety of adverse outcomes for their offspring, including difficult temperament (Galler, Harrison, Ramsey, Butler, & Forde, 2004), behavioural and emotional problems (O'Connor, Heron, Golding, & Glover, 2003), poor mother-child interactions (Nicol-Harper, Harvey, & Stein, 2007), and non-secure attachment styles (Martini et al., 2013).

Schizophrenia/psychotic disorders.

Schizophrenia and other psychotic disorders are a group of disorders characterized by at least one of the following features: a) delusions, b) hallucinations, c) disorganized thinking, d) grossly disorganized motor movement, and e) negative symptoms (APA, 2013). The psychotic disorders in this category range in symptomology, severity, and prevalence rates. Mothers with schizophrenia and other psychotic disorders are dealing with a multitude of complex issues, which tend to lead to extreme difficulties with their children. The complexity of psychotic disorders includes illness severity, social cognitive impairments, the presence of positive and negative symptoms, and a lack of social support (Wan, Moulton, & Abel, 2008). Mothers with schizophrenia have been found to have difficulties with many aspects of caregiving (Abel, Webb, Salmon, Wan, & Appleby, 2005), and have lower sensitivity to their children (Wan et al.,

2007). This lowered sensitivity has been hypothesized to be a possible reason for the elevated rate of both insecure and disorganized attachment styles that have been found in the children of these mothers (Wan et al., 2008). However, some studies (e.g., McNeil, Persson-Blennow, Binett, Harty, & Karyd, 1988) have found no effect on attachment security in children of mothers who experienced post-partum psychotic episodes.

Personality disorders.

Personality disorders are a category of 10 specific disorders, which have different symptomology but are all characterized by a pervasive and enduring pattern of behaviour that differ markedly from social and normative expectations and lead to distress and/or impairment (APA, 2013). Mothers with personality disorders have been found to have a variety of issues related to parenting skills. They have been found to be less sensitive, more intrusive, and less consistent in their interactions with their children (Newman, Stevenson, & Boyce, 2007). Researchers have examined the effects of the different personality disorder clusters on maternal-child interactions, and found relationships between the personality disorders and maternal sensitivity, child care practices, and maternal involvement (Conroy, Marks, Schacht, Davies, & Moran, 2010). Cluster B Personality Disorders, including borderline, antisocial, histrionic, and narcissistic, were found to have the strongest correlation with impaired maternal sensitivity (Conroy et al., 2010), and children of these mothers were less attentive and eager to interact with their mothers (Newman, Stevenson, & Boyce, 2007). Most of the research in this field focuses on borderline personality disorder. Significantly higher proportions of children of mothers with borderline personality disorder have been classified as having a disorganized attachment style than children of mothers without it (Hobson, Patrick, Crandell, Garcia-Perez, & Lee, 2005).

Substance-related disorders.

Substance-related disorders refer to a broad classification of problems related to ten types of drugs, which all share the common brain reward system activation when taken in excess, and which can interfere with the performance of normal, every-day activities (APA, 2013). While often a co-occurring disorder along with many of the other disorders listed in this section, alcohol and/or substance abuse can lead to specific dysfunctions in mothers' interactions with their children. Postpartum alcohol and drug use limit a mother's ability to remain emotionally connected with her child (Carroll, Chapman, & Wu, 2013). Mothers using drugs have also been found to be less attentive to their infants and engage in fewer interactions with their infants (Mayes et al., 1997), as well as having higher levels of conflict during mother-infant feeding behaviours (Eiden, 2001). However, some studies failed to find a significant difference (e.g., Neuspiel, Hamel, Hochberg, Greene, & Campbell, 1991).

Considering the host of issues and psychopathologies that can arise from a non-secure attachment orientation, it is incredibly important to investigate factors that could affect the formation of the attachment relationship. The proposed research will focus only on the mother as the primary caregiver, as the majority of attachment research focuses on mothers (Bowlby, 1988); however, it should be noted that current data and theory suggests that the findings on biological mothers should apply to any primary caregiver (Bowlby, 2008). The development of a secure attachment orientation between a mother and her child is dependent on the mother's sensitivity and ability to attend to a child's needs (Wan & Green, 2009). Research has shown that mothers who are experiencing psychopathologies are often unable to provide sensitivity and responsivity to their child (Atkinson et al., 2000). It is therefore critically important to determine

if maternal psychopathology is a risk factor for a non-secure mother-child attachment relationship, and thus a risk factor for additional mental health problems.

Rationale for Present Study

While various strong studies have been conducted to examine the relationship between maternal psychopathology and infant attachment, little consensus on the nature of this relationship has been reached. There have been numerous studies that have inspected this relationship in more common psychopathologies, such as maternal depression, but some studies have found significant effects (e.g., Hipwell, Goossens, Melhuish, & Kumar, 2000; Murray & Cooper, 1996), while others have found negligible effects (e.g., DeMulder & Radke-Yarrow, 1991; Teti, Gelfand, Messinger, & Isabella, 1995). Other psychopathologies, such as schizophrenia, have been vastly overlooked in this area of research, with only a few contradictory results being published (Wan & Green, 2009). Two qualitative reviews have been conducted in attempt to summarize the results of this field (Lefkovics, Baji, & Rigo, 2014; Wan & Green, 2009); while these produced interesting results of a descriptive nature, there still lacks a quantitative consensus on the effect size of this relationship.

The qualitative review article by Wan & Green (2009) is the most recent review of the literature surrounding the issue of maternal psychopathology and child attachment. This article focused on mothers with depressive and psychotic disorders, and attempted to compile the evidence for the impact of these psychopathologies on the child's attachment and the role of this dynamic in the transmission of both developmental and clinical risk for the child. First considering depresson, the review presented three previous meta-analyses, now out-dated, that had been conducted on the relationship betweeen maternal deression and child attachment. One of these meta-analyses was incredibly small, using only 6 studies, and found that maternal

depression was strongly associated with increased avoidant and disorganized attachment (Martins & Gaffan, 2000). A more inclusive meta-analysis conducted in the same year included 15 studies, and found only a weak significant relationship between maternal depression and attachment non-security (Atkinson et al., 2000). A third meta-analysis used many of the same studies, but looked specifically at disorganized attachment, and found no overall support for the relationship between maternal depression and this form of attachment non-security (Van Ijzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). This review article also considered maternal psychotic disorders, in addition to maternal depression. At the time of the article, very few studies had been conducted to consider the attachment orientations of children born to mothers with psychotic disorders. Some studies showed an increased likelihood of avoidant attachment in children of mothers with schizophrenia (D'Angelo, 1986), while other studies did not show that these children were any more likely to be insecurely attached (Näslund, Persson-Blennow, McNei, Kaij, & Malmquist-Larsson, 1984). A similar pattern of mixed results was also found for the children of mothers with bipolar disorder (Wan & Green, 2009).

Many further studies on the relationship between maternal psychopathology and infant attachment have been published since these meta-analyses were conducted 15 years ago, but no recent meta-analysis has yet been done to update the literature and summarize a new effect size for the relationship.

In 2014, a narrative review on maternal psychopathology and child attachment was conducted; however, only maternal depression was considered (Lefkovics, Baji, & Rigo, 2014). This review examined 35 studies relating to maternal depression and issues with child attachment; however, this was a qualititative review and no overall effect sizes were calculated. One again, conflicting results were rampant among this review; while most of the studies

provided evidence for the relationship between maternal depression and attachment non-security, some studies did not find any significant effect.

A meta-analysis on the relationship between maternal psychopathology and infant attachment security has been conducted here to provide a statistical, quantitative consensus on the strength of this association, and to investigate disorders other than depression. It has also allowed for an investigation into possible moderators of this relationship, including characteristics of the mother, the infant, and the study. Through these analyses, this study aims to clarify the relationship between maternal psychopathology and infant attachment security.

The main objectives of this study were to: (1) determine the overall relationship beteen maternal psychopathology (both general and specific disorders) and non-secure infant attachment orientations, and (2) examine the effects of various moderators, both of the participants and of the studies, on this relationship. The specific classifications of maternal psychopathology that were of interest in this meta-analysis were: a) depressive disorders, b) bipolar disorder, c) anxiety disorders, d) schizophrenia/psychotic disorders, e) personality disorders, and f) substance-related disorders. In addition, the following moderators were explored: a) age of infant, b) age of mother, d) gender of infant, e) racial background of mother, f) mother's level of education, g) country of publication, h) year of publication, i) type of publication, j) type of maternal psychopathology, k) co-morbidity status, l) maternal sample source, and m) treatment status.

Research Questions

The current study aimed to answer the following research questions:

1. What is the rate of non-secure attachment in infants of mothers with psychopathology (excluding substance-related disorders)[1]?
2. What is the rate of non-secure attachment in infants of mothers with depression?
3. What is the rate of non-secure attachment in infants of mothers with bipolar disorder?
4. What is the rate of non-secure attachment in infants of mothers with anxiety disorders?
5. What is the rate of non-secure attachment in infants of mothers with schizophrenia and other psychotic disorders?
6. What is the rate of non-secure attachment in infants of mothers with personality disorders?
7. What is the rate of non-secure attachment in infants of mothers with substance-related disorders?
8. Do infants of mothers with psychopathology have increased odds of non-secure attachment orientations compared to infants of mothers who are psychologically healthy?
9. How large is the association between maternal psychopathology symptoms and infants' attachment non-security (and is it a statistically significant association)?
10. Do infants of mothers with psychopathology have greater levels of attachment insecurity than infants of mothers without psychopathology?
11. Do infants with non-secure attachment orientations have mothers with higher rates of psychopathology symptomology than infants with secure attachment orientations?

[1] Infants of mothers with substance-related disorders were excluded from all analyses except for research question seven, due to possible prenatal substance exposure.

Moderator Analyses

The following moderators were analyzed to examine their effect on the association between maternal psychopathology symtomology and infant attachment non-security (Research Question 9 above):

a. Does the gender composition of the infant sample moderate the degree of attachment non-security?
b. Does the mean age of the infant sample moderate the degree of attachment non-security?
c. Does the mean age of the maternal sample moderate the degree of attachment non-security?
d. Does the racial composition of the maternal sample moderate the degree of attachment non-security?
e. Does the level of education of the maternal sample moderate the degree of attachment non-security?
f. Does the type of family environment (i.e., 2-parent or 1-parent household) moderate the degree of attachment non-security?
g. Does the year of publication moderate the degree of attachment non-security?
h. Does the type of publication (unpublished vs. published) moderate the degree of attachment non-security?
i. Does the country of study moderate the degree of attachment non-security?
j. Does the type of maternal psychopathology moderate the degree of infant attachment non-security?
k. Does maternal co-morbidity status (i.e., having more than one psychopathology) moderate the degree of infant attachment non-security?

l. Does maternal sample source (i.e., whether the the mothers were recruited from community or clinical settings) moderate the degree of infant attachment non-security?
m. Does mothers being in treatment for their psychopathologies moderate the degree of infant attachment non-security?

Research Hypotheses

Based on the previous literature on maternal psychopathology and infant attachment security, it was expected that there would be an increased odds of non-secure attachment classifications in the infants of mothers with psychopathology (Wan & Green, 2009). Also, it was anticipated that there would be an increased risk of non-secure attachment in infants of mothers who were suffering from maternal depression and substance-related and addictive disorders compared to psychopathologies such as bipolar and schizophrenia, in which the results would be more mixed and would lead to smaller effect sizes. It was also predicted that mothers of infants with non-secure attachment orientations would have higher rates of psychopathology symptomology than mothers of infants with secure attachment orientations.

Several predictions regarding the influence of moderators on the association between maternal psychopathology and attachment orientatons were made based on the findings of previous literature. A number of infant-related variables were thought to be important to take into consideration. Considering the gender composition of the infant sample, it was hypothesized that this would not be a significant moderator on the relationship, as few studies take this into consideration (e.g., Hipwell et al., 2000; Radke-Yarrow et al., 1991), due to a lack of consistent gender differences in the rate of attachment non-security (ASPE, 1991). However, due to the exclusive focus on only one gender of parent (i.e., mothers) in this study, it was decided that considering infant gender may be important. In terms of age composition of infant sample, it was

predicted that age would be a significant moderator of this relationship, as there is weaker evidence supporting the effects of maternal psychopathology on attachment after toddlerhood (Van Ijzendoorn et al., 1999); it was important to determine if this relationship was evident across the meta-analysis.

A number of mother-related characteristics were also thought to be essential to consider. Based on a meta-analysis that considered predictors of maternal-fetal attachment, as well as the lack of association between other SES-associated variables and attachment security, mother's level of education was not predicted to have any significant effects on the results (Yarcheski, Mahon, Yarcheski, Hanks, & Cannella, 2009). Regardless, it was felt that this would be an important moderator to analyze, to determine if our meta-analysis found the same trend of a lack of significance for this SES-associated variable. Maternal racial background was thought to be an important moderator to consider, due to cultural differences in performance on the Strange Situation Procedure and differences in the conceptualization of a healthy attachment relationship (e.g., Li, Delvecchio, Miconi, Salcuni, & Di Riso, 2014; Van IJzendoorn, & Kroonenberg, 1988). Maternal age was also thought to be an interesting characteristic to consider, as younger mothers (particularly adolescents) tend to have higher rates of attachment non-security with their infants (Broussard, 1995). The family composition (i.e., a one-parent or two-parent household) was also thought to be a significant moderating variable, as mothers who are single may have additional stressors and have less external support than mothers who have a partner. This variable has not frequently been considered in the literature surrounding maternal psychopathology and infant attachment security, but it was felt it may impact the relationship.

It was thought that some of the most important moderating variables to take into account in this relationship were those that directly impacted the mother's psychopathology. The type of

psychopathology was an important characteristic as it was thought that different symptoms would impact a mother's mental and emotional state in different ways, which may impact the way she interacts with her infant in different ways. Infants of mothers with depression were expected to show more severe attachment non-security, such as disorganized attachment patterns (e.g., Radke-Yarrow et al., 1999; Van Ijzendoorn, Schuengel, & Bakermans-Kranenburg, 1999); the rates of attachment non-security in other psychopathologies is less known. Relatedly, it was also important to consider the mother's co-morbidity status (for example, if a mother was suffering from both depression and anxiety); if a mother was suffering from not one but two psychopathologies, this may more severely impact her mental health and her relationship with her child. It was also thought to be important to determine if the sample source of the mothers (i.e, whether the mothers were from a community or clinical sample) significantly impacted the relationship, as it was expected that mothers wth community vs. clinical levels of psychopathology would present differently and have very different levels of psychopathology, with mothers with clinical levels having greater impairments of their functional abilities. Finally, whether the mothers were in treatment or not for their psychopathology was also thought to be an important moderating variable, as this may help to determine if treatment for psychopathology is also beneficial at improving the attachment relationship with these infants.

Considering the characteristics of the studies themselves is an important question, as it is imperative to determine if study characteristics are having a significant moderating effect on the relationship found. Type of publication was expected to be a significant moderator, as studies published in journals are more likely to report significant findings than unpublished studies (Dwan et al., 2008). Year of publication was also expected to be a significant moderator, with older studies demonstrating a stronger relationship, as indicated to be the trend by past research

(Connell & Goodman, 2002). Country of publication was also expected to potentially moderate the relationship, for the same reasons described above for racial background of the participants.

Method

Search Strategy and Study Indentification

A meta-analysis was conducted to summarize and analyze, in a quantitative manner, the mixed findings within the literature in regards to the relationship between maternal psychopathology and infant attachment. The systematic search was conducted following the guidelines from the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA), to determine the identification, screening, and eligibility of the studies that would be included (Moher et al., 2009). The PRISMA guidelines were developed for researchers conducting both meta-analyses and systematic reviews. An extensive literature search was undertaken, where both published and unpublished reports prepared up to July 2015, were systematically searched for in each of six main databases: 1) PsycINFO, 2) Medline (PubMed), 3) Educational Resources Information Centre (ERIC), 4) Scopus, 5) Dissertations and Theses (Proquest), and 6) Google Scholar. The decision to include unpublished studies as well as published studies in this meta-analysis was an attempt to reduce publication bias (Card, 2012). Publication bias occurs when the results of a study influence its likelihood of being published; studies that find significant (either statisitically or clinically) results are more likely to be published than those studies that do not (Dickersin, 2005). If one were to only include published studies in their meta-analysis, the results would tend to favour signicant results and ignore insignificant results.

The search strategy for this meta-analysis included a combination of keywords that were meant to capture all possibly relevant studies related to infant attachment and maternal psychopathology. Both descriptor-based and more general searches were conducted. The precise search strategy for each of the databases varied slightly based on the different limiters in each database used to narrow down the search results. The following keywords were used in the six databases to find articles relevant to this meta-analysis: attachment, object attachment, attachment behaviour, attachment theory, mother-child relations, parent-child relations, stranger reactions, emotional security, seperation reactions, infant, child, secur*, insecur*, nonsecur*, disorganized, anxious-ambivalent, anxious-avoidant, maternal, mother, offspring, psychopathology, mood disorders, anxiety disorders, personality disorders, schizophrenia and disorders with psychotic features, substance-related disorders, mental disorder, depression, bipolar, seasonal affective disorder, postpartum depression, mania, posttraumatic stress disorder, postpartum psychosis, addiction, alcoholism, substance abuse, psychosis, panic disorder, phobia, obsessive compulsive disorder.

The initial search was conducted by entering the search strategy into each database. These search results were then filtered by language, to include only English-reported studies and by research methodology, to include only studies involving a quantitative comparison (i.e., excluding literature reviews and qualitative studies). A secondary search was then conducted in an attempt to find any additional studies that were not found in the primary search – this included consulting the previous qualitative reviews and meta-analyses published on the subject. A backwards/forwards search of eligible studies was also conducted (Card, 2012). A forwards search is the process of searching for articles that have cited a given article, while a backwards search is the processs of checking the given article's reference section for possible studies that

meet eligibility criteria that have not already been identified through the primary search. Any articles identified through the secondary search underwent the same process as outlined above.

Eligibility Criteria for Study Selection

The following eligibility criteria, composed of clear and concrete inclusion/exclusion criteria, were used as a guide to determine which studies were eligible for the meta-analysis. These criteria are as follows:

1. The study must have been reported in English and published or prepared up to July 2015. Both published and unpublished studies were eligible, including studies published online.
2. The study must have included a quantitative consideration of the relationship between a mother's psychopathology status or symptoms and an infant's attachment security, either between a maternal psychopathology group and a comparison group (either a psychologically healthy maternal group or other clinical maternal group) or within a maternal psychopathology group (correlational, rate, or regressional studies).
3. The study must have included a direct measure or diagnosis (by a health care professional) of maternal psychopathology or maternal psychopathology symptomology (as opposed to indirect or related measures such as parenting sensitivity, stress, coping style, emotional regulation, or overall mental health quality). The measure of psychopathology must have been in the post-natal, rather than the prenatal, period.
4. The study must have included a quantitative or categorical infant attachment outcome, such as the Strange Situation Procedure or other comparable attachment classification systems (such as the Attachment Q-Set; Waters & Deane, 1985), resulting in either categorical or continuous outcomes of attachment.

5. Offspring participants must have been between the ages of 0-36 months (as this is the age range covered by the majority of young child attachment research).
6. The study must not have focused on infants with developmental disabilities (including, but not limited, to Down's syndrome, autism spectrum disorders, and intellectual disability) or infants born pre-term. If a study included a small number of infants with disabilities or pre-term births, it was considered eligible.

The studies identified as relevant through the search results of the six databases were screened for eligibility based on the above criteria through a number of steps, as outlined in PRISMA. The PRISMA flow diagram illustrates the number of studies included and excluded at each stage of this screening process (See Figure 1). The first step was to compare the search results from the different databases in order to identify any duplicate studies. Second, the articles were screened, using the above eligibility criteria, based on their title and abstract. All studies that appeared eligible through their title and abstract were moved on to the third stage, the full manuscript review. Studies that progress to the full manuscript review stage were referred to at this stage as *potential studies*, and were entered into a meta-analysis tracking file and given a study number. Each of these potential studies was read through in their entiretey, to verify that they met all of the above eligibility criteria. Studies that passed this stage were included in the final meta-analysis, and were termed *eligible studies*. Studies that did not meet all of the eligibility criteria were excluded from further analysis, and their number and reasons for exclusions are noted in the PRISMA diagram.

Coding

The research questions were used to create a coding manual (see Appendix A) which was used as a guide to code all eligible studies. This manual provided clear step-by-step instructions

on how to properly extract information from a study, including both descriptors of the study itself and outcome data. The data from each eligible study was recorded on a corresponding coding form (see Appendix B). Important information about the study itself included: a) type of publication, b) year of publication, and c) country of publication. The important information from each study about maternal psychopathology diagnosis or symptoms included: a) diagnostic procedures and/or measures, b) co-morbidity status, c) level of severity (clinical or community), and d) treatment status. Specific information about infant attachment orientation included: a) attachment identification procedure and measures. For moderator analyses, the following demographic information on the maternal and infant sample was also coded: a) gender composition of infant sample, b) mean age of infant sample, c) mean age of maternal sample, d) mean years of maternal education, and e) racial background of maternal sample. In order to be eligible for this meta-analysis, studies were required to provide data with: a) group comparisons (mothers with psychopathology vs. a control group), b) correlations assessing the relationship of maternal psychopathology symptoms with infant attachment, or c) rate of infant non-secure attachment orientation among mothers with maternal psychopathology. Data from the completed coding forms for all eligible studies was entered into the most common statistical software used to conduct meta-analyses, Comprehensive Meta-Analysis (CMA) 3.0 (Borenstein, Hedges, Higgins, & Rothstein, 2014).

