The Relationship Between Paternal Depression and Family Functioning: Meta-Analyses on Child, Parenting, and Marital Outcomes

by

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Abstract

The current research literature on paternal depression and family functioning provides conflicting findings regarding the strength and direction of the association between paternal depression and negative family outcomes, including child externalizing behaviours, parenting behaviours, and marital quality. Meta-analyses are an efficient method of summarizing and analyzing mixed findings within the literature; however, the most recent meta-analyses on the present topic are outdated and only examined the association between paternal depression and child outcomes. The main objective of this research was to provide an updated summary of the strength and direction of the relationship between paternal depression and the following outcomes across three individual studies: (a) child externalizing behaviours (Study 1), (b) parenting behaviours (Study 2), and (c) marital quality (Study 3). The current dissertation found a small relationship between paternal depressive symptoms and child externalizing behaviors, negative parenting behaviors, and mother-rated marital quality. The relationship between paternal depressive symptoms and father-rated marital quality was medium. The relationship between paternal depressive symptoms and negative parenting behaviors was significantly moderated by the informant of the parenting behavior and the parenting behavior assessment. The outcomes of this dissertation suggest that practitioners should be mindful of the relationship between paternal depressive symptoms and the above family-related outcomes. Suggestions for future research and treatment implications are provided.

Keywords: externalizing behaviours, marital quality, meta-analysis, parenting behaviours, paternal depression

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Table of Contents

Abstract……...…….……...ii

Acknowledgements……iii

List of Tables……...…….…….……...viii

List of Figures…….…….…….……..xi

List of Appendices……..……...xii

Preface: Contributions of Authors ……...…….…….……...……...xiii

Chapter 1 – General Introduction…...……....……..…..…….…….1

Parental Depression.…….……1

Theories of Parental Depression.……...……..…….3

Maternal Depression…….……...…..…13

Changes to Paternal Involvement in Families and Research……...……....18

Paternal Depression.……..……..……...22

Rationale for the Current Research and Outline of Studies……...28

References……..31

Chapter 2 – Paternal Depression and Child Externalizing Behaviours: A Meta-Analysis…….50

Abstract…...…….……...……...……50

Introduction.……...…….……...……51

Method……...58

Results…....……..……..…64

Discussion.……..……..…..67

References……..……..……..76

Tables……...…….....91

Figures……...…101

Appendices……...…….……...103

Chapter 3 – Paternal Depression and Parenting Behaviours: A Meta-Analysis……..…...126

Abstract…...…….……..……....……..…126

Introduction……...…….……...……...……..127

Method…….135

Results..……...…….……141

Discussion...……...……..143

References……..……..…155

Tables……...…….....172

Figures……..173

Appendices……...…….……...174

Chapter 4 – Paternal Depression and Marital Quality: A Meta-Analysis.....……...….201

Abstract…...…….……..……....……..201

Introduction……...…….……...……...……..202

Method…….209

Results…....…….…215

Discussion……..……..…217

References……..……..…229

Tables……...…….…241

Figures……...…242

Appendices……...…….……...243

Chapter 5 – Conclusions and Implications……..……271

Research Summary…….....271

Distinct Contribution to the Literature……..…...271

Theoretical Implications…….……..…...272

Limitations of the Paternal Depression Literature…….……..276

Historical Changes in the Family……..……..….278

Gender Differences in Depression……..…….……278

Clinical Implications ……..……..…280

Directions for Future Research……..……..……285

Concluding Remarks……..……..…286

References……..……..…288

List of Tables

Chapter 2 – Paternal Depression and Child Externalizing Behaviours: A Meta-Analysis

Table 1: Characteristics of Manuscripts Included in the Meta-Analysis……...……...91

Table 2: Study-Level Effect Sizes by Child Externalizing Behaviour Outcomes…….....…..….95

Table 3: Moderator Analyses..……...99

Table 4: Distribution of Categories Across Moderators.……100

Table C1: Definitional Characteristics of Group Comparison Studies...…….122

Table C2: Characteristics of Studies Included in the Analysis of the Rate of Externalizing Disorders of Children of Fathers with Depression (Additional Research Question #1)…..……123

Table C3: Characteristics of Studies Included in the Analysis of the Odds Ratios of Children of Fathers with Depression Having an Externalizing Disorder Compared Children of Fathers without Depression (Additional Research Question #2)……...…….124

Table C4: Characteristics of Studies Comparing the Mean Level of Externalizing Behaviours of Children of Fathers with and without Depression (Additional Research Question #3)…....…125

Chapter 3 – Paternal Depression and Parenting Behaviours: A Meta-Analysis

Table 1: Moderator Analyses for Overall Parenting Behaviours……..…...172

Table C1: Characteristics of Manuscripts Included in the Analysis of the Degree of Association Between Paternal Depressive Symptoms and Positive Parenting Behaviours (Research Question #1).…….....……188

Table C2: Characteristics of Manuscripts Included in the Analysis of the Degree of Association Between Paternal Depressive Symptoms and Negative Parenting Behaviours (Research Question #2).……...……191

Table C3: Summary of the Meta-Analyses of the Degree of the Association Between Paternal Depressive Symptoms and Parenting Behaviours.……..……...……...…194

Table D1: Definitional Characteristics of Group Comparison Studies……...…198

Table D2: Characteristics of Studies Comparing the Mean Level of Positive Parenting Behaviours of Fathers with and without Depression (Additional Research Question #1)…...…199

Table D3: Characteristics of Studies Comparing the Mean Level of Positive Parenting Behaviours of Fathers with and without Depression (Additional Research Question #2)……..200

Chapter 4 – Paternal Depression and Marital Quality: A Meta-Analysis

Table 1: Moderator Analyses for the Relationship between Paternal Depressive Symptoms and Father-Rated Marital Quality…….……...…241

Table C1: Characteristics of Studies Comparing Father-Ratings of Marital Quality of Fathers with Higher Depressive Symptoms and Fathers with Lower or No Depressive Symptoms (Research Question #1)…….…...253

Table C2: Characteristics of Manuscripts Included in the Analysis of the Association Between Paternal Depressive Symptoms and Father-Rating of Marital Quality (Research Question #2) …..……255

Table C3: Characteristics of Manuscripts Included in the Analysis of the Association Between Paternal Depressive Symptoms and Mother-Rating of Marital Quality (Research Question #3) …….……...……...…258

Table D1: Characteristics of Studies Comparing Mother-Ratings of Marital Quality of Fathers with Higher Depressive Symptoms and Fathers with Lower or No Depressive Symptoms (Additional Research Question #3)…….…….……263

Table D2: Characteristics of Manuscripts Included in the Analysis of the Association Between Paternal Depressive Symptoms and Father-Rating of Negative Forms of Marital Quality (Additional Research Question #4)……..…….264

Table D3: Characteristics of Manuscripts Included in the Analysis of the Association Between Paternal Depressive Symptoms and Father-Rating of Positive Forms of Marital Quality (Additional Research Question #5)……..265

Table D4: Characteristics of Manuscripts Included in the Analysis of the Association Between Paternal Depressive Symptoms and Mother-Rating of Negative Forms of Marital Quality (Additional Research Question #6)……..…268

Table D5: Characteristics of Manuscripts Included in the Analysis of the Association Between Paternal Depressive Symptoms and Mother-Rating of Positive Forms of Marital Quality (Additional Research Question #7)……..269

List of Figures

Chapter 2 – Paternal Depression and Child Externalizing Behaviours: A Meta-Analysis

Figure 1: PRISMA Flow Chart……...…….……101

Figure 2: Cumulative meta-analysis sorted by ascending years.……..……..102

Chapter 3 – Paternal Depression and Parenting Behaviours: A Meta-Analysis

Figure 1: PRISMA Flow Chart……...…….……173

Chapter 4 – Paternal Depression and Marital Quality: A Meta-Analysis

Figure 1: PRISMA Flow Chart……...…….……242

List of Appendices

Chapter 2 – Paternal Depression and Child Externalizing Behaviours: A Meta-Analysis

Appendix A: Coding Manual for Meta-Analysis on Paternal Depression and Child Externalizing Behaviours ……..……...……..……...103

Appendix B: Coding Form for Meta-Analysis on Paternal Depression and Child Externalizing Behaviours ……..……...……..……...112

Appendix C: Additional Analyses……...118

Chapter 3 – Paternal Depression and Parenting Behaviours: A Meta-Analysis

Appendix A: Coding Manual for Meta-Analysis on Paternal Depression and Parenting Behaviours ……..……...…….……174

Appendix B: Coding Form for Meta-Analysis on Paternal Depression and Parenting Behaviours ……..……...……182

Appendix C: Supplementary Tables……....188

Appendix D: Additional Analyses…….……....195

Chapter 4 – Paternal Depression and Marital Quality: A Meta-Analysis

Appendix A: Coding Manual for Meta-Analysis on Paternal Depression and Marital Quality ……..……...…….……243

Appendix B: Coding Form for Meta-Analysis on Paternal Depression and Marital Quality ……..……...……249

Appendix C: Supplementary Tables……....253

Appendix D: Additional Analyses……...260

Preface: Contributions of Authors

Chapter 2 – Paternal Depression and Child Externalizing Behaviours: A Meta-Analysis

Kristene Cheung designed and executed the study, analyzed and interpreted the data, and wrote the manuscript. **Jennifer Theule** collaborated with the design and interpretation of the data, collaborated with writing the manuscript, and edited the final manuscript.

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Chapter 1 – General Introduction

Parental Depression

Depression is classified as a depressive disorder, which is broadly characterized by prolonged feelings of sadness, worthlessness, hopelessness, or irritability, as well as cognitive and physiological challenges that interfere with daily functioning (American Psychiatric Association [APA], 2013). The diagnostic features of depression include (a) depressed mood; (b) reduced interest in activities that were once pleasurable; (c) marked weight gain or weight loss, or increase or decrease in appetite; (d) difficulty falling asleep or feelings of fatigue; (e) feelings of guilt, worthlessness, hopelessness, or irritability; (f) difficulty concentrating or making decision; and (g) repeated thoughts of death and suicide-related thoughts or behaviors (e.g., plans, attempts). To be diagnosed with depression, individuals must experience several of the depressive symptoms listed above over a two-week period, and these symptoms must be observed as a notable change from their previous state of functioning. Depression often co-occurs with several different mental disorders, such as anxiety disorders (De Jong, Sportel, De Hullu, & Nauta, 2010; Spinhoven, van Balkom, & Nolen, 2011), posttraumatic stress disorder (Rytwinski, Scur, Feeny, & Youngstrom, 2013), and substance-related disorders (Najt, Poli, & Brambilla, 2011).

Depression has been recognized as one of the most burdensome disorders worldwide (Kessler & Bromet, 2013; World Health Organization [WHO], 2008) and is one of the leading causes of disability (WHO, 2008). Depression is also one of the most common mental disorders among parents (Baker & Lees, 2014; Ertel, Rich-Edwards, & Koenen, 2011), especially new parents (Vesga-Lopez et al., 2008) and parents of children with mental health (Baker & Lees, 2014) and physical health concerns (e.g., Kolaitis, Meentken, & Utens, 2017; Lv et al., 2009).

The prevalence rates of parental depression are estimated between 9% (Letourneau, Tramonte, & Willlms, 2013) and 18% (Kouros, Merrilees, & Cummings, 2008) for mothers, and 10% (Lee, Taylor, & Bellamy, 2012) to 14% (Kouros et al., 2008) for fathers. Research has shown that parental depression is related to negative family outcomes, including increased rates of mental disorders in the offspring (Goodman et al., 2011; Kane & Garber, 2004; Marchand-Reilly, 2012), compromised parent-child relationships (Lee et al., 2013; Logsdon, Wisner, & Pinto-Foltz, 2006), increased parenting stress (Theule, Wiener, Tannock, & Jenkins, 2013), reduced marital quality (e.g., Kouros et al., 2008; Ramchandani et al., 2011), and increased family discord (Foster et al., 2008; Pilowsky, Wickramaratne, Nomura, & Weissman, 2006). Although research on maternal depression tends to dominate the literature on parental depression and family functioning (Goodman et al., 2011; Surkan, Kennedy, Hurley, & Black, 2011), researchers have recently widened their focus to paternal depression as well.

The overarching goal of the current dissertation was to examine the relationship between paternal depression and family-related outcomes, including child externalizing behaviours (Study 1), parenting behaviours (Study 2), and marital quality (Study 3). The current dissertation consists of five chapters. The purpose of Chapter 1 is first to provide a brief overview of the research on maternal depression and family functioning, including the theories and models that guide our understanding of the research findings. This overview is presented in the current paper because of the assumption that the underlying theories and research on the effects of maternal depression on family functioning may also apply to the impact of paternal depression. Second, a brief description of the historical changes in the family will be highlighted. Third, a summary of the findings from the body of literature on paternal depression and family functioning will be provided. Fourth, the rationale for the present research will be offered. Chapter 1 is followed by

the manuscripts of Study 1 (Chapter 2), Study 2 (Chapter 3), and Study 3 (Chapter 4). Chapter 2, Chapter 3, and Chapter 4 are presented in a manuscript format to be submitted for publication. Given the manuscript style of this dissertation, there may be some overlap across the chapters. Finally, Chapter 5 discusses the outcomes of the three studies, highlights clinical implications, and provides suggestions for future research.

Theories of Parental Depression

The impact of parental depression in families can be conceptualized using two major theories: (a) family systems theory (Bowen, 1978), and (b) the cognitive theory of depression (Beck, 1972). The literature on parental depression and families has predominately focused on maternal depression; therefore, most theories of parental depression were initially developed to understand the impact of maternal depression on family functioning. Given that the roles of mothers and fathers are beginning to overlap (Lamb, 2010; Parker & Wang, 2013; Wang, Parker, & Taylor, 2013), the theories of maternal depression and family functioning may also apply to paternal depression.

Family systems theory. The first major theory that was used as an overarching theoretical framework for this dissertation is family systems theory proposed by Bowen (1978). Family systems theory is commonly used to explain the impact of mental disorders on a family (Rasheed, Rasheed, & Marley, 2011). Specifically, this theory emphasizes that each family member has an impact on the well-being of other members and the functioning of the family system (Bowen, 1978). That is, each family member contributes to the balance or imbalance in the family unit (Bowen, 1978). Based on family systems theory, parental depressive symptoms would be expected to have a direct or indirect impact on (a) each of the individual family members, (b) the interactions and relationships within the family system, and (c) the family as a

whole. For example, increased parental depressive symptoms may also (a) increase emotional or behavioural difficulties experienced by individual family members, (b) contribute to maladaptive parent-child interactions and relationships, and (c) heighten levels of stress in the family unit. Indeed, Goodman and Gotlib (1999) have stated that maternal depressive symptoms contribute to an imbalance in the family system, which ultimately gives rise to family dysfunction.

It is important to note that interactions within family systems are multi-directional in nature, such that a given interaction between family members will likely affect each of the individual family members involved (Bowen, 1978). Given the multi-directional nature of the family system, family systems theory suggests that individual family members and the family system could also have an influence on a parent with depression. For example, family members may act or respond to a parent in such a way that increases or decreases the parent's symptoms of depression. Indeed, researchers have found that family conflict (Koblinsky, Kuvalanka, & Randolph, 2006), marital conflict (Hanington, Heron, Stein, & Ramchandani, 2012; Kouros et al., 2008), and family stress (Herr, Hammen, & Brennan, 2007) tend to increase symptoms of maternal depression. Additionally, the theory emphasizes that when family members are experiencing difficulties, the emotional connection between family members often becomes strained and the family system experiences heightened levels of tension (Bowen, 1978). Family systems theory further proposes that the family members who often feel overwhelmed and distressed by other family members are also likely to be the most accommodating family member (Bowen, 1978). As an attempt to reduce stress in the family unit, these individuals tend to "absorb" the overall distress of the family system by either (a) accepting responsibility for the distress experienced by other family members, or (b) giving up their control (Bowen, 1978). Kerr (2000) suggests that these individuals are also most susceptible to marital difficulties,

physical health conditions, and mental disorders, including depression. Based on this theory, mothers who feel largely responsible for the well-being of the family unit may be especially susceptible to depression.

The cognitive theory of depression. The second major theory that was used as an overarching theoretical framework for this dissertation is the cognitive theory of depression (Beck, 1972). As the name suggests, Beck (1972) viewed depression from a cognitive perspective, consisting of three key mechanisms: (a) the "cognitive triad," (b) negative schemas, and (c) errors in logic (i.e., cognitive distortions or faulty information processing). The "cognitive triad" includes three components that Beck identified as being fundamental to depression as a disorder: (a) a negative view of the self, (b) a negative view of the world, and (c) a negative view of the future. In other words, Beck suggested that individuals with depression perceive themselves, the world, and their future primarily through a negative lens. Of note, Beck indicated that these three components interact with each other and can occur simultaneously, such that an individual may believe that their future is hopeless because they view themselves as being worthless, and vice versa.

The cognitive theory of depression holds that negative schemas might contribute to the development and maintenance of the "cognitive triad" (Beck, 1972). Schemas are organized concepts that help individuals interpret and organize new information, which enables them to process information with more efficiency, but not necessarily with more accuracy (Newman, 2013). Schemas are thought to develop from past experiences, which may be either positive or negative (Newman, 2013). Although individuals without depression also use a set of schemas, according to this theory, individuals with depression tend to have a more maladaptive, distorted, and depressive set of schemas than individuals without depression. For example, individuals

with depression tend to hold negative beliefs and expectations about situations and experiences. On the other hand, individuals who do not have predominately negative maladaptive schemas may enter a situation from a more positive or neutral stance.

The cognitive theory of depression also holds that individuals with distorted and maladaptive schemas are susceptible to making errors in logic, which are commonly referred to as faulty information processing, or cognitive distortions (Beck, 1972). This theory outlines several types of cognitive distortions, including arbitrary interference, selective abstraction, magnification, and minimization. Arbitrary interference is where an individual assumes that they are at fault for a negative event or a lack of an outcome (Beck, 1972; Newman, 2013). Selective abstraction refers to when an individual only focuses or hyper-focuses on negative features (i.e., thoughts or feelings) of a situation as opposed to attending to all aspects of the situation, including positive elements (Beck, 1972; Newman, 2013). Magnification and minimization are loosely defined as the tendency to overemphasize the negative and disqualify or downplay the positive, respectively (Beck, 1972; Newman, 2013).

Additional theories relevant to parental depression. Several other theories that are commonly cited in the depression literature, including the depression-distortion hypothesis (Richters & Pellegrini, 1989), the action-control framework (Dix & Meunier, 2009), and the couple and family model of depression (Beach, 2014). These theories are provided below and are organized in terms of their respective areas of research, which include parenting, marital quality, and child outcomes.

Depression-distortion hypothesis. The depression-distortion hypothesis was developed by Richters and Pellegrini (1989). It states that individuals with depression tend to have distorted and exaggerated perceptions of others (Richters & Pellegrini, 1989). This hypothesis

has been applied to mothers' perceptions of child behaviour problems (Cummings, Keller, & Davies, 2005; Cummings, Schermerhorn, Keller, & Davies, 2008; De Los Reyes, Goodman, & Kliewer, 2008; Gartstein, Bridgett, Dishion, & Kaufman, 2009), and adolescents' perceptions of negative parenting behaviours (Parent et al., 2014). If we consider the depression-distortion hypothesis with the cognitive theory of depression, it is clear that it is a specific type of cognitive distortion, namely a magnification.

Theory of maternal depression and parenting: The action-control framework. The action-control framework was proposed by Dix and Meunier (2009) and provides an explanatory framework for the association between maternal depression and negative parenting strategies. The framework was constructed based on a systematic review of 152 studies on maternal depression and parenting. Dix and Meunier attributed ineffective parenting techniques in these families to the presence of depressive symptoms, which impair a mother's ability to process information successfully at the following five stages: (a) goal processing, (b) input processing, (c) appraisal, (d) emotion, and (e) response processing. At the goal processing stage, depressive symptoms interfere with the ability to focus on parent-oriented goals (i.e., instilling values and developing skills), which in turn increases child-oriented goals (i.e., unreasonable requests or unchallenged inappropriate behaviours). The theory outlined that mothers with depression tend to select parenting methods that are low-effort and have short-term goals, which hinder positive long-term skill development. During the input processing stage, depressive symptoms reduce the extent to which a mother can effectively attend to and receive valuable social information, such as cues and emotions, from their children. At the appraisal stage, depressive symptoms increase the degree to which mothers engage in negative cognitive biases, which contribute to negative appraisals of their children, self-critical tendencies, and low parental self-efficacy. At the

emotion stage, depressive symptoms hinder a mother's ability to exchange positive emotional responses with her child. Finally, at the response processing stage, depressive symptoms reduce the extent to which a mother can generate positive and effective parenting responses, which in turn impedes her ability to problem-solve efficiently. The authors stated that this framework is consistent with other cognitive and cognitive-behavioural models, such as the cognitive theory of depression (Beck, 1972). Of note, the interactional features of this framework (i.e., mother-child dyads) are also congruent with family systems theory.

Theory of depression and marital quality: The couple and family model of depression (CFMD). The CFMD is an extension of the Marital Discord Model of Depression (Beach, Sandeen, & O'Leary, 1990) and was recently revised by Beach (2014). This model holds that depression arises from marital discord and marital stress, which can be generated by behaviours that increase marital distress or decrease marital support. Beach, Sandeen, and O'Leary (1990) identified six key factors related to marital support: (a) couple cohesion, (b) acceptance of emotional expression, (c) actual and perceived coping assistance, (d) self-esteem support, (e) spousal dependability, and (f) intimacy. Based on the model, a reduction in any one of these features reduces marital support and leads to marital discord and depression (Beach et al., 1990). The model also highlights five key features that are thought to increase marital stress, including (a) verbal and physical aggression; (b) threats of separation or divorce; (c) severe spousal denigration, criticism, and blame; (d) severe disruption of scripted routines; and (e) major idiosyncratic marital stressors (Beach et al., 1990). Beach et al. emphasized that both actual and perceived marital stressors and marital support should be considered when applying this model. They also speculated that depressive symptoms (a) interfere with an individual's ability to cope with marital difficulties effectively and (b) increase the tendency for both partners

to engage in avoidance. The authors posited that both of these issues (i.e., poor coping and avoidance) heighten levels of frustration between partners and ultimately lead to marital discord. The model also holds that experiencing depression changes an individual's thoughts and physiology, which further maintains the symptoms. The dyadic and interactive features of the CFMD align with family systems theory (Bowen, 1978) and the cognitive pieces regarding perceptions of marital stress fit with the cognitive theory of depression (Beck, 1972).

Theory of parental depression and child outcomes: The role model theory. Another theory that is cited in the parental depression literature is role model theory (see Brody & Hall, 2008), which states that children often model themselves after their same-gendered parent. Researchers have acknowledged that although children are often influenced by all members of their family, there is a tendency for children to be more similar to the same-gendered parent than the opposite-gender parent in terms of mannerisms and behaviours. For example, research has demonstrated that compared to sons of mothers with depression, daughters tend to be more negatively impacted (Cummings et al., 2005; 2008; Goodman et al., 2011; Silk, Shaw, Skuban, Oland, & Kovacs, 2006). Conversely, research studies have demonstrated that this finding holds true for sons of fathers with depression (Cummings et al., 2005; Ramchandani et al., 2013). Although this theory aligns more closely with the social learning theory (Bandura, 1962) and the gender schema theory (Bem, 1981) than the two major theories identified above, the basic concepts of family systems theory (i.e., each member of the family has an impact on other members of the family) still apply here.

Goodman and Gotlib's developmental model. A review of the theories of parental depression and family functioning would not be complete without mentioning Goodman and Gotlib's (1999) classic developmental model of the transmission of the risk of psychopathology

from mothers to children. This model specifically outlines four mechanisms and several moderating factors that the authors believe to be contributing elements to the development of psychopathology in children of mothers with depression. This model continues to be one of the most cited theories in the maternal depression literature to date; however, given that many of the mechanisms and moderating factors proposed by this model overlap with the theories above, only a brief description of this model will be provided.

Mechanism 1. Goodman and Gotlib (1999) postulated that children of mothers with depression have a genetic predisposition to developing depression.

Mechanism 2. Goodman and Gotlib (1999) proposed that children of mothers who experienced depression during their pregnancy are born with emotion regulation impairments, which present as notable behavioural tendencies or response styles, such as negative affect or problems with behavioural inhibition. The authors speculated that experiencing depression during pregnancy exposes the fetus to neuroendocrine alterations, which results in abnormal fetal development. Research supporting this mechanism found that depressive and anxious symptoms reported during pregnancy accounted for 27% of the variance in behavioral reactivity of 4-month-old infants (Davies et al., 2004). Another study demonstrated that prenatal depression was significantly related to infant negative behavioral reactivity even after controlling for postnatal depression and anxiety (Davis et al., 2007). Additionally, Field, Diego, and Hernandez-Reif (2006) found that newborns of mothers who experienced depression during pregnancy were more irritable, less responsive, had higher levels of cortisol, and lower levels of dopamine and serotonin compared to newborns of mothers who did not experience depression during pregnancy.

Mechanism 3. The third mechanism proposed by Goodman and Gotlib (1999) stated that

children of mothers with depression are exposed to dysfunctional and negative affect, cognitions, and behaviours, which contribute to the development of child psychopathology. Goodman and Gotlib noted that this mechanism has several connecting elements. First, due to experiencing negative affect, cognitions, and behaviours, mothers with depression have difficulty meeting the social and emotional needs of their child. Second, mothers with depression tend to struggle with parenting practices, which consequently interferes with the child's social and cognitive development. Third, children of mothers with depression learn dysfunctional and negative affect, cognition, and behaviour patterns by observing their mother. Fourth, children of mothers with depression tend to have negative cognitive biases that are further exacerbated and maintained by continually being exposed to maternal depressive symptoms. Several aspects of Goodman and Gotlib's third mechanism coincides with the cognitive theory of depression (Beck, 1972) by highlighting the impact that negative cognitions have on the mother-child dyad.

Mechanism 4. The fourth mechanism states that compared to their counterparts, offspring of mothers with depression are more likely to be exposed to stressors in their environment (Goodman & Gotlib, 1999). Some of the stressors that are noted in the literature include family conflict (Koblinsky et al., 2006), marital conflict (Hanington et al., 2012; Kouros et al., 2008), and family stress (Herr et al., 2007). Goodman and Gotlib (1999) suggested that exposure to the above stressors contribute to family dysfunction, and ultimately to the development of child psychopathology. Goodman and Gotlib's fourth mechanism aligns with family systems theory by recognizing the interconnection between maternal depression, child psychopathology, and familial dysfunction, and acknowledging the significance of each element within a family system.

Moderating factors. In addition to the four mechanisms noted above, Goodman and

Gotlib (1999) also proposed that the prognosis and timing of maternal depression moderates the risk of psychopathology in the offspring of mothers with depression. Based on the consequences of early exposure to and the cumulative effects of maternal depression, the authors suggested that an earlier age of onset of maternal depression has more negative implications for a child's development (Goodman & Gotlib, 1999).

The additional theories on parental depression discussed in this section tend to share common features with at least one of the two major theories identified above. For example, theories that feature an interactional component between the family subsystems, such as mother-child and mother-father dyads, tend to align with family systems theory (Bowen, 1978). Theories that incorporate specific cognitive aspects of depression are consistent with the cognitive theory of depression (Beck, 1972). Given the overlap between the various theories of parental depression and family systems theory (Bowen, 1978) and the cognitive theory of depression (Beck, 1972), these two major theories were used as the theoretical framework for this dissertation.

Although the theories presented above were established in the maternal depression literature, it is expected that apart from Goodman and Gotlib's (1999) second mechanism (i.e., stress experienced during pregnancy), all of the theories will also apply to the impact of paternal depression and family functioning to some extent. It is important to consider that certain aspects of the theories may apply to the paternal depression literature to a lesser degree because of the differences between mothers and fathers. For example, despite the general increase in paternal involvement in childcare over the past few decades (Pew Research Center, 2015), in some families, fathers continue to be uninvolved or less involved than mothers (Parker & Wang, 2013). Additionally, fathers are sometimes viewed as providing support to and helping mothers

with childcare rather than being an equal co-parent (Lamb, 2010; Parker & Wang, 2013; Wilson & Prior, 2010). Moreover, the roles of some fathers continue to differ from mothers, where fathers tend to be seen as a playmate (Wilson & Prior, 2010) as opposed to a nurturer (Lamb, 2010). Each of these considerations may influence the degree to which the theories outlined above are generalizable to the paternal literature.

Maternal Depression

Research on maternal depression tends to dominate the literature on parental depression and family functioning (Goodman et al., 2011; Surkan et al., 2011). The large body of literature on maternal depression seems to have emerged for three main reasons. First, research on family systems has mainly focused on mothers (Lamb, 2010). This is because historically, fathers and mothers were viewed as the sole breadwinner and the primary caregiver and homemaker, respectively (Bianchi & Milkie, 2010; Lamb, 2010; Wang et al., 2013). Second, maternal depression is one of the most prevalent types of parental psychopathology (Kouros et al., 2008). Third, research studies have consistently demonstrated that maternal depression is associated with negative family outcomes, including poverty, unemployment, financial stress, poor physical health, limited social support, and family dysfunction (Ertel et al., 2011; Horowitz, Briggs-Gowan, Storfer-Isser, & Carter, 2007).

Child externalizing behaviours. Researchers in the field of maternal depression have come to a consensus that exposure to maternal depression is strongly associated with child psychopathology, especially externalizing behaviours (Fletcher et al., 2011; Goodman et al., 2011; Kouros et al., 2008). Externalizing behaviours, which are colloquially referred to as behaviour problems, include symptoms associated with disruptive behaviour disorders, such as oppositional defiant disorder (ODD) and conduct disorder (CD). Externalizing disorders are

highly prevalent among children and adolescents (APA, 2013; Merikangas et al., 2010a; 2010b) with lifetime prevalence estimates of 12.6%, and 6.8%, for ODD and CD, respectively (Merikangas et al., 2010b). Externalizing disorders have also been found to be prevalent among children of mothers who have experienced depression during (Murray et al., 2011) and outside of (Barker, Copeland, Maughan, Jaffee, & Uher, 2012) the postpartum period. Findings from a population-based study demonstrated that compared to children of mothers without depression, children of mothers with depression had 2.3 and 4.5 the odds of having ODD and CD, respectively (Barker et al., 2012).

In addition to higher rates of externalizing disorders among children of mothers with depression, studies have consistently demonstrated a strong correlation between maternal depressive symptoms and externalizing behaviours. Based on Cohen's (1977, 1988) guidelines for effect size interpretation where small: $r \leq .10$, medium: $r = .30$, and large: $r \geq .50$, a meta-analysis by Goodman et al. (2011) found a small effect size for the association between maternal depressive symptoms and child externalizing behaviours. Findings from more recent studies have also corroborated the results of the above meta-analysis. Specifically, research continues to demonstrate a link between maternal depressive symptoms and overall symptoms of oppositional-defiant behaviour (Dette-Hagenmeyer & Reichle, 2014), conduct problems (Fletcher et al., 2011), delinquency (Kouros et al., 2008), and aggression (Kouros et al., 2008; Letourneau et al., 2013). Furthermore, consistent with the role model theory, findings from multiple studies imply that daughters of mothers with depression tend to be more negatively impacted than sons with respect to emotion regulation (Silk et al., 2016), and externalizing problems (Cummings et al., 2005; Goodman et al., 2011).

Maternal depression and family functioning. In addition to child externalizing

behaviours, researchers have also demonstrated that maternal depression is associated with negative parenting behaviours, decreased marital quality, chronic family stress, family conflict, and negative family relationships (Horowitz et al., 2007).

Parenting behaviours. The research on maternal depression and parenting behaviours often examines the presence and absence of negative and positive parenting behaviours, respectively. Maternal depression is associated with several negative parenting behaviours, including rejection (Elgar, Mills, McGrath, Waschbusch, & Brownridge, 2007), inconsistent (Dette-Hagenmeyer & Reichle, 2014; Leung & Slep, 2006), ineffective, harsh, and manipulative (Leung & Slep, 2006) discipline. With respect to the absence of positive parenting behaviours, studies have demonstrated a relationship between maternal depression and reduced levels of parenting quality (Letourneau, Salmani, & Duffett-Leger, 2010), warmth (Letourneau et al., 2010; Waylen & Stewart-Brown, 2010), acceptance (Herr et al., 2007), support (Waylen & Stewart-Brown, 2010), monitoring (Elgar et al., 2007), and nurturance (Elgar et al., 2007; Letourneau et al., 2010). Researchers have proposed that difficulties with positive parenting behaviours exhibited by mothers with depression could be attributed to the fact that mothers with depression tend to have difficulty meeting their children's emotional needs (Dix & Meunier, 2009; Goodman & Gotlib, 1999; van Doesum, Hosman, Riksen-Walraven, & Hoefnagels, 2007) and struggle with providing an adequate degree of responsiveness to their children (Ashman, Dawson, & Panagiotides, 2008; Maughan, Cicchetti, Toth, & Rogosch, 2007). Studies have also suggested that maternal depressive symptoms interfere with a mother's ability to recognize her infant's cues, provide positive feedback (van Doesum et al., 2007), demonstrate positive expression (Feng, Shaw, Skuban, & Lane, 2007), and be emotionally available or provide warmth (Cummings et al., 2005).

Marital quality. Considering the research on the relationship between maternal depression and parenting behaviours described above, it is not surprising that maternal depression has also been shown to be associated with negative marital quality (Nelson, O'Brien, Blankson, Calkins, & Keane, 2009; Smith, Eryigit-Madzwamuse, & Barnes, 2013; Weinfield, Ingerski, & Moreau, 2009). Marital quality is often assessed using measures of marital satisfaction, cohesion, affection, conflict, and distress (Pritchett et al., 2011). Studies show that maternal depression is associated with increased marital discord (Smith et al., 2013), decreased marital satisfaction (Nelson et al., 2009; Weinfield et al., 2009), and subsequent marital breakdown (Meadows, McLanahan, & Brooks-Gunn 2007).

Maternal postpartum depression and family functioning. In recent years, more research has begun to examine maternal postpartum depression, which is a form of depression that may begin during pregnancy and up to one year after the birth of a child (Leitch, 2002). Much research on maternal postpartum depression consistently concurs with the family research on maternal depression reviewed above (Letourneau et al., 2012). Feldman et al. (2009) reported that maternal postpartum depressive symptoms are negatively correlated with maternal adjustment, parental competence, and social support. The authors also found that maternal depressive symptoms reported at six months postpartum were significantly related to parenting stress. Additionally, mothers with postpartum depression had higher levels of withdrawal and lower levels of sensitivity during mother-infant interactions compared to mothers with postpartum anxiety and control mothers (Feldman et al., 2009). With respect to child outcomes, infants of mothers with postpartum depression had lower levels of social engagement and also tended to fuss and cry more than infants of mothers without postpartum anxiety or depression (Feldman et al., 2009). Notably, some of these factors (e.g., withdrawal, sensitivity) are related

to mother-infant attachment. Based on attachment theory, which underscores that early infant-caregiver interactions guide an individual's future understanding of relationships (Bowlby, 1973), it is not surprising that compared to their counterparts, infants of mothers with depression are at greater odds of having non-secure attachment styles (i.e., insecure and disorganized attachment styles; Barnes & Theule, 2016). The type of attachment style developed in infancy is especially important given the stability of attachment style across the developmental lifespan (Fraley, 2002) and the inter-generational transmission of attachment styles (i.e., infants of mothers with non-secure attachment styles tend to have non-secure attachment styles themselves; Steele, Steele, & Fonagy, 1996). Notably, researchers have found that non-secure attachment styles are related to child externalizing behaviours (Theule, Germain, Cheung, Hurl, & Markel, 2016), parenting behaviours (Karavasilis, Doyle, & Markiewicz, 2003), and marital dissatisfaction (Banse, 2004).

Family functioning in families of mothers with depression in relation to child outcomes. Based on family systems theory (Bowen, 1978), it is not surprising that the domains described above (i.e., child externalizing behaviours, parenting behaviours, and marital quality) are interconnected (Du Rocher Schudlich & Cummings, 2007; Elgar et al., 2007; Hanington et al., 2012; Kouros et al., 2008). Specifically, research has demonstrated that marital difficulties are associated with increased child adjustment difficulties (i.e., externalizing behaviours; Cummings, Cheung, Koss, & Davies, 2014; Du Rocher Schudlich & Cummings, 2007; Hanington et al., 2012; Kouros et al., 2008) and decreased positive parenting behaviours (Du Rocher Schudlich & Cummings, 2007). Moreover, studies have found a relationship between negative parenting behaviours and child externalizing behaviours (Elgar et al., 2007; McCoy, George, Cummings, & Davies, 2013; Schoppe-Sullivan, Schermerhorn, & Cummings, 2007).

Changes to Paternal Involvement in Families and Research

Historical changes in the family and fatherhood. Several historical changes in the family have altered the roles of fathers and how we view fatherhood in our society (Bianchi & Milkie, 2010; Galinsky, Aumann, & Bond, 2011; Parker & Wang, 2013; Wang et al., 2013). Some of these changes could be attributed to increased rates of separation, divorce, and common-law relationships, in conjunction with the rise of married and cohabiting same-sex couples (Parker & Wang, 2013); however, the most notable changes that have occurred over the past half-century include the increase in maternal employment and the increase in paternal involvement in caregiving (Bianchi & Milkie, 2010; Galinsky et al., 2011; Parker & Wang, 2013; Wang et al., 2013). The recent increase in maternal employment has had both direct and indirect impacts on the increase in paternal involvement in childcare (Parker & Wang, 2013; Wang et al., 2013).

Maternal employment. Traditional gender roles are converging and strict adherence to these roles has decreased since the 1960s (Wang et al., 2013). In 2015, only about one-quarter of families maintained the traditional male breadwinner and female homemaker roles (Patten, 2015), which is a significant decrease from 70% of families in the 1960s (Wang et al., 2013). There has also been a shift from mothers being the primary caregiver to mothers providing a source of income (Wang et al., 2013). Specifically, nearly half of the workforce is currently made up of women, with approximately 71% of them being mothers, which is a notable increase from 37% in 1968 (Parker & Wang, 2013). This trend is often attributed to the increased employment rate and educations levels among mothers (Galinsky et al., 2011; Parker & Wang, 2013; Wang et al., 2013). Moreover, recent estimates have reported that about 63% of married/cohabiting parents have two incomes (i.e., dual-earner couples; Patten, 2015), which is

up from 25% in the 1960s (Parker & Wang, 2013; Wang et al., 2013). The number of families where both parents work full-time has also increased from 31% in 1970 to 46% in 2015 (Patten, 2015).

Maternal employment and paternal involvement in childcare. Compared to 50 years ago, fathers are spending less time engaging in paid employment (Galinsky et al., 2011; Parker & Wang, 2013), and more time participating in housework and childcare (Parker & Wang, 2013). Specifically, an American survey found that the time spent engaged in housework and childcare has doubled for fathers and reduced by half for mothers (Parker & Wang, 2013). Recent surveys have also estimated that the amount of time that fathers are spending with their children has tripled over the past 50 years (Galinsky et al., 2011; Parker & Wang, 2013). Specifically, the average number of hours fathers spend per week on childcare has increased from 2.5 hours in 1965 to 8 hours in 2016 (Parker & Livingston, 2018). This number has also increased among mothers, with mothers reporting that they spent 10 hours a week on childcare in 1965 to 14 hours a week in 2016 (Parker & Livingston, 2018). Of note, the majority of the samples surveyed were White and college educated or employed. Therefore, the results may not be generalizable across diverse populations (e.g., different ethnicities or socioeconomic status).

With increased paternal involvement in the home, fathers are subject to difficulties in maintaining a work-life balance. A recent survey found that about half of working mothers and fathers preferred to be at home with their children (Parker & Wang, 2013), whereas the other half of working mothers and fathers expressed a desire to continue working while at the same time acknowledging that it takes away from time with their family (Parker & Wang, 2013). In recent years, fathers have been reportedly experiencing greater work-life conflict than ever before (Galinsky et al., 2011; Parker & Wang, 2013) and their views on work-life conflict are becoming

much more similar to those of working mothers (Parker & Wang, 2013). Researchers have identified several factors that predict work-life conflict among fathers, including working more hours, being in a dual-earner relationship (i.e., both partners are involved in paid labor), being family or dual-centric (i.e., being family and work-centered), and having high levels of job pressure (Galinsky et al., 2011). On the other hand, engaging in self-care, having other family members take responsibility for childcare, and perceiving greater autonomy at work are associated with lower levels of work-life conflict (Galinsky et al., 2011). In addition, the importance of maintaining a work-life balance seems to be more important for fathers than working mothers with respect to their degree of perceived happiness (Parker & Wang, 2013). Specifically, researchers found that compared to working mothers, fathers' level of happiness were more strongly associated with their work-life balance (Parker & Wang, 2013). Approximately one-half of fathers surveyed believed that they were not spending enough time with their children, compared to about one-quarter of mothers (Parker & Wang, 2013). When asked to rate themselves as parents, working mothers tended to give themselves higher ratings than working fathers (Parker & Wang, 2013). Given that their perceived parent ratings were associated with the amount of time spent with their children, it is not surprising that working mothers rated themselves higher than fathers.

Fathers as the primary caregiver. There has been an increase in the number of stay-at-home (Uppal, 2015) and single (Beaupré, Dryburgh, & Wendt, 2014; Bronte-Tinkew, Scott, & Lilja, 2010) fathers in recent years. The rate of stay-at-home fathers has at least doubled over the past decade (Uppal, 2015) with approximately 6% of partnered fathers (i.e., married or cohabiting) identifying as stay-at-home fathers (Parker & Wang, 2013). In comparison, the number of stay-at-home fathers is about one-fifth of the number of stay-at-home mothers (Parker

& Wang, 2013). With regards to single fathers, there has been an eightfold increase in the amount of time that single fathers are spending with their children compared to 30 years ago (Parker & Wang, 2013). Specifically, in 2011, single fathers reported spending about eight hours a week with their children compared to less than one hour per week in 1985 (Parker & Wang, 2013). Overall, in today's society, fathers are now being viewed as meaningful contributors to child development more than ever before (Pew Research Center, 2015; Pleck, 2010).

Paternal presence in research. Historically, mothers have largely been seen as the primary caregiver in and outside of the research context. In fact, over the past several decades, mothers have often been the sole participant in research on families and parenting to the extent that even the introduction of fathers in family-related research was primarily conducted through a maternal lens (for a review see Lamb, 2010). Early paternal research in the field of mental health relied on maternal reports of paternal symptoms and parenting practices (Lamb, 2010; Pleck, 2010). In addition, some of the earliest research on fatherhood focused on the consequences of "fatherlessness," and masculinity (Garfield et al., 2014; Lamb, 2010; Pleck, 2010). Over the past few decades, research on fathers has begun to increase and diversify. This trend likely emerged from several societal and economic changes that have occurred over the past few decades as described above. One area of study that has increased over the past few decades is paternal mental health including paternal depression (for a review see Bradley & Slade, 2011; Cummings, Merrilees, & George, 2010; Edward et al., 2015; Price-Robertson, 2015; Schumacher, Zubaran, & White, 2008). Research on paternal depression has substantially increased as researchers and clinicians have begun to recognize the importance of studying and understanding paternal depression with respect to family outcomes (for a review see Spector, 2006).

Paternal Depression

Despite the recency of the emergence of research on paternal depression (Edward et al., 2015; Schumacher et al., 2008), paternal depression is not a new phenomenon, but rather an understudied area compared to maternal depression. Although there is an extensive body of research on maternal depression and family functioning, as reviewed above (Goodman et al., 2011; Surkan et al., 2011; Wachs, Black, & Engle, 2009), researchers have suggested that when examining risk factors for poor child outcomes, considering paternal depression may be just as important as focusing on maternal mental health problems (Nath et al., 2016). As researchers recognize the importance of studying fathers as another unique contributor to child development, more studies on paternal depression and family functioning have been published in recent years. Moreover, researchers have also suggested that additional studies on paternal depression and family functioning should be conducted given that unlike the literature on maternal depression, there is still a lack of consensus regarding paternal depression and family outcomes.

Paternal depression and child, parenting, and marital outcomes. Although there is an established body of literature on maternal depression and family functioning, a complete understanding of the impact of paternal depression on child functioning cannot simply be deduced from or restricted to the literature on maternal depression. One of the reasons for supporting the examination of paternal depression research in relation to family functioning is that there are notable gender differences between males and females with respect to depression (APA, 2013; Edward et al., 2015). One of the most salient gender differences in depression is in symptom presentation (Edward et al., 2015), where compared to females, males often demonstrate more change in social behaviour and withdrawal from social situations (for a review see Spector, 2006). Also, males with depression often exhibit more symptoms of indecisiveness,

irritable mood, and cynicism than females (for a review see Spector, 2006). Moreover, there are differing societal views of maternal and paternal depression, especially regarding postpartum depression. For example, maternal postpartum depression is often seen as biological, whereas paternal postpartum depression (i.e., depression experienced by fathers during the postpartum period) is often seen as psychosocial (Edward et al., 2015). Furthermore, given that mothers are traditionally viewed as the nurturer (Lamb, 2010) and tend to play a greater role in emotion socialization than fathers (Cassano, Perry-Parrish, & Zeman, 2007; Fivush, Brotman, Buckner, & Goodman, 2000; Klimes-Dougan et al., 2007), the impact that maternal depression has on the children and the family may differ from paternal depression.

Child externalizing behaviours in families of fathers with depression. There has been a steady increase in the number of studies that have examined the association between child externalizing behaviours and paternal depression; however, this current body of literature is mixed. Some research shows that paternal depression is associated with symptoms of externalizing behaviours, such as oppositional-defiant behaviour (Dette-Hagenmeyer & Reichle, 2014), conduct problems (Fletcher et al., 2011; Nath et al., 2016; Ramchandani et al., 2008), and overall externalizing behaviour (Cummings et al., 2008; Kane & Garber, 2009; Marchand-Reilly, 2012). Other studies either failed to find an association (Fisher, Brock, O'Hara, Kopelman, & Stuart, 2015; Meadows et al., 2007) or demonstrated a weak association (Hanington et al., 2012; Malmberg & Flouri, 2011).

Kane and Garber (2004) conducted the most recent meta-analysis on paternal depression and child externalizing behaviours. They found a small association between paternal depressive symptoms and child externalizing behaviours; however, an interesting trend emerged when the effect sizes were organized based on the year of publication. Notably, a larger relationship

between paternal depression and child externalizing behaviours appeared with publication dates after 1990. The above finding can also be observed in more recent studies (e.g., Dette-Hagenmeyer & Reichle, 2014; Nath et al., 2016). Furthermore, some of the earliest studies included in Kane and Garber's meta-analysis (e.g., Forehand, Long, Brody, & Fauber, 1986; Webster-Stratton, 1988) produced negative effect sizes, which suggested a negative association between paternal depressive symptoms and child externalizing behaviours.

Even though more recent research appears to demonstrate a larger relationship between paternal depression and child externalizing behaviours, the more recent studies published in this area continue to be mixed. In addition to the year of publication, other study characteristics may also have an impact on the strength of the relationship. Collectively, the studies that demonstrated stronger associations between paternal depression and child externalizing behaviours (r = .18, Dette-Hagenmeyer & Reichle, 2014; r = .36, Kane & Garber, 2009) tended to differ from studies that found no (r = .03, Kouros et al., 2008; r = .10, Meadows et al., 2007) or weak (r = .12; Malmberg & Flouri, 2011) relationships. Notably, these studies tended to consist of child samples with an older mean age (i.e., at least five years of age) and with a higher composition of boys (Cummings et al., 2005; Kane & Garber, 2009; Ramchandani et al., 2013). The finding that studies with samples of older children seemed to coincide with a stronger relationship between paternal depression and child externalizing behaviours is consistent with the developmental trajectory of ODD and CD, where increased rates and symptoms are often seen in older children compared to younger children (Frick & Viding, 2009; Murray & Farrington, 2010). On the other hand, studies that found weak or no relationship between paternal depression and child externalizing behaviours also seemed to share several sample characteristics. For example, the samples of the studies tended to be restricted to biological

fathers (Malmberg & Flouri, 2011) and two-parent families (Kouros et al., 2008; Malmberg & Flouri, 2011; Meadows et al., 2007). In addition, the sample of child participants in these studies often had a young mean age (i.e., under five years of age; Malmberg & Flouri, 2011; Meadows et al., 2007).

The results from a handful of studies seemed to be related to other factors, such as who assessed the child externalizing behaviours, and the gender of the child sample. For example, studies have found that paternal depression is associated with father-reported, but not mother- (Cummings et al., 2005; 2008) or teacher- (Cummings et al., 2005) reported child externalizing behaviours. In terms of differences with respect to child gender, research has suggested that sons are more negatively influenced by paternal depression than daughters (Ramchandani et al., 2013). Consistent with the role model theory, studies show that sons of fathers with depression are more likely to exhibit externalizing behaviours than daughters of fathers with depression (Cummings et al., 2005; Ramchandani et al., 2013).

Although some study characteristics seem to correspond to specific results, other study characteristics do not appear to align with stronger or weaker relationships clearly. One such study characteristic is the time at which paternal depression was assessed. One study found that paternal depressive symptoms assessed during the postpartum period were associated with an increased risk of having conduct problems (odds ratio = 1.69; Fletcher et al., 2011). Yet, the findings from other studies demonstrated a weak relationship between postpartum paternal depressive symptoms and child conduct problems when assessed at 42 months (r = .07; Hanington et al., 2012) and seven years of age (r = .10; Nath et al., 2016). Other study characteristics that seem to be unclear with respect to their impact on the relationship between paternal depression and child externalizing behaviours are the sampling method (i.e., community

versus clinical samples), and where the study was conducted (i.e., country of study). Of note, many of the studies on paternal depression and child externalizing behaviours were conducted in North America or Europe, and recruited from community samples or used representative samples (Dette-Hagenmeyer & Reichle, 2014; Fletcher et al., 2011; Hanington et al., 2012; Kane & Garber, 2009; Malmberg & Flouri, 2011; Meadows et al., 2007; Nath et al., 2016).

Paternal depression and parenting behaviours. Recent studies have suggested that paternal depression is related to maladaptive and negative parenting behaviours (Dette-Hagenmeyer & Reichle, 2014; Du Rocher Schudlich & Cummings, 2007; Elgar et al., 2007; Marchand-Reilly, 2012). Notably, a handful of studies demonstrated that paternal depressive symptoms were correlated with rejection (Elgar et al., 2007), over-reactive and lax discipline (Marchand-Reilly, 2012), and utilization of psychological control (Aunola, Ruusunen, Viljaranta, & Nurmi, 2015). In addition, paternal depression has also been found to be associated with low warmth (Epkins & Harper, 2016; Harold et al., 2011), nurturance (Elgar et al., 2007), and parental acceptance (White et al., 2009). Moreover, a meta-analysis by Wilson and Durbin (2010) found that paternal depression was significantly associated with maladaptive parenting behaviours. The authors also suggested that the relationship between paternal depression and parenting behaviours resembled that of the association between maternal depression and parenting behaviours. Interestingly, similar to the meta-analysis by Kane and Garber (2004), the studies that were published more recently (i.e., post-2000s) tended to be associated with larger effect sizes. The observed finding may be attributed to the societal changes mentioned above, including greater paternal involvement in childcare (Pew Research Center, 2015) and an increase in parental responsibilities among fathers (Parker & Wang, 2013; Pew Research Center, 2015). Elger et al. (2007) even found that paternal depression was more strongly associated with

negative parenting behaviours than maternal depression. That said, a handful of studies failed to find a correlation between paternal depression and negative parenting (Cummings et al., 2005), parental hostility (Reeb et al., 2014), or decreased levels of warmth (Harvey, Stoessel, & Herbert, 2011).

Unlike the research on paternal depression and child externalizing behaviours, specific study characteristics do not appear to have a noticeable impact on the relationship between paternal depression and parenting behaviours. This finding may be due to the fact that many of the studies on paternal depression and parenting behaviours tend to share the following study characteristics: (a) having high rates of maternal depression in the sample, (b) using self-reports as opposed to observational data to assess parenting behaviours, and (c) recruiting participants from American or European community samples (e.g., Dette-Hagenmeyer & Reichle, 2014; Du Rocher Schudlich & Cummings, 2007; Elgar et al., 2007; Reeb et al., 2014).

Paternal depression and marital quality. Much research suggests that paternal depression is associated with unfavorable marital outcomes (Cummings et al., 2005; Hanington et al., 2012; Kouros et al., 2008; Ramchandani et al., 2011; Reeb et al., 2014). Specifically, studies have demonstrated a link between paternal depression and reduced marital satisfaction (e.g., Beach, Katz, Kim, & Brody, 2003; Bower, Schoppe-Sullivan, Mangelsdorf, & Brown, 2013), a lack of relational cohesion (Ramchandani et al., 2011), and decreased marital happiness (Yang, 1997). Preliminary research on paternal postpartum depression and marital quality concur with the above findings (Goodman, 2008; Ramchandani et al., 2011; Smith et al., 2013). Additionally, lower marital satisfaction (Da Costa et al., 2015), lower levels of affection (Bradley & Slade, 2011), and marital difficulties (for a review see Spector, 2006) have been identified as significant risk factors for paternal postpartum depression.

Interestingly, father-reported marital dissatisfaction tended to be more strongly associated with paternal depressive symptoms than mother-reported marital dissatisfaction (Nelson et al., 2009; Ramchandani et al., 2011). Moreover, Ramchandani et al. (2011) found that fathers with depression had significantly lower ratings of overall satisfaction, cohesion, and higher levels of mutual critical tendencies than fathers without depression. On the other hand, there were no significant differences between fathers with and without depression when mothers provided ratings on the above measures (Ramchandani et al., 2011). A study by Sevigny and Loutzenhiser (2010) also found that paternal depressive symptoms were only related to father-ratings of marital satisfaction and not mother-ratings.

Similar to the research on paternal depression and parenting behaviours, the majority of the studies conducted on paternal depression and marital quality seemed to have several study characteristics in common. Specifically, most samples were recruited from American or European communities, and had rates of maternal depression in the sample as high as 42% (Kovacs, 2003).

Rationale for the Current Research and Outline of Studies

The main objectives of the present dissertation were to provide an updated understanding of, and further insight into, the functioning of families of fathers with depression or depressive symptoms. Of note, the studies available on each given topic determined whether paternal depression was assessed in terms of (a) clinical diagnoses (i.e., currently meets diagnostic criteria for major depressive disorder); (b) depression status (i.e., currently meets or exceeds clinical cut-offs on symptom severity measures); or (c) depressive symptoms (i.e., using a continuous measure of depressive symptoms). Paternal depression is an understudied area of research (Nath et al., 2016), yet research suggests that paternal depression is just as important as maternal health

problems when considering risk factors for child outcomes (Kane & Garber, 2009; Nath et al., 2016). Researchers have also suggested that the impact of paternal depression on child and family functioning may be unique from maternal depression (Kane & Garber, 2009). With the number of societal and economic changes that have occurred over the past few decades, society's view of fathers has moved away from the "forgotten" parent (Lamb, 1975) to a meaningful contributor to child development (Lamb, 2010; Pleck, 2010). This increased awareness also seems to coincide with the substantial growth of research on paternal depression (Edward et al., 2016; Schumacher et al., 2008), and vice versa. Therefore, it is imperative that we update our understanding of paternal depression and family-related outcomes.

This research investigated the association between paternal depression and the following outcomes across three individual studies: (a) child externalizing behaviours (Study 1, Chapter 2), (b) parenting behaviours (Study 2, Chapter 3), and (c) marital quality (Study 3, Chapter 4). The three outcomes were selected for this dissertation because each outcome either represents a family subsystem (i.e., father-child dyad, father-mother dyad) or a key aspect of family functioning (i.e., parenting; Pritchett et al., 2011). Considering the main purpose of the current dissertation, to gain further insight into the functioning of families of fathers with depression or depressive symptoms, it was important to assess the impact of paternal depression across several family-related domains. Additionally, this research examined whether specific factors influence the relationship between paternal depression and the specific outcomes noted above.

The outcomes of the current dissertation have implications for both the academic and non-academic community, namely other researchers, knowledge users, educators, clinicians, and the general public in several ways. Clarifying the discrepancies pertaining to the relationship between paternal depression and family-related outcomes has both research and treatment

implications. Concerning future research, the results of this dissertation may generate conversations and future research ideas about paternal depression, which may be valuable to researchers and educators. The findings of the current dissertation will also (a) highlight the impact that fathers have on the family, (b) inform clinicians of the links between paternal depressive symptoms and family-related outcomes, and (c) encourage clinicians to include fathers in treatment and programming.

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Chapter 2 – Paternal Depression and Child Externalizing Behaviours: A Meta-Analysis

Abstract

Although there is a consensus that maternal depression is strongly related to child externalizing behaviours, research on the association between paternal depression and child externalizing behaviours is mixed. Some research shows that paternal depressive symptoms are positively associated with symptoms of externalizing behaviours, including oppositional-defiant behaviour, conduct problems, and overall externalizing behaviour; while other studies fail to find an association, or demonstrate a weak or negative association. Given that the most recent meta-analysis on paternal depression and child externalizing behaviours is outdated, an updated meta-analysis is necessary. The present meta-analysis consisted of 52 published and unpublished manuscripts that included a quantitative comparison between paternal depression and child externalizing behaviours. There was a small relationship between paternal depressive symptoms and child externalizing behaviours (r = .15; 95% CI [.13, .18]; k = 49). Overall, the results suggest that clinicians working with families of fathers with depressive symptoms should be cognizant of possible co-occurring child externalizing behaviours in the family. Directions for future research and other clinical implications are provided based on the findings of the current study.

Keywords: conduct problems, externalizing behaviours, externalizing difficulties, meta-analysis, paternal depression

Parental Depression

Depression is one of the most common mental disorders among parents (Baker & Lees, 2014), with estimated prevalence rates between 9% (Letourneau, Tramonte, & Willlms, 2013) and 18% (Kouros, Merrilees, & Cummings, 2008) for mothers, and 10% (Lee, Taylor, & Bellamy, 2012) and 14% (Kouros et al., 2008) for fathers. Research has shown that parental depression is related to negative family outcomes, including compromised parent-child relationships (Lee et al., 2013), increased parenting stress (Theule, Wiener, Tannock, & Jenkins, 2013), reduced marital quality (Hanington, Heron, Stein, & Ramchandani, 2012), increased marital discord (Kouros et al., 2008), and an increased risk of child psychopathology (Dette-Hagenmeyer & Reichle, 2014; Goodman et al., 2011; Kane & Garber, 2004).

Paternal Depression and Child Externalizing Behaviours

The literature suggests that maternal depression is strongly associated with child externalizing behaviours (Goodman et al., 2011; Kouros et al., 2008). Externalizing behaviours include symptoms associated with oppositional defiant disorder (ODD) and conduct disorder (CD), including conduct problems, aggression, oppositional-defiant behaviours, disruptive behaviours, and antisocial behaviours. There has been a steady increase in the number of studies examining the association between child externalizing behaviours and paternal depression; however, the current body of literature is mixed. Some research has found that paternal depression is associated with increased symptoms of externalizing behaviours, such as oppositional-defiant behaviour (Dette-Hagenmeyer & Reichle, 2014), conduct problems (Nath, Russell, Kuyken, Psychogiou, & Ford, 2016), and overall externalizing behaviour (Cummings, Keller, & Davies, 2005; Kane & Garber, 2009), while a handful of studies fail to find an association (Fisher, Brock, O'Hara, Kopelman, & Stuart, 2015: Meadows, McLanahan, &

Brooks-Gunn, 2007), or demonstrate a weak (Malmberg & Flouri, 2011) or negative (Forehand, Long, Brody, & Fauber, 1986; Webster-Stratton, 1988) association.

Kane and Garber (2004) conducted the most recent meta-analysis on paternal depression and child externalizing behaviours, which included studies published up to 2000. Based on Cohen's guidelines (1988) for interpreting effect sizes (small: $r \leq .10$, medium: $r = .3$, and large: $r \geq .50$), they found a small association between paternal depressive symptoms and child externalizing behaviours; however, an interesting trend emerged when the effect sizes were organized based on the year of publication. Notably, a larger relationship between paternal depressive symptoms and child externalizing behaviours appeared in studies with publication dates after 1990. Furthermore, some of the earliest studies included in Kane and Garber's meta-analysis (e.g., Forehand et al., 1986; Webster-Stratton, 1988) produced negative effect sizes, which suggested an inverse association between paternal depressive symptoms and child externalizing behaviours. That said, Kane and Garber did not formally test the observed trend toward larger effect sizes in the newer literature examining paternal depression and child externalizing behaviours in their meta-analysis. Considering how the roles of fathers in the familial and societal context have changed over the past 50 years (e.g., increase in paternal child care and involvement in childrearing; Parker & Wang, 2013), changes in the paternal depression literature may reflect these historical shifts.

Sample characteristics. Although the newer studies included in Kane and Garber's (2004) meta-analysis appear to indicate a larger relationship between paternal depression and child externalizing behaviours than older research, more recent studies published in this area continue to be mixed. This suggests that other study characteristics may also have an impact on the strength of the relationship.

Child characteristics. The gender composition of the child sample may moderate the strength of the relationship. Based on the social learning theory (Bandura, 1962) and the gender schema theory (Bem, 1981), researchers have postulated that children tend to be more influenced by and are more likely to model the behaviours and mannerisms of their same-gender parent than the opposite-gender parent. This speculation would suggest that fathers may have a greater influence on their sons than daughters. Indeed, one study found that compared to daughters of fathers with depression, sons were more negatively influenced by paternal depression and were more likely to exhibit problems with externalizing behaviours (Ramchandani et al., 2013). Additionally, Cummings et al. (2005) found that paternal depressive symptoms were associated with externalizing behaviours in sons, but not daughters. The mean age of the child sample may also moderate the relationship between paternal depressive symptoms and child externalizing behaviours such that studies with older children may differ from studies with samples of younger children in terms of the strength of the effect size. Goodman and Gotlib (1999) suggested that earlier and longer exposure to maternal depressive symptoms is related to a greater risk for child psychopathology. This finding may also hold true for children exposed to paternal depressive symptoms at an earlier stage of their development and for a longer duration. Additionally, longer exposure to child externalizing behaviours may also have an impact on parental depressive symptoms. Therefore, it is possible that studies with older child samples would produce larger effect sizes. The racialized background of the child sample might also be an important factor considering that researchers have noted possible racial/ethnic differences with respect to externalizing behaviours (Gudiño et al., 2009; McLaughlin, Hilt, & Nolen-Hoeksema, 2007). For example, a study examining the differences between behaviour and symptom reports of Black, Hispanic, and White adolescents found that Black adolescent males and Hispanic

adolescent females reported the highest levels of aggression; however, there were no significant differences between the groups (McLaughlin et al., 2007). On the other hand, research by Gudiño et al. (2009) reported that although overall externalizing scores were highest among White adolescents, adolescents of racialized backgrounds were more likely to receive mental health services for externalizing behaviours. Taken together, it is unclear whether the racialized background of the child sample will be a significant moderator.

Parent-related characteristics. In addition to child characteristics, parent-related characteristics may also have an impact on the strength of the relationship between paternal depression and child externalizing behaviours. For example, single fathers are more susceptible to depression than single mothers and married fathers (for a review see Spector, 2006). Single fathers with depression are also at a greater disadvantage in terms of personal and family functioning than partnered fathers with depression (Spector, 2006). Considering these findings together, children of single fathers with depression may be at an even greater risk for developing externalizing behaviours than their counterparts. Alternatively, single fathers of children with externalizing behaviours might be more susceptible to experiencing depression. Therefore, samples with a higher composition of single fathers may yield larger effect sizes. The mean age of the paternal sample may also moderate this relationship as differences across age groups have been documented in terms of depressive symptom severity (Nolen-Hoeksema & Aldao, 2011) and age of onset (Kessler et al. 2010). That said, some studies found that paternal age was not significantly correlated with paternal depressive symptoms or child externalizing behaviours (Hou, Kim, Hazen, & Benner, 2017; Kouros, 2008). Therefore, it is unclear whether the mean paternal age of the sample will significantly moderate this relationship. Additionally, maternal depression is also associated with poor child outcomes (e.g., Dette-Hagenmeyer & Reichle,

2014; Goodman et al., 2011) and children whose parents both have a mental disorder are vulnerable to more negative outcomes (Meadows et al., 2007). Therefore, samples with a higher composition of mothers with depression may be associated with a larger relationship between paternal depression and child externalizing behaviour.