Reliability

In order to assess reliabiliy of the coding, a secondary coder coded 25% of the eligible studies. The secondary coder was thoroughly trained and familiarized with the coding manual and coding form specific to this meta-analysis (Lipsey & Wilson, 2001), as coding is one of the most critical aspects of the execution of a meta-analysis. This allowed for the determination of

intercoder reliability, through the use of Cohen's kappa, and the intrac-class correlation coefficient, as appropriate, to calculate the agreement between the two coders (Card, 2012).

Statistical Analysis

A random effects model was used in this meta-analysis, as this approach, which assumes heterogeneity (variation) across the studies, is considered to be the most widely applicable and conservative model (Lipsey & Wilson, 2001). Primary individual meta-analyses were performed to address each of the main research objectives. A meta-analysis could only be conducted for a research question if there was a sufficient number of studies that provided the required data. A minimum of two studies yielding separate effect sizes was set as the minimum number of studies required to conduct each meta-analysis (Valentine, Pigot, & Rothstein, 2010). For research questions one through seven, the overall prevelance of non-secure (all 3 non-secure) attachment in infants of mothers with any psychopathology and specific types of psychopathology was computed. For research question eight, an odds-ratio effect size was calculated to examine the relative odds of the presence of non-secure attachment orientations in infants of mothers with psychopathology compared to infants of mothers without psychopathology. For research question nine, correlations between severity of maternal symptomology and attachment non-security were considered. For research question ten, a standardized mean difference was used to analyze the degree of the association between maternal psychopathology and infant attachment non-security, where maternal psychopathology status was the dichotomous variable and the degree of infant attachment non-security is the continious variable. Finally, for research question eleven, a standardized mean differerence was also used to analyze the degree of the association between materal psychopathology and the infant's attachment orientation, where the attachment orientation was the dichotomous variable (secure vs. non-secure) and the degree of materal

psychopathology symptomology was the continuous variable. While a point-biserial correlation could be used to analyze these last two objectives (one continuous, one dichotomous), Lipsey and Wilson (2001) recommend using a standardized mean difference. The decision to use either Cohen's *d* or Hedge's *g* for these calculations was determined by the size of studies included in the analysis, as Hedge's *g* is generally used in smaller samples to correct for the positivity bias (Borenstein, Hedges, Higgins, & Rothstein, 2009). Cohen's *d* was used for both of these analyses, as all of the sample sizes were greater than twenty-five.

Some studies provided more than the minimum required data to calculate effect sizes. For instance, many studies used multiple measures of maternal psychopathology within a single study; in these cases, a mean of the outcomes was used, and was referred to as an aggregated effect size. For example, if a study provided two different measures of depression (e.g., CES-D at 9-months and 18-months postpartum) the mean was used. However, it is important to note that for research questions two through nine, the rates of attachment non-security of infants from mothers with different psychopathologies were all analyzed separately; the above refers to research question that amalgamated the psychopathologies together. Additionally, some studies had multiple subgroups (e.g., postpartum depression and chronic depression) compared to the same control; in these cases, the subgroups were aggregated as well, and the study was used as the unit of analysis (not the subgroup), in order to maintain independence.

Moderator Analyses

All moderator analyses were conducted on the meta-analysis addressing the overall association between maternal psychopathology and attachment non-security (research question nine), using meta-regressions. While meta-regressions are generally used for continuous variables, they can also be used for categorical variables, and were used to evaluate the value of

a moderator in each study relative to its effect size (Card, 2012; Lipsey & Wilson, 2001). Individual meta-regressions were conducted for the following moderator variables: a) gender composition of infant sample, b) mean infant age, c) mean mother age, d) racial composition of mother sample, e) percentange of mothers who have completed high school, f) percentage of 2-parent families, g) year of publication, h) type of publication (published vs. unpublished), i) country of publication, j) type of psychopathology, k) co-morbidity status, l) severity of psychopathology, and m) treatment status. While these were the proposed moderators of interest, the ability to conduct each separate analysis was dependent on the number of eligible studies that included the required information.

Data Extraction and Missing Data

When multiple or duplicated sets of the same study were located through the searches, only one set of results from a single study were eligible to be included in the meta-analysis, to preserve independence (Wood, 2008). When there were multiple studies using the same data, published versions were included over unpublished versions, unless the published version was missing required information. When multiple published versions of a study were found (i.e., the same data was used), the publication with the largest *N* was chosen for inclusion unless it were missing critical information. As with any meta-analysis, some of the eligible studies identified by the searches did not provide sufficient information to calculate an effect size (Lipsey & Wilson, 2001). In these cases, every effort was made to contact the principal investigator of the study for clarification and/or provision of the missing data (Card, 2012). Additionally, if a study reported its results as merely "insignificant", every effort was made to contact the principal investigator to obtain additional information, as the goal to be all-inclusive can only be met if both significant and insignificant findings are included in the analysis. Inititally, seven studies had insufficient

data to be included. For one of the studies (Genet, 2012), the author's contact information could not be found, and thus they could not be contacted for additional data. One of the studies was a study protocol, and no data had yet been collected (Ramsauer et al., 2014). Missing data or clarification was therefore requested from five authors via email. The authors of one of the studies (Emery, Pacquette, & Bigras, 2008) provided the data that was necessary to include the study in the meta-analysis. The authors of one of the studies (Zahn-Waxler, Chapman, & Cummings, 1984) responded and provided clarification that the study was not eligible for inclusion, as there was insufficient data. The authors of three of the studies (Hinshaw-Fuselier, 2004; Shaw & Vondra, 1993; Teti, 1993) did not respond to the email correspondence, and their studies were exluded from further analysis.

Results

Study Characteristics

Search results from the six databases (Dissertations and Theses, PsycInfo, Eric, Scopus, Medline, and Google Scholar) yielded 12,239 results. Each eligible studied was subjected to a backwards (reference list of the eligible study checked) and forwards (studies that have cited the eligible study) checks; this yielded three additional eligible studies. While this number would normally be considered high-average for a backwards/forwards searches, one of the studies was not indexed, resulting in acceptable number of identified studies (Card, 2012). Past meta-analyses and qualitative reviews on this subject were also consulted; one additional eligible study was identified in this way. Once duplicates were removed, 8130 unique studies remained. The unique studies were screened for eligibility based on their title and abstract. This resulted in a total of 191 full-text articles that were then screened for eligibility. A total of 58 studies were

deemed to be eligible and were included in the final quantitative synthesis (see Figure 1). The reasons for exclusion at the full-text level, of 133 studies, are outlined in the PRISMA diagram (Figure 1).

As indicated above, 25% of the included studies (16 studies) were double-coded to assess for inter-rater reliability. Inter-rater reliability was assessed using Cohen's kappa, which was found to be .95 overall; this indicates almost perfect agreement (Cohen, 1960). The reliability ranged from .88 to 1 with the lowest Cohen's kappa being .88 for the variables of infant age, racial background, and sample source. The intraclass correlation coefficient (ICC) for continuous data varied from .76 to 1. An ICC of .76 was obtained for the correlational data. This was due to two minor disparities related to recording. Disagreements were solved through discussion until agreement was achieved between the two raters.

Of the 58 studies that met the inclusion criteria, 43 were published articles, 10 were dissertations/theses, and 5 were book chapters. All studies were published between 1984 and 2015. The majority of the studies were conducted in the United States of America (n = 40). There were 4 studies conducted in Canada, and 3 in Britain. There were 2 studies conducted in each of the following countries: Australia, Sweden, and Africa. There was 1 study conducted in each of the following countries: France, Korea, Germany, Switzerland, and the Netherlands. The percentage of female infants in each sample ranged from 39% to 61.8%. The mean age range in the sample of infants ranged from 12 months to 36 months. The mean age range of the sample of mothers was from 16.6 years to 35.7 years. The percentage of Caucasian mothers ranged from 0% to 100%. The percentage of mothers who had completed high school ranged from 3% to 100%. The percentage of infants coming from 2-parent families (parents married or living together) ranged from 0% to 100%.

To examine the attachment security of the infant, the majority of the studies used the Strange Situation Procedure (SSP), or a modified version of this measure (n = 48). The remainder of the studies used the Attachment Q-Sort (AQS), or a modified version of this measure (n = 10). A post-hoc moderator analysis (using studies from research question nine, consistent with other moderator analyses) was run to determine if there were significant differences between the use of the two measures. This analysis was significant (p = .017), with studies using the AQS yielding larger effect sizes (r = .22, CI [.13, .30], p <.001) than studies using the SSP (r = .08, CI [.01, .15], p = .035).

To assess maternal psychopathology, the majority of studies used self-report measures (n = 43). The most common self-report measures utilized were the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), the Centre for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977), and the Edinburgh Postpartum Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987). A large number of studies (n = 25) used more formal interview methods to arrive at a diagnosis of maternal psychopathology, such as the Structured Clinical Interview for DSM Disorders (SCID; First et al., 2002) or the Composite International Diagnostic Interview (CIDI; Robins et al., 1988).

Considering the types of psychopathology represented in this meta-analysis, the majority focused on unipolar depression (n = 47). The remainder of the psychopathologies were represented by only a handful of studies each: substance-related disorders (n = 5), anxiety disorders (n = 4), personality disorders (n = 3), psychotic disorders (n = 2), and bipolar disorder (n = 1).

Each study contributed between 1 and 8 individual effect sizes (M = 2.5), and 20 of the studies provided either 1 or 2 aggregated effect sizes. The number of individual effect sizes (k)

used to answer each major research question ranged from 2 to 36 (M = 14); research questions 7 and 11 consisted of the smallest number of effect sizes (k = 2, each), while research question 8 consisted of the largest number of effect sizes (k = 36).

Throughout this section, effect sizes will be provided along with the heterogeneity of the effect sizes. The random effects model is based on the assumption that the true effect differs between studies; thus, it is important to discuss the heterogeneity of the results. Cochrane's Q, the weighted sum of squared differences between individual study effects and the pooled effect across studies, is considered to be the classic measure of heterogeneity (Borenstein et al., 2009). The Q statistic reflects the observed dispersion of effect sizes; it tests the null hypothesis that there is no dispersion across effect sizes. It is also important to note that Q has low power to detect heterogeneity in small samples, and may overestimate heterogeneity in large samples (Higgins & Thompson, 2002). There a number of heterogeneity statistics that can also be used to quantify this dispersion (rather than merely indicating its statistical significance). The I^2 statistic describes the percentage of variation across studies that is due to true heterogeneity rather than chance (Higgins & Thompson, 2002). I^2 does not depend on the number of studies in the meta-analysis. The final heterogeneity statistic reported here is tau-squared, which is an estimate of the between-study variance in a random-effects meta-analysis (Borenstein et al., 2009).

Rate of Attachment Non-Security (Research Questions 1-7)

The overall rate of attachment non-security in infants of mother with a psychopathology (not including substance-related disorders) was 56.1% (95% CI [49.6, 62.2], k = 34; Table 1). The heterogeneity was $Q(33) = 194.00$, $p < .001$; tau-squared = 0.39; I^2 = 82.99%, indicating

that there is considerable heterogeneity. The rate of attachment non-security in infants of mothers with depression was similar, at 57.4% (95% CI [50.3, 64.2], $k = 26$; Table 2). The heterogeneity was $Q(25) = 181.02$, $p < .001$; tau-squared = 0.41; $I^2 = 86.19\%$, indicating that there is considerable heterogeneity. A meta-analysis was not conducted on the rate of attachment non-security in infants of mothers with bipolar disorder as there was an insufficient number of effect sizes ($k = 1$, prevalence = 76.2%; Radke-Yarrow, 1991). Three studies provided rates for infant attachment non-security in mothers with anxiety disorders, specifically PTSD ($k = 2$) and panic disorder ($k = 1$). The rate of attachment non-security in infants of mothers with anxiety disorders was 57.9% (95% CI [35.7, 77.3], $k = 3$; Table 3). The heterogeneity was $Q(2) = 4.22$, $p = .121$; tau-squared = 0.34; $I^2 = 52.57\%$, indicating that there may be moderate heterogeneity. The rate of attachment non-security in infants of mothers with psychotic disorders was 36.6% (95% CI [24.5, 50.6], $k = 4$; Table 4). The heterogeneity was $Q(2) = 4.22$, $p = .121$; tau-squared = 0.69; $I^2 = 52.57\%$, indicating that there may be moderate heterogeneity. The rate of attachment non-security in infants of mothers with borderline personality disorder was 62.2% (95% CI [28.6, 87.1], $k = 2$; Table 5). The heterogeneity was $Q(1) = 2.7$, $p = .099$; tau-squared = 0.34; $I^2 = 63.18\%$, indicating that there may be substantial heterogeneity. Finally, the rate of attachment non-security in infants of mothers with substance-related disorders was 51.1% (95% CI [34.7, 67.2], $k = 5$; Table 6). The heterogeneity was $Q(4) = 23.87$, $p < .001$; tau-squared = 0.43; $I^2 = 83.24\%$, indicating that there is considerable heterogeneity.

Relationship between Maternal Psychopathology Diagnosis and Attachment Non-security

Infants of mothers with psychopathology (excluding substance abuse) had 1.85 times the odds of having a non-secure attachment relationship compared to infants of mothers without psychopathology (95% CI [1.49, 2.31], $p < .001$, $k = 36$); this answers Research Question 8

(Table 7). The heterogeneity was $Q(35) = 141.22$, $p < .001$; tau-squared = 0.23; $I^2 = 75.23\%$, indicating that there is considerable heterogeneity. Infants of mothers with psychopathology also had significantly greater levels of attachment non-security (i.e., lower scores on the attachment measures) than infants of mothers without psychopathology ($d = -.52$, 95% CI [-.93, -.12], $p = .012$, $k = 2$); this answers Research Question 10 (Table 8). The heterogeneity was $Q(1) = 3.19$, $p = .074$; tau-squared = 0.06; $I^2 = 66.68\%$, indicating that there may be substantial heterogeneity.

Relationship between Maternal Psychopathology Symptoms and Attachment Non-security

The relationship between overall maternal psychopathology symptoms and infant attachment non-security was small but significant ($r = .14$, 95% CI [.07, .20], $p < .001$, $k = 17$); this answers Research Question 9 (Table 9). The heterogeneity was $Q(16) = 51.82$, $p < .001$; tau-squared = 0.01; $I^2 = 69.13\%$, indicating that there may be substantial heterogeneity. Additionally, infants with non-secure attachment orientations had mothers with significantly higher rates of psychopathology than infants with secure attachment orientations ($d = .28$, 95% CI [.02, .54], $p = 0.032$, $k = 7$); this answers Research Question 11 (Table 10). The heterogeneity was $Q(6) = 18.12$, $p = .006$; tau-squared = 0.07; $I^2 = 66.89\%$, indicating that there is substantial heterogeneity.

Outliers

Possible outliers are considered to be those with standardized residuals greater than 1.96 (Vichtbauer & Cheung, 2010). The potential outliers for each research question were determined by examining the standardized residual values as well as through visual inspection of forest plots. A total of 8 outliers were identified across all of the research questions; 4 of the research questions contained outliers. These outliers had standardized residual values that ranged from -2.29 to 2.18. Effect sizes from five unique studies were identified as outliers. Effect sizes from

one study were identified as outliers in two research questions (Teti, Gelfand, Messinger, & Isabella, 1995a), one study as an outlier in three research questions (Vrieze, 2011), and the remainder were outliers in only one research question (Campbell & Cohn, 1997; Rosenblum, Mazet, & Bénony, 1997; Tomlinson, Cooper, & Murray, 2005).

In conducting a meta-analysis, it is suggested to remove outliers to produce a trimmed distribution, by eliminating the identified outliers from the analyses (Lipsey & Wilson, 2001). To determine if using the trimmed distribution conveys an advantage to the analysis, the trimmed results are compared with the results of the untrimmed distribution. Outliers were therefore removed from research questions 1, 2, 8 and 9. Two effect sizes was removed (Teti et al., 1995a; Vrieze, 2011) from Research Question 1. The trimmed rate of 53.5% (95% CI [47.7, 59.3], k = 32) was slightly lower than the untrimmed rate of 56.1% (95% CI [49.6, 62.2], k = 34). One effect size (Vrieze, 2011) was also removed from Research Question 2. The trimmed rate of 55.7% (95% CI [49.0, 62.2], k = 25) was slightly higher than the untrimmed rate of 56.4% (95% CI [50.3, 64.2], k = 26).

After removing four effect sizes (Campbell & Cohn, 1997; Rosenblum et al., 1997; Teti et al., 1995a; Vrieze, 2011;) from Research Question 8, the trimmed odds ratio of 1.69 (95% CI [1.37, 2.07], $p < .001$, k = 32) was slightly lower than the untrimmed odds ratio of 1.85 (95% CI [1.49, 2.31], $p < .001$, k = 36), but the significance was not changed. Finally, one effect size (Tomlinson et al., 2005) was removed to assess the association between the degree of infant attachment non-security and the degree of psychopathology in mothers, for Research Question 9. The trimmed correlation of r = .16 (95% CI [.09, .27], $p < .001$, k = 16) was slightly higher than the untrimmed correlation of r = .14 (95% CI [.08, .20], $p < .001$, k = 17), but the significance was not changed. For these research questions, there were only small changes in mean effect

sizes and no changes in the significance of the findings; therefore, for the remainder of the analyses, the untrimmed findings were retained.

Moderator Analyses

Individual meta-regressions were conducted for 12 of the 13 moderator analyses (Table 11 and Table 12); these analyses were performed on Research Question 9. There were insufficient studies included in this research question that provided information on co-morbidity status to perform this moderator analysis ($k = 0$). The number of studies eligible for a given variable ranged from 10 to 18. Four of these moderators were found to be statistically significant. These were: 1) gender composition of the infant sample ($Q = 6.54$, $p = .011$, $k = 12$), with samples with greater percentages of girls yielding larger effect sizes; 2) racial composition of the maternal sample ($Q = 4.16$, $p = .042$, $k = 16$), with samples with greater percentages of White mothers yielding larger effect sizes, 3) maternal sample source ($Q = 17.57$, $p < .001$, $k = 17$), with community samples yielding larger effect sizes, and 4) treatment status ($Q = 4.05$, $p = .042$, $k = 17$), with samples with mothers in treatment for psychopathology yielding smaller effect sizes.

An analog ANOVA was performed on the categorical variable of maternal sample source, to produce two Pearson product moment correlations to analyse this difference. The studies involving community samples produced a much larger effect size ($r = .17$, CI [.123, .217], $p < .001$, $k = 15$) than the clinical samples ($r = -.068$, CI [-.169, .033], $p = .186$, $k = 2$). An analog ANOVA was also performed on the categorical variable of treatment status, to produce two Pearson product moment correlations to analyse this difference. The studies involving no treatment produced a much larger effect size ($r = .155$, CI [.096, .213], $p < .001$, $k = 16$) than the studies involving treatment ($r = -.044$, CI [-.226, .140], $p = .641$, $k = 1$). Both of these results need

to be interpreted with caution, as the groups are very unbalanced (i.e., 2 clinical vs. 15 community; 16 no treatment vs. 1 treatment).

The remainder of the moderators were not statistically significant.

Discussion

Based on a meta-analysis of the Strange Situation procedure, which included 2000 infant-parent dyads in 8 different countries, the global distribution of attachment categorizations (as discussed in the introduction) was found to be: A, anxious-avoidant, (21%); B, secure, (65%); and C, anxious-ambivalent (14%) (Van IJzendoorn & Kroonenberg, 1988). The findings of the Van Ijzendoorn and Kroonenberg meta-analysis was consistent with the original attachment distributions proposed by Ainsworth (1978). Notably, this does not include the D, disorganized, classification. Research studies that include the D classification have shown that in non-clinical samples, between 60-67% of infants in the United States are classified as secure (B), with the remaining classifications varying as follows: A (20.5-22.9%), C (7.5-12.5%), and D (14.7%); (van IJzendoorn, Goldberg, Kroonenberg, & Frenkel, 1992). It is important to note that many of the studies in the current meta-analysis were conducted in the United States (n = 44) and an additional four were conducted in Canada, resulting in 48 of the 62 studies being conducted in North America. Therefore, we can evaluate the results of the current meta-analysis in the context of the above data on the rates of security and non-security in the U.S. population. It's important to note that since many of the studies utilized "WEIRD" (Western, Education, Industrialized, Rich and Democratic) samples, conclusions drawn from this meta-analysis are most applicable to these populations. In the current meta-analysis, specific non-secure attachment orientations are

not considered; what is important to note is that the distribution of non-secure attachment orientations is typically around 30-35% of the total population.

The current meta-analysis found that approximately 56% of infants with mothers with psychopathology are non-securely attached. This is in contrast to the overall distributions in typical samples as noted above. It is important to consider the implications of a 20% higher rate of non-security among infants of mothers with psychopathology. The results of this meta-analysis have thus demonstrated that maternal psychopathology is associated with higher rates of infant attachment non-security, despite some individual studies that have argued the contrary.