Measurement and outcome, and bibliographic characteristics. Another factor that might influence the strength of the relationship between paternal depression and child externalizing behaviours is the informant of the externalizing behaviours. Some researchers have suggested that the association between maternal depression and child outcomes may be subject to possible reporting issues (i.e., the depression-distortion hypothesis; Gartstein, Bridgett, Dishion, & Kaufman, 2009) and therefore, the magnitude of the relationship may depend on the informant. Similar to the research on maternal depression, one study found paternal depression to be associated with father reported, but not mother or teacher reported child externalizing behaviours (Cummings et al., 2005). Other factors that might moderate the relationship between paternal depression and child externalizing behaviours include the type of recruitment method (i.e., community vs. clinical samples), and country of study. Notably, most studies on paternal depression and child externalizing behaviours have been conducted in North America or Europe and have utilized community or representative sampling methods (Dette-Hagenmeyer & Reichle, 2014; Kane & Garber, 2009; Nath et al., 2016).

Rationale for the Current Study

The purpose of the current study was to examine the relationship between child externalizing behaviours and paternal depression. Although the meta-analysis conducted by Kane and Garber (2004) provided a rich source of information regarding the relationship between paternal depression and child externalizing behaviours, there are still discrepancies

within the literature with regards to the strength of the association. This study aimed to address several limitations identified in Kane and Garber's meta-analysis and to provide a novel contribution to the literature in a number of ways. First, there has been substantial growth in the research on paternal depression since the publication of the studies included in Kane and Garber's meta-analysis. Providing an updated meta-analysis is important considering that many of the early studies on fathers and families tended only to include biological fathers (for a review see Downer, Compas, McWayne, & Gartner, 2008), which restricts our understanding of the relationship between paternal depression and child externalizing behaviours to biological families. Considering the various forms of male parenting, in the current study, a father was defined as a child's primary male caregiver, and could include biological fathers, stepfathers, adoptive fathers, and foster fathers.

The second way in which the current study provides a novel contribution will be by examining the relationship between paternal depression and child externalizing behaviours in more depth. Kane and Garber's (2004) meta-analysis provided an overview of the association between paternal depression and several child outcomes, namely internalizing symptoms, externalizing behaviours, and parent-child relationships. The aim of this study was to better understand the environmental, as opposed to the genetic, influence of paternal depression on family outcomes. Although child externalizing behaviours are sometimes viewed as heritable disorders (Larsson, Viding, Rijsdijk, & Plomin, 2008), studies have demonstrated that the risk factors for developing externalizing behaviours are also environmentally-based (Murray & Farrington, 2010). Studying externalizing behaviours in the context of families of fathers with depression is of particular interest considering that many of the identified risk factors for externalizing behaviours are also factors associated with parental depression, including parental

and familial conflict, parenting difficulties, neighborhood economic disadvantage, and family socioeconomic status (Kouros et al., 2008; Murray & Farrington, 2010; Reising et al., 2013). Additionally, this study focused exclusively on externalizing behaviours rather than overall behaviour problems (e.g., academic achievement, school discipline, and peer relations; e.g., Billings & Moos, 1985).

Third, although Kane and Garber's (2004) meta-analysis examined several moderators of the relationship between paternal depression and child externalizing behaviours (i.e., measure of paternal depression, recruitment method, and type of informant of child externalizing behaviours), they were not significant. The current study re-examined the moderators included in their meta-analysis given (a) the increase in the number of research studies on the current topic, (b) the lack of consensus in the literature, and (c) Kane and Garber's speculation that their original moderator analyses may have been underpowered. Kane and Garber also excluded studies that did not provide father-reported symptoms of depression. The present study did not exclude those studies, but rather considered the type of informant of paternal depressive symptoms (e.g., father, partner, and clinician) in a moderator analysis.

The fourth way in which the current study adds to the literature is by examining additional moderators that were not assessed by Kane and Garber (2004). Kane and Garber concluded that other factors that were not assessed in their meta-analysis might moderate the relationship between paternal depression and child externalizing behaviours. The Cochrane Collaboration guidelines also note the importance of updating meta-analyses to examine other factors (i.e., moderators) that may not have been included in past meta-analyses as additional study characteristics may impact the strength of the relationship (Hopewell et al., 2008). Therefore, this study sought to examine additional moderators, including paternal age, the

presence of maternal depression, the country of study, and year of publication.

For the reasons outlined above, conducting an updated meta-analysis on paternal depression and child externalizing behaviours is necessary to obtain a current understanding of fathers with depressive symptoms and their families. The first objective of the current study was to answer the following question: how large is the association between paternal depressive symptoms and child externalizing behaviours? The second objective of this study was to examine whether any of the factors discussed above moderate the strength of the association between paternal depressive symptoms and child externalizing behaviours.

Method

A meta-analysis was conducted to integrate and analyze the conflicting findings within the paternal depression literature with regards to child externalizing behaviours. The current research adhered to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) Statement with regards to the screening, identification, and selection process of eligible reports to be included in the final analysis (Moher, Liberati, Tetzlaff, & Altman, 2009).

Criteria for Manuscript Selection

We included manuscripts that were originally published and reported in English and published (or prepared) up to November 2017. Both published (e.g., journal articles) and unpublished manuscripts (e.g., master's theses and doctoral dissertations) were eligible. To be included in this meta-analysis, manuscripts required a specific measure of paternal depressive symptoms (as opposed to general mood or sadness, anxiety/depression, depressive personality traits, psychological distress) and a specific measure of child externalizing behaviours (as opposed to general behaviour problems, adjustment difficulties consisting of both internalizing and externalizing behaviours, or a cluster of symptoms including non-externalizing behaviours).

We included manuscripts that consisted of a quantitative consideration of the relationship between paternal depressive symptoms and child externalizing behaviours. For the purpose of the current study, only zero-order correlations were eligible. To reduce potential confounding factors, we excluded studies that focused on fathers or children with an identified developmental, genetic, or chronic physical health conditions (e.g., epilepsy, cancer, very low birth-weight, chronic pain, asthma, diabetes, endocrine disorders). We also excluded manuscripts that focused on fathers or children who were homeless, maltreated, incarcerated, and those who were bereaving the loss of a parent or whose symptoms were related to specific traumatic experiences (e.g., natural disasters, terrorist attacks). These populations were excluded because research has found that these populations tend to differ from other research samples on several factors, including socioeconomic status (Covey, Menard, & Franzese, 2013), symptom severity (Murray, Farrington, & Sekol, 2012), and presentation (Chemtob et al., 2010).

Search Strategy and Identification of Manuscripts

The following five databases were searched in November 2017: (a) PsycINFO, (b) Educational Resources Information Center (ERIC), (c) ProQuest Dissertations & Theses, (d) Medline, and (e) Google Scholar. Given that Google Scholar tends to generate a substantial list of search results, the manuscripts produced by the search were reviewed for eligibility up to 200 consecutively irrelevant manuscripts. Customized search strategies, including truncation for keywords, were created using specific keywords to obtain relevant manuscripts. The databases varied in terms of available search features, and the search strategies were customized based on the unique features of each database (e.g., options to expand, limit, or narrow search results). The following keywords were used in all databases to obtain relevant manuscripts: parent, father*, parental, paternal, depression, major depression, depressi*, depression (emotion),

externalizing, conduct problems, conduct disorder, disruptive behaviour, antisocial, callous*, behaviour* problem*, aggression, delinquen*, impulse control disorders, explosive disorder, behaviour disorders, oppositional defiant behaviours, oppositional defiant disorder, and adjustment.

Determining eligibility. The eligibility of the manuscripts that were collectively generated by the five databases noted above was determined at multiple stages. The PRISMA flow diagram (see Figure 1) was used throughout the screening process to record the number of manuscripts that were included and excluded at each stage. First, duplicate manuscripts across the databases were identified, recorded, and removed. Second, using the above set of inclusion criteria, the relevance of each manuscript was determined based on their titles and abstracts. Manuscripts that were considered eligible based on their title and abstract were referred to as potential manuscripts. Third, each potential manuscript was then reviewed in its entirety and determined eligible or ineligible based on the above inclusion criteria. Manuscripts that were considered eligible at this stage were included in the final analyses. The manuscripts that did not meet all aspects of the inclusion criteria listed above were excluded from further analysis. Specific explanations for why potential manuscripts were excluded from advancing to the eligibility stage are provided in the PRISMA flow diagram.

Obtaining additional manuscripts. Searches of relevant review articles, and the archives of peer-reviewed journals that frequently publish research on paternal depression or child externalizing behaviours, including the *American Journal of Men's Health* and *Journal of Child Psychology and Psychiatry,* were searched to supplement the systematic database searches. Backward and forward reference searches of eligible manuscripts were also conducted to retrieve additional manuscripts that might have been missed in the initial database searches (Card, 2012).

A backward reference search consists of checking the reference list of eligible manuscripts for additional manuscripts that meet the inclusion criteria above. A forward reference search refers to the process of reviewing studies that cited an eligible manuscript.

Data Extraction and Reliability

Each of the eligible manuscripts were coded for (a) quantitative data used to calculate an effect size and (b) study characteristics used for moderator analyses. A coding manual (see Appendix A) and a coding form (see Appendix B) were used to extract the data from each of the studies. The following moderators were coded as continuous: (a) gender composition of the child sample, (b) mean child age, (c) racial/ethnic background composition of the child sample, (d) fathers' relationship status, (e) mean paternal age, (f) presence of maternal depression, and (g) year of publication. The type of recruitment method, the paternal depressive symptom informant, the child externalizing behaviours informant, the type of publication, and the country of the study were coded as discrete categories. The data extracted from the eligible manuscripts were entered into and analyzed using the Comprehensive Meta-Analysis (CMA) software 3.0 (Borenstein, Hedges, Higgins, & Rothstein, 2013).

Overlapping and missing data. Overlapping data refers to when multiple manuscripts of the same study are published or prepared, or the same sample of participants are used across different studies. For the present study, overlapping data were addressed in one of two ways. In one of these procedures, data from all eligible manuscripts that used the same dataset were extracted and inputted into CMA, and the data from these manuscripts were regarded and analyzed as a single effect. For example, the data from Bowling (2007), Fanti, Panayiotou, and Fanti, (2013), and Weaver (2009) all used data from the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care dataset and therefore, the data were

aggregated. The other procedure consisted of using the manuscript with the most comprehensive set of information and excluding the other manuscripts. For example, Eiden, Edwards, and Leonard (2007) and Eiden et al. (2016) used the same dataset; however, Eiden et al. (2016) was excluded from the current study because the results presented in Eiden et al. (2007) were more comprehensive than the results provided by Eiden et al. (2016). The method (i.e., amalgamating data from multiple manuscripts or using a single manuscript) that provided the most complete set of data was selected for the current study.

Missing outcome data or clarification regarding sample sizes were requested from six authors via email, three of whom provided the necessary data or clarified information (Coren & Luthar, 2014; Marchand-Reilly, 2012; Webster-Stratton, 1988). Three manuscripts were excluded from this study because we were unable to obtain the requested data required to calculate the effect sizes (i.e., sample sizes and standard deviations).

Reliability. Reliability was assessed at two stages of the meta-analysis. First, the backward and forward referencing process provided a measure of reliability with regards to the initial search strategy. Given that the main purpose of backward and forward reference searches is to obtain manuscripts that are absent from the initial database searches, the reliability of the initial search strategy is associated with a lower number of additional manuscripts found through backward and forward referencing. No additional manuscripts were obtained through the backward and forward reference searches. The second reliability mechanism occurred at coding. A Ph.D. student with training in meta-analyses acted as the second coder for this study and independently coded 25% of the eligible manuscripts. There were no coding disagreements between the primary and secondary coder (i.e., 100% agreement on all variables coded).

Statistical Analyses

Random effects models were used throughout the analyses as it was assumed that there would be a wide degree of variation between the manuscripts included in the final analyses (Borenstein, Hedges, Higgins, & Rothstein, 2009; Lipsey & Wilson, 2001). Heterogeneity across the manuscripts was tested using the *Q* statistic, I^2 statistic, and tau^2 statistic. The *Q* statistic reports the presence of heterogeneity within the analysis. The I^2 statistic assesses the extent to which the total variation across the studies is due to heterogeneity. The I^2 statistic is presented as a percentage, where larger values reflect a greater degree of heterogeneity. The tau^2 statistic is another measure of heterogeneity and estimates the degree of variance between studies included in the analysis. Tau^2 values greater than 1 suggest the presence of heterogeneity.

The statistical analysis for examining the association between paternal depressive symptoms and child externalizing behaviours was conducted in several steps. First, a Pearson product-moment correlation coefficient was used to examine the association between paternal depressive symptoms and child externalizing behaviours. Although Pearson product-moment correlation coefficients were used to analyze the results, to account for variance in correlational data, the effect-sizes were transformed to Fisher's *z*-scale (Borenstein et al., 2009). The effect sizes were later transformed back to correlation coefficients for interpretation and reporting. Individual effects with standardized residuals greater than 1.96 were identified as outliers (Viechtbauer & Cheung, 2010) and trimmed (i.e., removed) from the summary effect size distribution (SESD). As recommended by Lipsey and Wilson (2001), the trimmed SESD was then compared to the original weighted mean effect (i.e., the untrimmed SESD) to determine whether the trimmed SESD should be used as the final analysis. When manuscripts included more than one outcome measure of child externalizing behaviours, the mean of the outcomes was used in the analysis (i.e., aggregated effect size). For example, when manuscripts provided

correlational data for oppositional behaviour and aggression, the weighted mean effect of the two outcomes was used to assess the overall externalizing behaviours. Second, moderator analyses were performed using meta-regression, which evaluates the degree to which a moderator influences the magnitude of an effect size (Card, 2012; Lipsey & Wilson, 2001). Temporal trends of the relationship were assessed by conducting a cumulative meta-analysis sorted by ascending years (Anzures-Cabrera & Higgins, 2010).

Results

Study Characteristics

Search results from the five databases produced 6148 unique manuscripts. One manuscript that was included in Kane and Garber's (2004) meta-analysis was also added to the current study (Forehand et al., 1986). A total of 373 full-text articles were selected for review and screened for eligibility. Only eight of the 17 individual effects from Kane and Garber's meta-analysis were included in the current study. Seven of the manuscripts included in their study were excluded in this study because they did not meet the eligibility criteria of this study for the following reasons: (a) no or ineligible quantitative comparison between paternal depressive symptoms and child externalizing behaviours, (b) missing sample sizes, and (c) ineligible measure of child externalizing behaviours.

Fifty-two manuscripts (43 published, 9 unpublished) produced between 1985 and 2017 were included in the current study (see Figure 1). Eighty-eight percent of the studies were conducted in North America (n = 46) with most of the studies conducted in the United States (U.S.; n = 43) and three studies conducted in Canada. The percentage of female children in the samples in each manuscript ranged from 0 to 100%. The age range of children and fathers in the samples was 2.5 to 18.6 years, and 18 to 79 years, respectively. There was a total of 17,854

participants across all of the studies.

Most of the manuscripts assessed paternal depressive symptoms using self-report measures, including versions of the Beck Depression Inventory (BDI), and the Center for Epidemiologic Studies Depression Scale (CES-D). Other measures used in the manuscripts included the Edinburgh Postnatal Depression Scale (EPDS), and the Symptom Checklist-90-Revised (SCL-90-R). Most of the manuscripts used parent reports of the externalizing scale from the Child Behavior Checklist (CBCL) to assess child externalizing behaviours. Other measures that were commonly used included the Teacher Rating Form, Conners' Parent and Teacher Rating Scales, and Youth Self-Report. Symptoms of externalizing behaviours tended to be assessed using an overall externalizing score; however, some manuscripts used measures of aggression, antisocial behaviours, conduct problems, oppositional behaviour, and/or defiance.

Relationship Between Paternal Depressive Symptoms and Child Externalizing Behaviours

The relationship between paternal depressive symptoms and child externalizing behaviours was small (r = .15; 95% confidence interval (CI) [.13, .18]; k = 49; $Q(48)$ = 141.49 (p < .001); I^2 = 66.08 %; tau^2 = 0.004; see Table 1). Three individual effects were identified as outliers and removed to produce a trimmed SESD. Given that the trimmed SESD (r = .15; 95% CI [.13, .18]; k = 46; $Q(45)$ = 113.15 (p < .001); I^2 = 60.23%; tau^2 = 0.003) only slightly differed from the untrimmed SESD, the untrimmed SESD was retained. Table 2 provides an overview of the study-level effect sizes organized by child externalizing behaviour outcomes. Three additional research questions were originally proposed but were not included in the submission of the manuscript due to issues with power (see Appendix C).

Moderator Analyses

A total of 11 moderator analyses were conducted using meta-regression (see Table 3).

Due to an insufficient number of studies that provided data on maternal depression, a moderator analysis on maternal depression was not conducted. Table 4 provides an overview of the category distribution of the moderators that were assessed categorically. The gender composition of child sample was the only significant moderator (Q = 4.30, p = .038, k = 40), with samples with a higher percentage of boys yielding larger effects. Visual inspection of the regression scatter plot suggested that this significant finding was driven by one single effect, which was originally identified as an outlier (Conger et al., 1993). Removal of this effect from the analysis resulted in this moderator losing significance (Q = 1.37, p = .242, k = 39), suggesting that the gender composition of the child sample does not significantly moderate the relationship. The mean paternal age of the sample approached significance (Q = 3.81, p = .051, k = 17), with samples of younger fathers producing larger effect sizes than samples of older fathers. Visual inspection of the regression scatter plot also suggested that this result was influenced by an individual effect (Hou et al., 2017). This moderator analysis no longer approached significance after the removal of outlier (Q = 0.72, p = .396, k = 16).

Other sample characteristics, including the mean age of the child sample, the racial/ethnic background composition of child sample, the fathers' relationship status, and the type of recruitment method, were not significant. None of the measurement and outcome moderators (i.e., the informant of paternal depressive symptoms, and the informant of child externalizing behaviours) were statistically significant. Unpublished studies did not differ from published studies with respect to the strength of the relationship. When the study was published and where the study was conducted did not influence the strength of the relationship. Visual inspection of the cumulative meta-analysis revealed temporal changes in the strength and direction of the effect size, with studies in the 1980s and early 1990s demonstrating a negative and non-

significant relationship (see Figure 2). The cumulative meta-analysis also illustrated that the effect became statistically significant around 1993 and remained significant.

Discussion

The current study provides a novel contribution to the literature by being the most recent meta-analysis that focuses exclusively on paternal depressive symptoms and child externalizing behaviours. Overall, this study found a small relationship between paternal depression and child externalizing behaviours, which supports the results from Kane and Garber's (2004) meta-analysis. The results of this study demonstrate a slightly weaker relationship between paternal depressive symptoms and child externalizing behaviours (r = .15) than the relationship originally established by Kane and Garber (r = .19). Considering the historical changes to fatherhood (Parker & Wang, 2013), it was expected that the magnitude of the relationship between paternal depression and child externalizing behaviours in the current meta-analysis would be stronger than the effect reported by Kane and Garber. Therefore, it is important to highlight several differences between the current meta-analysis and Kane and Garber's. As noted above, only eight of the 17 individual effects from Kane and Garber's meta-analysis were included in the current study. The current meta-analysis also omitted two manuscripts included in Kane and Garber's study because they were unpublished, not indexed in online databases, and not attainable. Additionally, the weaker relationship between paternal depression and child externalizing behaviours found in the current meta-analysis may reflect the decline effect, where effects reported in the research literature appear to decline over time (Schooler, 2011). Schooler (2011) noted that the several factors (e.g., publication bias, regression to the mean, differences in research methodology or reporting across time) could contribute to the decline effect. Given the differences between the current study and Kane and Garber's meta-analysis and in consideration

of the decline effect, the results of this study provide an updated and more robust estimate of the relationship than previously established.

The mean effect size in this study (r =.15) fell outside of the confidence intervals of the association between maternal depressive symptoms and child externalizing behaviors (r = .21; 95% CI [.20, .22]) established by Goodman et al. (2011). This outcome suggests that the relationship between paternal depressive symptoms and externalizing behaviours is different from the association between maternal depressive symptoms and child externalizing behaviours (Goodman et al., 2011). Given that mothers continue to spend more time engaged in childcare than fathers, even stay-at-home fathers (Parker & Wang, 2013), this result was expected. Additionally, the assumption that an increase in paternal involvement would influence the strength of the association between paternal depressive symptoms and child externalizing behaviours may be overestimated considering the genetic link between child externalizing behaviours and paternal (Larsson et al., 2008) and maternal (Goodman & Gotlib, 1999) depression. Moreover, other factors not examined in the current study might be moderating the relationship between paternal depression and child externalizing behaviours. For example, research suggests that paternal depression indirectly influences family functioning by contributing to financial stress (for a review see Spector, 2006).

The finding that the gender composition of child sample was not a significant moderator after the removal of an outlier does not support previous research that has found paternal depressive symptoms to be more strongly related to externalizing behaviours in boys than girls (Cummings et al., 2005; Ramchandani et al., 2013). This finding is also surprising considering that externalizing behaviour problems tend to be more common and severe in boys than girls (Bertrand & Pan, 2013; Dette-Hagenmeyer & Reichle, 2014). It is possible that other factors that

were not examined may be at play. For example, Cabrera, Tamis-LeMonda, Bradley, Shannon, and Hancoc (2012) found that mothers of sons whose fathers are depressed are more actively engaged with their children in a supportive and positive manner than mothers of daughters whose fathers are depressed. Given that supportive maternal engagement has been shown to be negatively associated with child externalizing behaviours (Verhoeven et al., 2010), the research by Cabrera et al. suggests that positive maternal behaviour may offset the experiences associated with having a father who is depressed for boys.

The mean age of the child sample was expected to be a significant moderator; however, the age of the child at the time of data collection does not determine the onset of the depressive symptoms, how long the child has been exposed to recurring and chronic depression, or the severity or recency of paternal depression. Additionally, an increased risk for child psychopathology does not necessarily speak to the symptom severity of the psychopathology. The mean age of the paternal sample was also not a significant moderator. Although some research has found differences in depressive symptom severity across different age groups (Kessler et al., 2010; Nolen-Hoeksema & Aldao, 2011), it is important to consider that these differences tend to exist between younger and older age groups and not between younger and middle-aged adults (Nolen-Hoeksema & Aldao, 2011). For example, research by Nolen-Hoeksema and Aldao (2011) demonstrated that there were no significant differences in depressive symptom severity between younger adults (25 to 35-year-olds) and middle-age adults (45 to 55-year-olds). This study did, however, find a significant difference between younger adults and older adults (65 to 75-year-olds; Nolen-Hoeksema & Aldao, 2011). It is not surprising that this moderator was not significant given that (a) fathers of children aged 18 and younger tend to fall in the younger or middle-age range and (b) the mean age of each sample of

fathers in the current meta-analysis ranged from 31 to 48 years old. Additionally, this finding is consistent with previous studies that fail to demonstrate an association between mean paternal age and paternal depressive symptoms and child externalizing behaviors (Hou et al., 2017; Kouros, 2008).

The finding that the racial/ethnic background of the child sample was not a significant moderator was likely due to limited range. Over two-thirds of the studies used in this moderator analysis included child samples with a high percentage of White children (75 to 100% of the child sample). Samples with a higher composition of single fathers were expected to be associated with larger effect sizes; however, the manuscripts that reported the relationship status of fathers consisted of samples with a high percentage of partnered fathers ranging from 81.5 to 100%. For some studies, relationship stability were requirements for study participation (e.g., Cummings et al., 2005). Moreover, fathers who are divorced tend to have lower response rates compared to partnered fathers (Tully, Iacono, & McGue, 2008). As a result, this non-significant finding might speak to a lack of variability within this area of research. The non-significant finding regarding the type of recruitment method (i.e., community vs. clinic samples) is inconsistent with research that demonstrates that clinical samples have higher levels of child externalizing behaviours compared to community samples (Görtz-Dorten, Ise, Hautmann, Walter, & Döpfner, 2014). Given that 82% of the eligible manuscripts used community samples, the lack of a significant finding may be due to limited variability.

Self-reported symptoms of paternal depressive were not related to a stronger association between paternal depression and child externalizing behaviours compared to clinician ratings of paternal depression. Most manuscripts used self-ratings of paternal depression, and therefore the results are likely limited by the lack of variability across studies. The type of informant for child

externalizing behaviours was also not significant. Given that paternal depression often coincides with maternal depression (Paulson & Bazemore, 2010), any depression-distortion effect unique to fathers may be washed out if the mothers who acted as informants had depression themselves.

The results of the current study indicated that published manuscripts were not associated with a larger relationship between paternal depression and child externalizing behaviours than unpublished manuscripts. This finding suggests that this area of research is not heavily influenced by publication bias, the notion that peer-reviewed academic journals are more likely to publish studies with significant results (Card, 2012). With respect to the country where the research was conducted, an overwhelming majority of the manuscripts were conducted in the U.S. Therefore, any potential differences between the studies would be difficult to detect. Regarding the year of publication, newer manuscripts did not have a stronger association between paternal depression and child externalizing behaviours compared to older manuscripts. Of note, the above hypothesis assumed that the relationship between paternal depression and child externalizing behaviours would become stronger as paternal involvement in childrearing activities increases and children spend more time with their fathers (Parker & Wang, 2013). It is possible that the relationship between paternal depression and child externalizing behaviours might not be heavily influenced by the increase in paternal involvement in childcare or research and may be more stable across time due to genetic or other factors at play. That said, the visual inspection of the cumulative meta-analysis suggested temporal changes in the strength and direction of the effect size, where effects became statistically significant around 1993 remained significant thereafter. Given that the earliest manuscript included in this study was from 1985, it might be difficult to detect significant temporal changes through moderator analyses alone. If older manuscripts on the relationship between paternal depressive symptoms and child

externalizing behaviours were available, the year of publication might have been a significant moderator.

Strengths and Limitations

The current study demonstrated several notable strengths. First, this study provided the most recent meta-analysis exclusively examining the association between paternal depression and child externalizing behaviours. Second, this study also re-examined the moderators assessed in Kane and Garber's study, which were posited to be non-significant due to issues with power. The third strength was the use of a reliable search strategy as indicated by the small number of manuscripts identified outside of the database searches and the high inter-rater reliability. The fourth strength was the inclusion of both published and unpublished manuscripts to reduce publication bias (Card, 2012), and the examination of the publication status as a moderator.

The present study has several limitations. First, due to potential issues with study quality, including unpublished research may also be viewed as a limitation. That said, given that publication status did not significantly moderate the relationship between paternal depression and child externalizing behaviours, the inclusion of unpublished research may be viewed as more of a strength than a limitation. Second, the current study only examined the correlational relationship between paternal depressive symptoms and child externalizing behaviours. Unfortunately, there was an insufficient number of eligible manuscripts providing data that could be used to examine whether children of fathers with depression have (a) increased odds of having externalizing disorders, or (b) higher levels of externalizing behaviours than their counterparts. Analyzing these related relationships would provide more information about these constructs. The third limitation is that many of the manuscripts used general parent ratings, rather than father ratings, of child externalizing behaviour and therefore, we were not able to

include these manuscripts in the moderator analyses examining whether paternal ratings of child externalizing behaviours differed from manuscripts that used other informants. Fourth, other factors (e.g., co-occurring mental disorders, familial stress, financial stress, parenting behaviours) that were not included in the moderator analyses might have moderated the strength of the relationship. Research suggests that family socioeconomic status is more strongly associated with family functioning outcomes than paternal depressive symptoms alone (Spector, 2006). Fifth, there was a lack of variability between manuscripts with respect to several moderators including the type of paternal depressive symptom informant. Sixth, the results of the current study cannot determine whether children of fathers with depression exhibit externalizing behaviours due to issues associated with being exposed to paternal depression, or whether the severity of depressive symptoms among fathers is influenced by the issues related to raising a child with externalizing behaviours.

Clinical Implications

The results of the current study provide support for and clarity to the relationship between paternal depression and child externalizing behaviours. Clinicians working with families of fathers with depression should be cognizant of possible co-occurring child externalizing behaviours. The results of this study may influence clinicians' decisions to adopt a whole family approach to care, which encourages the inclusion of fathers in family social services and community programming. For example, community programs (e.g., childhood development programs, parent education classes, and family support services) could adopt a whole family approach to care by ensuring that advertisement of their programs and services explicitly encourage the attendance of fathers. The outcomes may also inform intervention strategies for fathers with depression and their families, and clinicians might want to consider providing or

referring the family for treatment. Although research has supported the importance of paternal involvement in psychotherapeutic treatments (e.g., Bagner, 2013; Bakermans-Kranenburg, 2003), fathers are less likely to participate in treatment with their children or families than mothers (Phares, Rojas, Thurston, & Hankinson, 2010; Rojas, Fields, Binitie, Curley, & Phares, 2006). Additionally, compared to women, men tend to be less likely to seek treatment and often have lower rates of treatment attendance regardless of whether they have children (Mackenzie et al., 2006; Wang et al., 2007). Therefore, it is imperative to consider these trends when referring or working with fathers and their families in a treatment setting. One specific family therapy approach that may be efficacious when working with fathers and children with behavioral difficulties is solution-focused family therapy. Many of the features of this framework are amenable to paternal involvement in treatment, and this approach has been found to be effective for treating both adult depressive symptoms and child behavior difficulties (Gingerich & Peterson, 2013). Clinicians may want to consider exploring other treatment options that have been found to reduce both child externalizing behaviours and depression, such as emotion coaching or emotion socialization (Sanders, Zeman, Poon, & Miller, 2015).

Directions for Future Research

To provide a more complete understanding of the relationship between paternal depression and child externalizing behaviours, additional research comparing the symptom severity of children of fathers with and without depression would be advantageous. Considering the difficulties of recruiting and retaining fathers with depression for research (i.e., fathers with depression are less likely to participate in and more likely to drop out of research studies; Nath et al., 2016), exploring potential barriers to research participation among fathers with depression may also be helpful. Most of the manuscripts included in the current study were similar in terms

of sample and study characteristics, which limits our ability to fully understand the extent to which these factors moderate the relationship between paternal depression and child externalizing behaviours. Therefore, researchers may want to consider further examining the relationship (a) in the context of clinical samples, (b) using clinician assessment of paternal depressive symptoms or diagnostic status, (c) in countries outside of the U.S., and (d) among samples of non-partnered fathers. Researchers may want to consider providing separate father- and mother-rated externalizing behaviour scores to further assess the depression-distortion hypothesis. To gain a better understanding of the differences between paternal and maternal depression in relation to child externalizing behaviours, researchers may want to consider including the amount of time fathers spend with their children or the degree to which they adhere to traditional gender roles as moderating factors. Additionally, the results of this study provide researchers with several directions for future study to better understand the family systems of fathers with depressive symptoms.

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Table 1

Characteristics of Manuscripts Included in the Meta-Analysis

Study	*N*[c]	Pub status[d]	Country of study	% female children	Child age[e]	Child outcome	*r* (95% CI)	*p*
Anderson (1993)	70	U	US	0	6-12	Aggression	.23 (–.01, .44)	.055
Arnold (2016): Study 1	127-427	U	US	49	6.8	Aggression	.15 (.00, .28)	.043
Arnold (2016): Study 2	114	U	US	42	7	Aggression	.11 (–.08, .29)	.245
Brody et al. (1994)	90	P	US	53	11	Externalizing	.10 (–.11, .30)	.349
Bronte-Tinkew et al. (2009)	4027	P	US	48	3.0	Externalizing	.07 (.04, .10)	< .001
Callender et al. (2012)	245	P	US	48	5.5	Externalizing	.18 (.09, .26)	< .001
Carrere & Bowie (2012)	39-52	P	US	57	–	Externalizing	–.02 (–.23, .19)	.862
Carro et al. (1993)	70	P	US	–	2.7	Externalizing	.30 (.06, .50)	.013
Conger et al. (1995): OYS Sample	63	P	US	0	11.8	Antisocial behaviours	.19 (–.06, .42)	.136
Conger et al. (1992, 1995): IYFP Sample	196-205	P	US	0	12.0-14.0	Antisocial behaviours	.06 (–.03, .13)	.178
Conger et al. (1993)[a]	220	P	US	100	12.0-14.0	Antisocial behaviours	–.01 (–.10, .08)	.835
Coren & Luthar (2014)	144-173	P	US	0	13.5-18.7	Externalizing	.29 (.19, .39)	< .001
Cummings et al. (2005, 2013); Schacht et al. (2009)	107-235	P	US	55	–	Aggression/ Delinquency; CP; Externalizing	.17 (.11, .24)	< .001

Dette-Hagenmeyer & Reichle (2014)	161	P	Germany	44	5.0-9.0	ODB	.18 (.03, .33)	.022
Eiden et al. (2007)	227	P	US	49	3, 4, & K[ef]	Externalizing	.21 (.14, .28)	< .001
El-Sheikh & Flanagan (2001)	150	P	US	49	9.5	Externalizing	.26 (.10, .40)	.001
Fisher et al. (2015)	199	P	US	53	3.8	Externalizing	.16 (.06, .26)	.001
Forehand et al. (1986)	46	P	US	57	13.5	CD	–.12 (–.40, .18)	.429
Franck & Buehler (2007)	416	P	US	51	Grade 6	Externalizing	.17 (.07, .26)	.001
Gartstein & Fagot (2003)	159	P	US	52	About 5[g]	Externalizing	.14 (–.02, .29)	.078
Gryczkowski et al. (2010)	135	P	US	44	9.0	Externalizing	.15 (–.02, .31)	.089
Harold et al. (2011): Genetically unrelated fathers	156	P	UK	–	4-10	Antisocial behaviours	0.10 (–.06, .25)	.215
Harold et al. (2011): Genetically related fathers	403	P	UK	–	4-10	Antisocial behaviours	0.18 (.08, .27)	< .001
Hautmann et al. (2015)	106	P	Germany	30	5.0	CP/CD/ODD; Externalizing	.31 (.13, .47)	.001
Hou et al. (2017)	308	P	US	54	13.0	Delinquent behaviours	.02 (–.09, .13)	.727
Johnston (1991)	34	P	Canada	27	8.4	Externalizing	.23 (–.12, .53)	.192
Kane & Garber (2009)	81	P	US	41	11.8	Externalizing	.30 (.08, .48)	.007
Kashdan et al. (2004)	44	P	US	0	9.4	ODD	.11 (–.19, .39)	.479
Kelley (2008)	50	U	US	46	11.7	Externalizing	.05 (–.15, .25)	.623
Kemp (2012)	100	U	US	54	3.4	Externalizing	.08 (–.12, .27)	.430
Kouros (2008)	248-296	U	US	48	11.1	Externalizing	.19 (.15, .24)	< .001

Laurent et al. (2013)	210	P	US	43	1.5-4.5[h]	Externalizing	.08 (–.05, .21)	.242
Low & Stocker (2005)[a]	136	P	US	41	10.2	Externalizing	.40 (.25, .53)	< .001
MacMartin (1997)	101	U	Canada	100	3.2-3.8	Externalizing	.27 (.08, .44)	.006
Marchand (1998); Marchand & Hock (1998)	34-46	U/P	US	50	About 4[g]	Externalizing	.33 (.18, .46)	< .001
Marchand et al. (2004)	64	P	US	66	7.7	Externalizing	.28 (.04, .49)	.025
Marchand-Reilly (2012)[a]	36	P	US	53	6.4	Externalizing	.56 (.28, .75)	< .001
Middleton et al. (2009)	37	P	US	30	5.3	Externalizing	.46 (.16, .68)	.004
Montano (2013)	329-405	U	US	49	12.8	Externalizing	.03 (–.05, .10)	.473
Nath et al. (2016)	5705	P	UK	49	7.0	CP	.10 (.07, .13)	< .001
NICHD Dataset[b]	556-729	P	US	–	4.5-15.0	Externalizing	.14 (.12, .17)	< .001
Renk et al. (1999)	75	P	US	50	13.7	Externalizing	.21 (.05, .36)	.011
Salari et al. (2012)	485	P	Sweden	49	–	CP	.20 (.11, .28)	< .001
Schaughency & Lahey (1985)	39-40	P	US	29	5.0-14.0	Antisocial behaviours/CP/ Externalizing	–.04 (–.34, .28)	.831
Shelton & Harold (2008)	352	P	UK	49	11.7	Aggression/ Antisocial behaviours	.05 (–.02, .13)	.158
Thomas & Forehand (1997)	58	P	US	–	11-15	CP	.19 (.01, .36)	.040
Webster-Stratton (1988)	85	P	US	32	4.3	Externalizing	–.02 (–.23, .19)	.856
Weinfield et al. (2009)	49	P	US	51	2.5	Externalizing	.36 (.09, .58)	.011
Williamson et al. (2017)	179	P	Canada	0	9.7	Externalizing	.28 (.14, .41)	< .001

	I^2	tau^2	Q(df)	r (95% CI)	p
Summary Effect	66.08	0.004	141.49(48), $p < .001$	.15 (.13, .18)	< .001
Trimmed Summary Effect	60.23	0.003	113.15(45), $p < .001$	.15 (.13, .18)	< .001

Note. CD = conduct disorder; CI = confidence interval; CP = conduct problems; IYFP = Iowa Youth and Families Project; ODB = oppositional defiant behaviours; ODD = oppositional defiant disorder; OYS = Oregon Youth Study; UK = United Kingdom; US = United States.

[a]Manuscripts were identified as potential outliers and were not included in the trimmed summary effect size distribution. [b]The manuscripts by Bowling (2007), Fanti et al. (2013), and Weaver (2009) used data from the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and the data has been aggregated. [c]Ranges for *N* are provided when different sample sizes were used for different correlational data. [d]Pub status = Publication status (P = Published; U = Unpublished). [e]Mean age of child sample in years (or by Grade if specified); Age ranges are provided where mean age is not available. [f]K = kindergarten. [g]The manuscript noted that children were assessed when they were "about" a certain age. Children were assessed at several different time-points (Effect size represents amalgamated or averaged scores across the three time-points).

Table 2

Study-Level Effect Sizes by Child Externalizing Behaviour Outcomes

Individual studies by outcome	*N*[a]	Externalizing measure	Depression measure	*r* (95% CI)
Aggression				
Anderson (1993)	70	Staff ratings	BDI	.23 (–.01, .44)
Arnold (2016): Study 1	127-427	SDQ	HADS-D	.15 (.00, .28)
Arnold (2016): Study 2	114	CBCL	BDI	.11 (–.08, .29)
Schacht et al. (2009)	215	CBCL	CES-D	.15 (.02, .28)
Shelton & Harold (2008)	352	TRF; YSR-CBCL	BDI	.05 (–.02, .13)
Antisocial behaviours				
Conger et al. (1995): OYS Sample	63	Buss and Durkee	CES-D	.19 (–.06, .42)
Conger et al. (1992, 1995): IYFP Sample	196-205	Buss and Durkee	SCL-90-R	.06 (–.03, .13)
Conger et al. (1993)	220	Buss and Durkee	SCL-90-R	–.01 (–.10, .08)
Schaughency & Lahey (1985)	39-40	Conners PRS	BDI	–.08 (–.39, .24)
Shelton & Harold (2008)	352	Buss and Durkee	BDI	.06 (–.02, .13)
Conduct problems/conduct disorder				
Cummings et al. (2013)	235	SDQ	CES-D	.15 (.02, .27)
Forehand et al. (1986)	46	RBPC	BDI	–.12 (–.40, .18)
Nath et al. (2016)	5705	SDQ	Malaise Inventory	.10 (.07, .13)
Salari et al. (2012)	485	ECBI	DASS-DEP	.20 (.11, .28)
Schaughency & Lahey (1985)	39-40	Conners PRS/TRS	BDI	–.07 (–.37, .25)

Thomas & Forehand (1997)	58	RBPC	BDI	.19 (.01, .36)
Conduct problems/conduct disorder/oppositional defiant disorder				
Harold et al. (2011): Genetically unrelated fathers	156	SDQ	HADS-D	.10 (–.06, .25)
Harold et al. (2011): Genetically related fathers	403	SDQ	HADS-D	.18 (.08, .27)
Hautmann et al. (2015)	106	Diagnostic checklist	DASS-DEP	.32 (.14, .48)
Delinquent behaviours				
Hou et al. (2017)	308	YSR	CES-D	.02 (–.09, .13)
Schacht et al. (2009)	215	CBCL	CES-D	.14 (.01, .27)
Externalizing behaviours				
Brody et al. (1994)	90	RBPC	CES-D	.10 (–.11, .30)
Bronte-Tinkew et al. (2009)	4027	CBCL	CIDI-SF	.07 (.04, .10)
Callender et al. (2012)	245	CBCL	BSI	.18 (.09, .26),
Carrere & Bowie (2012)	39-52	BASC	BDI	–.02 (–.23, .19)
Carro et al. (1993)	70	CBCL	BDI	.30 (.06, .50)
Coren & Luthar (2014)	144-173	YSR	FHS	.29 (.19, .39)
Cummings et al. (2005, 2013)	107-235	CBCL/TRF	CES-D	.18 (.11, .25)
Eiden et al. (2007)	227	CBCL; SCBE	CES-D	.21 (.14, .28)
El-Sheikh & Flanagan (2001)	150	CBCL/TRF	SCL-90-R	.26 (.10, .40)
Fisher et al. (2015)	199	CBCL	IDD	.16 (.06, .26)
Franck & Buehler (2007)	416	CBCL; TRF; YSR	BDI; CES-D	.17 (.07, .26)
Gartstein & Fagot (2003)	159	CBCL	CES-D	.14 (–.02, .29)
Gryczkowski et al. (2010)	135	CBCL	CES-D	.15 (–.02, .31)
Hautmann et al. (2015)	106	CBCL	DASS-DEP	.31 (.12, .47)

Johnston (1991)	34	CBCL	BDI	.23 (–.12, .53)
Kane & Garber (2009)	81	CBCL & YSR	BDI	.30 (.08, .48)
Kelley (2008)	50	CBCL/TRF	CES-D	.05 (–.15, .25)
Kemp (2012)	100	CBCL	CES-D	.08 (–.12, .27)
Kouros (2008)	248-296	CBCL	CES-D; SCL-90-R	.19 (.15, .24)
Laurent et al. (2013)	210	CBCL	BDI	.08 (–.05, .21)
Low & Stocker (2005)	136	CBCL	BDI	.40 (.25, .53)
MacMartin (1997)	101	CBCL	BDI	.27 (.08, .44)
Marchand (1998); Marchand & Hock (1998)	34-46	CBCL	CES-D	.33 (.18, .46)
Marchand et al. (2004)	64	CBCL	CES-D	.28 (.04, .49)
Marchand-Reilly (2012)	36	CBCL	CES-D	.56 (.28, .75)
Middleton et al. (2009)	37	CBCL	BDI-II	.46 (.16, .68)
Montano (2013)	329-405	C-DISC IV	CES-D	.03 (–.05, .10)
NICHD Dataset[b]	556-729	CBCL	CES-D	.14 (.12, .17)
Renk et al. (1999)	75	CBCL	BDI	.21 (.05, .36)
Schaughency & Lahey (1985)	39-40	Conners TRS	BDI	.07 (–.25, .37)
Webster-Stratton (1988)	85	CBCL	BDI	–.02 (–.23, .19)
Weinfield et al. (2009)	49	CBCL	CES-D	.36 (.09, .58)
Williamson et al. (2017)	179	CBCL	BDI	.28 (.14, .41)
Oppositional defiant disorder or oppositional defiant behaviour				
Dette-Hagenmeyer & Reichle (2014)	161	VBV-EL 3-6	BDI-V	.18 (.03, .33)
Kashdan et al. (2004)	44	DBD Rating Scale	BDI	.11 (–.19, .39)

Note. BASC = Behavior Assessment System for Children; BDI = Beck Depression Inventory; BDI-II = Beck Depression Inventory, Second Edition; BDI-V = Simplified Beck Depression Inventory, German short version of the BDI; BSI = Brief Symptom Inventory; C-DISC IV = The Diagnostic Interview Schedule for Children; CBCL = Child Behavior Checklist; CES-D = The Center for Epidemiologic Studies Depression Scale; CIDI-SF = Composite International Diagnostic Interview – Short Form; Conners PRS = Conners Parent Rating Scale; DASS-DEP = Depression Anxiety Stress Scales-Depression Scale; DBD Rating Scale = Disruptive Behavior Disorders Rating Scale; ECBI = Eyberg Child Behavior Inventory; FHS = Family History Screen; HADS-D = Depression subscale of the Hospital Anxiety and Depression Scale; IDD = Inventory of Diagnose Depression; IYFP = Iowa Youth and Families Project; OYS = Oregon Youth Study; RBPC = Revised Behavior Problem Checklist; SCBE = Social Competence and Behavior Evaluation; SCL-90-R = Symptom Checklist-90-Revised (Depression Subscale); SDQ = Strengths and Difficulties Questionnaire; TRF = Teacher Report Form of the Child Behavior Checklist; TRS = Conners Teacher Rating Scale; VBV-EL 3-6 = German checklist for behavior problems and behavior disorders in preschool-age children; YSR = Youth Self Report; YSR-CBCL = Youth Self-Report Form of the Child Behavior Checklist.

[a]Ranges for *N* are provided when different sample sizes were used for different correlational data. [b]The manuscripts by Bowling (2007), Fanti et al. (2013), and Weaver (2009) used data from the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and the data has been aggregated.

Table 3

Moderator Analyses

Sample moderators	*k*	*Q*	*p*-value	R^2
Gender composition of child sample (% female)	40	4.30	.038	0.27
Mean age of the child sample	27	0.45	.502	0.00
Racial/ethnic background composition of child sample (% White)	23	0.45	.504	0.00
Fathers' relationship status (% partnered)	22	0.98	.321	0.02
Mean age of the father sample	17	3.81	.051	0.33
Type of recruitment method (community vs. clinical)	49	1.67	.432	0.02
Measurement and outcome moderators	*k*	*Q*	*p*-value	R^2
Paternal depressive symptoms informant (self vs. other)	47	2.55	.110	0.11
Child externalizing behaviours informant (father vs. other)	36	0.13	.722	0.00
Bibliographic moderators	*k*	*Q*	*p*-value	R^2
Type of publication (published vs. unpublished)	47	0.44	.506	0.00
Country of study	49	5.25	.262	0.06
Year of publication	46	0.18	.670	0.00

Note. k = number of effect sizes.

Table 4

Distribution of Categories Across Moderators

Sample moderators	*k*
Type of recruitment method	49
Clinical	8
Clinical and community samples combined	1
Community	40
Measurement and outcome moderators	
Paternal depression informant	47
Self-report	46
Other-report	1
Child externalizing behaviour informant (father vs. other)	37
Father-report only	2
Father-report with other-reports/Other-reports	35
Bibliographic moderators	
Type of publication	47
Published (e.g., journal article)	39
Unpublished (e.g., Doctoral dissertations, Master's theses)	8
Country of study	49
Canada	3
Germany	2
Sweden	1
United Kingdom	4
United States	39

Note. k = number of effect sizes.

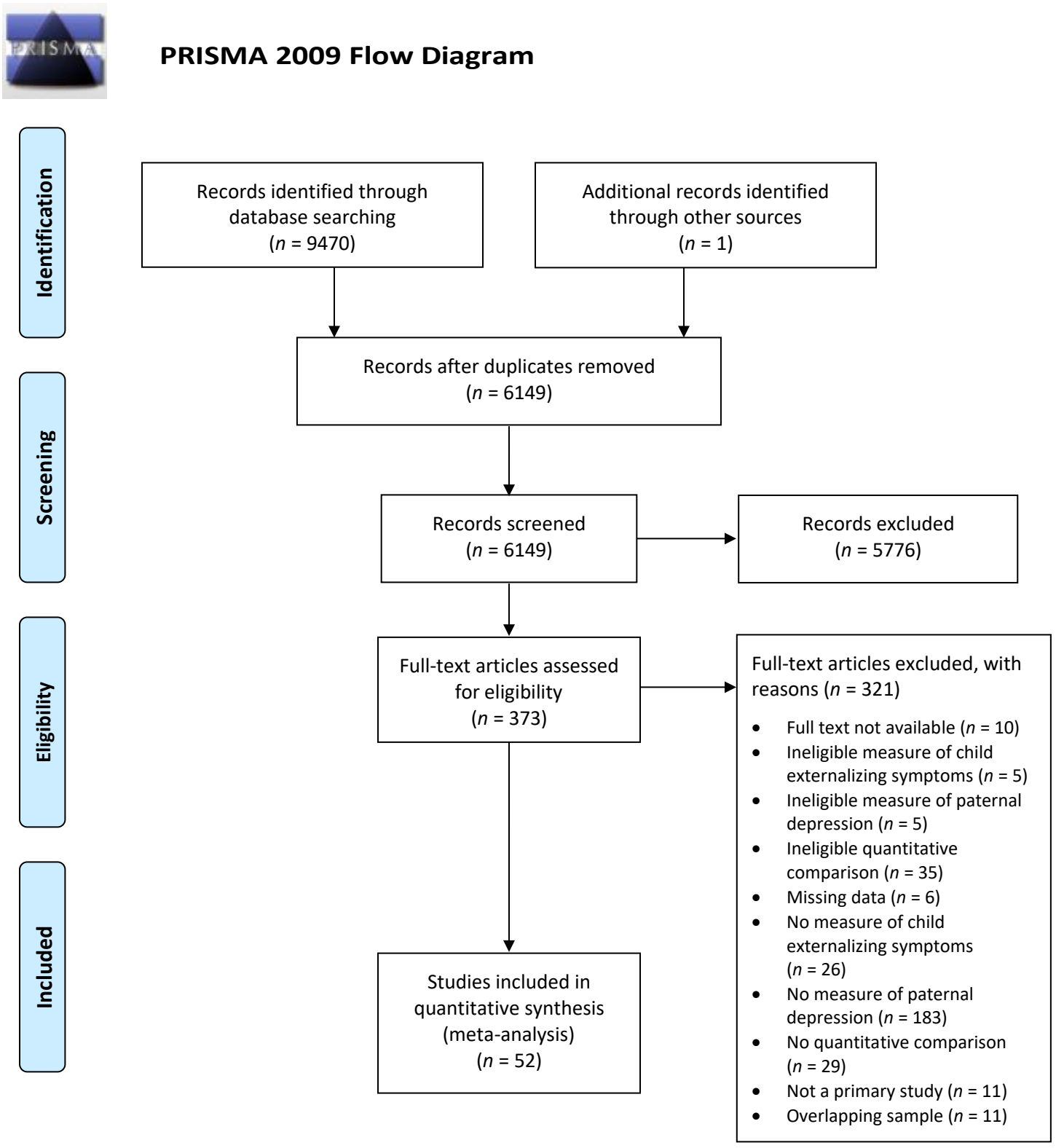


Figure 1. PRISMA Flow Chart. Adapted from "PRISMA 2009 Flow Diagram" by Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Annals of Internal Medicine, 151,* 264–269. doi:10.7326/0003-4819-151-4-200908180-00

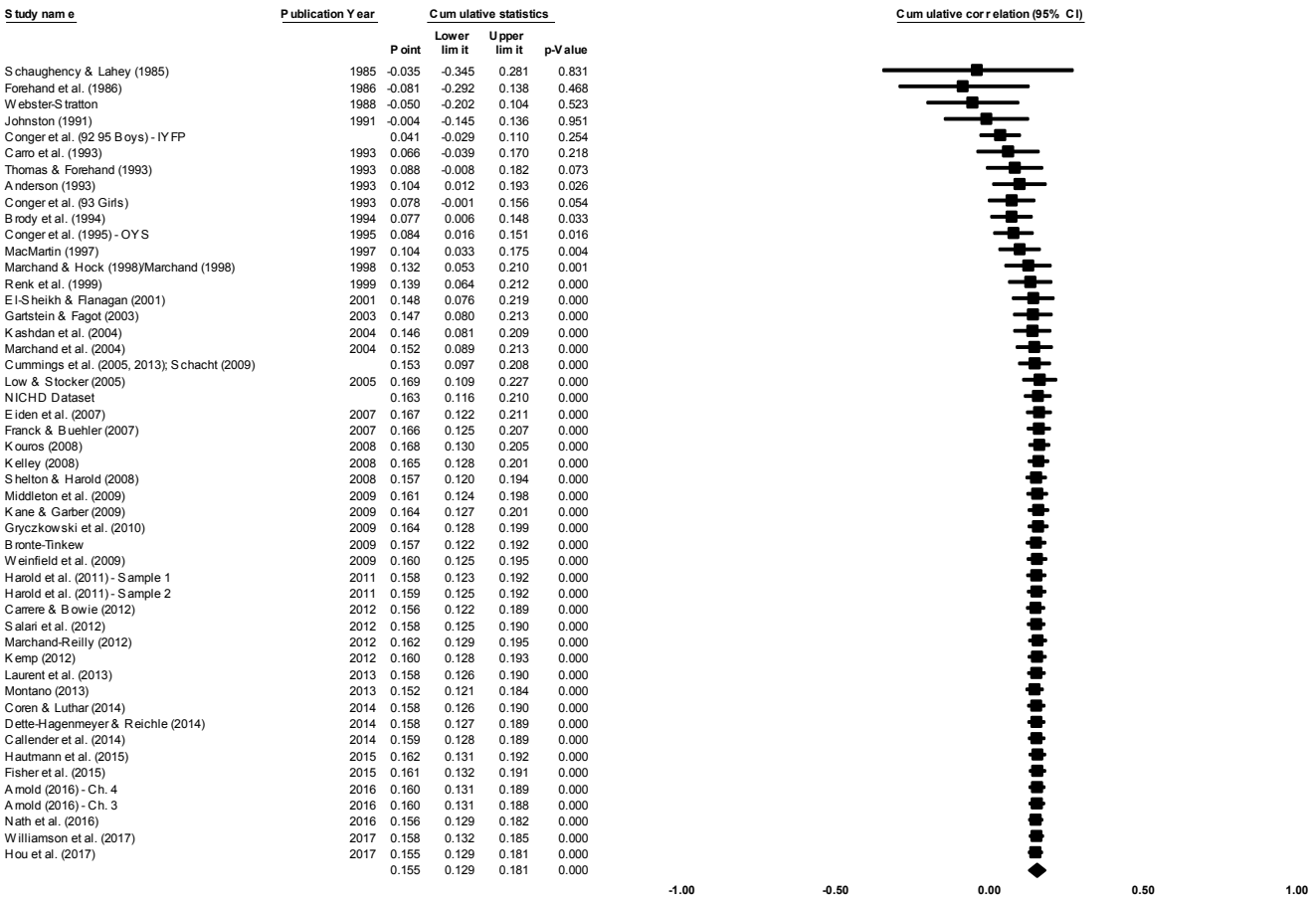


Figure 2. Cumulative meta-analysis sorted by ascending years.

Appendix A

Coding Manual for the Meta-Analysis on Paternal Depression and Child Externalizing Behaviours

General Coding Notes: Record the Study ID number at the top of every page used to code a given study. For every item starting at #5, indicate the page number where the information was found. Ranges are acceptable when needed. Note that most studies will not provide information in all the categories. Record as much information as is available.

I. Study Level Descriptors (Moderator Analyses)

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 "Paternal Depression and Child Externalizing Behaviours Meta-Analysis Tracking File."

3. Type of publication:
   a. Journal article
   b. Book chapter
   c. Conference paper
   d. Thesis or doctoral dissertation
   e. Unpublished data
   f. Other

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

4. Publication year: _____; Indicate if only published online to date: Yes/No

5. Place study conducted in: (pg. _____)
   a. US
   b. Canada
   c. U.K.
   d. Europe: _____
   e. Other: _____

Please indicate the country where the study was conducted.

6. Diagnostic status of paternal depression (pg. _____)
    a. Current diagnosis
    b. Past diagnosis
    c. No explicit diagnosis *(skip question #7)*

Please indicate whether the fathers included in the sample have a current or past diagnosis of depression.

7. Paternal depression diagnosed/confirmed by *(circle all that apply)*: (pg. _____)
    a. Previous diagnosis by a qualified health professional *(e.g., psychologist, family physician, pediatrician, psychiatrist)*
    b. DISC *(this is a diagnostic interview)*
    c. Study Clinician interview *(any activity undertaken by a qualified professional involved in the study to establish or confirm a diagnosis of depression)*
    d. Questionnaire (e.g., BDI, BDI-II, CES-D): _____
    e. Other: _____
    f. None

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

8. Paternal depressive symptoms rated by: (pg. _____)
    a. Self
    b. Clinician *(psychologist, psychiatrist, family physician)*
    c. Partner
    d. Other *(student, lay interviewer):* _____

Please indicate who rated the fathers' depressive symptoms.

9. Child externalizing disorder diagnosis (pg. _____)
    a. Current diagnosis
    b. Past diagnosis
    c. No explicit diagnosis

Please indicate whether the sample of children included in the study have a current or past diagnosis of an externalizing disorder (e.g., conduct disorder or oppositional defiant disorder).

10. Child externalizing behaviours rated by: (pg. _____)
    a. Father
    b. Clinician *(psychologist, psychiatrist, family physician)*
    c. Other parent *(mother or father)*
    d. Self *(i.e., child or adolescent)*

Please indicate who rated the children's externalizing behaviours. If the manuscript included ratings from several informants, provide this information in the quantitative section below.

11. Type of sampling method (pg. _____)
    a. Community
    b. Clinical

Please indicate whether the sample was recruited from a community sample or a clinical sample. Clinical samples are defined as participants who were recruited for the study based on their clinical presentation (e.g., "fathers with depression were recruited for this study" or "participants were recruited from a clinic that provides services to individuals with depression"). Community samples refer to participants who were recruited from the community (e.g., schools, from pediatrician offices).

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

	n male	*n* female	% female	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

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

13. Child age (in years) (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate the mean age of the sample in years and any subsamples as appropriate. Also indicate the standard deviation (SD) and sample size (n) where this information is available.

14. Child racial/ethnic background (pg. _____)

	White (%)	Black (%)	Hispanic (%)	Asian (%)	Other (%)
Total Sample					
Depression group					
Comparison group:					
Other group:					

Indicate the racial/ethnic background of the child sample. Only code this moderator if the study specifically states the racial/ethnic background of the child sample. Please do not include the racial/ethnic background if the study only refers to the "the sample" or the family sample.

15. Fathers' relationship status: (pg. _____)

	Partnered (%)	Non-Partnered (%)	*n*
Total Sample			
Depression group			
Comparison group:			
Other group:			

Indicate the percentage of fathers in the sample who are partnered (married, co-habiting) or non-partnered (single, widowed, divorced, separated). For the purpose of this study, fathers will be considered 'partnered' only if the study indicates that their partner shares household responsibilities, including childcare.

16. Fathers' age (in years) (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate the mean age of the fathers and any subsamples as appropriate. 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. If no age information is provided please write, "doesn't specify" beside father age.

17. Type of father: (pg. _____)

	Biological (%)	Adoptive (%)	Foster (%)	Stepfather (%)	Grandfather (%)	*n*
Total Sample						
Depression group						
Comparison group:						
Other group:						

Indicate the percentage of the type of fathers in the sample (biological, adoptive, custodial, non-custodial, foster, stepfather, grandfather).

18. Fathers' racial/ethnic background (pg. _____)

	White (%)	Black (%)	Hispanic (%)	Asian (%)	Other (%)
Total Sample					
Depression group					
Comparison group:					
Other group:					

Indicate the racial/ethnic background of the paternal sample. Only code this moderator if the study specifically states the racial/ethnic background of the father sample. Please do not include the racial/ethnic background if the study only refers to the "the sample" or the parental sample.

19. Fathers' level of education (pg. _____)

	Less than high school (%)	High school (%)	Some post-secondary education (%)	Completed post-secondary education (%)	*n*
Total Sample					
Depression group					
Comparison group:					
Other group:					

Indicate the percentage of fathers in the sample who completed the different levels of education. Post-secondary education includes trade, College, University Certificate, Diploma, University degree, Associates degree.

20. Fathers' level of education (in years) (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate the mean number of years of education obtained by the father sample.

21. Percentage of partners in the sample with a current diagnosis of depression (pg. _____)

	%	*n*	*N*	Depression defined by:
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate the percentage of partners (mothers or fathers) in the sample who have a current diagnosis of depression or meet the cut-off criteria for having depression. Note how the diagnosis/measure of depression was assessed (e.g., ≥ 16 on the CES-D).

22. Number of children in the family (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate the mean number of children in the family samples.

23. Percentage of families in the sample with more than one child (pg. _____)

	%	*n*
Total Sample		
Depression group		
Comparison group:		
Other group:		

Indicate the percentage of families in the sample that have more than one child.

II. Quantitative Considerations (Main Analyses)

1. Categorical DV, prevalence (pg. _____)

*Place the appropriate **%** in each box*

Measure of paternal depression: _____

Current/Past

Cut-off score: _____

Measure of paternal postpartum depression: yes/no (*Please indicate whether the symptoms of paternal depression were assessed within the postpartum period as defined as the first 12 months of the birth of a child.)*

Measure of child externalizing behaviours: _____

Current/Past

Cut-off score: _____

		Paternal depression	
Clinical %	Clinical *n*		
Total *N*			
Child Outcome			

2. Chi-square studies/Group Comparison Studies, Categorical DV (pg. _____)

Place the appropriate n or % in each box

Measure of paternal depression: _____

Current/Past

Cut-off score: _____

Measure of paternal postpartum depression: yes/no (*Please indicate whether the symptoms of paternal depression were assessed within the postpartum period as defined as the first 12 months of the birth of a child.)*

Measure of child externalizing behaviours: _____

Current/Past

Cut-off score: _____

		Paternal depression		Nonclinical	
Clinical %	Clinical *n*				
Total *n*					
Child Outcome					

---

3. Group Comparison Studies, Continuous DV (pg. _____)

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

2. Compared to/between fathers with depression and fathers without depression
   a. Paternal Depression and Non-clinical
   b. Other: _____

3. Type of data effect size based on:
    a. Means and SD
    b. *t*-test
    c. One-way ANOVA

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

Measure of paternal depression: _____

Current/Past

Cut-off score: _____

Measure of paternal postpartum depression: yes/no (*Please indicate whether the symptoms of paternal depression were assessed within the postpartum period as defined as the first 12 months of the birth of a child.)*

Measure of child externalizing behaviours: _____

Current/Past

Comparison	*Mean*	*SD*	*n*	*t*	*F*	*df*	*p*
Depression							
Nonclinical							

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 one-way ANOVAs*** *are eligible for effect size calculation.*

---

4. Correlational Studies (pg. _____)

Note: Partial correlations are an ineligible quantitative comparison for this meta-analysis.

1. Sample
    a. Depression only
    b. Depression and non-depression
    c. Other: _____

Indicate whether the study investigated child externalizing behaviours solely in a depression group, in a combined depression and non-depression group (where depressive symptoms were then included as a correlation), or in a differently composed group (in which case, please specify).