Furthermore, this meta-analysis demonstrated that infants of mothers with psychopathology also have significantly higher *odds* (nearly double) of having a non-secure attachment relationship than infants of mother who are psychologically healthy. In addition, infants of mothers with psychopathology were found to have significantly greater *levels* of attachment non-security than infants of mothers without psychopathology. A significant reverse effect was also found, in that infants with non-secure attachment had mothers who also had significantly greater rates of psychopathology than mothers of infants with secure attachment. The relationship between infant attachment non-security and maternal psychopathology symptoms was small but significant, indicating that with increased maternal psychopathology symptoms (for example, higher scores on the BDI), infant attachment non-security also increased.

In addition to the analyses considering the relationship between overall maternal psychopathology and infant attachment non-security, rates of infant attachment non-security in mothers with five specific types of psychopathology – unipolar depression, anxiety disorders,

psychotic disorders, borderline personality disorder, and substance abuse disorders were examined[2].

The majority of the studies in this meta-analysis related to maternal unipolar depression. The rate of attachment non-security in infants of mothers with depression (57.4%) was very similar to the rate of non-security in infants of mothers with overall psychopathology, which is expected as these studies were all included in that analysis, and comprised the majority of the studies included. The rate of attachment non-security in infants of mothers with depression were again found to be higher than the rate of attachment non-security in the general population. This is consistent with the majority of the body of literature examining the effects of maternal depression on infant development and mother-infant interactions. Maternal depression has been shown to affect mother-infant interactions in a negative manner (e.g., Beck, 1995), with mothers who suffer from depression displaying less affectionate contact behaviour with their infants, and tending to be more withdrawn from and less responsive to their infants (Tompson et al., 2010). The symptoms that commonly define depression tend to have a profound impact on individuals' interpersonal behaviour, including emotional expressiveness and responsiveness (Murray & Cooper, 1996). Studies on infants of healthy mothers have demonstrated that infants are very sensitive to these qualities in their caregiver, and very impacted by change to these. It is therefore highly reasonable to expect that maternal depression will impact mothers' interpersonal functioning with their infants, which will negatively impact infants' development. These effects of depression on mothers' interpersonal functioning have been shown to result in impaired empathic understanding of their infants (Coyne, Low, Miller, Seifer, & Dickstein, 2007) and

[2] The analysis for bipolar disorder could not performed in this study, due to an insufficient number of studies that met inclusion criteria and provided sufficient data.

lowered sensitivity to their infants (Santona et al., 2015). As maternal sensitivity is a necessary component for the development of a secure attachment orientation (Campbell et al., 2004), the current results of elevated levels of attachment security in this population of mothers with depression is congruent with this theory.

This meta-analysis also demonstrated similar rates of non-security for infants of mothers with anxiety disorders (PTSD and panic disorder), at 57.9%. This is, once again, higher than the expected non-secure attachment rate of approximately 35% in the general population. Anxiety in the postpartum stage is expecially important to consider in relation to the findings on depression, as anxiety and depression have a high rate of co-morbidity, frequently around 50% (Hirschfeld, 2001). The presence of this comorbidity can also be considered a marker of severity of each of the individual disorders themselves (Glasheen et al., 2010). Maternal stress, and specifically anxiety, in the postnatal period has been shown to have dramatic effects on mother-infant interactions, with high-trait anxiety mothers showing less sensitive responding and reduced emotional tones during interactions, even when those with depressive symptomology were removed from analysis (Nicol-Harper, Harvey, & Stein, 2007). High cortisol levels in mothers has been found to be linked to high cortisol levels in the offspring (Monk, Spicer, & Champagne, 2012). Research on cortisol levels and attachment has found that attachment style can serve to buffer cortisol reactivity in secure infants, but non-securely attached infants will display significant elevations in their cortisol levels (Dawson et al., 2000). It has also been suggested that caregivers who have difficulty regulating themselves (such as with anxiety), will be impaired in their ability to accurately respond to and reflect their children's own mental states, resulting in infants who have to attempt to regulate their own states of arousal without assistance (Scheher et al., 2009). Two of the four studies on anxiety included in this meta-analysis considered PTSD,

which is characterized by signficiant affect dysregulation and a defensive, self-preservative position relative to others (APA, 2013). Researchers argue that this type of stance prohibits psychological availability to another, including an infant, and again may inhibit awareness of the infant's own mental state (Scheher et al., 2009). Certain emotional regulation strategies, such as high avoidance and blunting coping strategies, are commonly seen in those who suffer from PTSD (Benoit, Bouthillier, Moss, Rousseau, & Brunet, 2010), and can have a negative impact on a mother's ability to connect with her infant. There is evidence that maternal trauma history can be associated with different patterns of caregiving, including predominantly hostile (may increase the likelihood of developing an A attachment orientation) or emotionally withdrawn (may increase the likelihood of developing a C attachment orientation; Lyons-Ruth & Block, 1996). Mothers who have suffered from trauma may also act in frightening ways (Van Ijzendoorn et al., 1999), including dissociating, negative intrusive behaviours, disoriented responses, and affect intolerance, which could lead to disorganized behaviours in infants (Lyons-Ruth & Block, 1996).

The lowest rate of non-secure attachment in infants of mothers with psychopathology was for the mothers suffering from psychotic illnesses, at approximately 37%. This rate is consistent with the rate of non-secure attachment found in non-clinical samples. This result is surprising, considering the severity of psychotic disorders such as schizophrenia, and the research that has indicated that maternal psychosis is associated with maternal interactive deficits (Wan et al., 2008). Few studies have examined the outcomes of children of mothers with psychosis; one follow-up study on infants whose mothers had experienced a postpartum psychotic episode found that 6-year outcomes, such as cognitive development and mental health, were unaffected (McNeil, Persson-Blennow, Binett, Harty, & Karyd, 1988). It's important to note that the 4 effect

sizes used for this analysis came from only 2 studies. The first study (Naslund, Persson-Blennow, McNeil, Kaij, & Malmquist-Larsson, 1984), provided three separate effect sizes – schizophrenia, cycloid pyschosis, and non-affective psychosis; the second study (Hipwell, Goossens, Melhuish, & Kumar, 2000) provided one effect size, which included participants with psychosis, schizoaffective disorder, and psychotic affective disorders. Due to the small number of studies included in this analysis, these results should be interpreted with caution. The mothers with psychotic disorders included in this meta-analysis may also not be typical of most mothers with psychotic disorders, as most mothers with psychosis do not retain custody of their children (Gewurtz, Krupa, Eastabrook, & Horgan, 2004).

The rate of attachment non-security was highest for the population of infants of mothers with personality disorders, specifically borderline personality disorder (BPD) and other Cluster B personality disorders, as these were what comprised the included studies. The rate was approximately 62%. Cluster B personalities disorders are personality disorders that share the common problems of impulse control and emotional regulation (APA, 2013). BPD in particular is characterized by intense and unstable emotions, impulsive and risky behaviours, unstable sense of self, and polarized thinking (APA, 2013). Past research has demonstrated that Cluster B personality disorders have strong correlations with impaired maternal sensitivity (Conroy et al., 2010); mothers with these disorders are also less likely to follow recommended infant care practices (Conroy et al., 2010), and display more negative reaction to infant distress (Kiel, Gratz, Moore, Latzman, & Tull, 2011). There is evidence that the characteristics associated with BPD can negatively influence mothers' relations to their infants (Main & Hesse, 1990). Given the difficulties with emotional regulation and interpersonal relationships that these women encounter, coupled with the risk of impulsive and dangerous behaviours (including self-harming

behaviours), the high rate of non-secure attachments in the infants mothered by this population is unsurprising.

Finally, this study also included mothers suffering from substance-related disorders. It was originally proposed that these studies would be included in all of the meta-analyses within this study. However, after reviewing the literature, it was decided that these disorders should be considered separately from the remainder of the disorders. The reason for this was due to the confounding nature of the substance-related disorders, specifically the concern that mothers with substance-related disorders are likely to have used substances in the prenatal period, which would have substantial effects on infant development (see *limitations* for further details). Therefore, the rate of infant attachment non-security within this population are considered, but these studies have been excluded from further analyses. The rate of attachment non-security in infants of mothers suffering from substance-related disorders was similar to the other rates discussed, at approximately 51%. While there may be many confounding developmental issues to consider from the prenatal period, research has shown that alcohol and drug use in the postpartum stage can impair a mother's ability to have an emotional connection to her child (Pajulo, 2012). Depression correlates highly with substance abuse (Lazareck et al., 2012), particularly in the postpartum phase, and these risk factors, combined with the decreased sensitivity implied by both of these disorders, are important to investigate.

Prior to beginning this meta-analysis, it was proposed that a total of 13 moderators would be examined. Due to an insufficient number of studies providing information about co-morbidity, this moderator could not be examined; however, the remaining moderators did have sufficient information to be conducted. Four of the moderators were found to be significant, and these will be discussed first.

The first moderator variable that was found to be significant was the gender composition of the infant sample. This was not hypothesized to be a significant moderator on the relationship, as literature reviews have indicated that across hundreds of studies considering attachment, no consistent sex differences have been reported in terms of frequencies of non-secure attachment (ASPE, 1991). However, what was found in this meta-analysis was that an increased percentage of female infants resulted in a larger effect size (stronger association between maternal psychopathology and infant attachment non-security). While this is not consistent with past literature, research has suggested that it may be easier for same gender parent-infant dyads to form attachment relationships, implying that same-gender dyads may be more likely to develop secure attachment relationships (Schoppe-Sullivan et al., 2006). It is therefore possible that the the male infants in these studies may have developed a secure attachment relationship primarly from their father. The female infants, who may rely more on their mothers for the development of an attachment relationship, may have experienced increased difficulty in forming a secure relationship, due to their mothers suffering from psychopathology and compromised sensitivity. Schoppe-Sullivan and colleages (2006) demonstrated that if sons have an non-secure attachment relationship with their mother, fathers can generally compensate for this, but the same is not true for their daughters.

The second moderator that was found to be significant was the racial composition of the mother sample. This was hypothesized to be a significant moderator, as cultural differences on performance of the SSP have been well-documented (e.g., Li, Delvecchio, Miconi, Salcuni, & Di Riso, 2014; Van IJzendoorn & Kroonenberg, 1988). Based on this, it was hypothesized that greater percentages of mothers of ethnic minorities would be associated with greater degrees of attachment non-security. Surprisingly the opposite effect was found; higher percentages of White

mothers were associated with larger effect sizes (stronger correlation between maternal psychopathology and infant attachment non-security). This was unexpected as the SSP, and the AQS to a lesser extent, have been the focus of critique for cultural inappropriateness (Gaskins, 2013). The SSP involves a variety of assumptions that are challenged outside of Western society; the level of stress induced by the SSP is therefore not considered to be equal across cultures. Additionally, the attachment categories themselves have been said to be inadequate at capturing the normal variation in attachment across cultures (Gaskins, 2013). Despite this, for all cultures that have been thus far studied from the attachment perspective, the majority of infants in any culture are identified as "secure", with rates varying from between 50-75%. However, the break-down of rates within the different non-secure attachment categories has been found to vary substantially (e.g., Rothbaum, Weisz, Pott, Miyake, & Morelli, 2000). The present study did not consider the individual non-secure attachment categorizations. Perhaps the explanation for this finding comes from cultural differences in the realm of child-raising. In many cultures outside of Western society, the mother is not the only primary caregiver of a child; for example, in other cultures, grandparents or other extended family members play a more significant role in the raising of children (Hayslip, Baird, Toledo, Toledo, & Emick, 2006). Perhaps this supportive network can offer an infant more positive experiences when the mother is suffering from a psychopathology; perhaps they are able to compensate for the mother being less emotionally sensitive/available to their infant. Past research has indicated that while mothers and children of ethnic minorities are often more at risk for mental health issues and other challenges, they have many more protective factors than White families, such as extended families, supportive kin, and social networks (Samaan, 2010).

The third moderator that was significant was the maternal sample source. It was

hypothesized that this would be significant, with clinical samples being associated with higher degrees of attachment non-security than community samples. However, while this moderator was significant, the opposite directional effect was found, with community samples being associated with greater degrees of attachment non-security. This was surprising, as it was hypothesized that mothers in the clinical samples would be experiencing more debilitating levels of psychopathology. A possible explanation is that though it may be expected that the community samples would score low on psychopathology measures, some of the community samples actually had mean scores that were reflective of being at risk for clinical levels of psychopathology (e.g., mean CES-D scores above clinical cut-off of 16, Hubbs-Tait, Osofsky, Hann, & Culp, 1994). It is also important to note that only 2 studies were in the clinical group, and 15 studies were in the community group. Therefore, we need to interpret these results with caution.

The final moderator that was significant was the treatment status of the mothers. It was expected that if mothers were in treatment, this would result in a reduced relationship between psychopathology and attachment non-security. This directional effect was found in this meta-analysis. However, as with the moderator of the maternal sample source, these results need to be interpreted with caution, as only one of the studies involved participants that were in treatment, and the remainder did not. In the study that involved treatment (Henderson, 2003), all of the mothers in the depressed group were required to have sought treatment for their depressive disorder sometime between conception and the initial study visit when the infant was 18-months old. This could include medication and/or therapy; further details were not provided. This finding is consistent with previous literature that indicates that treatment, including anti-depressants (Logsdon, Wisner, & Hanusa, 2009) and psychotherapy (Muzik, Marcus, & Flynn,

2009), can improve maternal role functioning, with the most efficacious for infant outcomes appearing to be dyadic therapies (Nylen, Moran, Franklin, & O'Hara, 2006).

The remaining moderator analyses were not significant, and will be discussed next.

The mean age of the infant sample was not a significant moderator. It was hypothesized that this would be a significant moderator, as there is weaker evidence supporting the effects of maternal psychopathology on attachment after toddlerhood (Van Ijzendoorn et al., 1999). Thus, it was expected that increased age would result in lower effect sizes. This was the direction of the effect found, but it was not significant. This is most likely due to the restricted range of ages used in this meta-analysis, from 12-36 months. It is possible that if this age range was extended to later ages (i.e., childhood), this effect would have been significant.

Similary, the mean maternal age of the sample was also not significant predictor. This is consistent with the hypothesis as, based on past meta-analyses, this was not expected to moderate the relationship significantly. However, this is particularly interesting to note, as there were a number of studies that exclusively used adolescent mothers as their sample. This group has in the past been shown to have infants with increased rates of non-secure attachment orientations (e.g., Broussard, 1995); the current results demonstrate that this may not always be the case.

Mother's level of education (i.e., percentage who had completed high school) was not a significant predictor. This was not hypothesized to be a significant predictor; this based on a meta-analysis that considered predictors of maternal-fetal attachment, in which this predictor was not significant (Yarcheski et al., 2008). This is also consistent with findings from other primary studies as well, that have indicated that SES-associated variables, including income and level of education, are not associated with attachment security (Freeman & Brown, 2001).

The marital status/family composition of the sample was also not a significant predictor.

This is an interesting finding, as it was hypothesized that this would be significant, as mothers who are single and/or not in a supportive relationship may have many other additional stressors in addition to their psychopathology; it was thus hypothesized that this would result in larger effect sizes. However, in this meta-analysis, no moderating effect was found.

The type of psychopathology was also not found to be a significant moderator. Infants of mother with depression were expected to show more severe attachment non-security based on past research (e.g., Radke-Yarrow et al., 1999; Van Ijzendoorn, Schuengel, & Bakermans-Kranenburg, 1999), as the distribution of attachment orientations in other psychopathologies is uncertain. However, this non-significant finding indicates that psychopathology in general appears to be a risk factor for non-secure attachment in infants, and that type of psychopathology may be less important. However, it is important to note that out of all the studies included in this moderator analysis, nearly all were on depression, with one on anxiety and one on personality, thus these results must be interpreted with caution. This moderator analysis was only conducted on Research Question 9; if other research questions with more diverse psychopathologies represented had been considered, the results may have been different.

Finally, none of the characteristics of the studies themselves were found to be significant. Year of publication was expected to be a significant moderator, as older studies in this field generally demonstrate stronger effect sizes (Connell & Goodman, 2002). However, this was not the case. The country of publication was also not a significant moderator, though this moderator did approach significance. When an analog ANOVA was considered, it demonstrated that the two studies from Canada resulted in the largest effect size (r = .224, p = .023). The results from the studies in the U.S. resulted in a moderate effect size of (r = .148, p <.001). The most outlying result was the one study from Africa, which demonstrated a small negative effect size (r= -.133,

p = .335). While this was not what was expected, it is congruent with the hypothesis that the results of this moderator would follow the trend of the racial moderator. The final characteristic of the study itself was the type of publication – that is, whether the study was published (journal article or book chapter) or unpublished (dissertation). This was hypothesized to be significant, as due to publication bias, studies that are published generally have more significant results compared to unpublished studies. However, this was not found to be a significant effect. Consulting the analog ANOVA, it is evident that this was the trend, with published studies having a larger effect size than unpublished studies, but it was not a significant finding.

Strengths and Limitations

The first and most notable strength of this meta-analysis is that it is the first meta-analysis to examine the relationship between infant attachment non-security and a variety of forms of maternal psychopathology. No meta-analysis has considered this relationship with forms of maternal psychopathology other than depression. As mentioned previously, literature review articles on this subject have been published, but these were only qualitative in nature and did not deal with effect sizes. The most recent and inclusive meta-analysis was conducted by Atkinson and colleagues (2000) that considered a variety of maternal mental health correlates and infant attachment security. One of the meta-analyses included in this article examined the relationship between maternal depression and infant attachment security, and calculated an effect size of r = .18 (p <.001) using 15 studies. The segments of the current meta-analysis that also considered a correlation effect sized included 17 studies, 16 of which involved maternal depression, and found a similar effect size of r = .14 (p <.001). It is important to note, however, that our entire meta-analysis included 62 studies, 48 of which involved depression. Of the 15 studies that were included in the Atkinson meta-analysis, the current meta-analysis included 9 of these; the

remaining 6 did not meet the eligibility criteria. This meta-analysis included 39 studies that were not originally included in the Atkinson meta-analysis. Considering that the Atkinson meta-analysis was published 16 years ago, the current meta-analysis makes a unique contribution to the literature by proving an update on the relationship between maternal depression and infant attachment security. Specifically, 33 of the 39 additional studies were prepared or published after Atkinson's cut-off date of 1999. Additionally, it is worthwhile to note that 6 of the 39 additional studies were prepared or published prior to Atkinsons' cut-off date of 1999. This latter discrepancy was most likely due to a) differences in eligibility criteria and b) differences in databases searched. The Atkinson meta-analysis only searched 3 electronic databases, whereas the current meta-analysis searched 6 electronic databases.

Another strength of the current meta-analysis is the search strategy, determined through the outcome of the backwards/forwards search. The current backwards/forwards search yielded five additional eligible studies, and one additional study was identified through consulting of the past-meta-analyses and literature reviews. Note that while this number would normally be considered in the high-average range for a meta-analysis, one of the studies was not indexed, and two were related to prenatal substance exposure, which were being excluded. This demonstrates that the search strategy was thorough and we can have confidence that the majority of the potential studies in the literature were found and included.

Another strength of this meta-analysis was the strong reliability of the second coding. With an overall Cohen's kappa of .95, this indicates excellent reliability. The process of coding is one of the most important components of conducting a meta-analysis. The strong reliability found in this meta-analysis indicates that we can have confidence in how the coding was performed.

Another major strength of this meta-analysis was the decision to include both published and unpublished studies in this meta-analysis. The inclusion of unpublished studies was done in an effort to reduce publication bias (Card et al., 2012), as discussed previously. While the inclusion of both published and unpublished studies is considered to be a strength, the inclusion of unpublished studies can also alternatively be considered a limitation. The main reason that the inclusion of unpublished studies can be considered a limitation is that these studies have not undergone the peer review process that is required of published studies. This is typically a rigorous process and is used to ensure that only studies of high quality are published and included in the literature. Dissertations have not undergone this process and may have methodological flaws or statistical errors that will then be included in the meta-analysis. The quality of a meta-analysis is dependent on the quality of studies included in the analyses, and the inclusion of studies of low quality can result in meta-analysis results that are of low quality. However, publication type was not a significant moderator, indicating that there was not a significant difference in the effect sizes found for published studies compared to unpublished studies.

Another consideration of the quality of the studies included in the meta-analysis is the type of assessment measures used. In regards to attachment security, the assessment measures included in the studies is another strength of this meta-analysis. All of the studies used in the meta-analysis either used the Strange Situation Procedure (SSP), a modified version of the SSP (such as the Preschool Assessment of Attachment), the Attachment Q-Set (AQS), or a modified version of the AQS (such as the Toddler Attachment Sort-45). The SSP and the AQS are considered to be the "gold standard" measures of assessing attachment security (van Rosmalen, van Ijzendoorn, & Bakermans-Kranenburg, 2014), with the SSP producing categorical

classifications and the AQS producing dimensional classifications. Because none of the included studies assessed attachment using anything other than these two, we can have confidence in the reliability of these attachment classifications. As mentioned previously, a post-hoc analysis revealed that the attachment measure used was a significant moderator, indicating that studies that used the AQS reported significantly larger effect sizes than studies that used the SSP. One possible reason for this is that the AQS may be performed by a trained observer or by the attachment figure themselves (i.e., the mother); self-report measures, as will be discussed below, have a number of inherent issues, including extreme reporting that could lead to larger effect sizes. Other factors have also been shown to affect the effect size achieved by the AQS; for example, longer observation sessions have been shown to result in larger effect sizes (Van Ijzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004). In terms of maternal psychopathology, there was a much more diverse assortment of assessment tools used. The majority of the studies used self-report measures, which are associated with a number of issues, including impression management, acquiescing responding, and extreme responding (Paulhus & Vazire, 2007). This could lead to over-reporting or under-reporting of symptoms, which would lead to inaccuracy in maternal diagnosis classification, which is a limitation. However, many of the studies did also use clinical structured interviews, which gives us more confidence about the diagnosis.