2. *N*: _____ *(if n differs from N above, please note appropriate n)*

3. Correlations with decreased externalizing behaviours. *If a study used a measurement in which lower numbers translate to higher degree of externalizing behaviours, check here and highlight so that effects can be reversed:* _____

Paternal depression measured with: _____

Current/Past

Cut-off score: _____

Measure of paternal postpartum depression: yes/no (*Please indicate whether the symptoms of paternal depression were assessed within the postpartum period as defined as the first 12 months of the birth of a child.)*

Child externalizing behaviour measured with: _____

r	*n*	Child Outcome[a]	Child Measure[b]	Rater of Child Outcomes

[a] *Please indicate the specific type of outcome (e.g., externalizing, conduct problems, etc.) under child outcome.*

[b] *Please indicate the instrument used to measure the type of child externalizing outcome under child measure.*

Appendix B

Coding Form for the Meta-Analysis on Paternal Depression and Child Externalizing Behaviours

I. Study Level Descriptors (Moderator Analyses)

1. Bibliographic reference: _____
_____
_____

2. Study ID number: _____

3. Type of publication:
   a. Journal article
   b. Book chapter
   c. Conference paper
   d. Thesis or doctoral dissertation
   e. Unpublished data
   f. Other

4. Publication year: _____; Indicate if only published online to date: Yes/No

5. Place study conducted in: (pg. _____)
   a. US
   b. Canada
   c. Britain/U.K.
   d. Europe: _____
   e. Other: _____

6. Diagnostic status of paternal depression (pg. _____)
   a. Current diagnosis
   b. Past diagnosis
   c. No explicit diagnosis

7. Paternal depression diagnosed/confirmed by: (pg. _____)
   a. Previous diagnosis by a qualified health professional
   b. DISC
   c. Study Clinician interview
   d. Questionnaire (e.g., BDI, BDI-II, CES-D): _____
   e. Other: _____
   f. None

8. Paternal depressive symptoms rated by: (pg. _____)
    a. Self
    b. Clinician
    c. Partner
    d. Other: _____

9. Child externalizing disorder diagnosis (pg. _____)
    a. Current diagnosis
    b. Past diagnosis
    c. No explicit diagnosis

10. Child externalizing behaviours rated by: (pg. _____)
    a. Father
    b. Clinician
    c. Other parent
    d. Self

11. Type of sampling method (pg. _____)
    a. Community
    b. Clinical

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

	n male	*n* female	% female	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

13. Child age (in years) (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

14. Child racial/ethnic background (pg. _____)

	White (%)	Black (%)	Hispanic (%)	Asian (%)	Other (%)
Total Sample					
Depression group					
Comparison group:					
Other group:					

15. Fathers' relationship status: (pg. _____)

	Partnered (%)	Non-Partnered (%)	*n*
Total Sample			
Depression group			
Comparison group:			
Other group:			

16. Fathers' age (in years) (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Paternal depression group				
Comparison group:				
Other group:				

17. Type of father: (pg. _____)

	Biological (%)	Adoptive (%)	Foster (%)	Stepfather (%)	Grandfather (%)	*n*
Total Sample						
Depression group						
Comparison group:						
Other group:						

18. Fathers' racial/ethnic background (pg. _____)

	White (%)	Black (%)	Hispanic (%)	Asian (%)	Other (%)
Total Sample					
Depression group					
Comparison group:					
Other group:					

19. Fathers' level of education (pg. _____)

	Less than high school (%)	High school (%)	Some post-secondary education (%)	Completed post-secondary education (%)	*n*
Total Sample					
Depression group					
Comparison group:					
Other group:					

20. Fathers' level of education (in years) (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

21. Percentage of partners in the sample with a current diagnosis of depression (pg. _____)

	%	*n*	*N*	Depression defined by:
Total Sample				
Depression group				
Comparison group:				
Other group:				

22. Number of children in the family (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

23. Percentage of families in the sample with more than one child (pg. _____)

	%	*n*
Total Sample		
Depression group		
Comparison group:		
Other group:		

II. Quantitative Considerations

1. Categorical DV, prevalence (pg. _____)

Measure of paternal depression: _____
Current/Past
Cut-off score: _____
Measure of paternal postpartum depression: yes/no

Measure of child externalizing behaviours: _____
Current/Past
Cut-off score: _____

		Paternal depression	
Clinical %	Clinical *n*		
Total *N*			
Child Outcome			

2. Chi-square studies/Group Comparison Studies, Categorical DV (pg. _____)

Measure of paternal depression: _____
Current/Past
Cut-off score: _____
Measure of paternal postpartum depression: yes/no

Measure of child externalizing behaviours: _____
Current/Past
Cut-off score: _____

		Paternal depression		Nonclinical	
Clinical %	Clinical *n*				
Total *n*					
Child Outcome					

---

3. Group Comparison Studies, Continuous DV (pg. _____)

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

2. Compared to/between fathers with depression and fathers without depression
   a. Paternal Depression and Non-clinical
   b. Other: _____

3. Type of data effect size based on:
   a. Means and SD
   b. *t*-test
   c. One-way ANOVA

Measure of paternal depression: _____
Current/Past
Cut-off score: _____
Measure of paternal postpartum depression: yes/no

Measure of child externalizing behaviours: _____
Current/Past

Comparison	*Mean*	*SD*	*n*	*t*	*F*	*df*	*p*
Depression							
Nonclinical							

---

4. Correlational Studies (pg. _____)

1. Sample
   a. Depression only
   b. Depression and non-depression
   c. Other: _____

2. *N*: _____

3. Correlations with decreased externalizing behaviours: _____

Paternal depression measured with: _____
Measure of paternal postpartum depression: yes/no

Child externalizing behaviour measured with: _____

r	*n*	Child Outcome	Child Measure	Rater of Child Outcomes

Appendix C

Additional Analyses

Research Questions

The following research questions were originally proposed, but not included in the journal submission:

(1) What is the rate of child externalizing disorders in families of fathers with depression/fathers with higher levels of depressive symptoms?

(2) Do children of fathers with depression/fathers with higher levels of depressive symptoms have increased odds of externalizing disorders compared to children of fathers without depression/fathers with lower levels or no depressive symptoms?

(3) Do children of fathers with depression/fathers with higher levels of depressive symptoms have higher levels of externalizing behaviours than children of fathers without depression/fathers with lower levels or no depressive symptoms? If so, how large is this effect?

(4) Does the presence of maternal depression (percent of mothers in the sample that met diagnostic or cut-off criteria for depression) moderate the relationship between paternal depressive symptoms and child externalizing behaviours?

(5) Does the racial/ethnic background composition of the paternal sample (% White) moderate the relationship between paternal depressive symptoms and child externalizing behaviours?

(6) Does the mean number of children in the family samples moderate the relationship between paternal depressive symptoms and child externalizing behaviours?

(7) Does the year of publication in conjunction with the type of informant (father vs. other)

of the child externalizing behaviours moderate the relationship between paternal depressive symptoms and child externalizing behaviours?

(8) Does the year of publication in conjunction with the type of informant (self vs. other) of the paternal depressive symptoms moderate the relationship between paternal depressive symptoms and child externalizing behaviours?

Research Question #1 through 3 were not used in the current study due to a lack of manuscripts that included quantitative data to answer the research questions. Research Questions #4 to 6 were not conducted due to an insufficient number of manuscripts that included the necessary data to run the meta-regressions (i.e., less than 10 manuscripts). Meta-regression models were also not conducted on Research Questions #7 to 8 due to limited variability.

Statistical Analyses

The statistical analyses for the Research Questions #1 to 3 were conducted in several steps. First, the overall rate of child externalizing disorders present in families of fathers with depression was computed (Research Question #1). Only two of the studies included a sample of fathers formally diagnosed with depression; therefore, we defined paternal depression status as meeting or exceeding the cut-off scores on the symptom measures. Second, odds-ratio effect sizes were calculated to examine the odds of the presence of child externalizing disorders in families of fathers with depression in comparison to families of fathers without depression (Research Question #2). Both the diagnostic status of paternal depression and child externalizing disorders were used as dichotomous variables (present/absent). Table C1 provides an overview of how studies classified diagnostic groups. Third, a standardized mean difference was used to analyze the degree of the association between the diagnostic status of paternal depression and child externalizing behaviours (Research Question #3). The diagnostic status of paternal

depression was the dichotomous variable (present/absent) and the level of child externalizing behaviours was the continuous variable.

Results

The rate of children of fathers with depression/fathers with higher levels of depressive symptoms who met criteria for an externalizing disorder was 16.84% (95% CI [13.47, 20.84]; $p < .001$; $k = 2$; see Table C2). Children of fathers with depression/fathers with higher levels of depressive symptoms had 1.38 times the odds of children of fathers without depression/fathers with lower levels or no depressive symptoms of having an externalizing disorder (95% CI [1.05, 1.82]; $p = .021$; $k = 2$; see Table C3). Table C4 shows that children of fathers with depression/fathers with higher levels of depressive symptoms had significantly higher levels of externalizing behaviours than children of fathers without depression/fathers with lower levels or no depressive symptoms ($d = 0.48$; 95% CI [0.01, 0.94]; $p = .045$; $k = 2$).

References

Jacob, T., & Johnson, S. L. (1997). Parent-child interaction among depressed fathers and mothers: Impact on child functioning. *Journal of Family Psychology, 11,* 391–409. doi:10.1037/0893-3200.11.4.391

Narayanan, M. K., & Nærde, A. (2016). Associations between maternal and paternal depressive symptoms and early child behavior problems: Testing a mutually adjusted prospective longitudinal model. *Journal of Affective Disorders, 196,* 181–189. doi:10.1016/j.jad.2016.02.020

Ramchandani, P., O'Connor, T. G., Evans, J., Heron, J., Murray, L., & Stein, A. (2008). The effects of pre- and postnatal depression in fathers: A natural experiment comparing the effects of exposure to depression on offspring. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 49,* 1069–1078. doi:10.1111/j.1469-7610.2008.02000.x

Tully, E. C., Iacono, W. G., & McGue, M. (2008). An adoption study of parental depression as an environmental liability for adolescent depression and childhood disruptive disorders. *American Journal of Psychiatry, 165,* 1148–1154. doi:10.1176/appi.ajp.2008.07091438

Table C1

Definitional Characteristics of Group Comparison Studies

Study	Paternal Depression Status	
	Fathers with depression/Fathers with higher levels of depressive symptoms	Fathers without depression/Fathers with lower levels or no depressive symptoms
Jacob & Johnson (1997)	Current diagnosis of depressive disorder	No current diagnosis of depressive disorder
Ramchandani et al. (2008)	Scores greater than 12 on the EPDS	Scores equal to or less than 12 on the EPDS
Tully et al. (2008)	Fathers diagnosed with depression based on clinician administrated SCID	Fathers not diagnosed with depression based on clinician administrated SCID
	Child Externalizing Disorder Status	
	Children with externalizing disorders/ Children with higher levels of externalizing behaviours	Children without externalizing disorders/ Children with lower levels or no externalizing behaviours
Ramchandani et al. (2008)	Children who met the top 10% cut-off on the RRPSPC conduct problems scale	Children who did not meet the top 10% cut-off on the RRPSPC conduct problems scale
Tully et al. (2008)	Children diagnosed with ODD or CD based on clinician administrated DICA	Children not diagnosed with ODD or CD based on clinician administrated DICA

Note. CD = conduct disorder; DICA = Diagnostic Interview for Children and Adolescents; EPDS = Edinburgh Postnatal Depression Scale; ODD = oppositional defiant disorder; RRPSPC = Revised Rutter Parent Scale for Preschool Children; SCID = Structured Clinical Interview for DSM.

Table C2

Characteristics of Studies Included in the Analysis of the Rate of Externalizing Disorders of Children of Fathers with Depression[a] *(Additional Research Question #1)*

Study	*N*	Pub status[b]	Country of study	% female children	Child outcome	Rate (95% CI)	*p*
Ramchandani et al. (2008)	6110	P	UK	48.8	Conduct problems	15.92 (11.87, 21.03)	< .001
Tully et al. (2008)	172	P	US	53.49	CD/ODD	18.25 (12.87, 25.23)	< .001
			I^2	tau^2	Q(df)	Rate (95% CI)	*p*
Summary Effect			0.00	0.00	0.36(1), p = .546	16.84 (13.47, 20.84)	< .001

Note. CD = conduct disorder; CI = confidence interval; ODD = oppositional defiant disorder; UK = United Kingdom; US = United States.

[a]Fathers with depression/fathers with higher levels of depressive symptoms. [b]Pub status = Publication status (P = Published; U = Unpublished).

Table C3

Characteristics of Studies Included in the Analysis of the Odds Ratios of Children of Fathers with Depression[a] Having an Externalizing Disorder Compared Children of Fathers without Depression[b] (Additional Research Question #2)

Study	*N*[c]	Pub status[d]	Country of study	% female children	Child outcome	*OR* (95% CI)	*p*
Ramchandani et al. (2008)	6110	P	UK	48.8	Conduct problems	1.54 (1.09, 2.17)	.015
Tully et al. (2008)	984	P	US	52.74	CD/ODD	1.15 (0.73, 1.82)	.536
			I^2	tau^2	*Q*(df)	*OR* (95% CI)	*p*
Summary Effect			0.00	0.00	0.95(1), $p = .329$	1.38 (1.05, 1.82)	.021

Note. CD = conduct disorder; CI = confidence interval; ODD = oppositional defiant disorder; UK = United Kingdom; US = United States. [a]Fathers with depression/fathers with higher levels of depressive symptoms. [b]Fathers without depression/fathers with lower levels of depressive symptoms or no depressive symptoms. [c]*N* includes both the depression and control group. [d]Pub status = Publication status (P = Published; U = Unpublished).

Table C4

Characteristics of Studies Comparing the Mean Level of Externalizing Behaviours of Children of Fathers with[a] and without[b] Depression (Additional Research Question #3)

Study	*N*[c]	Pub status[d]	Country of study	% female children	Child outcome	*d* (95% CI)	*p*
Jacob & Johnson (1997)	94	P	US	-	Externalizing behaviour	0.76 (0.34, 1.18)	< .001
Narayanan & Nærde (2016)	1140	P	Norway	51.93	Aggression	0.28 (0.19, 0.37)	< .001
			I^2	tau^2	*Q*(df)	*d* (95% CI)	*p*
Summary Effect			79.51	0.092	4.88(1), *p* = .027	0.48 (0.01, 0.94)	.045

Note. CI = confidence interval; US = United States.

[a]Fathers with depression/fathers with higher levels of depressive symptoms. [b]Fathers without depression/fathers with lower levels of depressive symptoms or no depressive symptoms. [c]*N* includes both the depression and control group. [d]Pub status = Publication status (P = Published; U = Unpublished).

Chapter 3 – Paternal Depression and Parenting Behaviours: A Meta-Analysis

Abstract

The primary objective of the current study was to provide a summary of the strength of the relationship between paternal depression and parenting behaviours. A secondary objective of this study was to examine whether specific factors moderate the magnitude of this relationship. A series of meta-analyses were conducted to examine the strength of the association between paternal depressive symptoms and parenting behaviours. Several moderator analyses were also conducted to examine whether specific factors influenced the strength of the relationship. Moderators analyzed included: mean paternal age, mean child age, paternal relationship status, the method of assessing parenting behaviours, and bibliographic factors. The current study found a small relationship between paternal depressive symptoms and both positive ($r = –.16$; 95% CI [–.20, –.13]; $k = 35$; $p < .001$) and negative ($r = .17$; 95% CI [.13, .21]; $k = 28$; $p < .001$) parenting behaviours. The relationship between paternal depressive symptoms and overall parenting behaviours was significantly moderated by the informant of the parenting behaviour, and the parenting behaviour assessment. Parenting behaviours assessed with questionnaires (vs. observations) and self-reports of parenting behaviours (vs. child-reports, maternal-reports, or observation) were associated with larger effect sizes. The results of this study suggest that practitioners should be mindful of the relationship between paternal depressive symptoms and parenting behaviours when working with families. Suggestions for future research and treatment implications are provided.

Keywords: meta-analysis, parenting, parenting behaviours, paternal depression

Paternal Depression

Over the past few decades, the research on parental psychopathology and family functioning has shifted to reflect the greater recognition of the role of fathers in child development and the family system (Parker & Wang, 2013; Pew Research Center, 2015). Given the notable links between maternal depression and family-related dysfunction (e.g., Goodman et al., 2011; Letourneau, Tramonte, & Willlms, 2013) and that about one in ten fathers experience depression (Cameron, Sedov, & Tomfohr-Madsen, 2016; Lee, Taylor, & Bellamy, 2012), researchers have now focused their efforts to better understand families of fathers with depression. Studies in this area have demonstrated that many of the difficulties reported in families of mothers with depression, such as increased rates of child psychopathology (Goodman et al., 2011), compromised parent-child relationships (Lee et al., 2013), and increased family discord (Foster et al., 2008) are also found in families of fathers with depression (e.g., Cheung & Theule, 2018; Dette-Hagenmeyer & Reichle, 2014; Nelson, O'Brien, Blankson, Calkins, & Keane, 2009).

Paternal Depression and Parenting Behaviours

Another difficulty commonly experienced by mothers with depression is engaging in positive and effective parenting behaviours (Wilson & Durbin, 2010). Dix and Meunier's (2009) action-control framework provides an explanatory structure for the relationship between maternal depression and negative parenting strategies. This framework largely attributes ineffective parenting techniques in mothers with depression to the presence of depressive symptoms, which impair a mother's ability to process information successfully at the following five stages: (a) goal processing, (b) input processing, (c) appraisal, (d) emotion, and (e) response processing. Given that depressive symptoms experienced by fathers would also likely hinder

their ability to process information, it is not surprising that paternal depression has also been associated with ineffective and negative parenting behaviours. For example, studies have demonstrated a relationship between paternal depressive symptoms and several forms of negative parenting behaviours, including inconsistent discipline (Dette-Hagenmeyer & Reichle, 2014), utilization of psychological control (Aunola, Ruusunen, Viljaranta, & Nurmi, 2015; Herr, Hammen, & Brennan, 2007), and rejection (Elgar, Mills, McGrath, Waschbusch, & Brownridge, 2007). Paternal depression has also been found to be inversely associated with positive parenting behaviours, such as nurturance (Elgar et al., 2007), monitoring (Elgar et al., 2007; Onatsu-Arvilommi, Nurmi, & Aunola, 1998), and parental acceptance (Herr et al., 2007; White, Roosa, Weaver, & Nair, 2009).

Wilson and Durbin (2010) conducted the most recent meta-analysis on paternal depression and parenting behaviours and found a small relationship between paternal depressive symptoms and both positive ($r = -.19$; $k = 21$) and negative ($r = .16$; $k = 19$) parenting behaviours. On the other hand, a few studies have found that paternal depression is not significantly associated with negative parenting (e.g., Gartstein & Fagot, 2003; Reeb et al., 2014; Sethna, Murray, Netsi, Psychogiou, & Ramchandani, 2015). Additionally, some research has demonstrated that paternal depression is positively associated with positive parenting behaviours (e.g., Middleton, Scott, & Renk, 2009; Sethna et al., 2015), and negatively associated with negative parenting behaviours (e.g., McElwain & Volling, 1999; Onatsu-Arvilommi et al., 1998).

Sample, measurement and outcome, and bibliographic characteristics. Although the results from Wilson and Durbin's (2010) meta-analysis align with the consensus that paternal depression and negative parenting behaviours are linked, the variation in the strength of the association found across studies may be influenced by specific factors, including sample,

measurement and outcome, and bibliographic characteristics.

Sample characteristics. Sample characteristics that might influence the strength of the relationship between paternal depressive symptoms and parenting behaviors include (a) child sample characteristics (e.g., gender composition and mean age), (b) paternal sample characteristics (e.g., mean age, racialized background, and relationship status), and (c) additional sample characteristics (e.g., maternal depression, and recruitment method).

Child sample characteristics. Given that some research found that paternal depressive symptoms were more strongly associated with negative parenting behaviours for fathers with sons than those with daughters (Reeb, 2012), the gender composition of the child sample may moderate the relationship. Another child sample characteristic that might moderate the strength of the relationship is the mean age of the child sample. Elgar, Mills, McGrath, Waschbusch, and Brownridge (2007) demonstrated that child age was positively associated with parental rejection and negatively associated with parental nurturance. Moreover, the mean age of the child sample approached significance in Wilson and Durbin's (2010) meta-analysis, with samples of younger children tending to be associated with a larger relationship between paternal depression and negative parenting behaviours.

Paternal sample characteristics. Father-related factors, such as the mean age of the paternal sample might also moderate the strength of the relationship. Elgar et al. (2007) found that increased paternal age was positively associated with parental nurturance and rejection. Moderator analyses conducted by Wilson and Durbin (2010) also revealed that paternal age had a significant influence on negative parenting behaviours, such that samples of younger fathers yielded larger effect sizes. The authors speculated that exhibiting negative parenting behaviours may decrease over time as parenting skills and experience are acquired. Additionally,

considering differences regarding parenting styles and beliefs across cultures (e.g., Bornstein, 2012; Rubin & Chung, 2013), the racial or ethnic background of the father or child sample might also influence the relationship. For example, Chang, Park, Singh, and Sun (2009) found that compared to White parents, parents with racialized backgrounds demonstrated higher levels of parental intrusiveness and detachment behaviour. Indeed, Wilson and Durbin found that the racial/ethnic composition of the sample significantly moderated the relationship between paternal depressive symptoms and negative, but not positive parenting behaviours. Furthermore, previous studies have found a negative association between depression and several indicators of socioeconomic status (SES), such as employment (Rizvi et al., 2015), education, and income (Goodman, 2009). Some studies have also suggested that parenting difficulties are related to indicators of low SES (e.g., Augustine, 2014; Chang, Park, Singh & Sung, 2009). Taken together, this suggests that SES might also moderate this relationship.

Another paternal sample characteristic that might impact the strength of the association is the relationship status of the father. Single fathers tend to have higher rates of depression (Bronte-Tinkew, Moore, Matthews, & Carrano, 2007) and tend to experience greater personal-, financial- and family-related issues than partnered fathers with depression (for a review see Spector, 2006). Single parents and working fathers tend to report lower levels of parental efficacy than working mothers (Parker & Wang, 2013). Given that parental self-efficacy is associated with depressive symptoms (Sevigny & Loutzenhiser, 2010) and parenting behaviour (Glatz, Cotter, & Buchanan, 2017), single fathers with depression may be especially susceptible to struggling with specific parenting behaviours.

Additional sample characteristics. Given the moderate correlation between maternal depressive symptoms and paternal depressive symptoms (Medeiros, Gouveia, Canavarro, &

Moreira, 2016; Paulson & Bazemore, 2010; Paulson, Bazemore, Goodman, & Leiferman, 2016; Ponnet, 2014), having a partner with high levels of depressive symptoms might influence the magnitude of the relationship between paternal depressive symptoms and parenting behaviors. Another factor that could impact the strength of the relationship is whether the participants were recruited from a community or clinical sample. Depressive symptoms tend to be higher in clinical than community samples (Taylor, Lovibond, Nicholas, Cayley, & Wilson, 2005) and therefore, clinical samples may demonstrate larger effect sizes.

Measurement and outcome characteristics. In addition to sample characteristics, several measurement and outcome factors might moderate the strength of the relationship between paternal depressive symptoms and parenting behaviours. Considering issues related to paternal adjustment during the transition to parenthood (Doss, Rhoades, Stanley, & Markman, 2009; Parfitt, 2013), the timing of paternal depression (i.e., postpartum versus non-postpartum paternal depression) might moderate the relationship. Self-reports of parenting behaviours may also be associated with a larger relationship between paternal depression and parenting behaviours given that the relationship between paternal depressive symptoms and parenting behaviours has been found to be stronger when studies used self-reports of paternal parenting behaviour than when using observation (Conger et al., 1992; Conger, Patterson, & Ge, 1995; Harvey, Stoessel, & Herbert, 2011) or child-reports (Du Rocher Schudlich, 2004; Epkins & Harper, 2016; Leinonen, Solantaus, & Punamäki, 2002) of paternal parenting behaviours. Wilson and Durbin's (2010) results echoed these results for negative, but not positive, parenting behaviours.

Bibliographic characteristics. Additional insight into the variation in the magnitude of the relationship between paternal depression and parenting behaviours across manuscripts may be provided by examining specific bibliographic characteristics, including the type of publication

(i.e., published or unpublished), the year of publication, and the country of study. Research that produces significant findings is more likely to be published than manuscripts with null results (i.e., publication bias; Franco, Malhotra, & Simonovits, 2014). Therefore, published manuscripts will likely be associated with a larger relationship between paternal depression and parenting behaviours than unpublished manuscripts. The year the research was published might also moderate the strength of the relationship given historical shifts in fatherhood (i.e., increase in paternal involvement in caregiving; Pew Research Center, 2015). Therefore, the magnitude of the relationship may be larger in newer manuscripts than older manuscripts. Finally, the country of study might also influence the strength of this relationship given the differences in parenting practices across cultures (Bornstein, 2012; Chang et al., 2009; Rubin & Chung, 2013). For example, researchers have found that Asian parents tend to endorse authoritarian parenting styles (Park, Kim, Chiang, & Ju, 2010). Additionally, Domenech Rodríguez, Donovick, and Crowley (2009) reported that Hispanic parents scored higher on measures of warmth and demandingness and lower on autonomy granting than White parents.

Rationale for the Current Study

This study aims to build on Wilson and Durbin's (2010) meta-analysis in several ways. First, it will update the literature given that their work only included manuscripts published up to 2008 and current guidelines suggest that meta-analyses should be updated every two to five years (Hopewell et al., 2008). Moreover, there has been a growth in the number of studies examining paternal depression, and there has been an increase in parental responsibilities among fathers in recent years (Pew Research Center, 2015), which may have impacted these relationships. Additionally, Wilson and Durbin only searched two databases, PsycINFO and ProQuest

Dissertations & Theses. This study searched two additional databases to retrieve relevant manuscripts, Educational Resources Information Center (ERIC) and Google Scholar.

Second, the Cochrane Collaboration guidelines note the importance of updating meta-analyses to examine other factors (i.e., moderators) that may not have been included in past meta-analyses (Hopewell et al., 2008). This study examined several moderators (i.e., mean years of paternal education, paternal relationship status, recruitment method, timing of paternal depression, type of parenting behaviour informant, year of publication, country of study) that were not originally assessed by Wilson and Durbin (2010). Due to the growth of the paternal depression literature over the past decade, the current study also re-examined the moderators included in Wilson and Durbin's meta-analysis, some of which may have lacked significance due to low power.

Third, Wilson and Durbin (2010) excluded studies that did not assess parenting behaviours through self-reports or observational methods. Instead of excluding these studies, this study used the type of informant of paternal parenting behaviours (e.g., father, partner, child, clinician, observational) as a moderator. Including studies with informant reports of paternal parenting behaviours provided the opportunity to examine whether the type of informant significantly moderates the relationship between paternal depression and parenting behaviours.

Fourth, Wilson and Durbin (2010) divided their analyses by examining parenting behaviours in terms of positive and negative types; however, parenting behaviours can also be viewed on a continuum. Overall negative parenting might consist of either the absence of positive parenting behaviours or the presence of negative parenting behaviours. Alternatively, overall positive parenting could consist of an absence of negative parenting behaviours and the presence of positive parenting behaviours. Therefore, in addition to examining the positive and

negative parenting behaviours separately (i.e., as done in Wilson and Durbin's study), the present study also examined overall parenting behaviours by including positive and negative parenting behaviours within the same analysis.

Fifth, Wilson and Durbin (2010) examined the relationship between paternal depressive symptoms and parenting behaviour using manuscripts that assessed these variables at diverse time points, most investigating the link between past paternal depressive symptoms and current parenting behaviours. This study only included manuscripts that explored paternal depressive symptoms and parenting behaviours concurrently because we were interested in examining the current relationship between paternal depressive symptoms and parenting behaviours as opposed to examining the association between the two variables at different time-points.

Research Questions

The first objective of the current study was to answer the following research questions: (1) How large is the association between paternal depressive symptoms and positive parenting behaviours? (2) How large is the association between paternal depressive symptoms and negative parenting behaviours? and (3) How large is the association between paternal depressive symptoms and overall parenting behaviours? The second objective of this study was to investigate whether any of the following factors moderate the strength of the association between paternal depressive symptoms and parenting behaviours: (a) gender composition of the child sample, (b) mean age of the child sample, (c) mean age of the paternal sample, (d) racial/ethnic background of the child sample, (e) racial/ethnic background of the paternal sample, (f) mean years of paternal education, (g) relationship status composition of the paternal sample, (h) recruitment method (i.e., community or clinical), (i) timing of paternal depression (postpartum vs. non-postpartum), (j) parenting behaviour assessment (questionnaire vs. observation), (k)

parenting behaviour informant (paternal- vs. other-report), (l) type of publication (published vs. unpublished), (m) year of publication, and (n) country of study.

Method

Search Strategy and Manuscript Retrieval

The screening, identification, and selection procedures were conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) Statement (Moher, Liberati, Tetzlaff, & Altman, 2009). The following four databases were systematically searched in December 2017 for both published and unpublished manuscripts prepared up to December 2017: PsycINFO, ERIC, ProQuest Dissertations & Theses, and Google Scholar. Considering the magnitude of search results often generated by Google Scholar, manuscripts were reviewed for eligibility up to 200 consecutively irrelevant manuscripts. The search strategies used in the above databases depended on the specific search features available within each database (e.g., truncation for keywords, options to expand, limit, or narrow down search results). The following keywords were used in all databases to retrieve relevant manuscripts: parent, father*, parental, paternal, depression, major depression, depressi*, depression (emotion), parenting, caregiver* behaviour, parent* behaviour*, parent* quality, parent* warmth, parent* acceptance, parent* support, parent* nurturance, parent* intrusiveness, parent* discipline, ineffective discipline, harsh discipline, manipulative, psychological control, and inconsistent discipline.

Review articles on paternal depression and the archives of academic journals that publish research on paternal depression (e.g., *American Journal of Men's Health, Journal of Child Psychology and Psychiatry)* were also searched to retrieve additional relevant manuscripts. Backward and forward reference searches were completed to identify manuscripts that were not

found in the initial database searches (Card, 2012). A backward reference search refers to reviewing the reference list of eligible manuscripts for other potential manuscripts that meet the inclusion criteria listed below. A forward reference search consists of evaluating manuscripts that cited an eligible manuscript.

Inclusion Criteria and Determining Eligibility

We included manuscripts that (1) were published in English, (2) included a current and direct measure of paternal depressive symptoms, and (3) included a current measure of parenting behaviours, including positive (e.g., parental warmth, acceptance, support, nurturance) or negative (e.g., rejection, hostility, psychological control, over-reactivity) behaviours. For the purpose of this study, the quality of the parent-child relationship, parental self-efficacy, and attachment styles were not considered forms of parenting behaviors. Types of parenting styles (e.g., permissive, authoritarian), and the completion of specific childrearing tasks were not considered parenting behaviours. Harsh physical punishment or corporal discipline (e.g., spanking, grabbing, shoving) and forms of physical abuse were not included as negative parenting behaviours in isolation (i.e., unless they were included as part of a larger measure on parenting behaviour). To be included in this study, self- or informant-reports or observation of parenting behaviour were required. Vignettes or hypothetical situations of parenting behaviours were excluded. Studies must have quantitatively considered the relationship between concurrent paternal depressive symptoms and parenting behaviours to be included. We defined fathers as the primary male caregiver in the home and included biological fathers, stepfathers, and adoptive fathers. Manuscripts focusing on non-resident fathers were not eligible. As an attempt to avoid the "apples to oranges" problem outlined by Lipsey and Wilson (2001), manuscripts that focused on fathers or children with identified developmental difficulties, genetic conditions (e.g., autism

spectrum disorder, fragile X syndrome, Turner syndrome), or chronic physical health conditions (e.g., epilepsy, cancer, very low birth-weight, chronic pain, asthma, diabetes, endocrine disorders) were not eligible. Manuscripts that included a small number of fathers or children with specific health conditions were eligible. We also excluded manuscripts that focused on children who (a) were adopted from orphanages, (b) were in foster care, (c) had a history of homelessness, or (d) had a history of child maltreatment. Additionally, we excluded studies that focused on fathers with a history of incarceration, or severe mental illness. These samples were excluded given that these populations often differ from other populations on several relevant factors, such as family dysfunction (e.g., Crea, Chan, & Barth, 2014), SES (e.g., Druss, Zhao, Von Esenwein, Morrato, & Marcus, 2011), and mental and physical health (e.g., Cheung et al., 2018; Edidin, Ganim, Hunter, & Karnik, 2012; Turney, Wildeman, & Schnittker, 2012).

Manuscripts were screened for eligibility at three stages. First, duplicates of manuscripts identified across the databases were recorded and excluded. Second, manuscripts were screened based on their titles and abstracts using the inclusion criteria above. Third, the manuscripts were reviewed in their entirety and deemed eligible or ineligible based on the inclusion criteria. Manuscripts that adhered to the inclusion criteria were included in the final analyses. The number of manuscripts that were included and excluded at each stage was recorded in the PRISMA flow diagram (see Figure 1). Explanations for why manuscripts were excluded from the final eligibility stage are also provided in the PRISMA flow diagram.

Data Extraction and Reliability

A coding manual (see Appendix A) and a coding form (see Appendix B) were used to extract the (a) quantitative data used to calculate an effect size and (b) manuscript characteristics used for moderator analyses (i.e., sample, measurement and outcome, and bibliographic

characteristics) from each of the eligible manuscripts. The data were then inputted into and analyzed using the Comprehensive Meta-Analysis (CMA) software 3.0 (Borenstein, Hedges, Higgins, & Rothstein, 2013).