Other limitations of the meta-analysis also relate to the limitations of the primary studies. Families and individuals with more severe levels of psychopathology may be less likely to be involved in research studies, as they have many more barriers and complications. This could be related to the maternal psychopathology itself, or could also relate to the behaviours of the infant (i.e., infants with more challenging behaviours may be less likely to included in research

studies). Additionally, these families may be more likely to drop out of research studies once they are enrolled. Attrition for other reasons should also be considered, and attrition is always a concern in primary studies, as the participants who drop out may differ from those who do not drop out on a number of variables, which may or may not be accounted for.

Another limitation of this study was the low number of studies that examined maternal psychopathology other than depression. This was the first meta-analysis to include these other psychopathologies, which was a strength as discussed earlier. A meta-analysis is dependent on sufficient primary studies to have been conducted that look at the research questions of interest. Depression was the most represented psychopathology in this meta-analysis ($k = 48$). Substance-related disorders were the next more represented psychopathology, ($k = 9$), but these studies were excluded from overall analyses. Anxiety, personality, and psychotic disorders were all represented by only a handful of studies, and bipolar disorder could not be analyzed due to only one study examining this psychopathology. The low number of studies included in many of these individual analyses means the results need to be interpreted with caution. Additionally, postpartum depression could not be specifically analyzed, as the youngest infant samples were 12 months of age. It's important to note however that attachment cannot be measured until 6-9 months of age, and the standard youngest age of measurement is 12 months.

Another limitation of the meta-analysis relates to the subset of studies relating to substance abuse. Substance-related and addictive disorders (APA, 2013) refer to a broad classification of problems relating to ten types of drugs (alcohol, caffeine, cannabis, hallucinogens, inhalants, opioids, sedatives, hypnotics, stimulants, tobacco and other/unknown). Nine eligible studies in this category were included in this meta-analysis. The studies varied in the type of substance included; the substances included alcohol, heroin, methadone, cocaine,

PCP, etc. The studies also varied in how the substance use was assessed. Limited studies used DSM diagnostic criteria; most of them relied on biological markers, such as urine toxicology, to determine substance abuse. It was decided that there were too many confounds with this type of psychopathology to include these studies in the overall analyses. The reason for this is that many of the infants could have been (and in some studies it was explicitly stated that they were) exposed to prenatal substance abuse. Prenatal substance exposure has a variety of harmful effects on infant outcomes, including impaired cognitive, motor, language, and emotional development (Kim & Krall, 2006). Thus instead of measuring effects due to maternal psychopathology, it is more likely that we are measuring the developmental and neurological effects of prenatal substance exposure. To compensate for these confounds, some studies did use pre-term comparison groups, but others did not. It is also reasonable to expect that different types of substances are going to have vastly different effects, both on the infant and the mother's sensitivity and parenting abilities.

A strength of this meta-analysis was that it included studies with sufficient information to be able to conduct almost all of the moderator analyses proposed. However, one moderator was not able to be analyzed due to insufficient information, and this was the moderator of co-morbidity. This is a possible confounding issue because, as discussed previously, the co-prevalence of depression with many other disorders (notably anxiety and substance abuse) is very high. Thus, it is likely that in many of the included studies, there were many participants who may have co-morbid disorders that were not reported. This may make it more difficult to tease apart the effects of each individual disorder.

Directions for Future Research

As evidenced from this meta-analysis, research on the relationship between maternal psychopathology and infant attachment security has focused almost exclusively on maternal depression. Only a handful of studies found through the exhaustive literature search conducted for this meta-analysis focused on other psychopathologies. The conclusions on these psychopathologies that could be drawn from this meta-analysis are therefore much more limited and need to be interpreted with caution due to small sample size. Despite evidence that many of these psychopathologies in mothers can have a profound impact on infant and child development, the effects of these psychopathologies on infant attachment, an integral component of healthy development, has remained relatively untouched. More primary research on these subjects needs to be conducted, so that a better understanding of this relationship can be gleaned. Furthermore, many of the studies did not include information on co-morbidity status. Considering the high rate of co-existing mental health issues, especially with a mental disorder such as depression, it is suggested that future research consider the importance of reporting on this information and attempting to elucidate the main and interaction effects of individual disorders.

Clinical Implications and Conclusions

The results of this meta-analysis provide a greater understanding of the relationship between maternal psychopathology and infant attachment security, as well as the influential moderators of this relationship. The results of this study provide an update on the association between maternal depression and infant attachment security, and clarifies some of the discrepancies in the literature regarding this relationship by supporting the notion that there is a clear and significant relationship between maternal depression and the development of non-secure attachment orientations in their infants. This study also provides the first quantitative

consensus on the relationship between infant attachment non-security and other maternal psychopathologies, including substance-related disorders, personality disorders, anxiety disorders, and psychotic disorders. The implications of this meta-analysis suggest that to clinicians that mothers with psychopathologies may be at risk for interacting with their infants in negative ways, and is a risk factor for the development of a non-secure attachment orientation. This information could be used to support the integration of universal screening for maternal psychopathology during the postpartum periods, so that mothers that are found to be at risk could be offered early interventions, that focuses both on improving maternal mental health and enhancing the attachment relationship.

References

Abel, K.M., Webb, R., Salmon, M., Wan, M.W., & Appleby, L. (2005). The prevalence and predictors of parenting outcomes in a cohort of mothers with schizophrenia admitted for joint psychiatric care in England. *Journal of Clinical Psychology, 66,* 781-789. doi: 10.4088/JCP.v66n0618

Ainsworth, M.D., Blehar, M.C., Waters, E., & Wall, S. (1978). *Patterns of Attachment*. Hillsdale, NJ: Erlbaum.

Ainsworth, M.D. (1979). Infant-mother attachment. *American Psychologist, 34*(10), 932-937. doi: 10.1037/0003-066X.34.10.932

American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders (4th ed.)*. Washington, DC.

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders (5th ed.)*. Washington, DC.

Armsden, G.A., McCauley, E., Greenberg, M.T., Burke, P.M., & Mitchell, J.R. (1990) Parent and peer attachment in adolescent depression. *Journal of Abnormal Clinical Psychology, 18*(6), 683-697.

Atkinson, L., Paglia, A., Coolbear, J., Niccols, A., Parker, K., & Guger, S. (2000). Attachment security: A meta-analysis of mental health correlates. *Clinical Psychology Review, 20*(8), 1019-1040.

Baer, J., & Martinez, C.D. (2006). Child maltreatment and insecure attachment: A meta-analysis. *Journal of Reproductive and Infant Psychology, 24*(3), 187-197. doi: 10.1080/02646830600821231

Baker, E., Beech, A., & Tyson, M. (2006). Attachment disorganization and its relevance to sexual offending. *Journal of Family Violence, 21*(3), 221-231. doi: 10.1007/s10896-006-9017-3

*Barwick, M. A., Cohen, N. J., Horodezky, N. B., & Lojkasek, M. (2004). Infant communication and the mother–infant relationship: The importance of level of risk and construct measurement. *Infant Mental Health Journal, 25*, 240–266. doi: 10.1002/imhj.20000

*Beall, J.A. (2006). *The biological and behavioural effects of maternal trauma and posttraumatic stress disorder on child development* (Unpublished doctoral dissertation). University of Adelaide: Australia.

Beck, C.T. (1995) The effects of postpartum depression on maternal-infant interaction: A meta-analysis. *Nursing Research, 44*(5), 298-304.

Beck, A.T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961) An inventory for measuring depression. *Archives of General Psychiatry, 4*, 561-571. doi: 10.1001/archpsyc.1961.01710120031004

*Beeghly, M., Frank, D.A., Rose-Jacobs, R., Cabral, H., & Tronick, E. (2003). Level of prenatal cocaine exposure and infant-caregiver attachment behavior. *Neurotoxicology & Teratology, 25*(1), 23-38. doi: 10.1016/S0892-0362(02)00323-9

*Bennett, L.S. (2004) *The role of attachment in the relationship between maternal and childhood depressive symptomatology: The test of a mediational model* (Doctoral dissertation). Retrieved from Proquest Dissertation and Theses A&I (Order No. 3139190).

Benoit, M., Bouthillier, D., Moss, E., Rousseau, C., & Brunet, A. (2010). Emotion regulation strategies as mediators of the association between level of attachment security and PTSD symptoms following trauma in adulthood. *Anxiety, Stress, and Coping, 23*, 101–118. doi:

10.1080/10615800802638279

*Bergin, C., & McCollough, P. (2009). Attachment in substance-exposed toddlers: The role of caregiving and exposure. *Infant Mental Health Journal, 30*, 407–423. doi: 10.1002/imhj.20221

Borenstein, M., Hedges, L., Higgins, J., & Rothstein, H. (2009). *Introduction to Meta-Analysis*. Englewood, NJ: Wiley.

Borenstein, M., Hedges, L., Higgins, J., & Rothstein, H. (2014). Comprehensive Meta Analysis Version 3.0 [software]. Englewood, NJ: Biostat.

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

*Bosquet-Enlow, M., Egeland, B., Carlson, E., Blood, E., & Wright, R.J. (2014). Mother-infant attachment and the intergenerational transmission of posttraumatic stress disorder. *Developmental Psychopathology, 26*(1), 41-65. doi: 10.1017/S0954579413000515.

Bowlby, J. (1988). *A secure base: Parent-child attachmetn and healthy human development*. New York, NY: Basic Books.

Bowlby, J. (1982). *Attachment and loss (Vol 1): Attachment* (2nd ed.). New York: Basic Books.

Bowlby, R. (2008). Attachment, what it is, why it is important, and what we can do about it to help young children acquire a secure attachment. *Attachment to the Quality of Childhood Group Conference*. Lecture conducted in European Parliament.

Broussard, E. R. (1995). Infant attachment in a sample of adolescent mothers. *Child Psychiatry and Human Development, 25*(4), 211-219.

Brumariu, L.E., & Kerns, K.A. (2010). Parent-child attachment and internalizing symptoms in childhood and adolescence: A review of empirical findings and future directions. *Development and Psychopathology, 22*(1), 177-203.

*Campbell, S.B., & Cohn, J.F. (1997). The timing and chronicity of postpartum depression: Implications for infant development. In L. Murray & P. Cooper (Eds.), *Postpartum Depression and Child Development* (pp. 165-197). New York, NY: The Guilford Press.

*Campbell, S.B., Brownell, C.A., Hungerford, A., Spieker, S.J., Mohan, R., & Blessing, J.B. (2004). The course of maternal depressive symptoms and maternal sensitivity as predictors of attachment security at 36 months. *Development and Psychopathology, 16*(2), 231-252. doi:10.1017/S0954579404044499.

Card, N. A. (2012). *Applied meta-analysis for social science research.* New York, NY: The Guilford Press.

Carroll, S.L., Chapman, C., & Wu, L-T. (2013) Postpartum substance use and depressive symptoms: A review. *Women & Health, 53*(5), 479-503.

*Carter, A.S., Garrity-Roukous, F.E., Chazan-Cohen, R., Little, C., & Briggs-Gowan, M.J. (2001). Maternal depression and comorbidity: Predicting early parenting, attachment security, and toddler social-emotional problems and competencies. *Journal of the American Academy of Child and Adolescent Psychiatry, 40,* 80-26. doi: 10.1097/00004583-200101000-00012

Colonnesi, C., Draijer, E.M., Stams, G.J., O' Van der Bruggen, C., Bogels, S.M., & Noom, M.J. (2011). The relation between insecure attachment and child anxiety: A meta-analytic review. *Journal of Clinical Child & Adolescent, 40*(4), 630-645. doi: 10.1080/15374416.2011.581623

Connell, A. M., & Goodman, S. H. (2002). The association between psychopathology in fathers versus mothers and children's internalizing and externalizing behavior problems: A meta-analysis. *Psychological Bulletin, 128*(5), 746-773. doi: 10.1037/0033-2909.128.5.746

Conroy, S., Marks, M.N., Schacht, R., Davies, H.A., & Moran, P. (2010). The impact of maternal depression and personality disorder on early infant care. *Social Psychiatry Epidemiology, 45,* 285-292. doi: 10.1007/s00127-009-0070-0

*Cooper, P.J., Tomlinson, M., Swartz, L., Landman, M., Molteno, C., Stein, A., … Murray, L. (2009). Improving quality of mother-infant relationship and infant attachment in socioeconomically deprived community in South Africa: Randomised controlled trial. *British Medical Journal*, 338:b974. doi: 10.1136/bmj.b974.

*Coyl, D. D., Roggman, L. A., & Newland, L. A. (2002). Stress, maternal depression, and negative mother–infant interactions in relation to infant attachment. *Infant Mental Health Journal, 23*, 145–163. doi: 10.1002/imhj.10009

Coyne, L. W., Low, C. M., Miller, A. L., Seifer, R., & Dickstein, S. (2007). Mothers' empathic understanding of their toddlers: Associations with maternal depression and sensitivity. *Journal of Child and Family Studies, 16*(4), 483-497. doi: 10.1007/s10826-006-9099-9

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*, 782-786.

D'Angelo, E.J. (1986) Security of attachment in infants with schizophrenia, depressed, and unaffected mothers. *Journal of Genetic Psychology, 147*, 421–422.

*Dawson, G. Klinger, L.G., Panagiotides, H., Spieker, S., & Frey, K. (1992). Infants of mothers with depressive symptoms: Electroencephalographic and behavioral findings related to

attachment status. *Development and Psychopathology, 4*, 67-80. doi:10.1017/S0954579400005563.

Dawson, G., Ashman, S.B., & Carver, L.J. (2000). The role of early experience in shaping behavioral and brain development and its implications for social policy. *Developmental Psychopathology, 12*(4), 695-712.

*Dawson G., Ashman S. B., Hessl D., Spieker S., Frey K., Panagiotides H., et al. (2001). Autonomic and brain electrical activity in securely- and insecurely-attached infants of depressed mothers. *Infant Behaviour and Development, 24*, 135–149. doi:10.1016/s0163-6383(01)00075-3

Demulder, E.K., & Radke-Yarrow, M. (1991). Attachment with affectively ill and well mothers: Concurrent behavioural correlates. *Development and Psychopathology, 3,* 227-242.

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

Dickersin, K. (2005). Publication bias: Recognizing the problem, understanding its origins and scope, and preventing harm. In H. R. Rothstein, A. J. Sutton, & M. Borenstein (Eds.), *Publication bias in meta-analysis: Prevention, assessment and adjustments* (pp. 11-33). Chichester, UK: John Wiley & Sons.

*Donaldson, K. (1992). *The relationship of maternal depressive symptoms and attachment* (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses A&I (Order No. 9231028).

*Donovan, W. L., & Leavitt, L. A. (1989). Maternal self-efficacy and infant attachment: integrating physiology, perceptions, and behavior. *Child Development*, *60*(2), 460–472. doi: 10.2307/1130990

Dwan, K., Altman, D. G., Arnaiz, J. A., Bloom, J., Chan, A. W., Cronin, E., ... Williamson, P. R. (2008). Systematic review of the empirical evidence of study publication bias and outcome reporting bias. *PloS One*, *3*(8), e3081. doi: 10.1371/journal.pone.0003081.

*Edhborg, M., Lundh, W., Seimyr, L., & Widstrom, A. (2001). The long-term impact of postnatal depressed mood on mother–child interaction: A preliminary study. *Journal of Reproductive and Infant Psychology, 19*(1), 61-71, doi:10.1080/02646830123255

Eiden, R.D. (2001) Maternal substance use and mother-infant feeding interactions. *Infant Mental Health Journal, 22*(4), 497-511.

*Eiden, R.D., Edwards, E.P., & Leonard, K.E. (2002). Mother-infant and father-infant attachment among alcoholic families. *Developmental Psychopathology, 14*(2), 253-278. doi: 10.1017/S0954579402002043

*Emery, J., Pacquette, D., & Bigras, M. (2008) Factors predicting attachment patterns in infants of adolescent mothers. *Journal of Family Studies,14*(1), 65-90. doi: 10.5172/jfs.327.14.1.65

Etkin, A., & Wager, T.D. (2007). Functioning neuroimaging of anxiety: A meta-analysis of emotional processing in PTSD, social anxiety disorder, and specific phobia. *American Journal of Psychiatry, 164,* 1476-1488.

Finzi-Dottan, R., Manor, I., & Tyano, S. (2006). ADHD, temperament, and parental style as predictors of the child's attachment patterns. *Child Psychiatry and Human Development, 37*(2), 103-114. doi: 10.1007/s10578-006-0024-7

First, M.B., Spitzer, R. L., Gibbon, M., & Williams, J.B. (2002). Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Patient Edition. (SCID-I/P) New York, NY: Biometrics Research, New York State Psychiatric Institute.

First, M.B., Spitzer, R. L., Gibbon, M., & Williams, J.B. (2002). Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition. (SCID-I/NP) New York, NY: Biometrics Research, New York State Psychiatric Institute.

First, M.B., Gibbon M., Spitzer, R.L., Williams, J.B., & Benjamin, L.S. (1997). Structured Clinical Interview for DSM-IV Axis II Personality Disorders, (SCID-II). Washington, D.C.: American Psychiatric Press, Inc.

*Fitzpatrick-Behnke, E.M. (2014). *Exploring reflective function, attachment, risk, and substance abuse* (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses A&I (Order No. 3627831).

*Forman, D.R., O'Hara, M.W., Stuart, S., Gorman, L.L., Larsen, K.E., & Coy, K.C. (2007) Effective treatment for postpartum depression is not sufficient to improve the developing mother-child relationship. *Development and Psychopathology, 19*(2), 585-602.

*Foss, L. A., Hirose, T., & Barnard, K. E. (1999). Relationship of three types of parent–child interaction in depressed and non-depressed mothers and their children's mental development at 13 months. *Nursing & Health Sciences, 1*, 211–219. doi: 10.1046/j.1442-2018.1999.00026.x

Freeman, H., & Brown, B. B. (2001). Primary attachment to parents and peers during adolescence: Differences by attachment style. *Journal of Youth and Adolescence, 30*(6), 653-674. doi: 10.1023/A:1012200511045

Galler, J.R., Harrison, R.H., Ramsey, F., Butler, S., & Forde, V. (2004). Postpartum maternal mood, feeding practices and infant temperament in Barbados. *Infant Behavioural Development, 27*(3), 267-287. doi: 10.1016/j.infbeh.2003.11.002

Gaskins, S. (2013). The puzzle of attachment: Unscrambling maturational and cultural contributions to the development of early emotional bonds. In N., Quinn & J.M. Mageo (Eds.), *Attachment reconsidered: Cultural perspectives on a Western theory*. New York, NY: Palgrave MacMillan.

Genet, M. (2012). Interactions of borderline mothers and their infants: Longitudinal perspectives. Symposium abstract published in *Neuropsychiatrie de l'Enfance et de l'Adolescence, 60*(5S), 37. doi:10.1016/j.neurenf.2012.05.129

Gewurtz, R., Krupa, T., Eastabrook, S., & Horgan, S. (2004). Prevalence and characteristics of parenting among people served by assertive community treatment. *Psychiatric Rehabilitation Journal*, *28*(1), 63–65. doi: 10.2975/28.2004.63.65

Glasheen, C., Richardson, G., & Fabio, A. (2010). A systematic review of the effects of postnatal maternal anxiety on children. *Archives of Women's Mental Health, 13,* 61-74. doi: 10.1007/s00737-009-0109-y

*Goodman, G. Hans, S.L., & Cox, S.M. (1999). Attachment behavior and its antecedents in offspring born to methadone-maintained women. *Journal of Clinical Child Psychology, 28*(1), 58-69.

Goodman, S.H., Rouse, M.H., Connell, A.M., Robbins Broth, M., Hall, C.M., & Heyward, D. (2011) Maternal depression and child psychopathology: A meta-analytic review. *Clinical Child and Family Psychology Review, 14,* 1-27. doi: 10.1007/s10567-010-0080-1

*Gratz, K.L., Kiel, E.J., Latzman, R.D., Elkin, T.D., Moore, S.A., & Tull, M.T. (2014). Emotion: empirical contribution. Maternal borderline personality pathology and infant emotion regulation: Examining the influence of maternal emotion-related difficulties and infant attachment. *Journal of Personality Disorders, 28*(1), 52-69.

doi: 10.1521/pedi.2014.28.1.52.

Groh, A.M., Fearon, R.P., Bakermans-Kranenburg, M.J., Van Ijzendoorn, M.H., Steele, R.D., & Roisman, G.I. (2014). The significance of attachment security for children's social competence with peers: A meta-analytic study. *Attachment and Human Development, 16*(2), 103-136. doi: 10.1080/14616734.2014.883636

Guttmann-Steinmetz, S., & Crowell, J. (2006). Attachment and externalizing disorders: a developmental psychopathology perspective. *Journal of the American Academy of Child and Adolescent Psychiatry, 45*(4), 440-451. doi: 10.1097/01.chi.0000196422.42599.63

Hayslip, B., Baird, A.H., Toledo, J.R., Toledo, C., & Emick, M.A. (2006). Cross-cultural differences in traditional and custodial grandparenting: A qualitative approach. In B. Hayslip & J. Hicks-Patrick (Eds.), *Custodial grandparenting: individual, cultural, and ethnic diversity* (pp. 169-182). Springer Publishing Co: New York, NY.