Overlapping data. We addressed overlapping data (i.e., when the same dataset was used across different manuscripts) in one of two ways. Data from the eligible manuscripts that used the same dataset were analyzed as an individual effect (i.e., aggregated) in CMA when each of the manuscripts contributed unique data (e.g., different subsamples or outcome measures). For example, Conger et al. (1992) and Conger, Patterson, and Ge (1995) used the same dataset but reported on different types of parenting behaviours. Therefore, both of these manuscripts were included, and their data were aggregated to produce an individual effect. Alternatively, when one manuscript included a more comprehensive set of information than other manuscripts that used the same dataset, the manuscript with the most comprehensive set of information was included, and the other manuscripts were excluded. For example, Du Rocher Schudlich and Cumming (2007) and Du Rocher Schudlich (2004) used the same dataset; however, Du Rocher Schudlich provided a more comprehensive set of information than Du Rocher Schudlich and Cumming. Consequently, the former was included, and the latter was excluded.

Missing data. Authors were emailed when relevant data necessary to calculate an effect size (e.g., sample sizes, quantitative data of nonsignificant findings) were missing. We contacted six authors, and two provided the requested data (Singley et al., 2017; Wilson, 2012). Three manuscripts were excluded from this study because we were unable to obtain sample sizes and information regarding a specific parenting measure. We were also unable to obtain the quantitative data for nonsignificant findings from one manuscript; however, other data from this manuscript was usable, and therefore, this manuscript was included.

Reliability of manuscript retrieval and data extraction. The reliability of the manuscript retrieval process and the initial search strategy were assessed based on the results of the backward and forward reference searching. As noted above, the purpose of conducting backward and forward reference searches is to retrieve manuscripts that were missing from the initial database searches. Therefore, the reliability of these two procedures is related to the number of manuscripts identified through backward and forward referencing. No additional manuscripts were obtained through the backward and forward reference searches, suggesting that the manuscript retrieval process and the initial search strategy was reliable. The reliability of the extracted data was evaluated by two secondary coders (Ph.D. level students) who coded 25% of the eligible manuscripts. There were no disagreements between the primary and secondary coders (i.e., 100% agreement on all of the data extracted).

Calculation and Analysis of Effect Sizes

A series of meta-analyses were conducted to integrate and analyze the association between paternal depression and parenting behaviours. Random effects models were used throughout the analyses to account for heterogeneous features across the manuscripts included in final analyses (Borenstein, Hedges, Higgins, & Rothstein, 2010; Lipsey & Wilson, 2001). Heterogeneity was assessed using the Q statistic, I^2 statistic, and tau^2 statistic. Research Questions #1 to 3 were addressed using Pearson product-moment correlation coefficients to investigate the association between paternal depressive symptoms and levels of parenting behaviours. Research Questions #1 and #2 examined positive and negative parenting behaviours separately. Research Question #3 examined overall parenting behaviours, where the effect sizes of positive parenting behaviours were reversed so that lower levels of positive parenting behaviours were assessed as being negative. The effect-sizes were first transformed to Fisher's

z-scale to account for the variance in correlational data (Borenstein et al., 2010) and then transformed back to correlation coefficients for interpretation and reporting.

Multiple outcomes. Most manuscripts included more than one quantitative consideration of the relationship between paternal depressive symptoms and parenting behaviours. For example, some manuscripts reported on the relationship between paternal depressive symptoms and different types of parenting behaviours. Others reported on the relationship using different ways of assessing parenting behaviours (e.g., self-report, child-report, observation). Data from manuscripts with more than one quantitative consideration were aggregated, and each manuscript contributed no more than one individual effect size to each weighted mean effect size distribution.

Outliers. Outliers were defined as individual effect sizes with standardized residuals greater than 1.96 (Viechtbauer & Cheung, 2010). Effect sizes from manuscripts that were identified as outliers were trimmed (i.e., removed) from the weighted mean summary effect size distribution (SESD). The trimmed SESD of each meta-analysis was then compared to the untrimmed SESD.

Moderator analyses. All moderator analyses were conducted on the individual meta-analysis examining the association between paternal depressive symptoms and overall parenting behaviours (Research Question #3). Meta-regressions, which evaluate the degree to which a moderator influences the magnitude of an effect size (Card, 2012), were used to conduct the moderator analyses. Data from a minimum of 10 individual effects were required to conduct each moderator analysis based on recommendations from the Cochrane Handbook (Higgins & Green, 2011).

Results

Sample and Bibliographic Characteristics

Search results from the four databases generated 12,278 unique manuscripts and 464 full-text articles were selected for review and screened for eligibility. The current study includes 50 manuscripts (37 published, 13 unpublished) that were produced between 1990 and 2017 (see Figure 1). Most of the studies were conducted in North America (n = 41) with 76% of the studies conducted in the United States (U.S.) and 6% conducted in Canada. Other studies were conducted in Belgium (n = 1), Finland (n = 3), Germany (n = 1), Portugal (n = 1), and the United Kingdom (n = 3). There was a total of 10,801 participants across all of the studies. The percentage of female children in the samples ranged from 0 to 100%. The mean age of children and fathers in the samples ranged from 4 months to 15.7 years, and 25.3 to 46.1 years, respectively. The manuscripts that included information on the relationship status of the paternal sample reported that 99 to 100% of fathers in the sample were partnered. Most of the studies consisted of community samples (n = 47), and the composition of the paternal (61.6 to 100.0%) and child (58.1 to 100.0%) samples were predominately White.

Measure and Outcome Characteristics

Paternal depressive symptoms. All of the manuscripts included self-reports of depressive symptoms with the most common measures being the Center for Epidemiologic Studies Depression Scale (CES-D; n = 18) and versions of the Beck Depression Inventory (BDI; n = 15). Other manuscripts used the Edinburgh Postnatal Depression Scale, the Hospital Anxiety and Depression Scale, and the Symptom Checklist-90-Revised. Few manuscripts examined paternal postpartum depressive symptoms (n = 4).

Parenting behaviours. Most manuscripts included self-reports of parenting behaviours

(n = 37), while other manuscripts assessed parenting behaviours using child-reports (n = 11), maternal-reports (n = 2), and observation (n = 14). The most commonly used measures of parenting behaviors included the Children's Report of Parental Behavior Inventory (n = 9), the Parenting Scale (n = 6), versions of the Alabama Parenting Questionnaire (n = 5), the Child Rearing Practices Scale (n = 4), and the Parental Acceptance–Rejection Questionnaire (n = 4). The manuscripts included in this study provided a myriad of specific types of parenting behaviours with more manuscripts reporting on positive types of parenting behaviours than negative.

Paternal Depressive Symptoms and Parenting Behaviours

The results were interpreted and categorized based on Cohen's (1977, 1988) guidelines as small ($r \leq .10$), medium, ($r = .30$) or large ($r \geq .50$). There was a small negative relationship between paternal depressive symptoms and positive parenting behaviours (r = –.16; 95% CI [–.20, –.13]; k = 35; $Q(34)$ = 129.16; I^2 = 73.68; tau^2 = 0.01; see Table C1) and a small positive relationship between paternal depressive symptoms and negative parenting behaviours (r = .17; 95% CI [.13, .21]; k = 28; $Q(27)$ = 81.60; I^2 = 66.91; tau^2 = 0.01; see Table C2). The relationship between paternal depressive symptoms and overall parenting behaviours was also small (r = .17; 95% CI [.14, .20]; k = 48; $Q(47)$ = 176.81; I^2 = 73.42; tau^2 = 0.01; see Table C3). Across all three analyses, the tests for heterogeneity were significant at $p < .001$ and the results of the I^2 suggested a moderate to high amount of heterogeneity. Across the three research questions, six effect sizes from four manuscripts were identified as outliers (Dette-Hagenmeyer & Reichle, 2014; McElwain & Volling, 1999; Medeiros et al., 2016; Rice, Lewis, Harold, & Thapar, 2013) and trimmed from the weighted mean SESD. The difference between the untrimmed and the trimmed SESDs across all three research questions were negligible, and

therefore, the untrimmed findings were used in the final analyses. Additional research questions were originally proposed, but not included in the journal submission of the manuscript due to issues with power (see Appendix D).

Moderator Analyses

Table 1 displays the results of the 14 meta-regressions. A moderator analysis on the presence of maternal depression in the sample was not conducted due to an insufficient number of studies that provided this data. The method for assessing parenting behaviour was a significant moderator ($Q = 5.04$, $p = .025$, $k = 43$). The mean effect size of the studies that used questionnaires was larger ($r = .19$; 95% CI [.15, .22]) than the mean effect size of the studies that used observational data ($r = .09$; 95% CI [.04, .14]). The informant of the parenting behaviours (self-ratings vs. informant-ratings or observation) was also statistically significant ($Q = 4.37$, $p = .037$, $k = 36$). Manuscripts that used self-ratings of parenting behaviours had a much larger mean effect size ($r = .20$; 95% CI [.17, .24]) than those that did not ($r = .10$; 95% CI [.07, .14]). None of the remaining moderator analyses were significant.

Discussion

The current study updates our understanding of the association between paternal depressive symptoms and parenting behaviours. Overall, the results of this study corroborate Wilson and Durbin's (2010) meta-analysis, which also found a small relationship between these variables. Compared to the results of Wilson and Durbin's study ($r = –.19$; $r = .16$), the current study demonstrated a slightly weaker relationship between paternal depressive symptoms and positive parenting behaviours ($r = –.16$) and a similar relationship between negative parenting behaviours ($r = .17$). The difference between the results of this study and Wilson and Durbin's may be due to the fact that Wilson and Durbin's meta-analysis included manuscripts published

up to 2008 and the current study includes manuscripts published up to 2018. Additionally, only 18 of the 28 manuscripts included in Wilson and Durbin's meta-analysis met the eligibility criteria for the current study. Reasons for exclusion included (a) missing sample sizes, (b) ineligible measures of paternal depressive symptoms or parenting behaviours, and (c) ineligible quantitative comparisons between paternal depressive symptoms and parenting behaviours (i.e., both measures were not assessed at the same time). Considering that less than one-third of the manuscripts included in the current study were the same as those included in Wilson and Durbin's study, the overall findings across the two studies are still strikingly similar.

The strength of the association between paternal depressive symptoms and parenting behaviours found in this study were not as strong as the relationship between maternal depressive symptoms and parenting behaviours as reported by Wilson and Durbin (2010). Although paternal involvement in childcare has increased over the years (Wang & Parker, 2013), this result is expected given that mothers continue to be perceived as the primary caregiver (Pew Research Center, 2015). Mothers also tend to experience a higher degree of parenting stress (Vismara et al., 2016) and report higher rates of depression (Sotomayor-Peterson, Wilhelm, & Card, 2011) than fathers, which might also contribute to the lack of similarity. Additionally, Putnick et al. (2012) found that fathers, in general, are less likely to engage in some forms of positive parenting behaviors (e.g., warmth, acceptance) and are more likely to engage in some forms of negative parenting behaviors (e.g., hostility/rejection/neglect) than mothers. Therefore, differences in parenting behaviors between fathers with and without depressive symptoms might not be as pronounced as mothers with and without depressive symptoms. That said, the mean effect sizes in this study ($r = –.16$; $r = .17$) fell within the confidence intervals of the association between maternal depressive symptoms and positive ($r = – .20$; 95% CI [–.29, –.10]) and

negative (r = .22; 95% CI [.14, .30]) parenting behaviours (Wilson & Durbin, 2010). This outcome suggests that the association between paternal depressive symptoms and parenting behaviours is similar to the relationship between maternal depressive symptoms and parenting behaviours established by Wilson and Durbin eight years ago.

Two of the moderators examined significantly influenced the strength of the association between paternal depressive symptoms and overall parenting behaviours. Studies that used questionnaires to assess self-, child-, or maternal-ratings of parenting behaviours were associated with larger mean effect sizes than those that used observations to assess parenting behaviours. This result is similar to Wilson and Durbin's (2010) finding that self-reports of parenting behaviours yielded larger effect sizes than observational data. This result is not surprising considering that observations are time-limited and conducted in unnatural laboratory settings, which reduces the face validity of the assessment. Self- and informant-reports of paternal parenting behaviour likely reflect a more realistic and natural measure of parenting behaviours. Moreover, Wilson and Durbin found that the length of the observation significantly moderated the relationship between paternal depressive symptoms and positive parenting behaviours, such that longer observations yielded larger effects than shorter observations. In other words, fathers tended to engage in fewer positive parenting behaviours the longer the observation, which likely increases the validity of the measure as individuals may struggle to maintain positive presentation styles.

The finding that self-ratings of negative parenting behaviours were associated with larger effect sizes than informant-ratings or observations aligns with Wilson and Durbin's (2010) results and Dix and Meunier's (2009) action-control framework. This framework attributes the engagement of ineffective parenting strategies to depressive symptoms, such that depressive

symptoms are thought to impair the ability to process information at five different stages (i.e., goal processing, input processing, appraisal, emotion, and response processing; Dix & Meunier, 2009). Difficulties with processing information accurately at the appraisal stage especially fits with this current finding. At the appraisal stage, depressive symptoms are thought to enhance the degree to which parents engage in negative cognitive biases. Cognitive biases are believed to contribute to (a) negative appraisals of one's children, (b) self-critical tendencies, and (c) low parental self-efficacy. Based on this theory and the significance of this moderator, fathers with depressive symptoms may be misperceiving the degree to which they are engaging in negative and positive parenting behaviours. Fathers may be engaging in specific types of cognitive distortions such as selective abstraction, which refers to focusing or hyper-focusing on negative elements (i.e., negative parenting behaviours) rather than considering other aspects of the situation, such as positive features (i.e., positive parenting behaviours; Beck, 1972). Fathers with depressive symptoms may also be overemphasizing the extent to which they engage in negative parenting behaviours (i.e., magnification) and disqualifying the degree to which they exhibit positive parenting behaviours (i.e., minimization; Beck, 1972).

The remaining 12 moderator analyses were not significant. The finding that the gender composition of the child sample was not a significant moderator aligns with Wilson and Durbin's (2010) findings and previous research (Rice et al., 2013). The mean age of the child sample was also not a significant moderator and supports Wilson and Durbin's original findings. Based on research by Elgar et al. (2007), it is possible that the impact that the age of the child sample may have on the relationship could be related to specific types of parenting behaviours as opposed to overall parenting behaviours. This study examined different types of parenting behaviours in a

single analysis, and therefore, any influence that the child sample age may have on the relationship might not have been detectable.

Samples with a younger mean paternal age were expected to be associated with larger effect sizes; however, the mean age of the father sample was not a significant moderator. This result did not correspond with previous research (e.g., Elgar et al., 2007; Wilson & Durbin, 2010). Wilson and Durbin (2010) found that samples of fathers with younger mean ages tended to engage in more negative parenting behaviours than older fathers and suggested that older fathers may have acquired more parenting skills and experience over time than younger fathers. Other factors such as the number of children the father has and the birth order of the target child, could be potential indicators of parenting experience in addition to paternal age. Although having more children may increase caregiving experience, it may also heighten parenting stress (e.g., Viana & Welsh, 2010). Additionally, the age of first-time fathers has increased over the past 30 years (Khandwala, Zhang, Lu, & Eisenberg, 2017), and therefore, the mean age of father samples from older manuscripts may not be comparable to newer manuscripts.

Neither the racial/ethnic background of the child or father samples were significant moderators. The lack of significance for these moderators are likely due to limited variability as almost all of the manuscripts that included the racial/ethnic composition of the samples reported that the majority of the sample was White. Only one of the studies included in the analyses focused on a population with a racialized background (White et al., 2009). Samples of fathers with fewer years of education did not significantly moderate the relationship between paternal depressive symptoms and negative parenting behaviours. Only ten effects were included in this analysis, seven of which consisted of samples of fathers reporting approximately 14 years of education (± one year). As a result, this non-significant finding may be due to issues with power

and limited variability. The finding that the relationship status of the father sample was not a significant moderator was also likely due to limited variability as the manuscripts that reported on the relationship status of the father sample indicated a limited range (i.e., 99-100%). The non-significant findings for the recruitment method (i.e., community vs. clinical) and the timing of paternal depression (i.e., postpartum vs. non-postpartum) were also likely impacted by limited variability. Of the 48 individual effects included in the moderator analyses, only three consisted of clinical samples and four reported on postpartum paternal depressive symptoms.

None of the bibliographic moderators were significant. Published manuscripts were expected to be associated with a larger relationship between paternal depression and parenting behaviours than unpublished manuscripts; however, this was not the case. This non-significant finding might suggest that academic journals have shifted to becoming more open to publishing non-significant findings. More recent manuscripts were expected to be associated with larger effect sizes than older manuscripts. This prediction was based on the assumption that with an increase in parental demands on fathers over the past couple decades (Parker & Wang, 2013; Pew Research Center, 2015), the magnitude of the effect sizes would be larger for newer manuscripts than older manuscripts. Additionally, newer manuscripts were predicted to yield a larger effect size given that an increase of paternal involvement in caregiving might also lead to higher levels of parenting stress, which has been linked to negative parenting behaviours (Putnick et al., 2008). Alternatively, there has been an increase in the recognition and support for fathers as caregivers over the past few decades (Pew Research Center, 2015). This support, whether in the form of enhanced community resources, maternal and familial support, or online and public initiatives, may help promote positive parenting behaviours among fathers now more than previous decades. If these two competing possibilities (i.e., increased parenting stress and

parenting support) are at play, effects from either one of these factors would cancel each other out, resulting in the non-significant finding. Finally, the country where the manuscript was conducted was not a significant moderator. Most manuscripts were conducted in North America, and none of the manuscripts included in this study were conducted in countries with cultures that tend to be linked to types of parenting styles that differ from Westernized norms (e.g., Park et al., 2010).

Strengths and Limitations

The present study has several notable strengths. This study is the most recent meta-analysis examining the relationship between paternal depressive symptoms and parenting behaviours. The current study also examined overall parenting behaviours in addition to examining negative and positive parenting behaviours separately. Viewing parenting behaviours on a continuum as opposed to isolated categories (i.e., negative vs. positive) provided a more comprehensive understanding of the relationship. Combining positive and negative parenting behaviours within the same analysis also increased the number of individual effects available for the moderator analyses. A greater number of effects allowed us to re-analyze moderators that were examined in Wilson and Durbin's (2010) study, especially those that the authors speculated were not significant due to issues with power. This study also explored several moderators that were not analyzed in Wilson and Durbin's meta-analysis, including recruitment method, publication year, and the timing of paternal depression. Another strength of this study is the high reliability of the manuscript retrieval and data extraction. Finally, including unpublished manuscripts is a strength as it addresses issues of publication bias (Card, 2012).

The current study also has several limitations. First, considering potential issues with study quality, including unpublished manuscripts that did not undergo the peer-review process

might be a limitation. That said, the publication status of the manuscripts included in this study was not found to be a significant moderator, suggesting that including unpublished manuscripts did not affect the results of the study. Second, including manuscripts that used observations as a method to assess parenting behaviours could be seen as both a limitation and a strength. Considering potential issues related to cognitive distortions, using observational data and trained coders to assess parenting behaviours may reduce distorted ratings and provide a more objective measure of parenting behaviours; however, data from observations may lack ecological, content, concurrent, translational/representation, and face validity. The validity of observational data can also be threatened by both personal and procedural reactivity. Third, all of the included manuscripts used self-report measures of paternal depression, which possibly affected the results of the study. The lack of variation in the assessment of depressive symptoms also did not allow for further investigation as to whether the type of informant rating paternal depressive symptoms moderates the relationship. Fourth, due to the lack of diverse participant samples across the manuscripts, the results of this research may not be generalizable to all fathers and families. In light of this, it may be more appropriate to view the current study as examining the relationship between paternal depressive symptoms and parenting behaviours in two-parent heterosexual White community samples. The results of this study may also be an underestimation of the magnitude of the relationship between paternal depressive symptoms and parenting behaviours considering that the population of fathers who were not widely represented in the samples (i.e., single, lower SES) tend to have higher rates of depression and parenting difficulties (e.g., Goodman, 2009; for a review see Spector, 2006). Fifth, other factors (e.g., social support, parenting stress, parental self-efficacy, co-occurring mental disorders) that were not examined might have influenced the strength of the relationship. Recent research has demonstrated that

paternal depressive symptoms are associated with lower levels of perceived social support, parenting alliance, and parenting satisfaction, all of which are also related to positive parenting behaviours (Singley et al., 2017). Sixth, there may be potential interaction effects between the explored moderators, such as paternal relationship status and paternal age. Finally, the findings of the current study cannot confirm whether depressive symptoms lead to negative parenting behaviours, or whether engaging in negative parenting behaviours contribute to experiencing greater depressive symptoms.

Clinical Implications

The outcomes of this research provide support for the relationship between paternal depressive symptoms and parenting behaviours. Practitioners working with families of fathers who present with depressive symptoms or parenting difficulties should be mindful of this link. Based on the findings from this study, treatment options that enhance positive parenting behaviours and minimize negative parenting behaviours may also decrease symptoms of paternal depression. Alternatively, treatments explicitly targeting depressive symptoms may also indirectly shift the degree to which fathers engage in negative parenting behaviours. Promising results from other areas of family research has supported this concept. For example, a meta-analysis by Theule, Cheung, and Aberdeen (2018) demonstrated that targeted treatment for children with attention-deficit/hyperactivity disorder (ADHD) decreased levels of parenting stress in families of children with ADHD. Treatment efforts to reduce paternal depressive symptoms and negative parenting behaviours could also focus on targeting factors that are associated with both paternal depressive symptoms and negative parenting behaviours, such as parental self-efficacy and social support (Singley et al., 2017). Indeed, a recent study by Taraban et al. (2018) found that social support satisfaction reduced the strength of the association

between parental depressive symptoms and over-reactive parenting. That said, given the research on men and help-seeking behaviors (e.g., Addis & Mahalik, 2003; Galdas, Cheater, & Marshall, 2005; Mackenzie, Gekoski, & Knox, 2006), it is important to consider whether fathers with depressive symptoms and fathers, in general, would be receptive to specific treatment options. For example, a common trend reported in the research literature is that men are less likely to engage in services that are advertised as and focused around fixing a problem (Addis & Mahalik, 2003; Frank, Keown, Dittman, & Sanders, 2015; Mansfield, Addis, & Courtenay, 2005). Frank, Keown, Dittman, and Sanders (2015) found that although some fathers are reluctant to attend parenting-related sessions that are problem-focused, they would be open to attending sessions around enhancing child and parent-child outcomes. Specifically, fathers in the study ranked the following three topics as being the most important topics to include in a parenting program: (a) increasing positive parent-child relationships, (b) increasing their child's confidence, and (c) discussion around how fathers can positively influence their child's development. Although fathers may be less inclined to seek services for their depressive symptoms, attending sessions focused on optimizing their child's well-being and their relationship with their child may indirectly promote positive parenting behaviors and reduce depressive symptoms. In the hopes of increasing participation of fathers in programming, it is important to consider the preferences of fathers. For example, some researchers have found that fathers value father-only education/support groups (Frank et al., 2015; Nash, 2018). Although some programs geared towards fathers have been developed in recent years (Nash, 2018; Panter-Brick et al., 2014; Taskin & Erkan, 2009); the majority of intervention programs continue to be mother-focused or include the participation of both parents (Fletcher, May, St. George, Stoker, & Oshan, 2014; Panter-Brick et al., 2014). With respect to the results of the current study, it is

promising to see that most of the father-focused programs focus on promoting discussion about parenting issues among groups of fathers (The California Evidence-Based Clearinghouse for Child Welfare, 2016).

Finally, the finding that self-ratings of negative parenting behaviours was a significant moderator may also inform intervention strategies for fathers with depression who are struggling with parenting behaviours. Utilizing treatment strategies that highlight the discrepancies between perceptions and reality, such as video and audio feedback, modifying assumptions, and cognitive restructuring, may be helpful for addressing cognitive distortions. Targeting cognitive distortions may be especially important considering that a higher perception of negative parenting behaviours may also maintain or exacerbate symptoms of depression. Additionally, elevated depressive symptoms may not only increase negative parenting behaviours but could also contribute to a more considerable distortion of negative parenting behaviours, which could ultimately maintain the cycle.

Directions for Future Research

To provide a more extensive understanding of the association between paternal depression and parenting behaviours, future researchers should explore this relationship with more diverse samples. Similar to most of the research on paternal psychopathology, the majority of the studies in this area consisted of samples of partnered fathers who were White and had more than a high school education. To expand our understanding of this relationship and to produce more generalizable findings, researchers could focus on single or divorced fathers from various educational and racialized backgrounds, especially within cultures that differ in predominate parenting styles. Researchers may also wish to examine this association in clinical samples and with respect to paternal postpartum depression. To further examine the link

between paternal depression and parenting behaviours, future studies could evaluate whether other factors (e.g., paternal involvement, gender role conflict and attitudes) have an impact on the relationship. Researchers may also want to examine whether treatment for paternal depression reduces negative parenting behaviours and vice versa. Finally, future research should explore whether addressing factors related to both paternal depression and parenting behaviours (e.g., parenting stress, parental self-efficacy, social support, parent-child relationships) would be advantageous in reducing depressive symptoms and negative parenting behaviours.

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Table 1

Moderator Analyses for Overall Parenting Behaviours

Sample moderators	*k*	*Q*	*p*	R^2
Gender composition of the child sample (% female)	33	0.03	.870	0.00
Mean age of the child sample	31	0.01	.939	0.00
Mean age of the father sample	27	3.18	.075	0.20
Racial background composition of the child sample (% White)	17	0.63	.426	0.20
Racial background composition of the father sample (% White)	14	0.28	.596	0.00
Mean years of paternal education	10	0.98	.322	0.00
Fathers' relationship status (% partnered)	36	0.01	.930	0.00
Recruitment method (clinical vs. community)	48	0.10	.752	0.00
Measurement and outcome moderators				
Timing of paternal depression (postpartum vs. non-postpartum depression)	48	1.26	.533	0.00
Parenting behaviour assessment (questionnaire vs. observation)	43	5.04	.025	0.19
Parenting behaviour informant (paternal- vs. other-report)	36	4.37	.037	0.21
Bibliographic moderators				
Type of publication	48	0.22	.637	0.00
Year of publication	47	1.57	.211	0.08
Country of study	48	11.07	.086	0.19

Note. k = number of effect sizes.

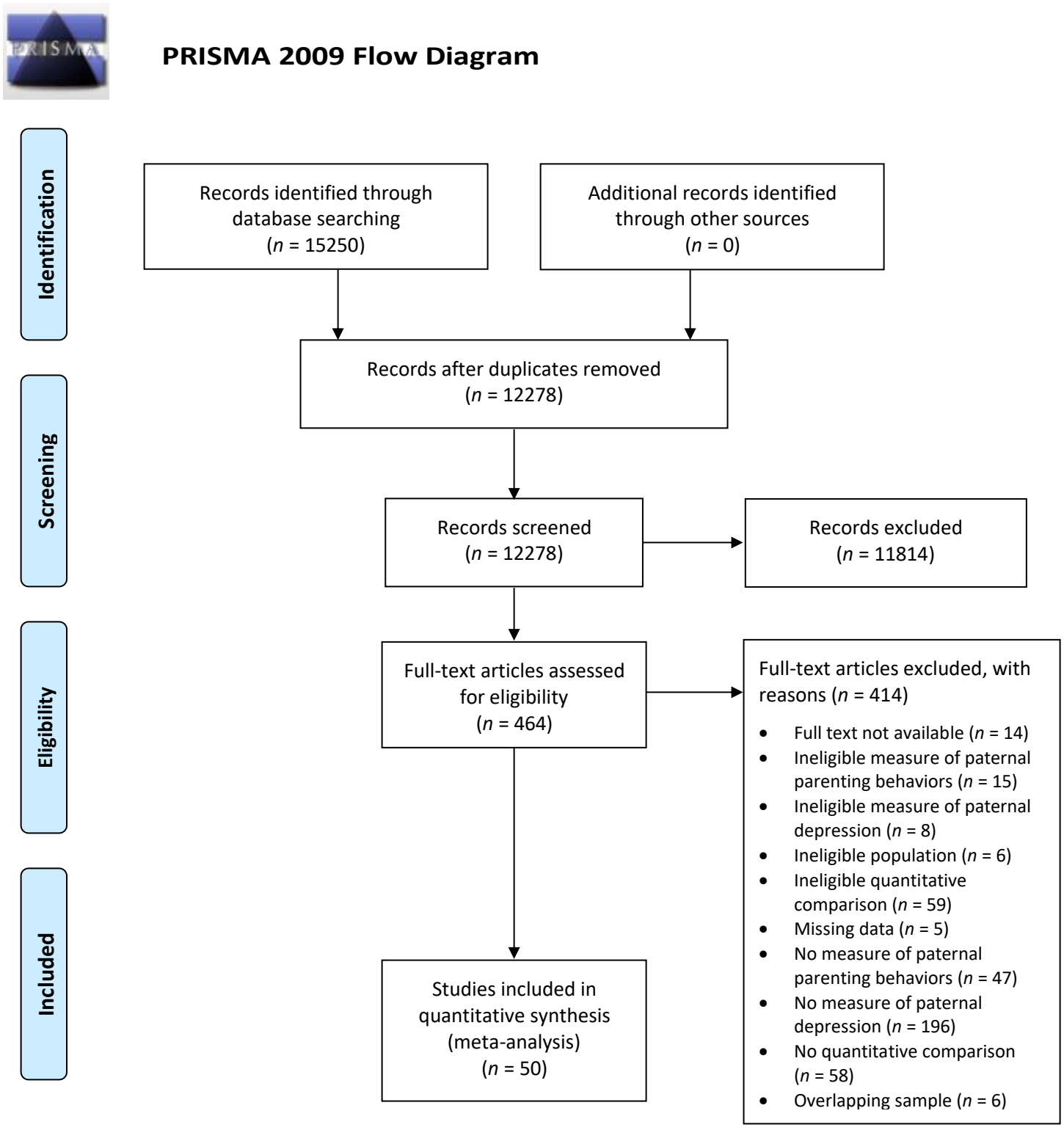


Figure 1. PRISMA Flow Chart. Adapted from "PRISMA 2009 Flow Diagram" by Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Annals of Internal Medicine, 151,* 264–269. doi:10.7326/0003-4819-151-4-200908180-00

Appendix A

Coding Manual for Meta-Analysis on Paternal Depression and Parenting Behaviours

General Coding Notes: Record the Study ID number at the top of every page used to code a given study. For every item starting at #5, indicate page number where information found. Ranges are acceptable when needed. For longitudinal and treatment studies, measurements will be recorded at time one/baseline.

I. Study Level Descriptors (Moderator Analyses)

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 "Paternal Depression and Parenting Behaviours meta-analysis tracking file."

3. Type of publication:
   a. Journal article
   b. Book chapter
   c. Conference paper
   d. Thesis or doctoral dissertation
   e. Unpublished data
   f. Other

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

4. Publication year: _____; Indicate if only published online to date: Yes/No

5. Place study conducted in: (pg. _____)
   a. US
   b. Canada
   c. UK
   d. Europe: _____
   e. Other: _____

Please indicate the country where the study was conducted.

6. Paternal depression diagnosed/confirmed by (circle all that apply): (pg. _____)
    a. Previous diagnosis by a qualified health professional *(e.g., psychologist, family physician, pediatrician, psychiatrist) a condition of participation*
    b. DISC (*this is a diagnostic interview*)
    c. Study Clinician interview *(any activity undertaken by a qualified professional involved in the study to establish or confirm a diagnosis of depression, other than the DISC)*
    d. Questionnaire (e.g., BDI, BDI-II, CES-D): _____
    e. Other: _____
    f. None

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

7. Paternal depression diagnosis (pg. _____)
    a. Yes – Current diagnosis
    b. Yes – Past diagnosis
    c. No explicit diagnosis

Please indicate whether the fathers included in the sample have a current or past diagnosis of depression.

8. Paternal depression rated by: (pg. _____)
    a. Self
    b. Partner
    c. Clinician *(psychologist, psychiatrist, family physician)*
    d. Other *(student, lay interviewer):* _____

Please indicate which of the following individual rated the father's depressive status.

9. Parenting behaviour rated by:
    a. Self
    b. Partner
    c. Child
    d. Clinician *(psychologist, psychiatrist, family physician)*
    e. Observation: _____
    f. Other: _____

Please indicate which of the following individual rated the identified parenting behaviours. If the manuscript included ratings from several informants, please provide this information in the quantitative section below.