*Henderson, E.N. (2003). *Influences of maternal personality pathology on toddler attachment and associations with maternal depression* (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses A&I (Order No. 3104733).

*Herrick, B.J. (2001) *Maternal depression, relationship quality, perceived parenting stress, and children's security of attachment* (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses A&I (Order No. 3025146).

Higgins, J.P., & Thompson, S.G. (2002). Quantifying heterogeneity in a meta-analysis. *Statistics in Medicine, 21*, 1539-1558.

Hinshaw-Fuselier, S. S. (2004) *Pathways to disorganized attachment in infancy: Are maternal depressed mood and disruptive life events meaningful contributors?* (Unpublished doctoral dissertation). The University of Texas: Texas.

*Hipwell, A. E., Goossens, F., Melhuish, E., & Kumar, R. (2000a). Severe maternal psychopathology and infant-mother attachment. *Development and Psychopathology, 12*, 157-175. (Inpatient sample)

*Hipwell, A. E., Goossens, F., Melhuish, E., & Kumar, R. (2000b). Severe maternal psychopathology and infant-mother attachment. *Development and Psychopathology, 12*, 157-175. (Community sample)

Hirschfeld, R.M. (2001). The comorbidity of major depression and anxiety disorders: Recognition and management in primary care. *Primary Care Companion Journal of Clinical Psychiatry, 3*(6), 244–254.

*Hobson, R.P., Patrick, M., Crandell, L., Garcia-Perez, R., & Lee, A. (2005). Personal relatedness and attachment in infants of mothers with borderline personality disorder. *Development and Psychopathology, 17,* 329-347. doi: 10.1017/S0954579405050169

* Huang, Z.J., Lewin, A., Mitchell, S.J., & Zhang, J. (2012). Variations in the relationship between maternal depression, maternal sensitivity, and child attachment by race/ethnicity and nativity: Findings from a nationally representative cohort study. *Maternal Child Health Journal, 16*(1), 40-50. doi: 10.1007/s10995-010-0716-2.

* Hubbs-Tait, L., Osofsky, J. D., Hann, D. M., & Culp, A. M. (1994). Predicting behavior problems and social competence in children of adolescent mothers. *Family Relations*, *43*(4), 439–446. doi:10.2307/585376

*Jin, M.K. (2005) *A cross-cultural study of infant attachment patterns in Korea and the United States: Associations among infant temperament, maternal personality, separation anxiety and depression* (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses A&I (Order No. 3174483).

Jones, E. (1996). Introduction to the special section on attachment and psychopathology: Part 1. *Journal of Consulting and Clinical Psychology, 64*(1), 5-7.

Jones, I., Chandra, P.S., Dazzan, P., & Howard, L. (2014) Bipolar disorder, affective psychosis, and schizophrenia in pregnancy and the post-partum period. *Lancet, 384*, 1789-1799. doi: 10.1016/S0140-6736(14)61278-2

Kennedy, J.H., & Kennedy, C.E. (2004). Attachment theory: Implications for school psychology. *Psychology in Schools, 41*(2), 247-259. doi: 10.1002/pits.10153

Kiel, E. J., Gratz, K. L., Moore, S., Latzman, R. D., & Tull, M. T. (2011). The impact of borderline personality pathology on mothers' responses to infant distress. *Journal of Family Psychology, 25*, 907–918. doi: 10.1037/a0025474

Kim, J., & Krall, J. (2006). *Literature Review: Effects of Prenatal Substance Exposure on Infant and Early Childhood Outcomes*. Berkeley, CA: National Abandoned Infants Assistance Resource Center, University of California at Berkeley.

Kingston, D., Tough, S., & Whitfield, H. (2012) Prenatal and postpartum maternal psychological distress and infant development: A systematic review. *Child Psychiatry and Human Development, 43,* 683-714. doi: 10.1007/s10578-012-0291-4

Lazareck, S., Robinson, J.A., Crum, R.M., Mojtabai, R., Sareen, J., & Bolton, J.M. (2012). A longitudinal investigation of the role of self-medication in the development of comorbid mood and drug use disorders: Findings from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). *Journal of Clinical Psychiatry, 73*, 588–93. doi: 10.4088/JCP.11m07345

Lefkovics, E., Baji, I., & Rigo, J. (2014). Impact of maternal depression on pregnancies and early attachment. *Infant Mental Health Journal, 35*(4), 354-365. doi: 10.1002/imhj.21450

Li, J., Delvecchio, E., Miconi, D., Salcuni, S., & Di Riso, D. (2014). Parental attachment among Chinese, Italian, and Costa Rican adolescents: A cross-cultural study. *Personality and Individual Differences, 71*, 118-123. doi: 10.1016/j.paid.2014.07.036

Lipsey, M. W., & Wilson, D. B. (2001). *Practical Meta-Analysis*. Thousand Oaks, CA: Sage.

Logsdon, M. C., Wisner, K., & Hanusa, B. H. (2009). Does maternal role functioning improve with antidepressant treatment in women with postpartum depression? *Journal of Women's Health, 18*(1), 85-90. doi: 10.1089/jwh.2007.0635

*Lucas-Thompson, R., & Clarke-Stewart, K.A. (2007). Forecasting friendship: How marital quality, maternal mood, and attachment security are linked to children's peer relationships. *Journal of Applied Developmental Psychology, 28*(5-6), 499-514. doi: 10.1016/j.appdev.2007.06.004.

*Lyons-Ruth, K., Zoll, D., Connell, D. & Grunebaum, H. U. (1986) The depressed mother and her one-year-old infant: Environment, interaction, attachment, and infant development, 34, *New Directions for Child and Adolescent Development*, 1986: 61–82. doi: 10.1002/cd.23219863407

*Lyons-Ruth, K., Connell, D. B., Grunebaum, H. U. & Botein, S. (1990). Infants at social risk: Maternal depression and family support services as mediators of infant development and security of attachment. *Child Development, 61*, 85–98. doi: 10.1111/j.1467-8624.1990.tb02762.x

Lyons-Ruth, K., & Block, D. (1996). The disturbed caregiving system: Relations among childhood trauma, maternal caregiving, and infant affect and attachment. *Infant Mental Health Journal, 17*, 257–275.

Madigan, S., Atkinson, L., Laurin, K., & Benoit, D. (2013). Attachment and internalizing

behavior in early childhood: A meta-analysis. *Developmental Psychology, 49*(4), 672-689. doi: 10.1037/a0028793

Main, M. & Solomon, J. (1990). Procedures for identifying infants as disorganized-disoriented during the Ainsworth Strange Situation. In M. Greenberg, D. Cicchetti, & E. Cummings (Eds.), *Attachment in the preschool years: Theory, research and intervention (*pp. 121–160). Chicago, IL: University of Chicago Press.

Main, M., & Hesse, E. (1990). Parents' unresolved traumatic experiences are related to infant disorganized attachment status: Is frightened and/or frightening parental behavior the linking mechanism? In M. T. Greenberg, D. Cicchetti, & E. M. Cummings (Eds.), *Attachment in the preschool years: Theory, research, and intervention* (pp. 161–182). Chicago, IL: University of Chicago Press.

Martini, J., Wittich, J., Petzoldt, J., Winkel, S., Einsle, F., Siegert, J., …Wittchen, H-U. (2013). Maternal anxiety disorders prior to conception, psychopathology during pregnancy and early infants' development: A prospective-longitudinal study. *Archive of Women's Mental Health, 16,* 549-560. doi: 10.1007/s00737-013-0376-5

Martins, C., & Gaffan, E.A. (2000). Effects of early maternal depression on patterns of infant-mother attachment: A meta-analytic investigation. *Journal of Child Psychology and Psychiatry, 41*(6), 737-746.

Mayes, L.C., Feldman, R., Granger, R.H., Haynes, O., Bornstein, M.H., & Schottenfeld, R. (1997). The effects of polydrug use with and without cocaine on mother-infant interaction at 3 and 6 months. *Infant Behavior and Development, 20*, 489–502.

*McKim, M. K., Cramer, K. M., Stuart, B., & O'Connor, D. L. (1999). Infant care decisions and attachment security: The Canadian Transition to Child Care Study. *Canadian Journal of*

Behavioural Science / Revue canadienne des sciences du comportement, 31(2), 92-106. doi: 10.1037/h0087077

*McMahon, C. A., Barnett, B., Kowalenko, N. M., & Tennant, C. C. (2006). Maternal attachment state of mind moderates the impact of postnatal depression on infant attachment. *Journal of Child Psychology and Psychiatry, 47*, 660–669. doi: 10.1111/j.1469-7610.2005.01547.x

McNeil, T., Persson-Blennow, I., Binett, B., Harty, B., & Karyd, U-B. (1988). A prospective study of postpartum psychoses in a high risk group: V11. Relationship to later offspring characteristics. *Acta Psychiatrica Scandinavica, 78*, 613–617.

*Milan, S., Snow, S., & Belay, S. (2009). Depressive symptoms in mothers and children: Preschool attachment as a moderator of risk. *Developmental Psychology, 45*(4), 1019-1033. doi:10.1037/a0016164.

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Annals of Internal Medicine*, *151*(4), 264-269. doi: 10.1001/jama.2015.3656

Monk, C., Spicer, J., & Champagne, F. A. (2012). Linking prenatal maternal adversity to developmental outcomes in infants: The role of epigenetic pathways. *Development and Psychopathology, 24*(4), 1361-1376. doi: 10.1017/S0954579412000764

Moran, G., Pederson, D.R., & Krupka, A. (2005). Maternal unresolved attachment status that impedes the effectiveness of interventions with adolescent mothers. *Infant Mental Health*, *26*, 231-249. doi: 10.1002/imhj.20045

*Murray, L. (1992). The impact of postnatal depression on child development. *Journal of Child and Psychiatry, 33,* 543-561.

Muzik, M., Marcus, S. M., & Flynn, H. A. (2009). Psychotherapeutic treatment options for perinatal depression: Emphasis on maternal-infant dyadic outcomes. *Journal of Clinical Psychiatry, 70*(9), 1318-1319. doi: 10.4088/JCP.09com05451

*Näslund, B., Persson-Blennow, I., McNei, T., Kaij, L., & Malmquist-Larsson, A. (1984a) Offspring of women with nonorganic psychosis: Infant attachment to the mother at one year. *Acta Psychiatrica Scandinavica, 69*, 231–241. (Schizophrenia sample)

*Näslund, B., Persson-Blennow, I., McNei, T., Kaij, L., & Malmquist-Larsson, A. (1984b) Offspring of women with nonorganic psychosis: Infant attachment to the mother at one year. *Acta Psychiatrica Scandinavica, 69*, 231–241. (Cycloid Psychosis sample)

*Näslund, B., Persson-Blennow, I., McNei, T., Kaij, L., & Malmquist-Larsson, A. (1984c) Offspring of women with nonorganic psychosis: Infant attachment to the mother at one year. *Acta Psychiatrica Scandinavica, 69*, 231–241. (Non-endogenous psychosis sample)

*Näslund, B., Persson-Blennow, I., McNei, T., Kaij, L., & Malmquist-Larsson, A. (1984d) Offspring of women with nonorganic psychosis: Infant attachment to the mother at one year. *Acta Psychiatrica Scandinavica, 69*, 231–241. (Affective sample)

Neuspiel, D.R., Hamel, S.C., Hochberg, E., Greene, J., & Campbell, J. (1991). Maternal cocaine use and infant behavior. *Neurotoxicology & Teratology, 13*, 229–233.

Newman, L., Stevenson C.L., & Boyce, P. (2007) Mothers with borderline personality disorder, mother-infant interaction and parenting perceptions: Preliminary findings. *Australian and New Zealand Journal of Psychiatry, 41*, 598-605. doi: 10.1080/00048670701392833

Nicol-Harper, R., Harvey, A.G., & Stein, A. (2007). Interactions between mothers and infants: Impact of maternal anxiety. *Infant Behaviour and Development, 30*(1), 161-167. doi: 10.1016/j.infbeh.2006.08.005

Nylen, K. J., Moran, T. E., Franklin, C. L., & O'Hara, M. W. (2006). Maternal depression: A review of relevant treatment approaches for mothers and infants. *Infant Mental Health Journal, 27*(4), 327-343. doi: 10.1002/imhj.20095

*O'Brien Caughy, M., Huang, K.Y., & Lima, J. (2009). Patterns of conflict interaction in mother-toddler dyads: Differences between depressed and non-depressed mothers. *Journal of Child & Family Studies, 18*(1), 10-20. doi: 10.1002/imhj.20095

*O'Connor, M.J., Sigman, M., & Brill, N. (1987). Disorganization of attachment in relation to maternal alcohol consumption. *Journal of Consulting and Clinical Psychology, 55*(6), 831-836.

O'Connor, T.G., Heron, J., Golding, J., & Glover, V. (2003). Maternal antenatal anxiety and behavioural/emotional problems in children: A test of a programming hypothesis. *Journal of Child Psychology and Psychiatry, 44*(7), 1025-1036. doi: 10.1111/1469-7610.00187

Ogilvie, C.A., Newman, E., Todd, L., & Peck, D. (2014) Attachment and violent offending: A meta-analysis. *Aggression and Violent Behaviour, 19*, 322-339. doi: 10.1016/j.avb.2014.04.007

O'Hara, M. W. & Swain, A. M. (1996) Rates and risk of postpartum depression: A meta-analysis. *International Review of Psychiatry, 8*, 37– 54.

Pajulo, M.,Pyykkonen, N., Kalland, M., Helenius, H., Punamaki, R.-L., & Suchman, N. (2012). Substance-abusing mothers in residential treatment with their babies: Importance of pre-and postnatal maternal reflective functioning. *Infant Mental Health Journal, 33*, 70–81. doi: 10.1002/imhj.20342

Pasalich, D.S, Dadds, M.R., Hawes, D.J., & Brennan, J. (2012). Attachment and callous-unemotional traits in children with early-onset conduct problems. *Journal of Child Psychology and Psychiatry, 53*(8), 838-845. doi: 10.1111/j.1469-7610.2012.02544.x

Paulhus, D. L., & Vazire, S. (2007). The self-report method. In R. W. Robins, R. C. Fraley, & R. F. Krueger (Eds.), *Handbook of Research Methods in Personality Psychology* (pp. 224-239). New York, NY: Guilford Press.

*Putterman, J.T. (1999) *Infant attachment as a function of maternal depression, maternal representations of relationships, and mother-infant gaze* (Doctoral dissertation). Retrieved from PsycInfo (Order No. AEH9930219).

Radke-Yarrow, M., Cummings, E.M., Kuczynski, L., & Chapman, M. (1985). Patterns of attachment in two- and three- year olds in normal families and families with parental depression. *Child Development, 56,* 884-893.

*Radke-Yarrow, M. (1991) Attachment patterns in children of depressed mothers. In C.M. Parkes, J. Stevenson, & P. Marris (Eds.), *Attachment across the life cycle*, (pp. 115-126). London, UK: Tavistock/Rouledge.

Radloff, L.S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385-401.

*Raikes, H. A., & Thompson, R. A. (2006). Family emotional climate, attachment security and young children's emotion knowledge in a high risk sample. *British Journal of Developmental Psychology, 24*, 89–104. doi: 10.1348/026151005X70427

*Ramsauer, B., Lotzin, A., Quitmann, J. H., Becker-Stoll, F., Tharner, A., & Romer, G. (2014). Insightfulness and later infant attachment in clinically depressed and nonclinical mothers. *Infant Mental Health Journal, 35*, 210–219. doi: 10.1002/imhj.21446

Ramsauer, B., Lotzin, A., Mühlhan, C., Romer, G., Nolte, T., Fonagy, P., & Powell, B. (2014). A randomized controlled trial comparing Circle of Security Intervention and treatment as usual as interventions to increase attachment security in infants of mentally ill mothers: Study protocol. *BMC Psychiatry, 30*(14), retrieved from: http://www.biomedcentral.com/1471-244X/14/24.

Ranson, K.E., & Urichuck, L.J. (2008). The effect of parent-child attachment relationships on child biopsychosocial outcomes: A review. *Early Child Development and Care, 178*(2), 129-152. doi: 10.1080/03004430600685282

*Righetti-Veltema, M., Bousquet, A., Manzano, J. (2003). Impact of postpartum depressive symptoms on mother and her 18-month-old infant. *European Child & Adolescent Psychiatry, 12*(2), 75-83. doi: 10.1007/s00787-003-0311-9

Robins, L.N., Wing, J., Wittchem, H.J., Helzer, J.E., Babor, T.F., Burke, J., …Towle, L.H. (1988). The Composite International Diagnostic Interview: An epidemiologic instrument suitable for use in conjunction with different diagnostic systems and in different cultures. *Archives of General Psychiatry. 45*(12), 1069-1077. doi:10.1001/archpsyc.1988.01800360017003.

*Rodning, C., Beckwith, L., & Howard, J. (1989). Characteristics of attachment organization and play organization in prenatally drug-exposed toddlers. *Development and Psychopathology, 4*, 277-289.

*Rodning, C., Leila Beckwith, L., & Howard, J. (1991). Quality of attachment and home environments in children prenatally exposed to PCP and cocaine. *Development and Psychopathology, 3*(4), 351-366. doi:10.1017/S095457940000047X.

*Roggman, L.A., Boyce, L.K., & Cook, G.A. (2009) Keeping kids on track: Impacts of a

parenting-focused early head start program on attachment security and cognitive development. *Early Education and Development, 20*(6), 920-941, doi: 10.1080/10409280903118416

*Rosenblum, O., Mazet, P. and Bénony, H. (1997). Mother and infant affective involvement states and maternal depression. *Infant Mental Health Journal, 18*: 350–363. doi: 10.1002/(sici)1097-0355(199724)18:4<350::aid-imhj3>3.0.CO;2-P

Rothbaum, F, Weisz, J., Pott, M., Miyake, K., & Morelli, G. (2000). Attachment and culture: Security in the United States and Japan. *American Psychologist, 55,* 1093-1104. doi: 10.1037/0003-066X.55.10.1093

Santona, A., Tagini, A., Sarracino, D., Carli, P. D., Pace, C. S., Parolin, L., & Terrone, G. (2015). Maternal depression and attachment: The evaluation of mother–child interactions during feeding practice. *Frontiers in Psychology, 6,* 1235.

Schoppe-Sullivan, S., Diener, M. L., Mangelsdorf, S. C., Brown, G. L., McHale, J. L., & Frosch, C. A. (2006). Attachment and sensitivity in family context: The roles of parent and infant gender. *Infant and Child Development, 15*(4), 367-385. doi: 10.1002/icd.449

*Seifer, R., Sameroff, A.J., Dickstein, S., Gitner, G., Miller, I., Rasmussen, S., & Hayden, L. (1996). Parental psychopathology, multiple contextual risks, and one-year outcomes in children. *Journal of Clinical Child Psychology, 25*(4), 423-435. doi:10.1207/s15374424jccp2504_7

*Seifer, R., LaGasse, L. L., Lester, B., Bauer, C. R., Shankaran, S., Bada, H. S., … Liu, J. (2004). Attachment status in children prenatally exposed to cocaine and other substances. *Child Development*, *75*(3), 850–868. doi: 10.1111/j.1467-8624.2004.00710.x

Shaw, D. S., & Vondra, J. I. (1993). Chronic family adversity and infant attachment security. *Child Psychology & Psychiatry & Allied Disciplines, 34*(7), 1205-1215.

*Shaw, D.S., & Vondra, J.I. (1995). Infant attachment security and maternal predictors of early behavior problems: A longitudinal study of low-income families. *Journal of Abnormal Child Psychology, 23*(3), 335-57.

Speltz, M.L., DeKlyen, M., & Greenberg, M.T. (1999). Attachment in boys with early onset conduct problems. *Development and Psychopathology, 11*(2), 269-285.

*Spieker, S.J., & Booth, C.L. (1988). Maternal antecedents of attachment quality. In J. Belsky & T. Nezworski (Eds.), *Clinical Implications of Attachment*. New Jersey: Lawrence Erlbaum Associates Inc.

*Tarabulsy, G.M., Bernier, A., Provost, M.A., Maranda, J., Larose, S., Moss, E.,…Tessier, R. (2005) Another look inside the gap: Ecological contributions to the transmission of attachment in a sample of adolescent mother-infant dyads. *Developmental Psychology, 41*(1), 212-224. doi: 10.1037/0012-1649.41.1.212

Teti, D. (1993) Attachment security among infants of depressed mothers: Associations with mother-infant behavior and maternal functioning. In D. Teti (Chair), *Depressed mothers and their children: Individual differences in outcome.* Symposium presented at the Society for Research in Child Development, New Orleans.

*Teti, D.M., Gelfand, D.M., Messinger, D.S., & Isabella, R. (1995). Maternal depression and the quality of early attachment: An examination of infants, preschoolers and their mothers. *Developmental Psychology, 31,* 364-376. doi: 10.1037/0012-1649.31.3.364

*Teti, D.M. (2000a). Maternal depression and child–mother attachment in the first three years: A view from the intermountain west. In P.M. Crittenden & A.H. Claussen (Eds.), *The*

organization of attachment relationships: maturation, culture, and context. New York, NY: Cambridge University Press. (Infant sample)

*Teti, D.M. (2000b). Maternal depression and child–mother attachment in the first three years: A view from the intermountain west. In P.M. Crittenden & A.H. Claussen (Eds.), *The organization of attachment relationships: maturation, culture, and context*. New York, NY: Cambridge University Press. (Preschool sample)

*Tharner, A., Luijk, M.P., van Ijzendoorn, M.H., Bakermans-Kranenburg, M.J., Jaddoe, V.W., Hofman, A.,…Tiemeier H. (2012). Maternal lifetime history of depression and depressive symptoms in the prenatal and early postnatal period do not predict infant-mother attachment quality in a large, population-based Dutch cohort study. *Attachment and Human Development, 14*(1), 63-81. doi: 10.1080/14616734.2012.636659.

*Tomlinson, M., Cooper, P., & Murray, L. (2005). The mother–infant relationship and infant attachment in a South African peri-urban settlement. *Child Development, 76*, 1044–1054. doi: 10.1111/j.1467-8624.2005.00896.x

Tompson, M.C., Pierre, C.B., Dingman-Boger, K., McKowan, J.W., Chan, P.T., & Freed, R.D. (2010). Maternal depression, maternal expressed emotion, and youth psychopathology. *Journal of Abnormal Child Psychopathology, 38*, 105-117. doi: 10.1007/s10802-009-9349-6

*Toth, S.L., Rogosch, F.A., Manly, J.T., & Cicchetti, D. (2006). The efficacy of toddler-parent psychotherapy to reorganize attachment in the young offspring of mothers with major depressive disorder: A randomized preventive trial. *Journal of Consulting and Clinical Psychology, 74*(6), 1006-1016. doi:10.1037/0022-006x.74.6.1006

Valentine, J.C., Pigott, T.C., & Rothstein, H. R. (2010). How many studies do you need? A primer on statistical power for meta-analysis. *Journal of Educational and Behavioral Statistics, 35*(2), 215-247.

Van IJzendoorn, M. H., & Kroonenberg, P. M. (1988). Cross-cultural patterns of attachment: A meta-analysis of the strange situation. *Child Development, 59*(1), 147-156.

Van Ijzendoorn M. H., Goldberg S., Kroonenberg P. M., & Frenkel O. J. (1992). The relative effects of maternal and child problems on the quality of attachment: A meta-analysis of attachment in clinical samples. *Child Development, 63*, 840-858.

Van Ijzendoorn, M.H., Schuengel, C., & Bakermans-Kranenburg, M.J. (1999) Disorganized attachment in early childhood: Meta-analysis of precursors, concomitants, and sequelae. *Developmental Psychopathology, 11*, 225–249.

Van Ijzendoorn, M.H., Vereijken, C.M., Bakermans-Kranenburg, M.J., & Riksen-Walraven, J.M. (2004) Assessing attachment security with the Attachment Q Sort: Meta-analytic evidence for the validity of the observer AQS. *Child Development, 75*(4), 1188-1213.

van Rosmalen, L., van Ijzendoorn, M., & Bakermans-Kranenburg. (2014). ABC+D of attachment theory: The strange situation procedure as the gold standard of attachment assessment. In P. Holmes & S. Farnfield (Eds.), *The Routledge Handbook of Attachment Theory*. New York/London: Routledge.

Vichtbauer, W., & Cheung, M.L. (2010). Outlier and influence diagnostics for meta-analysis. *Research Synthesis Methods, 1*, 112-125. doi: 10.1002/jrsm.11

*Vrieze, D.M. (2011). *The role of parental reflective functioning in promoting attachment for children of depressed mothers in a toddler-parent psychotherapeutic intervention*

(Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses A&I (Order No. 3478511).

Wan, M.W., Salmon, M.P., Riordan, D., Appleby, L., Webb, R., & Abel, K.M. (2007) What predicts poor mother–infant interaction in schizophrenia? *Psychological Medicine, 37*, 537–546.

Wan, M.W., Moulton, S., & Abel, K.M. (2008) A review of mother-child relational interventions and their usefulness for mothers with schizophrenia. *Archive of Women's Mental Health, 11,* 171-179. doi: 10.1007/s00737-008-0010-0

Wan, M.W., & Green, J. (2009). The impact of maternal psychopathology on child-mother attachment. *Women's Mental Health, 12*, 123-124. doi: 10.1007/s00737-008-0010-0

*Warren, S.L., Huston, L., Egeland, B., & Sroufe, L.A. (1997). Child and adolescent anxiety disorders and early attachment. *Journal of American Academy of Child & Adolescent Psychiatry, 36*(5), 637-644.

*Warren, S.L., Gunnar, M.R., Kagan, J., Anders, T.F., Simmens, S.J., Rones, M., Wease, S.,… Sroufe, L.A. (2003) Maternal panic disorder: infant temperament, neurophysiology, and parenting behaviors. *Journal of American Academic Child & Adolescent Psychiatry, 42*(7), 814-25. doi: 10.1097/01.CHI.0000046872.56865.02

Waters, E., & Deane, K. (1985). Defining and assessing individual differences in attachment relationships: Q-methodology and the organization of behavior in infancy and early childhood. In I. Bretherton & E. Waters (Eds.), *Growing points of attachment theory and research. Monographs of the Society for Research in Child Development, 50 (Serial No. 209)*, 41 – 65.

Wood, J. (2008). Methodology for dealing with duplicate study effects in a meta-analysis. *Organizational Research Methods,11*(1), 79-95. doi: 10.1177/1094428106296638

*Wong, K.M. (2012) *A study of the effect of maternal depressive symptoms on the mother-infant relationship and protective effect of maternal reflective functioning* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses A&I (Order No. 1529826).

Yarcheski, A., Mahon, N.E., Yarcheski, T.J., Hanks, M.M., & Cannella, B. (2009). A meta-analytic study of predictors of maternal-fetal attachment. *International Journal of Nursing Studies, 46,* 708-715. doi: 10.1016/j.ijnurstu.2008.10.013

Zahn-Waxler, C., Chapman, M., & Cummings, E. M. (1984). Cognitive and social development in infants and toddlers with a bipolar parent. *Child Psychiatry and Human Development, 15*(2), 75-85.

Table 1

Characteristics of Studies Included in Analysis of Rate of Non-Secure Attachment in Infants of Mothers with Psychopathology (Research Question 1)

Study	*N* [a]	Publication Type	Country of Study	Mean Age of Infant	Attachment Measure [b]	Psychopathology Measures [c]	Rate (%)	95% CI
Beall (2006)	10	Journal article	U.S.	14 months	SSP	CIDI, PCL-C	50.0	[22.5, 77.5]
Bosquet Enlow, Egeland, Carlson, Blood & Wright (2014)	12	Journal article	U.S.	14.1 months	SSP	PCL-C	83.3	[52.3, 95.8]
Campbell & Cohn (1997)	26	Book chapter	U.S.	14 months	SSP	SADS (RDC)	35.6	[23.3, 50.0]
Campbell et al. (2004)	483	Journal article	U.S.	36 months	SSP	CES-D	41.0	[36.7, 45.4]
Carter, Garrity-Rokous, Chazan- Cohen, Little & Briggs-Gowan (2001)	26	Journal article	U.S.	14 months	SSP	SCID-NP, CES-D	47.6	[47.8, 92.4]
Dawson, Klinger, Panagiotides, Spieker & Frey (1992)	12	Journal article	U.S.	14.2 months	SSP	CES-D	25.0	[8.3, 55.2]
Dawson et al. (2001)	26	Journal article	U.S.	13.9 months	SSP	SCID-CV, CES-D	58.1	[46.1, 69.2]
Donaldson (1993)	50	Journal article	U.S.	16 months	SSP	CES-D, MMPI	35.6	[26.4, 45.9]
Edhborg, Lundh, Seimyr & Widstrom (2001)	13	Journal article	Sweden	16.5 months	SSP	EPDS	76.9	[47.8, 92.4]
Emery, Paquette & Bigras (2008)	79	Journal article	Canada	15.3 months	SSP	DIS-IIIR, EPDS	45.6	[34.9, 56.7]
Foss, Hirose & Barnard (1999)	118	Journal article	U.S.	13 months	SSP	SADS	55.6	[33.0, 76.0]
Gratz et al. (2014)	23	Journal article	U.S.	14.5 months	SSP	BEST	47.8	[28.8, 67.5]
Henderson (2003)	61	Dissertation	U.S.	25 months	SSP	SCID-NP, DC, BDI, IIP-PD, SCID-II	49.2	[36.9, 61.5]

Hipwell, Goossens, Melhuish & Kumar (2000a)	19	Journal article	Britain	12 months	SSP	RDC, SADS	42.1	[22.6, 64.4]
Hipwell, Goossens, Melhuish & Kumar (2000b)	16	Journal article	Britain	12 months	SSP	SADS, EPDS	62.5	[37.7, 82.1]
Hobson, Patrick, Crandella, Garcia-Perez & Lee (2005)	10	Journal article	Britain	13.5 months	SSP	SCID-NP, SCID-II	80.0	[45.9, 95.0]
Lyons-Ruth, Zoll, Connell & Grunebaum (1986)	26	Book chapter	U.S.	12 months	SSP	CES-D	53.8	[35.0, 71.6]
Lyons-Ruth, Connell, Grunebaum & Botein (1990)	31	Journal article	U.S.	12 months	SSP	CES-D	54.8	[37.4, 71.1]
McMahon, Barnett, Kowalenko & Tennant (2006)	75	Journal article	Australia	15 months	SSP	CIDI, CES-D	60.6	[48.8, 71.3]
Milan, Snow & Belay (1999)	461	Journal article	U.S.	36 months	SSP	CES-D	41.4	[36.7, 46.2]
Murray (1992)	66	Journal article	Britain	18 months	SSP	SPI (RDC), EPDS	61.8	[49.5, 72.6]
Naslund, Persson-Blennow, McNeil, Kaij & Malmquist-Larsson (1984a)	10	Journal article	Sweden	12 months	SSP	Project Diagnostic Criteria	50.0	[22.5, 77.5]
Naslund, Persson-Blennow, McNeil, Kaij & Malmquist-Larsson (1984b)	9	Journal article	Sweden	12 months	SSP	Project Diagnostic Criteria	22.2	[35.0, 71.6]
Naslund, Persson-Blennow, McNeil, Kaij & Malmquist-Larsson (1984c)	15	Journal article	Sweden	12 months	SSP	Project Diagnostic Criteria, RDC	26.7	[35.0, 71.6]
Naslund, Persson-Blennow, McNeil, Kaij & Malmquist-Larsson (1984d)	12	Journal article	Sweden	12 months	SSP	Project Diagnostic Criteria	16.7	[35.0, 71.6]
Radke-Yarrow (1991)	66	Journal article	U.S.	33 months	SSP	SADS (RDC)	54.9	[42.3, 66.9]
Ramsauer et al. (2005)	19	Journal article	Germany	14.7 months	SSP	SCID-CV, BDI, SCL-90	47.4	[26.8, 68.9]

Righetti-Veltema, Bousquet & Mazona (2003)	35	Journal article	U.S.	18 months	SSP	EPDS	77.1	[60.5, 88.1]
Rosenblum, Mazet & Benony (1997)	29	Journal article	France	12 months	SSP	MADRS	82.8	[64.7, 92.6]
Teti (2000a)[d]	31	Book chapter	U.S.	< 21 months	SSP	BDI	87.0	[70.3, 95.1]
Teti (2000b)	30	Book chapter	U.S.	> 21 months	PAA	BDI	80.0	[62.1, 90.7]
Toth, Rogosch, Manly & Cicchetti (2006)	130	Journal article	U.S.	36 months	SSP	DIS-IIIR, BDI	80.8	[73.1, 86.7]
Vrieze (2011)[d]	98	Dissertation	U.S.	21.8 months	SSP	DIS-IIIR, BDI	84.7	[76.1, 90.6]
Warren, Huston, Egeland & Sroufe (1997)	40	Journal article	U.S.	15.2 months	SSP	ASQ	47.5	[32.7, 62.7]

	Q	Rate (%)	95% CI
Summary Effect	194.00(33)	56.1	[49.8, 62.2]
Trimmed Summary Effect	142.32(31)	53.5	[47.7, 59.3]

[a] Total number of infant-mother dyads
[b] Assessment tool used to measure infant attachment security
[c] Assessment tool(s) used to measure maternal psychopathology
[d] Study was identified as a potential outlier and was not included in the Trimmed Summary Effect

Note. SSP = Strange Situation Procedure; PAA = Preschool Assessment of Attachment; Project Diagnostic Criteria = Criteria determined by project clinician; RDC = Research Diagnostic Criteria; CES-D = Centre for Epidemiological Studies Depression Scale; MMPI = Minnesota Multiphasic Personality Inventory; MADRS = Montgomery-Asberg Depression Rating Scale; SADS = Schedule for Affective Disorders and Schizophrenia; BDI = Beck Depression Inventory; EPDS = Edinburgh Postnatal Depression Scale; CIDI = Composite International Diagnostic Interview; DIS-IIIR = Diagnostic Interview Schedule for DSM-III-R; BEST = Borderline Evaluation of Severity over Time; SCID = Structured Clinical Interview for DSM; SCID-CV = Structured Clinical Interview for DSM Disorders – Clinician Version; SCID-NP = Structured Clinical Interview for DSM Non-Patient Edition; SCID-II = Structured Clinical Interview for Personality Disorders; DC = Depression Checklist (analogue to SCID); IIP-PD = Inventory of Interpersonal Problems Personality Disorders Screener; ASQ = Anxiety Scale Questionnaire; SPI = Standardized Psychiatric Interview; PCL-C = Posttraumatic Stress Disorder Checklist – Civilian Version; SCL-90 = Symptom Checklist 90

Table 2

Characteristics of Studies Included in Analysis of Rate of Non-Secure Attachment in Infants of Mothers with Depressive Disorder (Research Question 2)

Study	*N*[a]	Publication Type	Country of Study	Mean Age of Infant	Attachment Measure [b]	Psychopathology Measures [c]	Rate (%)	95% CI
Campbell & Cohn (1997)	26	Book chapter	U.S.	14 months	SSP	SADS (RDC)	41.0	[36.7, 45.4]
Campbell et al. (2004)	483	Journal article	U.S.	36 months	SSP	CES-D	41.0	[36.7, 45.4]
Carter, Garrity-Rokous, Chazan- Cohen, Little & Briggs-Gowan (2001)	26	Journal article	U.S.	14 months	SSP	SCID-NP, CES-D	68.5	[27.5, 68.5]
Dawson, Klinger, Panagiotides, Spieker & Frey (1992)	12	Journal article	U.S.	14.2 months	SSP	CES-D	25.0	[8.3, 55.2]
Dawson et al. (2001)	26	Journal article	U.S.	13.9 months	SSP	SCID-CV, CES-D	58.1	[46.1, 69.2]
Donaldson (1993)	50	Journal article	U.S.	16 months	SSP	CES-D, MMPI	35.6	[26.4, 45.9]
Edhborg, Lundh, Seimyr & Widstrom (2001)	13	Journal article	Sweden	16.5 months	SSP	EPDS	76.9	[47.8, 92.4]
Emery, Paquette & Bigras (2008)	79	Journal article	Canada	15.3 months	SSP	DIS-IIIR, EPDS	45.6	[34.9, 56.7]
Foss, Hirose & Barnard (1999)	118	Journal article	U.S.	13 months	SSP	SADS	55.6	[33.0, 76.0]
Henderson (2003)	61	Thesis	U.S.	25 months	SSP	SCID-NP, DC, BDI, IIP-PD, SCID-II	49.2	[36.9, 61.5]
Hipwell, Goossens, Melhuish & Kumar (2000a)	19	Journal article	Britain	12 months	SSP	RDC, SADS	42.1	[22.6, 64.4]
Hipwell, Goossens, Melhuish & Kumar (2000b)	16	Journal article	Britain	12 months	SSP	SADS, EPDS	62.5	[37.7, 82.1]

Lyons-Ruth, Zoll, Connell & Grunebaum (1986)	26	Book chapter	U.S.	12 months	SSP	CES-D	53.8	[35.0, 71.6]
Lyons-Ruth, Connell, Grunebaum & Botein (1990)	31	Journal article	U.S.	12 months	SSP	CES-D	54.8	[37.4, 71.1]
McMahon, Barnett, Kowalenko & Tennant (2006)	75	Journal article	Australia	15 months	SSP	CIDI, CES-D	60.6	[48.8, 71.3]
Milan, Snow & Belay (1999)	461	Journal article	U.S.	36 months	SSP	CES-D	41.4	[36.7, 46.2]
Murray (1992)	66	Journal article	Britain	18 months	SSP	SPI (RDC), EPDS	61.8	[49.5, 72.8]
Naslund, Persson-Blennow, McNeil, Kaij & Malmquist-Larsson (1984d)	12	Journal article	Sweden	12 months	SSP	Project Diagnostic Criteria	16.7	[35.0, 71.6]
Radke-Yarrow (1991)	66	Journal article	U.S.	33 months	SSP	SADS (RDC)	54.9	[42.3, 66.9]
Ramsauer et al. (2005)	19	Journal article	Germany	14.7 months	SSP	SCID-CV, BDI, SCL-90	47.4	[26.8, 68.9]
Righetti-Veltema, Bousquet & Mazona (2003)	35	Journal article	U.S.	18 months	SSP	EPDS	77.1	[60.5, 88.1]
Rosenblum, Mazet & Benony (1997)	29	Journal article	France	12 months	SSP	MADRS	82.8	[64.7, 92.6]
Teti (2000a)	31	Book chapter	U.S.	< 21 months	SSP	BDI	87.0	[70.3, 95.1]
Teti (2000b)	30	Book chapter	U.S.	> 21 months	PAA	BDI	80.0	[62.1, 90.7]
Toth, Rogosch, Manly & Cicchetti (2006)	130	Journal article	U.S.	36 months	SSP	DIS-IIIR, BDI	80.8	[73.1, 86.7]
Vrieze (2011)[d]	98	Thesis	U.S.	21.8 months	SSP	DIS-IIIR, BDI	84.7	[76.1, 90.6]

	Q	Rate (%)	95% CI
Summary Effect	181.02(25)	57.4	[50.3, 64.2]
Trimmed Summary Effect	142.87(24)	20.41	[17.70, 23.41]

[a] Total number of infant-mother dyads
[b] Assessment tool used to measure infant attachment security
[c] Assessment tool(s) used to measure maternal psychopathology
[d] Study was identified as a potential outlier and was not included in the Trimmed Summary Effect

Note. SSP = Strange Situation Procedure; PAA = Preschool Assessment of Attachment; Project Diagnostic Criteria = Criteria determined by project clinician; RDC = Research Diagnostic Criteria; CES-D = Centre for Epidemiological Studies Depression Scale; MMPI = Minnesota Multiphasic Personality Inventory; MADRS = Montgomery-Asberg Depression Rating Scale; SADS = Schedule for Affective Disorders and Schizophrenia; BDI = Beck Depression Inventory; EPDS = Edinburgh Postnatal Depression Scale; CIDI = Composite International Diagnostic Interview; DIS-IIIR = Diagnostic Interview Schedule for DSM-III-R; SCID = Structured Clinical Interview for DSM; SCID-CV = Structured Clinical Interview for DSM Disorders – Clinician Version; SCID-NP = Structured Clinical Interview for DSM Non-Patient Edition; SCID-II = Structured Clinical Interview for Personality Disorders; DC = Depression Checklist (analogue to SCID); IIP-PD = Inventory of Interpersonal Problems Personality Disorders Screener; SPI = Standardized Psychiatric Interview; SCL-90 = Symptom Checklist 90

Table 3

Characteristics of Studies Included in Analysis of Rate of Non-Secure Attachment in Infants of Mothers with Anxiety Disorders (Research Question 4)

Study	*N*[a]	Publication Type	Country of Study	Mean Age of Infant	Attachment Measure [b]	Psychopathology Measures [c]	Rate (%)	95% CI
Bosquet Enlow, Egeland, Carlson, Blood & Wright (2014)	12	Journal article	U.S.	14.1 months	SSP	PCL-C	83.3	[52.3, 95.8]
Beall (2006)	10	Journal article	U.S.	14 months	SSP	CIDI, PCL-C	50.0	[35.7, 77.3]
Warren, Huston, Egeland & Sroufe (1997)	40	Journal article	U.S.	15.2 months	SSP	ASQ	47.5	[32.7, 62.7]
					Q		Rate (%)	95% CI
Summary Effect					4.23(2)		57.9	[35.7, 77.3]

[a] Total number of infant-mother dyads
[b] Assessment tool used to measure infant attachment security
[c] Assessment tool(s) used to measure maternal psychopathology

Note. SSP = Strange Situation Procedure; PAA = Preschool Assessment of Attachment; CIDI = Composite International Diagnostic Interview; ASQ = Anxiety Scale Questionnaire; PCL-C = Posttraumatic Stress Disorder Checklist – Civilian Version

Table 4

Characteristics of Studies Included in Analysis of Rate of Non-Secure Attachment in Infants of Mothers with Psychotic Disorders (Research Question 5)

Study	*N*[a]	Publication Type	Country of Study	Mean Age of Infant	Attachment Measure [b]	Psychopathology Measure	Rate (%)	95% CI
Hipwell, Goossens, Melhuish & Kumar (2000b)	19	Journal article	Britain	12 months	SSP	RDC, SADS	42.1	[22.6, 64.4]
Naslund, Persson-Blennow, McNeil, Kaij & Malmquist-Larsson (1984a)	10	Journal article	Sweden	12 months	SSP	Project Diagnostic Criteria	50.0	[22.5, 77.5]
Naslund, Persson-Blennow, McNeil, Kaij & Malmquist-Larsson (1984b)	9	Journal article	Sweden	12 months	SSP	Project Diagnostic Criteria	22.2	[5.6, 57.9]
Naslund, Persson-Blennow, McNeil, Kaij & Malmquist-Larsson (1984c)	15	Journal article	Sweden	12 months	SSP	Project Diagnostic Criteria, RDC	26.7	[10.4, 53.5]
					Q	Rate (%)		95% CI
Summary Effect					2.40(3)	36.6		[24.5, 50.6]

[a] Total number of infant-mother dyads

[b] Assessment tool used to measure infant attachment security

[c] Assessment tool(s) used to measure maternal psychopathology

Note. SSP = Strange Situation Procedure; PAA = Preschool Assessment of Attachment; Project Diagnostic Criteria = Criteria determined by project clinician; RDC = Research Diagnostic Criteria; SADS = Schedule for Affective Disorders and Schizophrenia.