10. Type of sampling method referral (pg. _____)
    a. Community
    b. Clinical

Please indicate whether the sample was recruited from a community sample or a clinical sample. Clinical samples are defined as participants who were recruited for the study based on their clinical presentation (e.g., "fathers with depression were recruited for this study" or "participants were recruited from a clinic that provides services to individuals with depression"). Community samples refer to participants who were recruited from the community (e.g., schools).

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

	n male	*n* female	% female	Total *N*
Total Sample				
Depression group				
Comparison group:				
Other group:				

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

12. Child age (in years) (pg. _____)

	Mean	*SD*	Range	Total *N*
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate the mean age of the sample in years and any subsamples as appropriate. 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. If no age information is provided please write, "doesn't specify" beside child age.

13. Child racial/ethnic background (pg. _____)

	White (%)	Black (%)	Hispanic (%)	Asian (%)	Other (%)
Total Sample					
Depression group					
Comparison group:					
Other group:					

Indicate the ethnic background of the child sample for studies conducted in North America.

14. Percentage of children in the sample with an externalizing disorder (pg. _____)

	%	*n*
Total Sample		
Depression group		
Comparison group:		
Other group:		

Indicate what percentage of families in the sample have a child who currently meets diagnostic criteria for an externalizing disorder (CD, ODD).

15. Fathers' age (in years) (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate the mean age of the fathers and any subsamples as appropriate. 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. If no age information is provided please write, "doesn't specify" beside father age.

16. Fathers' relationship status: (pg. _____)

	Partnered (%)	Divorced (%)	Non-Partnered (%)	Total *N*
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate the percentage of fathers in the sample who are partnered (married, co-habiting) or non-partnered (single, widowed, divorced, separated). For the purpose of this study, fathers will be considered 'partnered' only if the study indicates that their partner shares household responsibilities, including childcare.

17. Type of father: (pg. _____)

	Biological (%)	Adoptive (%)	Foster (%)	Stepfather (%)	Grandfather (%)	Total *N*
Total Sample						
Depression group						
Comparison group:						
Other group:						

Indicate the percentage of the type of fathers in the sample (biological, adoptive, custodial, non-custodial, foster, stepfather, grandfather).

18. Father's racial/ethnic background (pg. _____)

	White (%)	Black (%)	Hispanic (%)	Asian (%)	Other (%)
Total Sample					
Depression group					
Comparison group:					
Other group:					

Indicate the ethnic background of the parent sample for studies conducted in North America.

19. Father's level of education (pg. _____)

	Less than high school (%)	High school (%)	Some post-secondary education (%)	Completed post-secondary education (%)	*n*
Total Sample					
Depression group					
Comparison group:					
Other group:					

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

20. Father's level of education (in years) (pg. _____)

	Mean	*SD*	Range	Total *N*
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate the number of years of education obtained by the father sample.

21. Percentage of partners in the sample with a current diagnosis of depression (pg. _____)

	%	*N*	Total *N*	Depression defined by:
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate the percentage of partners (mothers or fathers) in the sample who have a current diagnosis of depression. Note how the diagnosis/measure of depression was assessed (e.g., ≥ 16 on the CES-D).

22. Number of children in the family (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate whether the mean number of children in the family was indicated in the study.

23. Percentage of families in the sample with more than one child (pg. _____)

	%	*n*
Total Sample		
Depression group		
Comparison group:		
Other group:		

Indicate whether percentage of families in the sample that has more than one child.

II. Group Comparison Studies, Continuous DV (pg. _____)

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

2. Compared to/between fathers with depression and fathers without depression

3. Type of data effect size based on:
   a. Means and SD
   b. *t*-test
   c. 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.

Measures of paternal depression: _____

Measure of paternal postpartum depression: yes/no
Current/Past
Cut-off score: _____

Parenting behaviour measured with: _____

Current/Past

Comparison	*Mean*	*SD*	*n*	*t*	*F*	*df*	*p*
Depression							
Nonclinical							

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 one-way 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.*

III. Correlational Studies (pg. _____)

Note: Partial correlations are an ineligible quantitative comparison for this meta-analysis.

1. Sample
   a. Depression only
   b. Depression and non-depression
   c. Other: _____

Indicate whether the study investigated parenting behaviours solely in a depression group, in a combined depression and non-depression group (where depressive symptoms were then included as a correlation), or in a differently composed group (in which case, please specify).

2. *N*: _____

3. Correlations with increased negative parenting behaviours *(if n differs from N above, please note appropriate n). If study used a measurement in which lower numbers translate to higher degree of negative parenting behaviours, check here and highlight so that effects can be reversed:* _____

Depression Measure	
Measure of PPD	yes *or* no
Parenting Behaviour Outcome	
Type of Parenting Behaviour Outcome	Positive *or* Negative
Parenting Behaviour Measure	
r	
n	

Please indicate whether the specific measure of depression is measuring paternal postpartum depression (PPD; i.e., yes or no). Under "parenting behaviour outcome," indicate the specific type of outcome (e.g., warmth, nurturance, hostility, etc.). Under "parenting behaviour measure" indicate the instrument used to measure the construct at hand.

Appendix B

Coding Form for Meta-Analysis on Paternal Depression and Parenting Behaviours

I. Study Level Descriptors (Moderator Analyses)

1. Bibliographic reference: _____

_____

_____

2. Study ID number: _____

3. Type of publication:
   a. Journal article
   b. Book chapter
   c. Conference paper
   d. Thesis or doctoral dissertation
   e. Unpublished data
   f. Other

4. Publication year: _____; Indicate if only published online to date: Yes/No

5. Place study conducted in: (pg. _____)
   a. US
   b. Canada
   c. UK
   d. Europe: _____
   e. Other: _____

6. Paternal depression diagnosed/confirmed by: (pg. _____)
   a. Previous diagnosis by a qualified health professional
   b. DISC
   c. Study Clinician interview
   d. Questionnaire (e.g., BDI, BDI-II, CES-D): _____
   e. Other: _____
   f. None

7. Paternal depression diagnosis (pg. _____)
   a. Yes – Current diagnosis
   b. Yes – Past diagnosis
   c. No explicit diagnosis

8. Paternal depression rated by: (pg. _____)
    a. Self
    b. Partner
    c. Clinician
    d. Other: _____

9. Parenting behaviour rated by:
    a. Self
    b. Partner
    c. Clinician
    d. Observation: _____
    e. Other: _____

10. Type of sampling method referral (pg. _____)
    a. Community
    b. Clinical

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

	n male	*n* female	% female	Total *N*
Total Sample				
Paternal depression group				
Comparison group:				
Other group:				

12. Child age (in years) (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Paternal depression group				
Comparison group:				
Other group:				

13. Child racial/ethnic background (pg. _____)

	White (%)	Black (%)	Hispanic (%)	Asian (%)	Other (%)
Total Sample					
Depression group					
Comparison group:					
Other group:					

14. Percentage of children in the sample with an externalizing disorder (pg. _____)

	%	*n*
Total Sample		
Paternal depression group		
Comparison group:		
Other group:		

15. Fathers' age (in years) (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Paternal depression group				
Comparison group:				
Other group:				

16. Fathers' relationship status: (pg. _____)

	Partnered (%)	Divorced (%)	Non-Partnered (%)	Total *N*
Total Sample				
Depression group				
Comparison group:				
Other group:				

17. Type of father: (pg. _____)

	Biological (%)	Adoptive (%)	Foster (%)	Stepfather (%)	Grandfather (%)	Total *N*
Paternal depression group						
Comparison group:						
Other group:						

18. Father's racial/ethnic background (pg. _____)

	White (%)	Black (%)	Hispanic (%)	Asian (%)	Other (%)
Total Sample					
Depression group					
Comparison group:					
Other group:					

19. Father's level of education (pg. _____)

	Less than high school (%)	High school (%)	Some post-secondary education (%)	Completed post-secondary education (%)	n
Total Sample					
Depression group					
Comparison group:					
Other group:					

20. Father's level of education (in years) (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

21. Percentage of partners in the sample with a current diagnosis of depression (pg. _____)

	N	%	Total *N*
Total Sample			
Depression group			
Comparison group:			
Other group:			

22. Number of children in the family (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

23. Percentage of families in the sample with more than one child (pg. _____)

	%	*n*
Total Sample		
Depression group		
Comparison group:		
Other group:		

II. Group Comparison Studies, Continuous DV (pg. _____)

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

2. Compared to/between fathers with depression and fathers without depression

3. Type of data effect size based on:
   a. Means and SD
   b. *t*-test
   c. One-way ANOVA

Measures of paternal depression: _____
Measure of paternal postpartum depression: yes/no
Current/Past
Cut-off score: _____

Parenting behaviour measured with: _____
Current/Past

Comparison	*Mean*	*SD*	*n*	*t*	*F*	*df*	*p*
Depression							
Nonclinical							

Parenting behaviour measured with: _____
Current/Past

Comparison	*Mean*	*SD*	*n*	*t*	*F*	*df*	*p*
Depression							
Nonclinical							

_____

III. Correlational Studies (pg. _____)

1. Sample
   a. Depression only
   b. Depression and non-depression
   c. Other: _____

2. *N*: _____

3. Correlations with increased negative parenting behaviours:__

Depression Measure	
Measure of PPD	yes *or* no
Parenting Behaviour Outcome	
Type of Parenting Behaviour Outcome	Positive *or* Negative
Parenting Behaviour Measure	
r	
n	

Appendix C

Supplementary Tables

Table C1

Characteristics of Manuscripts Included in the Analysis of the Degree of Association Between Paternal Depressive Symptoms and Positive Parenting Behaviours (Research Question #1)

Manuscript	*N*	Pub status[c]	Country of study	Parenting outcomes	Parenting measure	*r*	95% CI	ESW
Aunola et al. (2015)	118	P	Finland	Affection	CRPR	–.09	–.27, .09	2.26
Bumpus (2000)	178	U	US	Acceptance	CRPBI	.01	–.14, .16	2.74
Carbray et al. (1993)	28	U	US	Warmth and cohesion	FES	–.40	–.60, –.14	1.36
Conger et al. (1992 & 1995) - IYFP Sample	205	P	US	Low hostility; Nurturance	Observation	–.01	–.11, .09	3.55
Conger et al. (1993)	220	P	US	Involvement; Low hostility; Nurturance	Observation	–.01	–.10, .08	3.61
Cummings et al. (2005)	235	P	US	Emotional availability (positive parenting, warmth)	APQ: Positive Parenting Subscale; PARQ: Warmth and Affection Subscale	–.11	–.24, .01	3.04
Davies et al. (2004)	227	P	US	Acceptance	PARQ: Warmth and Affection Subscale	–.26	–.29, –.04	3.00
Dette-Hagenmeyer & Reichle (2014)	161	P	Germany	Positive parenting behaviours	GEAPQ-P-ES: Positive Parenting Subscale	–.17	–.32, –.02	2.62
Devall (1990)	33-79	U	US	Nurturance	CRPS	–.23	–.38, –.07	2.45
Du Rocher Schudlich (2004)	267	U	US	Acceptance; Autonomy	CRPBI: Parent version	–.09	–.17, .00	3.75

Engle & McElwein (2013)	549	P	US	Sensitive scaffolding	Observation	–.13	–.21, –.05	3.78
Formoso (2002)	115	U	US	Engagement (acceptance, involvement, monitoring)	CRPBI; SPMS	–.20	–.32, –.07	3.00
Franck & Buehler (2007)	416	P	US	Warmth	IFIRS: Observational coding scales	–.18	–.27, –.09	3.57
Gartstein & Fagot (2003)	159	P	US	Cognitive guidance	Gauvain and Fagot's PSCS	–.08	–.23, .08	2.61
Harold et al. (2011)	156-403	P	UK	Warmth	IYFP FIRS: Warmth and Hostility subscales	–.27	–.35, –.19	3.79
Harvey et al. (2011)	108	P	US	Warmth	Audiotape	.03	–.16, .22	2.16
Iowa Adolescence Project[a]	198-382	U	US	Monitoring; Nurturance	CRPBI	–.06	–.11, .00	4.22
Johnson (2012)	550-553	U	US	Warmth and support	Scaled developed by author	–.13	–.19, –.07	4.15
Kashdan et al. (2004)	41	P	US	Warmth and positive involvement	PCRQ	–.14	–.43, .18	1.11
Kovacs (2003)	76	U	US	Acceptance; Positive involvement; Warmth	APQ; CRPBI; Observation	–.08	–.18, .02	3.47
MacMartin (1997)	136	U	Canada	Supportive parenting	PDI	–.35	–.49, –.19	2.43
McKee (2002)	27	U	US	Affection (and praise)	PS	–.24	–.57, .15	0.77
Medeiros et al. (2016)[b]	243	P	Portugal	Mindful parenting	IM-P	–.39	–.49, –.28	3.08
Middleton et al. (2009)	37	P	US	Autonomy granting involvement	PCRI	.14	–.19, .44	1.02
Onatsu-Arvilommi et al. (1998)	54	P	Finland	Affection; Autonomy; Monitoring	CRPR	–.23	–.47, .04	1.38

Papp et al. (2005)	269	P	US	Acceptance; Autonomy	PBI	–.21	–.32, –.09	3.18
Ponnet (2014)	798	P	Belgium	Positive parenting	PBS	–.24	–.30, –.17	4.00
Rice et al. (2013)[b]	61-199	P	UK	Verbal positivity, positive engagement, warmth	PASQ	–.35	–.43, –.28	3.77
Roggman et al. (2002)	59	P	US	Engagement	Observation	–.37	–.57, –.13	1.47
Simons et al. (1990)	63	P	US	Constructive parenting	Observation	–.22	–.44, .03	1.54
Singley et al. (2017)	456	P	US	Attunement and warmth; Engagement	PIWIS	–.19	–.28, –.10	3.64
Wheeler et al. (2011)	239	P	US	Warmth	CRPBI	–.24	–.32, –.15	3.67
White et al. (2009)	570	P	US	Acceptance	CRPBI	–.14	–.20, –.08	4.16
Wilson (2012)	130	U	US	Involvement; Positivity	Lab-PAB Scales	–.08	–.24, .10	2.38
Wong et al. (2014)	287	P	US	Supportive parenting	IPPA	–.09	–.20, .03	3.24
		I^2	tau^2	Q(df)		r	95% CI	p
Summary Effect		73.68	0.01	129.16(34), $p < .001$		–.16	–.20, –.13	< .001
Trimmed Summary Effect		62.92	0.01	83.31(32), $p < .001$		–.15	–.18, –.11	< .001

Note. APQ = Alabama Parenting Questionnaire; CI = confidence intervals; CRPBI= Children's Report of Parental Behaviour Inventory; CRPR = Block's Child Rearing Practices Report – Finnish Version; CRPS = Child Rearing Practices Scale (modified version); ESW = Effect size weighting; FES = Family Environment Scale; GEAPQ-P-ES = German extended version of the Alabama Parenting Questionnaire for Elementary School Age Children; IFIRS = Iowa Family Interaction Rating Scales; IM-P = Interpersonal Mindfulness in Parenting Scale (Portuguese version); IPPA = Inventory of Parent and Peer Attachment; IYFP = Iowa Youth and Families Project; IYFP FIRS = Iowa Youth and Families Project Family Interaction Rating Scales; Lab-PAB Scales = Laboratory Parenting Assessment Battery; PARQ = Parental Acceptance–Rejection Questionnaire; PASQ = Parental Affiliative Style Questionnaire; PBI = Parental Behavior Inventory; PBS = Parental Behavior Scale; PCRI = Parent-Child Relationship Inventory; PCRQ = Parent-Child Relationship Questionnaire; PDI = Parenting Dimensions Inventory; PIWIS = Paternal Involvement with Infants Scale; PS = The Parenting Scale; PSCS = Problem-Solving Code System; SPMS = The Small Parental Monitoring Scale.

[a]Maythew (1997) & Yang (1997). [b]Manuscripts were identified as potential outliers and not included in the trimmed summary effect size distribution. [c]Pub status = Publication status (P = Published; U = Unpublished)

Table C2

Characteristics of Manuscripts Included in the Analysis of the Degree of Association Between Paternal Depressive Symptoms and Negative Parenting Behaviours (Research Question #2)

Manuscript	*N*	Pub status[b]	Country of study	Parenting outcomes	Parenting measure	*r*	95% CI	ESW
Arnold (2016)	554	U	US	Hostile	IFIRS: Observational coding scales	.27	.19, .35	5.12
Aunola et al. (2015)	118	P	Finland	Psychological control	CRPR	.21	.03, .38	3.06
Conger et al. (1992 & 1995) - IYFP Sample	196	P	US	Inconsistent/harsh discipline	Observation, Parent Interview	.18	.10, .26	5.17
Conger et al. (1995) - OYS Sample	63	P	US	Inconsistent/harsh discipline	Observation, Parent Interview	.23	.06, .39	3.12
Cummings et al. (2005)	235	P	US	Psychological control	CRPBI	.17	.04, .29	4.11
Davies et al. (2004)	227	P	US	Inconsistent discipline	APQ: Inconsistent discipline subscale	.19	.00, .26	4.07
de Leon Siantz & Smith (1994)	161	P	US	Rejection	PARQ: Warmth and Affection Subscale	.26	.00, .49	1.92
Dette-Hagenmeyer & Reichle (2014)[a]	119	P	Germany	Inconsistent discipline	GEAPQ-P-ES: Inconsistent discipline subscale	.39	.25, .51	3.55
Epkins & Harper (2016)	159	P	US	Hostility; Low warmth; Negativity; Rejection	PARQ/Control Questionnaire	.16	.03, .28	4.11
Gartstein & Fagot (2003)	137	P	US	Coercion	Fagot Interactive Code	–.06	–.21, .10	3.53
Guimond et al. (2012)	403	P	Canada	Hostile; Overprotection	PACOTIS	.12	–.05, .28	3.30

Harold et al. (2011)	112-125	P	UK	Hostile	IYFP FIRS: Warmth and Hostility subscales	.27	.19, .35	5.12
Harvey et al. (2011)	41	P	US	Laxness; Negative affect; Over-reactivity	Audiotape; PS	.08	–.10, .25	3.09
Kashdan et al. (2004)	76	P	US	Intrusiveness and negative discipline	PCRQ	.27	–.04, .53	1.51
Kovacs (2003)	527	U	US	Harsh parenting; Inconsistent discipline; Negative involvement; Rejection	CRPBI; Observation	.11	.01, .21	4.70
Leinonen et al. (2002)	449	P	Finland	Non-involved; Punitive	CRPS	.08	.02, .14	5.59
Leung & Slep (2006)	36	P	US	Laxness; Over-reactivity	PS	.21	.12, .30	4.92
Marchand-Reilly (2012)	59	U	US	Laxness; Over-reactivity	PS	.44	.13, .67	1.35
McElwain & Volling (1999)[a]	27	P	US	Psychological control: Intrusiveness	Observation	–.21	–.44, .05	1.99
McKee (2002)	54	U	US	Laxness; Over-reactivity	PS	.46	.10, .72	1.04
Onatsu-Arvilommi et al. (1998)	172	P	Finland	Authoritarian control; Psychological control	CRPR	–.02	–.21, .18	2.87
Reeb (2012)	331	U	US	Hostile	IYFP FIRS: Hostility subscale	.07	–.04, .17	4.61
Rhoades et al. (2011)	176	P	US	Over-reactivity	PS: Over-reactivity subscale	.29	.19, .39	4.57
Sethna et al. (2015)	56	P	UK	Negative affect; Psychological control	Observation: GRS	.00	–.10, .10	4.63
Simons et al. (1990)	63	P	US	Destructive parenting	Observation	.28	.03, .49	2.09
Williamson et al. (2017)	179	P	Canada	Negative parenting/ Laxness/	APQ; Observation; PS	.22	.08, .36	3.71

				Over-reactivity				
Wilson (2012)	67-130	U	US	Hostile; Intrusiveness; Over-permissive	Lab-PAB Scales	.20	.00, .38	2.77
Wong et al. (2014)	287	P	US	Harsh parenting	CRPBI	.14	.02, .25	4.39
		I^2	tau^2	Q(df)		r	95% CI	p
Summary Effect		66.91	0.01	81.60(27), $p < .001$		.17	.13, .21	< .001
Trimmed Summary Effect		64.22	0.01	61.07(25), $p < .001$		.17	.13, .21	< .001

Note. APQ = Alabama Parenting Questionnaire; CI = confidence intervals; CRPBI= Children's Report of Parental Behavior Inventory; CRPR = Block's Child Rearing Practices Report – Finnish Version; CRPS = Child Rearing Practices Scale; ESW = Effect size weighting; GEAPQ-P-ES = German extended version of the Alabama Parenting Questionnaire for Elementary School Age Children; GRS = Global Rating Scale; IFIRS = Iowa Family Interaction Rating Scales; IYFP = Iowa Youth and Families Project; IYFP FIRS = Iowa Youth and Families Project Family Interaction Rating Scales; Lab-PAB Scales = Laboratory Parenting Assessment Battery; OYS = Oregon Youth Study; PACOTIS = Parental Cognitions and Conduct Toward the Infant Scale; PARQ = Parental Acceptance–Rejection Questionnaire; PCRQ = Parent-Child Relationship Questionnaire; PS = The Parenting Scale.

[a]Manuscripts were identified as potential outliers and not included in the trimmed summary effect size distribution. [b]Pub status = Publication status (P = Published; U = Unpublished).

Table C3

Summary of the Meta-Analyses of the Degree of the Association Between Paternal Depressive Symptoms and Parenting Behaviours

	I^2	tau^2	Q(df)	r (95% CI)	k	p
Positive parenting behaviours	73.68	0.01	129.16(34), $p < .001$	–.16 (–.20, –.13)	35	< .001
Trimmed SESD	62.92	0.01	83.31(32), $p < .001$	–.15 (–.18, –.11)	33	< .001
Negative parenting behaviours	66.91	0.01	81.60(27), $p < .001$	.17 (.13, .21)	28	< .001
Trimmed SESD	64.22	0.01	61.07(25), $p < .001$	.17 (.13, .21)	26	< .001
Overall parenting behaviours	73.42	0.01	176.81(47), $p < .001$	.17 (.14, .20)	48	< .001
Trimmed SESD	68.75	0.01	144.02(45), $p < .001$	.17 (.14, .20)	46	< .001

Note. CI = confidence interval; Trimmed SESD = trimmed summary effect size distribution.

Appendix D

Additional Analyses

Research Questions

The research questions listed below were originally proposed, but not included in the journal submission. Research Questions #1 through 5 were not included due to a lack of manuscripts that included the quantitative data required to answer the questions. Research Questions #6 through 7 were not included because all of the eligible studies used self-reports of paternal depressive symptoms.

(1) Do fathers with depression/fathers with higher levels of depressive symptoms have lower levels of positive parenting behaviours than fathers without depression/fathers with lower levels or no depressive symptoms? If so, how large is this effect?

(2) Do fathers with depression/fathers with higher levels of depressive symptoms have higher levels of negative parenting behaviours than fathers without depression/fathers with lower levels or no depressive symptoms? If so, how large is this effect?

(3) Does the presence of child externalizing disorders (percent of children in the sample that meet diagnostic criteria for conduct disorder or oppositional defiant disorder) moderate the relationship between paternal depressive symptoms and overall parenting behaviours?

(4) Does the presence of maternal depression (percent of mothers in the sample that meet diagnostic criteria for depression) moderate the relationship between paternal depressive symptoms and overall parenting behaviours?

(5) Does the mean number of children in the family samples moderate the relationship between paternal depressive symptoms and overall parenting behaviours?

(6) Does the type of informant of paternal depressive symptoms (father vs. clinician) moderate the relationship between paternal depressive symptoms and overall parenting behaviours?

(7) Does the year of publication in conjunction with the type of informant of paternal depression informant moderate the relationship between paternal depressive symptoms and overall parenting behaviours?

Statistical Analysis

Research Questions #1 and 2 were assessed by calculating the degree of the relationship between the status of paternal depression and parenting behaviours using a standardized mean difference (i.e., negative and positive parenting behaviours separately). Given that only one of the studies included samples of fathers who were formally diagnosed with depression, the status of paternal depression was defined as meeting or exceeding the cut-off scores on symptom measures. The status of paternal depression was the dichotomous variable (present/absent) and the level of parenting behaviours was the continuous variable. Table D1 provides an overview of how studies classified the depressed and non-depressed groups.

Results

Fathers with depression/fathers with higher levels of depressive symptoms did not have significantly lower levels of positive parenting behaviours than fathers without depression/fathers with lower levels or no depressive symptoms (d = –0.18; 95% CI [–0.46, 0.10]; p = .199; k = 2; see Table D2). Fathers with depression/fathers with higher levels of depressive symptoms also did not have significantly higher levels of negative parenting behaviours than fathers without depression/fathers with lower levels or no depressive symptoms (d = 0.37; 95% CI [–0.34, 1.08]; p = .302; k = 2; see Table D3).

References

Engle, J. M. (2011). *Parental depressive symptoms and marital intimacy as predictors of parent-child interaction: A family systems perspective* (Doctoral dissertation). Retrieved from Dissertations and Theses database. (UMI 3496294).

Fielding, E. D. (2004). *Depression and family interactions: Depressed parents and their 4-year-olds in dyads and triads.* Doctoral dissertation). Retrieved from Dissertations and Theses database. (UMI 3124720).

Sethna, V., Murray, L., Netsi, E., Psychogiou, L., & Ramchandani, P. G. (2015). Paternal depression in the postnatal period and early father–infant interactions. *Parenting: Science and Practice, 15*(1), 1–8. doi:10.1080/15295192.2015.992732

Table D1

Definitional Characteristics of Group Comparison Studies

Study	Paternal Depression Status	
	Fathers with depression/Fathers with higher levels of depressive symptoms	Fathers without depression/Fathers with lower levels or no depressive symptoms
Engle (2011)	CES-D scores equal to or greater than 16	CES-D scores less than 16
Fielding (2004)	CES-D scores equal to or greater than 16 *or* *T* scores on the Depression Symptom Dimension on the SCL-90-R equal to or greater than 63	CES-D scores less than 16 *or* *T* scores on the Depression Symptom Dimension on the SCL-90-R less than 63
Sethna et al. (2015)	Met criteria for MDD based on the SCID for DSM-IV Axis 1 Disorders	Did not meet criteria for MDD based on the SCID for DSM-IV Axis 1 Disorders

Note. CES-D = The Center for Epidemiologic Studies Depression Scale; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, 4th Edition; MDD = major depressive disorder; SCID = Structured Clinical Interview for DSM; SCL-90-R = Symptom Checklist-90-Revised.

Table D2

Characteristics of Studies Comparing the Mean Level of Positive Parenting Behaviours of Fathers with[a] and without[b] Depression (Additional Research Question #1)

Study	*N*[c]	Pub status[d]	Country of study	Parenting outcome	Parenting measure	*d*	95% CI	ESW
Engle (2011)	629	U	US	Positive engagement	Observation	–0.30	–0.56, –0.05	57.09
Sethna et al. (2015)	153	P	UK	Sensitivity	Observation: GRS	–0.02	–0.35, 0.31	42.91
		I^2	tau^2	*Q*(df)		*d*	95% CI	*p*
Summary Effect		44.35	0.02	1.80(1), *p* = .180		–0.18	–0.46, 0.10	.199

Note. CI = confidence intervals; ESW = Effect size weighting; GRS = Global Rating Scale; UK = United Kingdom; US = United States.

[a]Fathers with depression/fathers with higher levels of depressive symptoms. [b]Fathers without depression/fathers with lower levels of depressive symptoms or no depressive symptoms. [c]*N* includes both the depression and control group. [d]Pub status = Publication status (P = Published; U = Unpublished).

Table D3

Characteristics of Studies Comparing the Mean Level of Positive Parenting Behaviours of Fathers with[a] and without[b] Depression (Additional Research Question #2)

Study	*N*[c]	Pub status[d]	Country of study	Parenting outcome	Parenting measure	*d*	95% CI	ESW
Fielding (2004)	103	U	US	Coerciveness, control, invalidation, lack of emotional support, rejection, withdrawal	Observation	0.78	0.20, 1.35	44.60
Sethna et al. (2015)	153	P	UK	Negative affect, psychological control, remoteness	Observation: GRS	0.05	–0.28, 0.38	55.40
		I^2	tau^2	Q(df)		*d*	95% CI	*p*
Summary Effect		78.33	0.21	4.61(1), p = .032		0.37	–0.34, 1.08	.302

Note. CI = confidence intervals; ESW = Effect size weighting; GRS = Global Rating Scale; UK = United Kingdom; US = United States.

[a]Fathers with depression/fathers with higher levels of depressive symptoms. [b]Fathers without depression/fathers with lower levels of depressive symptoms or no depressive symptoms. [c]*N* includes both the depression and control group. [d]Pub status = Publication status (P = Published; U = Unpublished).

Chapter 4 – Paternal Depression and Marital Quality: A Meta-Analysis

Abstract

Much research suggests that paternal depression is associated with marital quality; however, the magnitude of the relationship varies across studies. The objectives of this study were to clarify the strength of the association and explore whether study-specific factors, including sample, measurement and outcome, and bibliographic characteristics, moderate the strength of the relationship. The present meta-analysis consisted of 42 published and unpublished manuscripts that included a quantitative comparison between paternal depressive symptoms and marital quality. Fathers with higher levels of depressive symptoms reported significantly lower levels of marital quality than fathers with lower or no depressive symptoms (d = –0.80; 95% CI [–0.96, –0.64]; k = 4; p < .001). There was a medium relationship between paternal depressive symptoms and father-ratings of marital quality (r = –.32; 95% CI [–.36, –.27]; k = 39; p < .001). The relationship between paternal depressive symptoms and mother-ratings of marital quality was small (r = –.22; 95% CI [–.26, –.19]; k = 18; p < .001). None of the explored moderators were significant. Overall, the findings of this study suggest that clinicians should be mindful of the link between paternal depression and marital quality. Clinical implications and future research directions are discussed.

Keywords: marital conflict, marital quality, marital satisfaction, meta-analysis, paternal depression

Paternal Depression

Fathers with children in the home are about twice as likely to have depression (10%; Lee, Taylor, & Bellamy, 2012; 14%; Kouros, Merrilees, & Cummings, 2008) as men in the general population (5.5%; Brody et al., 2018). Similar rates of depression have been documented among fathers during the postpartum period (Cameron, Sedov, & Tomfohr-Madsen, 2016). These rates are concerning considering that paternal depression has been linked to child externalizing behaviours (Cheung & Theule, 2018), negative parenting behaviours (Cheung, Henrikson, & Theule, 2018), parenting stress (deMontigny, Girard, Lacharité, Dubeau, & Devault, 2013), and chaotic and disorganized home environments (Nelson, O'Brien, Blankson, Calkins, & Keane, 2009). Researchers have also noted that fathers with depression tend to experience difficulties in their relationships with their family members, such as dysfunctional parent-child (deMontigny et al., 2013) and marital (Nelson et al., 2009) relationships. Studies have also found that paternal depression is associated with higher levels of criticism (Ramchandani et al., 2011), aggression, and hostility (Kouros et al., 2008) within marital relationships. Ramchandani et al. (2011) reported that fathers with depression are less confident that their marriage will succeed than fathers without depression.

Paternal Depression and Marital Quality

Paternal depression has also been found to be negatively correlated with several types of marital quality, including marital satisfaction (e.g., Beach, Katz, Kim, & Brody, 2003; Bower, Jia, Schoppe-Sullivan, Mangelsdorf, & Brown, 2013; Goodman, 2008), marital happiness (Yang, 1997), and marital adjustment (Pancer, Pratt, Hunsberger, & Gallant, 2000). Studies have also demonstrated that paternal depressive symptoms are positively correlated with negative forms of marital quality, such as marital discord (Smith, Eryigit-Madzwamuse, & Barnes, 2013) and

marital strain (Wade, 1997). Similar to paternal depression, marital dissatisfaction is also related to child psychopathology (Jones, Beach, & Forehand, 2001), parenting stress (Goodman, 2008; Saxbe, Schetter, Simon, Adam, & Shalowitz, 2017), dysfunctional parent-child interactions (Goodman, 2008), and chaotic and disorganized home environments (Nelson et al., 2009). Marital dissatisfaction is also inversely related to other positive family characteristics including adolescent-father warmth (Ransford, Crouter, & McHale, 2008), paternal involvement (Sheldon, 2015), and overall family satisfaction (Shockley & Allen, 2018).