Table 5

Characteristics of Studies Included in Analysis of Rate of Non-Secure Attachment in Infants of Mothers with Borderline Personality Disorder (Research Question 6)

Study	*N*[a]	Publication Type	Country of Study	Mean Age of Infant	Attachment Measure [b]	Psychopathology Measures [c]	Rate (%)	95% CI
Gratz et al. (2014)	23	Journal article	U.S.	14.5 months	SSP	BEST	47.8	[28.8, 67.5]
Hobson, Patrick, Crandella, Garcia-Perez & Lee (2005)	10	Journal article	Britain	13.5 months	SSP	SCID-NP, SCID-II	80.0	[45.9, 95.0]
					Q		Rate (%)	95% CI
Summary Effect					2.72(1)		62.2	[28.6, 87.1]

[a] Total number of infant-mother dyads
[b] Assessment tool used to measure infant attachment security
[c] Assessment tool(s) used to measure maternal psychopathology

Note. SSP = Strange Situation Procedure; PAA = Preschool Assessment of Attachment; BEST = Borderline Evaluation of Severity over Time; SCID-NP = Structured Clinical Interview for DSM Non-Patient Edition; SCID-II = Structured Clinical Interview for Personality Disorders

Table 6

Characteristics of Studies Included in Analysis of Rate of Non-Secure Attachment in Infants of Mothers with Substance-Related Disorders (Research Question 7)

Study	*N*[a]	Publication Type	Country of Study	Mean Age of Infant	Attachment Measure [b]	Psychopathology Measures [c]	Type of Substance	Rate (%)	95% CI
Eiden, Edwards & Leonard (2002)	20	Journal Article	U.S.	12 months	SSP	RDC, UM-CIDI, DSM-IV criteria, QFI, SVHD	Alcohol	70.0	[47.3, 85.9]
Fitzpatrick-Behnke (2015)	61	Dissertation	U.S.	15 months	SSP	Urine toxicology, MCMI-III, SCID	Methadone (previously heroin)	55.7	[43.2, 67.6]
Goodman, Hans & Cox (1999)	35	Journal article	U.S.	12 months	SSP	Urine toxicology, SADS-L, drug use history	Methadone (previously heroin/opiates)	28.6	[16.1, 45.4]
O'Connor, Sigman & Brill (1987)	12	Journal article	U.S.	12 months	SSP	Self-report, AA	Alcohol	83.3	[52.3, 95.8]
Seifer et al. (2004)	336	Journal article	U.S.	18 months	SSP	Self-report, meconium toxicology, study interview	Cocaine, opiates, or both	35.7	[30.8, 41.0]
					Q			Rate (%)	95% CI
Summary Effect					23.87(4)			51.1	[34.7, 67.2]

[a] Total number of infant-mother dyads
[b] Assessment tool used to measure infant attachment security
[c] Assessment tool(s) used to measure maternal psychopathology

Note. SSP = Strange Situation Procedure; AQS = Attachment Q-Sort; RDC = Research Diagnostic Criteria; UM-CIDI = University of Michigan Composite Diagnostic Index; DSM-IV = Diagnostics and Stats Manual; QFI = Quantity and Frequency Index; SVHD = Severity of Heavy Drinking; MCMI-III = Millon

Clinical Multiaxial Inventory-III; SCID = Structured Clinical Interview for DSM; Study Interview = interview on post-natal substance abuse conducted by study clinicians; SADS-L = Schedule for Affective Disorders and Schizophrenia – Lifetime Version (SADS-L); AA = Absolute Alcohol Score;

Table 7

Characteristics of Studies Included in Analysis of Odds Ratios of Infants of Mothers with Psychopathology having Non-Secure Attachment Compared to Infants of Mothers without Psychopathology (Research Question 8)

Study	Psycho-pathology *n* [a]	Control *n* [b]	Publication Type	Country of Study	Mean Age of Infant	Attachment Measure [c]	Psychopathology Measures [d]	Odds Ratio	95% CI	*p*-value
Beall (2006)	14	10	Journal article	U.S.	14 months	SSP	CIDI, PCL-C	.40	[.07, 2.18]	.290
Bosquet Enlow, Egeland, Carlson, Blood & Wright (2014)	12	33	Journal article	U.S.	14.1 months	SSP	PCL-C	10.00	[1.86, 53.76]	.007
Campbell & Cohn (1997)[e]	22-26	52-55	Book chapter	U.S.	14 months	SSP	SADS (RDC)	.48	[.24, .98]	.044
Campbell et al. (2004)	483	593	Journal article	U.S.	36 months	SSP	CES-D	1.28	[1.64, 1.93]	.053
Carter, Garrity-Rokous, Chazan-Cohen, Little & Briggs-Gowan (2001)	26	30	Journal article	U.S.	14 months	SSP	SCID-NP, CES-D	3.34	[1.14, 9.79]	.028
Dawson, Klinger, Panagiotides, Spieker & Frey (1992)	12	14	Journal article	U.S.	14.2 months	SSP	CES-D	1.11	[.22, 5.63]	.899
Dawson et al. (2001)	72	60	Journal article	U.S.	13.9 months	SSP	SCID-CV, CES-D	.89	[.48, 1.63]	.698
Donaldson (1993)	49-50	75-82	Journal article	U.S.	16 months	SSP	CES-D, MMPI	1.48	[.85, 2.60]	.168

Edhborg, Lundh, Seimyr & Widstrom (2001)	23	20	Journal article	Sweden	16.5 months	SSP	EPDS	2.31	[.63, 8.51]	.209
Emery, Paquette & Bigras (2008)	64	66	Journal article	Canada	15.3 months	SSP	DIS-IIIR, EPDS	1.32	[.76, 2.28]	.322
Foss, Hirose & Barnard (1999)	18	18	Journal aricle	U.S.	13 months	SSP	SADS	1.00	[.27, 3.72]	1.000
Gratz et al. (2014)	23	66	Journal article	U.S.	14.5 months	SSP	BEST	1.83	[.70, 4.81]	.218
Henderson (2003)	112 total		Thesis	U.S.	25 months	SSP	SCID-NP, DC, BDI, IIP-PD, SCID-II	1.03	[.62, 1.70]	.917
Hipwell, Goossens, Melhuish & Kumar (2000a)	19	19	Journal article	Britain	12 months	SSP	RDC, SADS	2.14	[.52, 8.81]	.291
Hipwell, Goossens, Melhuish & Kumar (2000b)	16	16	Journal article	Britain	12 months	SSP	SADS, EPDS	1.25	[.34, 4.59]	.740
Hobson, Patrick, Crandella, Garcia-Perez & Lee (2005)	10	14	Journal article	Britain	13.5 months	SSP	SCID-NP, SCID-II	3.00	[.46, 19.59]	.251
Huang, Lewin, Mitchell & Zhang (2012)	Approx. 8300 total		Journal article	U.S.	24.6 months	TAS-45	CES-D, CIDI	1.02	[.81, 1.28]	.899
Lyons-Ruth, Zoll, Connell & Grunebaum (1986)	26	30	Book chapter	U.S.	12 months	SSP	CES-D	2.33	[.79, 6.86]	.125
Lyons-Ruth, Connell, Grunebaum & Botein (1990)	31	39	Journal Article	U.S.	12 months	SSP	CES-D	1.15	[.45, 2.97]	.767

McMahon, Barnett, Kowalenko & Tennant (2006)	75	35	Journal article	Australia	15 months	SSP	CIDI, CES-D	2.69	[1.36, 5.33]	.004
Milan, Snow & Belay (1999)	316	522	Journal article	U.S.	36 months	SSP	CES-D	1.33	[1.05, 1.69]	.018
Murray (1992)	66	38	Journal article	Britain	18 months	SSP	SPI (RDC), EPDS	5.39	[2.72, 10.68]	<.001
Naslund, Persson-Blennow, McNeil, Kaij & Malmquist-Larsson (1984a)	10	21	Journal article	Sweden	12 months	SSP	Project Diagnostic Criteria	0.52	[.08, 3.26]	.485
Naslund, Persson-Blennow, McNeil, Kaij & Malmquist-Larsson (1984b)	9	18	Journal article	Sweden	12 months	SSP	Project Diagnostic Criteria	1.00	[.15, 6.85]	1.00
Naslund, Persson-Blennow, McNeil, Kaij & Malmquist-Larsson (1984c)	15	23	Journal article	Sweden	12 months	SSP	Project Diagnostic Criteria, RDC	2.42	[.46, 12.85]	.298
Naslund, Persson-Blennow, McNeil, Kaij & Malmquist-Larsson (1984d)	12	18	Journal article	Sweden	12 months	SSP	Project Diagnostic Criteria	9.50	[1.40, 64.35]	.021
Radke-Yarrow (1991)	66	45	Journal article	U.S.	33 months	SSP	SADS (RDC)	2.24	[1.13, 4.43]	.021
Ramsauer et al. (2005)	19	20	Journal article	Germany	14.7 months	SSP	SCID-CV, BDI, SCL-90	2.10	[.57, 7.81]	.268
Righetti-Veltema, Bousquet & Mazona (2003)	35	35	Journal article	U.S.	18 months	SSP	EPDS	5.06	[1.79, 14.31]	.002
Rosenblum, Mazet & Benony (1997)[e]	29	25	Journal article	France	12 months	SSP	MADRS	10.20	[2.84, 36.6]	<.001

Teti (2000a)[e]	30	20	Book chapter	U.S.	< 21 months	SSP	BDI	9.33	[2.52, 34.58]	.001
Teti (2000b)	31	23	Book chapter	U.S.	> 21 months	PAA	BDI	5.19	[1.37, 19.73]	.016
Tharner et al. (2012)	77	550	Journal article	Nether-lands	14.6 months	SSP	CIDI, EPDS, BSI	.99	[0.88, 1.13]	.948
Toth, Rogosch, Manly & Cicchetti (2006)	130	68	Journal article	U.S.	36 months	SSP	DIS-IIIR, BDI	5.32	[2.78, 10.17]	<.001
Vrieze (2011)[e]	98	62	Thesis	U.S.	21.8 months	SSP	DIS-IIIR, BDI	6.72	[3.19, 14.13]	<.001
Warren, Huston, Egeland & Sroufe (1997)	40	41	Journal article	U.S.	15.2 months	SSP	ASQ	0.95	[0.40, 2.27]	.908

	Q	*Odds Ratio*	95% CI	*p*-value
Summary Effect	141.26(35)	1.85	[1.49, 2.31]	<.001
Trimmed Summary Effect	95.10(31)	1.69	[1.37, 2.07]	<.001

[a] Total number of infant-mother dyads with mothers with psychopathology
[b] Total number of infant-mother dyads with mothers without psychopathology
[c] Assessment tool used to measure infant attachment security
[d] Assessment tool(s) used to measure maternal psychopathology
[e] Study was identified as a potential outlier and was not included in the Trimmed Summary Effect

Note. SSP = Strange Situation Procedure; PAA = Preschool Assessment of Attachment; TAS-45 = Toddler Attachment Sort-45 (modified version of Attachment Q-Sort); Project Diagnostic Criteria = Criteria determined by project clinician; RDC = Research Diagnostic Criteria; CES-D = Centre for Epidemiological Studies Depression Scale; MMPI = Minnesota Multiphasic Personality Inventory; MADRS = Montgomery-Asberg Depression Rating Scale; SADS = Schedule for Affective Disorders and Schizophrenia; BDI = Beck Depression Inventory; EPDS = Edinburgh Postnatal Depression Scale; CIDI = Composite International Diagnostic Interview; DIS-IIIR = Diagnostic Interview Schedule for DSM-III-R; BSI = Brief Symptom Invetory; BEST = Borderline Evaluation of Severity over Time; SCID = Structured Clinical Interview for DSM; SCID-CV = Structured Clinical Interview for DSM Disorders – Clinician Version; SCID-NP = Structured Clinical Interview for DSM Non-Patient Edition; SCID-II = Structured Clinical Interview for Personality Disorders; DC = Depression Checklist (analogue to SCID); IIP-PD = Inventory of Interpersonal Problems Personality Disorders Screener; ASQ = Anxiety Scale Questionnaire; SPI = Standardized Psychiatric Interview; PCL-C = Posttraumatic Stress Disorder Checklist – Civilian Version; SCL-90 = Symptom Checklist 90

Table 8

Characteristics of Studies Comparing the Mean Level of Attachment Non-Security of Infants of Mothers with and without Psychopathology (Research Question 10)

Study	Psychopathology *n* [a]	Control *n* [b]	Publication Type	Country of Study	Mean Age of Infant	Attachment Measure [c]	Psycho-pathology Measures [d]	*d*	95% CI	*p*-value
Forman et al. (2007)	49	37	Journal article	U.S.	28 months	AQS	SCID, HDRS	-.72	[-1.01, -.42]	<.001
Seifer et al. (1996)	52	120	Journal article	U.S.	18 months	SSP	SCID, SCID-2, SCL-90	-.30	[-.65, .04]	.087
						Q		*d*	95% CI	*p*-value
Summary Effect						3.19(1)		-.52	[-.93, -.12]	0.012

[a] Total number of infant-mother dyads with mothers with psychopathology
[b] Total number of infant-mother dyads with mothers without psychopathology
[c] Assessment tool used to measure infant attachment security
[d] Assessment tool(s) used to measure maternal psychopathology

Note. AQS = Attachment Q-Sort; SSP = Strange Situation Procedure; HDRS = Hamilton Depression Rating Scale; SCID = Structured Clinical Interview for DSM; SCID-NP = Structured Clinical Interview for DSM Non-Patient Edition; SCID-II = Structured Clinical Interview for Personality Disorders; SCL-90 = Symptom Checklist 90

Table 9

Characteristics of Studies Included in Analysis of the Degree of Association Between Infant's Attachment Non-Security and Maternal Psychopathology Symptomatology (Research Question 9)

Study	*N*[a]	Publication Type	Country of Study	Mean Age of Infant	Attachment Measure [b]	Psychopathology Measure [c]	Correlation	95% CI	*p*-value
Bennett (2004)	108-120	Dissertation	U.S.	13.5 months	SSP	CES-D	.16	[.03, .28]	.019
Coyl, Roggman & Newman (2002)	148	Journal article	U.S.	14 months	AQS	CES-D	.29	[.14, .43]	<.001
Dawson, Klinger, Panagiotides, Spieker & Frey (1992)	26	Journal article	U.S.	14.2 months	SSP	CES-D	.30	[-.10, .62]	.138
Henderson (2003)	112	Dissertation	U.S.	25 months	SSP	SCID-NP, DC, BDI, IIP-PD, SCID-II	-.04	[-.13, .04]	.303
Herrick (2007)	65	Dissertation	U.S.	32.6 months	AQS	BDI	.21	[-.13, .04]	.095
Hubbs-Tait, Osofsky, Hann & Culp (1994)	44	Journal article	U.S.	13 months	SSP	CES-D	.30	[.00, .55]	.047
Lucas-Thompson & Clarke-Stewart (2002)	1130	Journal article	U.S.	24 months	AQS	CES-D	.15	[.09, .21]	<.001
McKim, Cramer, Stuart & O'Connor (1999)	120	Journal article	Canada	15.9 months	AQS	CES-D	.22	[.04, .38]	.016
O'Brien Caughy, Huang & Lima (2009)	318	Journal article	U.S.	17 months	AQS	CES-D	.23	[.12, .33]	<.001
Putterman (1999)	37	Dissertation	U.S.	12 months	SSP	CES-D	-.03	[-.26, .21]	.804
Raikes & Thompson (2006)	42	Journal article	U.S.	28 months	AQS	CES-D	.28	[-.03, .54]	.072
Roggman, Boyce & Cook (2009)	110-155	Journal article	U.S.	14 months	AQS	CES-D	.24	[.12, .35]	<.001

Shaw & Vondra (1995)	83-102	Journal article	U.S.	16 months	SSP	BDI	.00	[-.10, .11]	.990
Tarabulsy et al. (2005)	64	Journal article	Canada	16.5 months	AQS	CES-D	.23	[-.02, .45]	.067
Tomlinson, Cooper & Murray (2005)[d]	98	Journal article	Africa	18 months	SSP	SCID	-.11	[-.25, .03]	.012
Warren, Huston, Egeland & Sroufe (1997)	172	Journal article	U.S.	15.2 months	SSP	ASQ	.12	[-.03, .27]	.117
Wong (2012)	101	Dissertation	U.S.	13.5 months	SSP	PPDS	.18	[-.02, .36]	.073

	Q	Correlation	95% CI	*p*-value
Summary Effect	51.82(16)	0.14	[0.08, 0.20)	<.001
Trimmed Summary Effecthed	40.93(15)	0.16	[0.10, 0.22]	<.001

[a] Total number of infant-mother dyads
[b] Assessment tool used to measure infant attachment security
[c] Assessment tool(s) used to measure maternal psychopathology
[d] Study was identified as a potential outlier and was not included in the Trimmed Summary Effect

Note. SSP = Strange Situation Procedure; AQS = Attachment Q-Sort; CES-D = Centre for Epidemiological Studies Depression Scale; BDI = Beck Depression Inventory; SCID = Structured Clinical Interview for DSM; PPDS = Postpartum Depression Scale; ASQ = Anxiety Scale Questionnaire.

Table 10

Characteristics of Studies Comparing the Mean Level of Maternal Psychopathology Symptomology of Mothers of Infants with Non-Secure and Secure Attachment Orientations (Research Question 10)

Study	Non-Secure *n* [a]	Secure *n* [b]	Publication Type	Country of Study	Age of Infant	Attachment Measure [c]	Psycho-pathology Measure [d]	*d*	95% CI	*p*-value
Barwick, Cohen, Horodezky, & Lojkasek (2004)	61	22	Journal article	Canada	20.5 months	SSP	BDI	.41	[-.09, .90]	.107
Cooper et al. (2009)	63	137	Journal article	Africa	18 months	SSP	EPDS	-.05	[-.35, .25]	.753
Donovan & Leavitt (1989)	7	33	Journal article	U.S.	15.8 months	SSP	CES-D	1.09	[.24, 1.90]	.012
Jin (2005)	18	62	Dissertation	Korea	16 months	SSP	CES-D	-.14	[-.66, -.39]	.611
Milan, Snow & Belay (2009)	355	583	Journal article	U.S.	36 months	SSP	CES-D	.14	[.01, .27]	.038
Spieker & Booth (1986)	39	21	Book chapter	U.S.	13 months	SSP	BDI	.82	[.40, 1.21]	<.001
Wong (2012)	59	13	Dissertation	U.S.	13.5 months	SSP	PPDS	.23	[-.37, .83]	.450
						Q		*d*	95% CI	*p*-value
Summary Effect						18.12(6)		0.28	[.02, .54]	<.001

[a] Total number of infant-mother dyads with infants with non-secure attachment orientations

[b] Total number of infant-mother dyads with mothers with secure attachment orientations
[c] Assessment tool used to measure infant attachment security
[d] Assessment tool(s) used to measure maternal psychopathology

Note. SSP = Strange Situation Procedure; CES-D = Centre for Epidemiological Studies Depression Scale; PPDS = Postpartum Depression Scale; EPDS = Edinburgh Postpartum Depression Scale; BDI = Beck Depression Inventory.

Table 11

Moderator Information for Studies Included [a] *in Moderator Analyses* [b]

Study	Year of Publication	Publication Type	Country of Study	Mean Infant Age (mo)	Mean Mother Age (yr)	Infant Gender (% female)	Maternal Racial Background (% White)	Maternal Education (% high school)	Family Composition (% 2-parent)	Sample Source	Treatment?	Psycho-pathology Type
Hubbs-Tait, Osofsky, Hann & Culp (1994)	1994	Journal article	U.S.	13.0	16.6	54.5	61.4	n/a	11.0	Community	No	Depression
Coyl, Roggman & Newman (2002)	2002	Journal article	U.S.	14.0	22.9	n/a	82.0	66.0	72.0	Community	No	Depression
Herrick (2002)	2002	Dissertation	U.S.	32.6	32.6	n/a	93.0	n/a	100.0	Community	No	Depression
Bennett (2004)	2004	Dissertation	U.S.	13.5	29.0	n/a	85.0	n/a	91.0	Community	No	Depression
Tomlinson, Cooper & Murray (2005)[d]	2005	Journal article	Africa	18.0	n/a	44.9	0.0	100.0	32.7	Clinical	No	Depression
Lucas-Thompson & Clarke-Stewart (2002)	2007	Journal article	U.S.	24.0	n/a	48.7	79.0	28.0	92.0	Community	No	Depression

Dawson, Klinger, Panagiotides, Spieker & Frey (1992)	1992	Journal article	U.S.	14.2	18.82	61.8	71.0	n/a	n/a	Community	No	Depression
Henderson (2003)	2003	Dissertation	U.S.	25.0	33.7	44.7	89.3	10.0	92.0	Clinical	Yes	Depression Personality
Wong (2012)	2012	Dissertation	U.S.	13.5	29.4	40.6	65.9	14.9	73.6	Community	No	Depression
Putterman (1999)	1999	Dissertation	U.S.	12	29.0	n/a	45.0	n/a	100	Community	No	Depression
Warren, Huston, Egeland & Sroufe (1997)	1997	Journal article	U.S.	15.2	20.5	47.0	84.0	41.0	38.0	Community	No	Anxiety
Roggman, Boyce & Cook (2009)	2009	Journal article	U.S.	14.0	28.4	n/a	82.0	24.0	72.0	Community	No	Depression
Tarabulsy et al. (2005)	2005	Journal article	Canada	16.5	17.4	51.6	100.0	n/a	n/a	Community	No	Depression
Raikes & Thompson (2006)	2006	Journal article	U.S.	28.0	25.5	52.4	78.6	94.0	23.8	Community	No	Depression
Shaw & Vondra (1995)	1995	Journal article	U.S.	16.0	25.0	41.0	61.0	73.5	46.0	Community	No	Depression

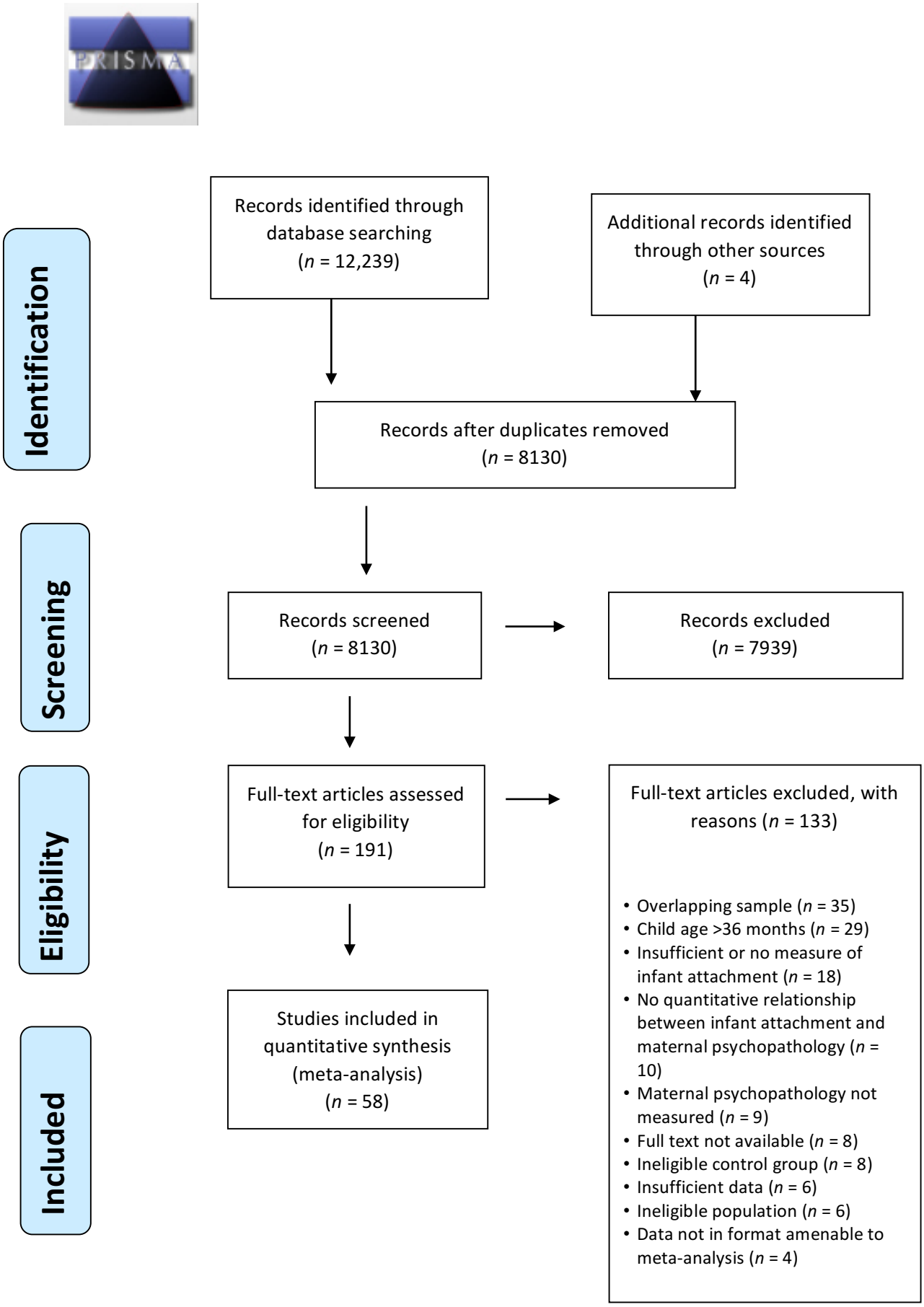
McKim, Cramer, Stuart & O'Connor (1999)	1992	Journal article	Canada	15.9	30.6	46.6	n/a	n/a	83.1	Community	No	Depression
O'Brien Caughy, Huang & Lima (2009)	2009	Journal article	U.S.	17.0	n/a	48.1	62.3	46.4	67.9	Community	No	Depression

[a] This table lists the moderator information for the studies that were included in the moderator analysis; studies included in Research Question 9. The moderator information for the remaining studies was coded, but is not included here.
[b] This table lists the information of the 12 moderators that were included in the analysis. The 13th moderator, co-morbidity status, is not included, as none of the above studies reported this information.

Table 12

Moderator Analyses

Moderator	No. Studies	*Q*	*p*-value	R^2
Gender composition of child sample (% Female)	12	6.54	.011	0.524
Mean age of the infant sample	17	0.41	.525	0.000
Mean age of the mother sample	14	2.72	.099	0.324
Racial composition of the mother sample (% White)	16	4.16	.042	0.959
Level of education of mother sample (% who completed high school)	10	0.26	.608	0.000
Family composition (% 2-parent household)	15	0.00	.952	0.000
Year of publication	17	0.45	.501	0.054
Type of publication	17	1.40	.238	0.010
Country of study	17	5.49	.064	0.217
Type of psychopathology	18	2.59	.274	0.117
Sample source (clinical vs. community)	17	17.57	<.001	0.785
Treatment status	17	4.05	.044	0.344


Identification
Screening
Eligibility
Included
Records identified through database searching (n = 12,239)
Additional records identified through other sources (n = 4)
Records after duplicates removed (n = 8130)
Records screened (n = 8130)
Records excluded (n = 7939)
Full-text articles assessed for eligibility (n = 191)
Full-text articles excluded, with reasons (n = 133)
• Overlapping sample (n = 35)
• Child age >36 months (n = 29)
• Insufficient or no measure of infant attachment (n = 18)
• No quantitative relationship between infant attachment and maternal psychopathology (n = 10)
• Maternal psychopathology not measured (n = 9)
• Full text not available (n = 8)
• Ineligible control group (n = 8)
• Insufficient data (n = 6)
• Ineligible population (n = 6)
• Data not in format amenable to meta-analysis (n = 4)
Studies included in quantitative synthesis (meta-analysis) (n = 58)

Appendix A

Coding Manual for Meta-Analysis of Maternal Psychopathology and Child Attachment Security

General Coding Notes:

Record the Study ID number at the top of every page used to code a given study.

In sections II – V, the data is broken down into ***insecure overall, avoidant, ambivalent, disorganized, and secure****. If the study does not indicate which insecure style, use insecure overall. If it happens to report on* ***security*** *(as opposed to* ***insecurity****), please indicate this very clearly as effects will need to be reversed in the calculations.*

Please note the following definitions:

Anxious attachment: can mean either avoidant or ambivalent. Code as Insecure Overall.

Dismissive: Code as avoidant (usually used to describe adults)

Disoriented: Same as disorganized.

Fearful: Code as avoidant (usually used to describe adults)

Preoccupied: Code as ambivalent (usually used to describe adults)

Resistant: Same as ambivalent

***If the paper places the word "insecure" or "anxious" before or after another attachment style term, use that other term in coding. E.g., "anxious-ambivalent" should be coded as ambivalent.*

In the case of longitudinal studies only record data from the first timepoint.

I. Study Level Descriptors

1. Bibliographic reference: _____
   _____
   _____

Write out the study reference in APA format. If two or more written reports were prepared on the same data, use the most comprehensive one.

2. Study ID number: _____

The Study ID number can be found in the "meta-analysis tracking file."

3. Type of publication:

1. Journal article
2. Book chapter
3. Conference paper
4. Thesis or doctoral dissertation
5. Unpublished data
6. Other

Please circle the number corresponding to the type of publication of the most comprehensive report consulted for this study.

4a. Publication year: _____

4b. Indicate if only published online to date: Yes/No

5. Place study conducted in:

a. US
b. Canada
c. Britain
d. Europe: _____
e. Australia
f. Israel
g. Other: _____

6. Maternal psychopathology diagnosed/confirmed by (circle all that apply):

a. Previous diagnosis by a qualified health professional (e.g., psychologist, family physician, paediatrician, psychiatrist) a condition of participation
b. SCID (*this is a diagnostic interview*)
c. SADS (*this is a diagnostic interview*)
d. Study Clinician interview *(any activity undertaken by a qualified professional involved in the study to establish or confirm a diagnosis, other than the SCID)*
e. Questionnaire (e.g., Beck Depression Inventory, Edinburgh Post-natal Depression Scale, State Trait Anxiety Inventory, Brief Symptom Inventory, Alcohol Use Disorders Identification Test, Minnesota Multiphasic Personality Inventory) : _____
f. Other: _____
g. None

The listing of questionnaires is not exhaustive. Other questionnaires may also be used and would be appropriately included in e. If a procedure other than those listed here is indicated, please circle f, and indicate the procedure.

7. Psychopathology type: (please circle the main diagnosis. If additional information about comorbidity is given, please write in this information and indicate how the secondary diagnosis was obtained. Please also provide any additional information given– e.g., postpartum depression)
   a) Depressive disorder:
   b) Bipolar disorder
   c) Anxiety disorder:
   d) Schizophrenia/psychotic disorder:
   e) Personality disorder:
   f) Substance abuse/addictive disorder:

8. Please indicate whether the psychopathology group is:
   a) Clinical
   b) Community
   c) Other: _____
   d) In treatment: _____

These groups are not necessarily mutually exclusive (i.e., could be a clinical group who is also in treatment). Please circle all that apply. If the group is in treatment, please circle "in treatment" and also indicate the type of treatment the group is receiving (ie. Anti-depressants, CBT, etc.)

9. Measure of attachment: _____

If more than one outcome measure is used in a given study, fill out separate forms for each and staple them together. This is done to ensure that each effect size is independent. Once we get to the analysis stage, we will then be able to statistically combine the effects from each measure in a study to produce an overall effect for that study.

10. Gender of identified child participants (pg. _____)

	n male	*n* female	% male	% female
Total Sample				
Psychopathology group				
Comparison group: _____				
Other Comparison group: _____				

Indicate whether the sample was restricted males, females, or if both genders were included. If both genders were included, indicate the percentage of each..

11. Child age (pg. _____)

	Mean	SD	Range	*n*
Total Sample				
Psychopathology group				
Comparison group: _____				
Other Comparison group: _____				

Indicate the mean age of the sample and any subsamples as appropriate, in months. Also indicate the standard deviation (SD) and sample size (n) where this information is available. Note that most studies will not provide information in all the categories. Record as much information as is available. At times you may need to calculate the mean age from other available data. If no age information is provided please write "Doesn't specify" beside child age.

11. Mother age (pg. _____)

	Mean	SD	Range	*n*
Total Sample				
Psychopathology group				
Comparison group: _____				
Other Comparison group: _____				

12. Mother racial background. (pg. _____)

	Caucasian (%)	African American (%)	Latino (%)	Asian American (%)	Other (%)
Total Sample					
Psychopathology group					
Comparison group: _____					

Other Comparison group: _____					

Please indicate the racial background of the mother sample for studies conducted in North America only.

13. Mother level of education (pg. _____)

	Less than High school (%)	High School (%)	Some post-secondary education (%)	Completed post-secondary education (%)
Total Sample				
Psychopathology group				
Comparison group: _____				
Other Comparison group: _____				

Indicate the level of education of the mother. Post-secondary education includes trade, College, University Certificate, Diploma, University degree.

14. Mother level of social support (pg. _____)

	Married and living with father (%)	Unmarried and living with father (%)	Divorced/unmarried, father involved (%)	Divorced/unmarried, father not involved (%)
Total Sample				
Psychopathology group				
Comparison group: _____				

Other Comparison group: _____				

Indicate the level of social support of the mother (family dynamics).

____

II. Group Comparison Studies, Continuous DV

1. Total N (both/all groups): _____

2. Compared to/between:

   a. Maternal psychopathology and control/psychopathology-free
   b. Between different types of maternal psychopathology

If more than one comparison was made (e.g., the individuals with and without psychopathology and also, between types of psychopathology) please do a separate form on each comparison.

3. Type of data effect size based on:

   1. Means and SD
   2. *t*-test
   3. One-way ANOVA

Indicate what type of data the effect size will be based on. They are ordered here in order of preference, with means and standard deviations being the most preferred format. Only choose one.

Avoidant:

Comparison	Mean	SD	*n*	t	F	df	p
Psychopathology							
Nonclinical							
Other:							

If means, standard deviations (SD) and sample size (n) are available, the other columns (t, F, df, p) do not need to be filled-in. Please note, for ANOVAs, ***only oneway ANOVAs*** *are eligible for effect size calculation. Also, for both t-tests and ANOVAs, record the most specific p value you can locate. If a specific p value is not indicated you may record the alpha level (e.g., $p < .05$) or n.s. for nonsignificant, if appropriate.*

Ambivalent:

Comparison	Mean	SD	*n*	t	F	df	p
Psychopathology							
Nonclinical							
Other:							

Insecure overall (if study doesn't break up into avoidant and ambivalent):

Comparison	Mean	SD	*n*	t	F	df	p
Psychopathology							
Nonclinical							
Other:							

Disorganized:

Comparison	Mean	SD	*n*	t	F	df	p
Psychopathology							
Nonclinical							
Other:							

III. Correlational Studies

1. Sample

    1. Psychopathology only
    2. Psychopathology and non-psychopathology
    3. Different types of psychopathologies: _____
    4. Other: _____

Indicate whether the study investigated attachment outcomes solely in a maternal psychopathology, in a combined maternal psychopathology and non-psychopathology group (where psychopathology symptoms were then included as a correlation), in a group that used 2 or more different psychopathology (in which case, please specify the psychopathologies), or in a differently-composed group (in which case, please specify).

2. N: _____

3. Correlations with attachment insecurity (if n differs from N above, please note appropriate n). If study reported on security (rather than insecurity), check here and highlight so that effects can be reversed: _____

Under "Measure" indicate the instrument used to measure the construct at hand (e.g., SSP, Attachment Q-Set).

Construct	Insecurity	Avoidant	Ambivalent	Disorganized	*n*	Measure
Maternal Psychopathology status overall						
Maternal Psychopathology symptoms						

IV. Chi-square studies/Group Comparison Studies, Categorical DV

Place the appropriate *n* in each box

	Insecure overall	Avoidant	Ambivalent	Disorganized	Secure
Psychopathology					
Nonclinical					
Other:					

V. Categorical DV, prevalence

Place the appropriate **%** in each box

	Insecure overall	Avoidant	Ambivalent	Disorganized	Secure
Psychopathology					
Nonclinical					
Other:					

Appendix B

Coding Form for Meta-Analysis of Maternal Psychopathology and Child Attachment Security

I. Study Level Descriptors

1. Bibliographic reference: _____
   _____
   _____

2. Study ID number: _____

3. Type of publication:

   12. Journal article
   13. Book chapter
   14. Conference paper
   15. Thesis or doctoral dissertation
   16. Unpublished data
   17. Other

4a. Publication year: _____

4b. Indicate if only published online to date: Yes/No

5. Place study conducted in:

   h. US
   i. Canada
   j. Britain
   k. Europe: _____
   l. Australia
   m. Israel
   n. Other: _____

6. Maternal psychopathology diagnosed/confirmed by (circle all that apply):

   h. Previous diagnosis by a qualified health professional (e.g., psychologist, family physician, paediatrician, psychiatrist) a condition of participation
   i. SCID (*this is a diagnostic interview*)
   j. SADS (*this is a diagnostic interview*)
   k. Study Clinician interview *(any activity undertaken by a qualified professional involved in the study to establish or confirm a diagnosis, other than the SCID)*

l. Questionnaire (e.g., Beck Depression Inventory, Edinburgh Post-natal Depression Scale, State Trait Anxiety Inventory, Brief Symptom Inventory, Alcohol Use Disorders Identification Test, Minnesota Multiphasic Personality Inventory) : _____
m. Other: _____
n. None

18. Psychopathology type: (please circle the main diagnosis. If additional information about comorbidity is given, please write in this information and indicate how the secondary diagnosis was obtained. Please also provide any additional information given– e.g., postpartum depression)
    g) Depressive disorder:
    h) Bipolar disorder
    i) Anxiety disorder:
    j) Schizophrenia/psychotic disorder:
    k) Personality disorder:
    l) Substance abuse/addictive disorder:

19. Please indicate whether the psychopathology group is:
    e) Clinical
    f) Community
    g) Other: _____
    h) In treatment: _____

7. Gender of identified child participants (pg. _____)

	n male	*n* female	% male	% female
Total Sample				
Psychopathology group				
Comparison group: _____				
Other Comparison group: _____				

8. Child adult age (pg. _____)

	Mean	SD	Range	*n*
Total Sample				
Psychopathology group				
Comparison group: _____				
Other Comparison group: _____				

.

11. Mother age (pg. _____)

	Mean	SD	Range	*n*
Total Sample				
Psychopathology group				
Comparison group: _____				
Other Comparison group: _____				

12. Mother racial background. (pg. _____)

	Caucasian (%)	African American (%)	Latino (%)	Asian American (%)	Other (%)
Total Sample					
Psychopathology group					
Comparison group: _____					
Other Comparison group: _____					

13. Mother level of education (pg. _____)

	Less than High school (%)	High School (%)	Some post-secondary education (%)	Completed post-secondary education (%)
Total Sample				
Psychopathology group				
Comparison group: _____				

Other Comparison group: _____				

14. Mother level of social support (pg. _____)

	Married and living with father (%)	Unmarried and living with father (%)	Divorced/unmarried, father involved (%)	Divorced/unmarried, father not involved (%)
Total Sample				
Psychopathology group				
Comparison group: _____				
Other Comparison group: _____				

II. Group Comparison Studies, Continuous DV

1. Total N (both/all groups): _____

2. Compared to/between:

   a. Maternal psychopathology and control/psychopathology-free
   b. Between different types of maternal psychopathology

3. Type of data effect size based on:

   a. Means and SD
   b. *t*-test
   c. One-way ANOVA

Avoidant:

Comparison	Mean	SD	*n*	t	F	df	p
Psychopathology							
Nonclinical							
Other:							

Ambivalent:

Comparison	Mean	SD	*n*	t	F	df	p
Psychopathology							
Nonclinical							
Other:							

Insecure overall (if study doesn't break up into avoidant and ambivalent):

Comparison	Mean	SD	*n*	t	F	df	p
Psychopathology							
Nonclinical							
Other:							

Disorganized:

Comparison	Mean	SD	*n*	t	F	df	p
Psychopathology							
Nonclinical							
Other:							

III. Correlational Studies

1. Sample
    1. Psychopathology only
    2. Psychopathology and non-psychopathology
    3. Different types of psychopathologies: _____
    4. Other: _____

2. N: _____

3. Correlations with attachment insecurity (if n differs from N above, please note appropriate n). If study reported on security (rather than insecurity), check here and highlight so that effects can be reversed: _____

Construct	Insecurity	Avoidant	Ambivalent	Disorganized	*n*	Measure
Maternal Psychopathology status overall						
Maternal Psychopathology symptoms						

IV. Chi-square studies/Group Comparison Studies, Categorical DV

Place the appropriate *n* in each box

	Insecure overall	Avoidant	Ambivalent	Disorganized	Secure
Psychopathology					
Nonclinical					
Other:					

V. Categorical DV, prevalence

Place the appropriate **%** in each box

	Insecure overall	Avoidant	Ambivalent	Disorganized	Secure
Psychopathology					
Nonclinical					
Other:					