The couple and family model of depression. The couple and family model of depression (CFMD) provides a framework for understanding the connection between marital dissatisfaction and depression (Beach, 2014; Beach, Sandeen, & O'Leary, 1990). In this model, depressive symptoms are posited to emerge from heightened levels of marital stress, which can be produced by hostility and criticism within the relationship, severe disruption of routines, or decreased marital support. Beach, Sandeen, and O'Leary (1990) hold that several features of marital relationships, such as marital intimacy and cohesion, and acceptance and exchange of emotional expression, are related to marital support. Based on the CFMD model, a reduction in any one of these features could lead to a decline in marital support, an increase in marital stress, and ultimately contribute to depressive symptoms. Consistent with this model, researchers have demonstrated that fathers with depression tend to have lower levels of marital intimacy (Engle & McElwain, 2013) and cohesion (Ramchandani et al., 2011) than fathers without depression. Beam et al. (2011) also found that the relationship between marital support and depressive symptoms was stronger among parents who have children under the age of 18 years than parents of children older than 18 years.

The Relationship Between Paternal Depressive Symptoms and Marital Quality

Although most research findings support the association between paternal depressive symptoms and poor marital quality, the strength of the significant correlations varies across studies, ranging from quite strong ($r = –.67$; Block, 2016) to quite modest ($r = –.20$; Kouros, 2008). A handful of studies have also failed to find any significant association (e.g., Schmidt, 1988; Simons, Whitbeck, Conger, & Melby, 1990; Stoneman, Brody, & Burke, 1989; Weinfield, Ingerski, & Moreau, 2009). To some extent, the strength of the association appears dependent upon who reports marital quality. Most research has demonstrated a stronger association between paternal depressive symptoms and father-ratings of marital satisfaction than mother-ratings (e.g., Marchand, 1998; Nelson et al., 2009; Ramchandani et al., 2011; Saxbe et al., 2017) while a few studies reported that paternal depressive symptoms were only associated with father-ratings and not mother-ratings at all (Block, 2016; Sevigny, 2007). In contrast, other studies found that the strength of the association between paternal depressive symptoms and marital satisfaction was comparable across father- and mother-reports of marital satisfaction (Beach et al., 2003; Kouros, 2008; Kovacs, 2003; Stevenson-Hinde, Curley, Chicot, & Jóhannsson, 2007). Given these inconsistencies across studies, we conducted a series of meta-analyses to clarify the nature and strength of this relationship.

Sample, measurement and outcome, and bibliographic characteristics. It is also important to acknowledge that differences in the magnitude of the relationship between paternal depressive symptoms and marital quality across the studies may be moderated by study-specific factors, including sample, measurement and outcome, and bibliographic characteristics.

Sample characteristics. Depression is negatively associated with measures of socioeconomic status (SES; Reising et al., 2013), including household income and education (Sheldon, 2015; Sotomayor-Peterson, Wilhelm, & Card, 2011). Sheldon (2015) also found that

household income was positively related to marital quality and commitment. Based on these findings, we predicted that samples of fathers with lower SES would produce larger effects. The racialized background of the paternal sample might also be important given that some research has found cultural differences in depressive symptom severity and marital quality. For example, several studies have found that participants with racialized backgrounds tend to report higher levels of depression than White participants (Fagan, 2009; Sotomayor-Peterson et al., 2011). Saxbe et al. (2017) also demonstrated that having a racialized background was significantly associated with paternal depressive symptoms when assessed between six to nine months postpartum. Some work has also suggested that fathers with a racialized background report lower levels of marital happiness (Sotomayor-Peterson et al., 2011) and relationship support (Fagan, 2009). Therefore, samples with a higher proportion of fathers with a racialized background were expected to yield larger effect sizes.

Another factor that could possibly moderate the strength of the relationship is the presence of maternal depression. Maternal depression is associated with both paternal depressive symptoms and decreased marital satisfaction (Smith et al., 2013). Based on the CFMD (Beach, 2014), having more than one partner struggle with depression may further contribute to lower and higher levels of marital support and marital stress, respectively. Therefore, samples with a higher proportion of mothers with depression may demonstrate a larger relationship compared to samples with a lower proportion of mothers with depression.

Family size or the mean number of children might also moderate this relationship, given that Wendorf, Lucas, Imamoğlu, Weisfeld, and Weisfeld (2011) found that the number of children had a negative impact on both father- and mother-ratings of marital satisfaction. An early meta-analysis on parenthood and marital satisfaction echoed these results (Twenge,

Campbell, & Foster, 2003). Fagan (2009) also found that having more than one child was related to greater parental depressive symptoms; however, Shockley and Allen (2018) reported that neither paternal depressive symptoms or marital satisfaction were significantly associated with the mean number of children in the household. Based on these findings, it is unclear whether the mean number of children in the home will significantly moderate this relationship.

Measurement and outcome characteristics. Exploring the differences in how paternal depressive symptoms and marital quality were assessed in each study may provide a better understanding of the variation in the strength of the association across the studies. For example, the time at which paternal depressive symptoms were reported might moderate this relationship. In light of the adjustment period after the birth of a child (Doss, Rhoades, Stanley, & Markman, 2009), the relationship between paternal depression and marital quality might be more robust when measures are assessed during as compared to after the postpartum period. Twenge et al. (2003) found that mothers with infants reported lower levels of marital satisfaction than mothers with older children; however, the age of the child did not moderate the magnitude of the effect for fathers. On the other hand, research by Bower et al. (2013) showed that the correlations between paternal depressive symptoms and father-rated marital satisfaction were stronger when the relationship was assessed during ($r = –.51$) rather than after ($r = –.37$) the postpartum period. Therefore, it is unclear whether the timing of paternal depression (i.e., postpartum vs. non-postpartum) will significantly moderate this relationship.

Bibliographic characteristics. In addition to measurement and outcome characteristics, bibliographic factors might also moderate the magnitude of the association between paternal depression and marital quality, such as (a) the type of publication (i.e., published or unpublished), (b) the year of publication, and (c) the country of study. Published manuscripts

may yield larger effect sizes than unpublished manuscripts if this area of research is subject to publication bias (Franco, Malhotra, & Simonovits, 2014). The year of publication might also moderate the magnitude of this relationship given the overall increase in paternal involvement in childcare over the past few decades (Pew Research Center, 2015). Earlier research in this area found that paternal depressive symptoms and marital quality were not significantly associated (e.g., Schmidt, 1988; Simons et al., 1990; Stoneman et al., 1989), whereas more recent studies seem to demonstrate a strong and significant relationship consistently (e.g., Block, 2016; Shockley & Allen, 2018; Top Cetisli, Guclu, & Zengin, 2016). These trends might be observed if higher levels of paternal involvement are leading to role overload, which has been positively correlated with paternal depression and marital dissatisfaction (Padilla et al., 2017). Therefore, recent manuscripts may yield larger effect sizes than older manuscripts.

Finally, the strength of this relationship might also be moderated by the country where the study was conducted. A recent meta-analysis revealed that North American countries had the highest rates of postpartum depression, and European countries and Australia had the lowest (Cameron et al., 2016). An epidemiological review examining major depression across countries also replicated this finding, with the United States (U.S.) having the highest prevalence of major depressive episodes among high-income countries (Kessler & Bromet, 2013). Concerning marital quality, Wendorf et al. (2011) found that father- and mother-ratings of marital satisfaction were comparable across American, British, and Turkish participants. Given the differences in findings across these two domains of research, it is unclear whether the country of study will moderate this relationship.

Rationale for the Current Study and Research Questions

Clarifying the nature and magnitude of the relationship between paternal depression and

marital quality and identifying the factors that might moderate the strength of the relationship is imperative considering the major impact that marital quality and paternal depression can have on the family system (e.g., deMontigny et al., 2013; Nelson et al., 2009; Saxbe et al., 2017). It is especially important to focus on fathers and examine the differences between father- and mother-reports of marital quality considering that paternal marital dissatisfaction is one of the strongest predictors of future marital dissolution (Stevenson-Hinde et al., 2007). To the best of our knowledge, no meta-analyses focusing specifically on paternal depression and marital quality have been conducted thus far. The most comparable meta-analysis to date was completed by Whisman (2001), who examined the association between depression and marital quality. Based on Cohen's (1988) guidelines for effect size interpretation (small: $r \leq .10$, $d = .20$; medium: $r = .30$, $d = .50$; large: $r = \geq .50$, $d = .80$), the results of Whisman's meta-analysis demonstrated a medium association between marital quality and depression among men ($r = –.37$; $k = 26$). It is important to note that only two of the studies included in Whisman's meta-analysis focused on fathers, whereas the current meta-analysis focuses exclusively on depressive symptoms reported by fathers, not men in general. Therefore, the first objective of the current study was to investigate the strength of the relationship between depressive symptoms and marital quality among fathers by answering the following research questions: (1) Do fathers with higher depressive symptoms report lower levels of marital quality than fathers with lower or no depressive symptoms? If so, how large is this effect? (2) How large is the association between paternal depressive symptoms and father-ratings of marital quality? and (3) How large is the association between paternal depressive symptoms and mother-ratings of marital quality? The second objective of this study was to investigate whether any of the following factors moderate the strength of the association between paternal depressive symptoms and father-ratings of

marital quality: (a) paternal SES (as measured by percent of the sample having completed post-secondary schooling), (b) racialized background of the paternal sample, (c) family size or mean number of children, (d) presence of maternal depression (percent of mothers in the sample that met diagnostic criteria for depression), (e) timing of paternal depression (postpartum vs. non-postpartum depression), (f) type of publication (published vs. unpublished), (g) year of publication, and (h) country of study.

Method

Search Strategy and Manuscript Retrieval

The screening, identification, and selection process of eligible manuscripts used in this meta-analysis conformed to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) Statement (Moher, Liberati, Tetzlaff, & Altman, 2009). Four databases (i.e., PsycINFO, Educational Resources Information Center, ProQuest Dissertations & Theses, and Google Scholar) were searched in April 2018 to retrieve published and unpublished manuscripts that were published or prepared up to April 2018. Considering the sheer number of results generated by Google Scholar, the title and abstracts of manuscripts in Google Scholar were screened until 200 consecutive manuscripts were irrelevant. We created unique search strategies for each database, which were based on database-specific search features (e.g., truncation for keywords, options to narrow results by methodology, population, language). The keywords that were used across all databases included: parent, father*, parental, paternal, depression, major depression, depressi*, depression (emotion), couple*, marital, partner, marriage, parents, interparental, inter-parental, spous*, dyad*, qualit*, satisfacti*, happ*, conflict, discord, stabl*, *stress, strain, difficult*, disharmon*, cohesi*, problem*, adjust*, and Dyadic Adjustment Scale.

Backward and forward reference searches were also completed to retrieve additional

manuscripts that might have been missed in the initial database searches, such as those not indexed in one of the four databases above (Card, 2012). A backward reference search consists of scanning the reference list of each eligible manuscript for additional manuscripts that meet the inclusion criteria listed below. A forward reference search refers to reviewing all the manuscripts that cited an eligible manuscript.

Inclusion Criteria and Determining Eligibility

Manuscripts were eligible if they were originally prepared, reported, and indexed in English. For the purpose of this study, fathers were classified as individuals who were the primary male caregiver in the home and had at least one child between the ages of 0–18 years. We included manuscripts that provided a direct and current measure of paternal depressive symptoms and marital relationship quality, such as marital discord, marital conflict, marital dis/satisfaction, marital in/stability, or marital mal/adjustment. Single-item measures of depression or marital quality were ineligible. Measures of intimate partner violence (IPV; e.g., O'Leary-Porter Scale or the Conflict Tactics Scale), exposure to IPV, or those that operationalized marital conflict as verbal, psychological, or physical forms of aggression were not considered measures of marital quality for the purpose of this study. We also excluded manuscripts that assessed marital relationship quality within a specific and limited time frame (e.g., using observational data or Marital Daily Records). Measures that specifically focused on depressive symptoms or parental conflict with respect to parenting and children (e.g., disagreement between parents regarding their children) were also ineligible. Measures were required to have a clear direction or description of what low or high scores represented (e.g., higher scores refer to higher levels of marital satisfaction) to be eligible. We only included manuscripts that consisted of a quantitative comparison of the relationship between current

paternal depression status (i.e., meets cut-off criteria for depression) or depressive symptoms and current marital quality that answered one or more of the research questions above. Quantitative considerations that were adjusted for various covariates were not eligible. Being cognizant of the "apples to oranges" problem (Lipsey & Wilson, 2001), manuscripts that focused on fathers or fathers of children with chronic physical health conditions (e.g., asthma, cancer, chronic pain, diabetes, epilepsy), developmental difficulties, or genetic conditions (e.g., autism spectrum disorder, fragile X syndrome, Turner syndrome) were excluded. Manuscripts with a small portion of the sample being fathers or fathers of children with specific health conditions were eligible. We also excluded manuscripts that focused on fathers with a history of (a) being in the military, (b) incarceration, and/or (c) severe mental illness. These participants were excluded because individuals from these populations tend to differ from other research participants on several factors, such as SES (e.g., Druss, Zhao, Von Esenwein, Morrato, & Marcus, 2011), severity of mental disorders (e.g., Turney, Wildeman, & Schnittker, 2012), and utilization of mental health services (e.g., Sareen et al., 2016).

Manuscripts underwent three screening stages to determine eligibility. We used the PRISMA flow diagram to record the number of manuscripts that were included and excluded at each stage (see Figure 1). First, duplicates of manuscripts were removed and excluded. Second, the title and abstracts of manuscripts were screened using the inclusion criteria above. Third, manuscripts that were eligible on the basis of their title and abstract underwent a full-text review. Manuscripts that met all of the inclusion criteria were classified as eligible and included in the final analyses. Manuscripts that did not meet all of the inclusion criteria at this stage were excluded, and specific reasons for their ineligibility were recorded in the PRISMA flow diagram.

Data Extraction and Reliability

Quantitative data were extracted from each manuscript to calculate one of two types of effect sizes: (a) standardized mean difference (i.e., Cohen's *d*), or (b) a Pearson product-moment correlation coefficient (*r*). A coding manual (see Appendix A) and a coding form (see Appendix B) were used to extract the data. Sample, measurement and outcome, and bibliographic characteristics were also extracted from each manuscript for moderator analyses. Being mindful of different currencies of income across countries, we used paternal educational attainment rather than household income to gauge SES for the current study. Data from all of the eligible manuscripts were then entered into and analyzed using the Comprehensive Meta-Analysis (CMA) software 3.0 (Borenstein, Hedges, Higgins, & Rothstein, 2013).

Overlapping data. Sets of studies using the same sample, including series of longitudinal studies that analyzed data at different time-points were considered overlapping data. We addressed overlapping data by identifying and selecting the manuscript that provided the most comprehensive set of data in terms of quantitative considerations and study characteristics. The other manuscripts that used the same sample were excluded. For example, the samples from Marchand (1998) and Lutz and Hock (2002) were part of the same longitudinal study. Marchand provided a more comprehensive set of information than Lutz and Hock and therefore, we included the former and excluded the latter.

Missing data. We emailed the corresponding author of manuscripts that were missing data that was pertinent to calculating an effect size (e.g., sample sizes). We also contacted authors to inquire about specific study characteristics or whether the sample used in their study overlapped with other identified studies. We contacted three authors, all of whom provided the requested data (Marchand, 1998; Padilla et al., 2017; Ramchandani et al., 2011).

Reliability of manuscript retrieval and data extraction. The outcome of the backward and forward reference searching was used to evaluate the reliability of the initial database searches and the manuscript retrieval process. The objective of the backward and forward reference search process was to obtain manuscripts that were not included in the initial database searches. Therefore, a smaller number of manuscripts identified through this process would speak to the reliability of the initial search strategy and the manuscript retrieval process. Only one additional manuscript was retrieved through the backward and forward reference searches, indicating that the initial search strategies and the manuscript retrieval process were reliable. The reliability of data extraction was assessed by a Ph.D. student who was thoroughly trained in meta-analyses. The student acted as a secondary coder and extracted data from 25% of the studies coded by the primary coder. There were no differences between the data extracted by the primary and secondary coder (i.e., 100% agreement).

Calculation and Analysis of Effect Sizes

Individual meta-analyses were conducted to answer each research question. Random effects models were used for all of the analyses to account for heterogeneity, which was evaluated with the *Q* statistic, I^2 statistic, and tau^2 statistic (Borenstein, Hedges, Higgins, & Rothstein, 2009). A significant *Q* statistic denotes the presence of heterogeneity within the analysis. The I^2 statistic evaluates the extent to which the total variation across the studies can be attributed to heterogeneity between the studies (as opposed to sampling error); it is reported as a percentage, with larger values representing a greater degree of heterogeneity. The tau^2 statistic provides an estimation of the degree of variance between the studies included in the analysis, where tau^2 values larger than 1 suggest the presence of heterogeneity.

None of the studies included samples of fathers who were formally diagnosed with

depression; therefore, we defined paternal depression status as meeting or exceeding the cut-off scores on symptom severity measures. The effect sizes of the negative forms of marital quality (e.g., marital dissatisfaction, marital discord, marital conflict) were reversed such that all analyses examined positive forms of marital quality. The effect sizes were also transformed to Fisher's *z*-scale to account for the variance in correlational data (Borenstein et al., 2009). The correlational effect sizes were later transformed back to correlation coefficients for interpretation and reporting purposes.

Multiple outcomes. Manuscripts by Dudley, Roy, Kelk, and Bernard (2001) and Kouros (2008) each reported two quantitative considerations of the relationship between paternal depression and marital quality by using different measures to assess depressive symptoms (e.g., the Center for Epidemiologic Studies Depression Scale (CES-D), Beck Depression Inventory (BDI)). The effects from these manuscripts were aggregated, and each contributed one effect size.

Outliers. Individual effect sizes with standardized residuals greater than 1.96 were classified as outliers (Viechtbauer & Cheung, 2010) and trimmed (i.e., removed) from the summary effect size distribution (SESD). The SESD and the trimmed SESD of each meta-analysis were evaluated and reported in Appendix C. The trimmed SESD was used if substantial differences between the two sets of results were evident.

Moderator analyses. Data from at least 10 manuscripts were required to conduct each moderator analysis as advised by the Cochrane Handbook (Higgins & Green, 2011). All of the moderator analyses were performed on the individual meta-analysis examining the association between paternal depressive symptoms and father-ratings of marital quality (Research Question #2). Moderator analyses were conducted using meta-regression, which assesses the degree to

which a moderator influences the magnitude of an effect size (Card, 2012; Lipsey & Wilson, 2001). Each moderator was analyzed using an individual meta-regression.

Results

Sample and Bibliographic Characteristics

The search results from the four databases generated 12,839 unique manuscripts and 270 full-text articles were selected for review and screened for eligibility. Forty-two manuscripts (27 published, 15 unpublished) produced between 1985 and 2018 were eligible and included in this meta-analysis (see Figure 1). The studies were conducted in Australia (n = 1), Canada (n = 2), Japan (n = 1), Poland (n = 1), Turkey (n = 1), the United Kingdom (UK; n =3), and the U.S. (n = 33). The mean age of fathers and mothers in the samples ranged from 29.0 to 45.7 years, and 27.2 to 43.5 years, respectively. The mean length of marriage in the samples ranged from 5.5 to 18.1 years. Nine to ninety-five percent of the fathers across the samples completed post-secondary education. Of the studies that reported the racial/ethnic composition of the paternal sample, 72.7% to 100.0% of fathers in the sample were White. Most of the studies did not explicitly state the composition of the type of father (e.g., biological, adoptive, step-fathers, etc.) of the paternal sample (n = 34). Eight studies reported that the majority of the fathers in the sample were biological fathers (84.3% to 100.0%). The percentage of fathers and mothers in the samples who had levels of depressive symptoms that met or exceeded the cut-off criteria of the respective measures used in the studies ranged from 3.0% to 46.2%, and 4.0% to 47.5%, respectively. The mean number of children of the families in the studies ranged from 1.0 to 3.4. All but one of the studies were recruited from a community sample, with the remaining study recruiting from a clinical sample of fathers of children with conduct problems (Webster-Stratton & Hammond, 1990).

Measurement and Outcome Characteristics

All of the included manuscripts used self-reports of depressive symptoms. The most common measures were the CES-D (n = 17), the Edinburgh Postnatal Depression Scale (EPDS; n = 10), and versions of the BDI (n = 8). About one-third of the manuscripts assessed paternal depressive symptoms during the postpartum period, defined here as 12 months after the birth of a child.

About half of the manuscripts reported both father- and mother-ratings of marital quality (n = 20). The most commonly used measures of marital quality were versions of the Dyadic Adjustment Scale (DAS; n = 20) and the Locke-Wallace Marital Adjustment Test (MAT; n = 9). Other measures included the Marital Bonds Scale, the Marital Comparison Level Inventory, and the Quality of Marriage Index. Tables C1 to C3 list the measures used in each of the eligible manuscripts.

Relationship Between Paternal Depression and Marital Quality

Fathers with higher depressive symptoms reported significantly lower levels of marital quality than fathers with lower or no depressive symptoms (d = –1.04; 95% CI [–1.39, –0.69]; k = 5; $Q(4)$ = 14.54, p = .006; I^2 = 72.48%; tau^2 = 0.11; see Table C1). One effect from Bielawska-Batorowicz and Kossakowska-Petrycka (2006) was identified as an outlier and removed to calculate the trimmed SESD (d = –0.80; 95% CI [–0.96, –0.64]; k = 4; $Q(3)$ = 1.66, p = .645; I^2 = 0.00%; tau^2 = 0.00). The magnitude of both SESDs were large. Given the difference between the two SESDs, the trimmed results will be used for interpretation and discussion. The relationship between paternal depressive symptoms and father-rated marital quality was medium (r = –.32; 95% CI [–.36, –.27]; k = 39; $Q(38)$ = 121.37, p < .001; I^2 = 68.69%; tau^2 = 0.01; see Table C2). Effect sizes from two manuscripts were identified as

outliers and removed. The difference between the trimmed and the untrimmed SESD were negligible; therefore, the untrimmed findings were retained. There was a small relationship between paternal depressive symptoms and mother-rated marital quality (r = –.22; 95% CI [–.26, –.19]; k = 18; $Q(17)$ = 8.26, p = .961; I^2 = 0.00%; tau^2 = 0.00; see Table C3). Several additional research questions were originally proposed for this study but were not included in the journal submission of the manuscript due to issues with power (see Appendix D). Table 1 shows the results of the eight moderator analyses, none of which were significant. The type of publication approached significance, with unpublished manuscripts producing larger effect sizes than published manuscripts.

Discussion

The current study is the first meta-analysis on paternal depression and marital quality. Overall, this study found a significant relationship between paternal depression and marital quality, regardless of the informant. This research indicated that fathers with higher levels of depressive symptoms report significantly lower ratings of marital quality than fathers with lower levels or no depressive symptoms (Research Question #1), which is consistent with the CFMD (Beach, 2014) and previous research (e.g., deMontigny et al., 2013; Nishimura, Fujita, Katsuta, Ishihara, & Ohashi, 2015; Ramchandani et al., 2011). Interestingly, all of the studies included in this specific analysis (i.e., Research Question #1; Do fathers with higher depressive symptoms report lower levels of marital quality than fathers with lower or no depressive symptoms? If so, how large is this effect?; see Table C1) assessed paternal depression during the postpartum period. This trend differs from the manuscripts that used correlational data (i.e., Research Questions #2 and #3) as the minority of those studies focused on paternal postpartum depressive symptoms. Additionally, all of the studies in this first analysis used the EPDS to assess

depression; however, only two of the five studies used the same cut-off criteria to categorize participants into fathers with and without depression. When comparing the individual effects based on their cut-off points, the studies with the largest and smallest effects had the highest (EPDS scores equal to or greater than 13; Bielawska-Batorowicz & Kossakowska-Petrycka, 2006) and lowest (EPDS scores equal to or greater than 8; Nishimura et al., 2015) cut-off points, respectively, suggesting that readers should be mindful of the cut-off criterion used in these studies.

The current study also found a medium relationship between paternal depressive symptoms and father-rated marital quality, which aligns with most research in this area (e.g., Jones et al., 2001; Padilla et al., 2017; Shockley & Allen, 2018; Smith et al., 2013). The strength of this effect was weaker than that found in Whisman's (2001) meta-analysis on depression and marital quality among husbands. Whisman's mean effect size ($r = –.37$) fell slightly outside confidence intervals of the effect established in the current study ($r = –.32$; 95% CI [–.36, –.27]), suggesting that these two relationships are somewhat different. The strength of the relationship between depressive symptoms and marital quality was expected to be larger for fathers than husbands considering the research that demonstrates more unfavorable outcomes for fathers (Twenge et al., 2003), especially those who have children under 18 (Beam et al., 2011), and those who have a greater number of children (Fagan, 2009; Twenge et al., 2003). This difference could speak to dissimilarities in data collection procedures between some of the paternal and non-paternal depression studies. For example, the studies on depression among husbands tend to report on data collection at a single time-point, whereas many of the paternal studies utilized longitudinal research designs, which often began data collection during pregnancy. Researchers have noted that fathers who do not participate across multiple time-points tend to be less

educated (Bower et al., 2013; Padilla et al., 2017), have lower family income (Padilla et al., 2017), and have greater work-family conflict (Koh, Chui, Tang, & Lee, 2013). Therefore, the strength of the relationship for fathers might be weakened by the fact that fathers who tend to be more at risk for depression (Koh et al., 2013; Sotomayor-Peterson et al., 2011) and marital dissatisfaction (Sheldon, 2015) are also more likely to drop out of research studies. Alternatively, differences between fathers and non-fathers might be responsible for this difference. For example, a study by Dykstra and Keizer (2009) demonstrated that fathers reported higher incomes and a higher quality of family relationships than men without children. Notably, both income and quality of family relationships have been linked to depression (Sheldon, 2015; Sotomayor-Peterson et al., 2011) and marital satisfaction (Sheldon, 2015). Dykstra and Keizer also alluded to the idea that fathers might differ from non-fathers based on the selection into fatherhood concept, where individuals who become fathers are more nurturing, sociable, and economically stable than their counterparts. All of these characteristics might also reduce marital stress and enhance marital support.

The present study also found that the association between paternal depressive symptoms and marital quality was weaker for mother-ratings than father-ratings of marital quality, with the effect of father-ratings of marital satisfaction ($r = –.32$; 95% CI [–.36, –.27]) not falling within the confidence intervals of this mean effect size ($r = –.23$; 95% CI [–.26, –.20]). This result aligns with the large majority of studies that considered both mother- and father-ratings of marital quality in relation to paternal depressive symptoms (e.g., Marchand, 1998; Ramchandani et al., 2011; Saxbe et al., 2017) and was therefore not surprising given that elevated levels of father-ratings of dissatisfaction could be at least partially explained by the cognitive distortions that individuals with depression often experience. Indeed, Beach et al. (1990) emphasized that

the perception and appraisal of marital stress are important when considering its impact on the relationship between depression and marital dissatisfaction. Additionally, paternal dissatisfaction could also be partly due to inaccurate and negative perceptions of the degree to which their partners are dissatisfied or critical of the relationship, which would likely further exacerbate both symptoms of depression and marital discord. Research by Ramchandani et al. (2011) supports this hypothesis as they found that fathers who were currently depressed believed that they were more critical of their partners and that their partners were more critical of them compared to fathers without depression. Interestingly, there were no group differences between the partners of depressed and non-depressed fathers on the same measures.

None of the moderators explored in the present study were statistically significant. The finding that paternal education was not a significant moderator aligns with previous research that found that paternal education was not significantly related to marital quality or depressive symptoms (Ransford et al., 2008; Saxbe et al., 2017). Interestingly, results from an early meta-analysis found that parents with higher SES status had greater levels of marital dissatisfaction than parents with middle or low SES status (Twenge et al., 2003). The authors speculated that families of higher SES might experience more issues around role conflict. Research has also identified work-family conflict as a significant predictor of paternal prenatal and postpartum depression (Koh et al., 2013). This non-significant finding could also be attributed to the fact that educational attainment continues to steadily increase over time (Barro & Lee, 2013) and therefore, educational attainment among paternal samples in newer studies may not be comparable to older studies. Taken together, paternal education as an indicator of family SES might not be as relevant as it used to be, especially considering that mothers are becoming increasingly more educated than fathers (Parker & Wang, 2013).

Samples with a higher proportion of fathers with a racialized background were expected to be related to larger effect sizes than samples with a lower proportion; however, this was not the case. This finding was inconsistent with previous research that highlighted differences between White and racialized populations in terms of severity of depressive symptoms and levels of marital quality (Fagan, 2009; Sotomayor-Peterson et al., 2011). It is possible that other factors in addition to racial/ethnic background play a role in depressive symptoms and marital quality. For example, Sotomayor-Peterson et al. (2011) discovered that although White fathers reported fewer depressive symptoms than Hispanic fathers who reported higher acculturation, their ratings of depressive symptoms were greater than Hispanic fathers who reported lower acculturation. Additionally, the time at which depression was assessed might also make a difference. Saxbe et al. (2017) reported that minority status (i.e., African American or Latino) was only associated with paternal depression when symptoms were measured six to nine months postpartum, and not before (one to three months postpartum) or after (12 to 16 months postpartum) this period. Fagan (2009) also found differences in spousal relationship support among African American, Hispanic, and White fathers at different time-points. Considering these findings together, it is likely that the way in which racial/ethnic background composition influences the relationship between paternal depression and marital quality is more complex than our analysis was able to investigate.

Maternal depressive symptoms were also not a significant moderator, a finding that contradicts assumptions based on the CFMD (Beach, 2014) and past literature (e.g., Smith et al., 2013; Weinfield et al., 2009). This non-significant finding could be due to issues with power as only 10 studies were included in this analysis.

The mean number of children in the home was also not found to be a significant

moderator. This finding is consistent with previous research that failed to find an association between the mean number of children in the home and paternal depressive symptoms or marital satisfaction (Shockley & Allen, 2018). Although this outcome contrasts with Wendorf et al. (2011) study, it is important to note that the strength of the relationship between marital satisfaction and the number of children reported in their study was small (*r*s ranging from –.09 to –.13). Wendorf et al. also speculated that while an increase in the number of children does not necessarily generate marital and parental difficulties, having more children might exacerbate any issues or symptoms that already exist. Therefore, fathers with pre-existing marital difficulties or depressive symptoms might be more strongly impacted by having more children than their counterparts. Given the cross-sectional and correlational nature of the studies included in this meta-analysis and the meta-analysis itself, we are limited in our ability to examine this phenomenon. Additionally, only 13 studies reported the mean number of children and most reported the mean number of children between the range of 1 and 2. Therefore, the non-significant finding could also be attributed to a lack of power and issues with limited range, which is likely due to the shrinking family size and the fact that it is rare to find larger families.

Studies that assessed paternal depressive symptoms during the postpartum period were expected to be associated with larger effect sizes than those that assessed symptoms after the postpartum period; however, the timing of paternal depression was not a significant moderator. This hypothesis was based on research that emphasized a host of issues experienced during the postpartum period, including decreased marital quality (Parfitt, 2013) and increased depressive symptoms (Top et al., 2016). Notably, most of the research conclusions regarding difficulties during the postpartum period are based on comparisons between the prenatal and postpartum period (e.g., Top et al., 2016). Yet postpartum status does not always coincide with the transition

to parenthood. For example, only one of the 40 studies included in this analysis explicitly focused on first-time parents (Pancer et al., 2000), suggesting that a large proportion of the samples were not first-time parents. Although a sharp decline in father-rated marital satisfaction is often observed between the prenatal and postpartum periods (Doss et al., 2009), research suggests that marital satisfaction continues to steadily deteriorate throughout the length of the marriage (Doss et al., 2009; Wendorf et al., 2011). Therefore, levels of marital quality might actually be higher for fathers during the postpartum period than fathers outside of the postpartum period as this may be indicative of shorter marriage length. Additionally, it is important to consider that the postpartum period may be especially difficult for non-first-time parents as the demands of parenting would likely heighten with an increase in responsibilities of caring for a newborn and other children concurrently.

None of the bibliographic moderators were significant. The finding that unpublished manuscripts did not differ from published manuscripts is consistent with the results of previous meta-analyses on paternal depression and family-related outcomes (Cheung & Theule, 2018; Cheung et al., 2018). This result conflicts with research that indicates that publication biases still exist in the research literature (Franco et al., 2014). It is possible that academic journals in this area of research have moved towards publishing more non-significant findings. Although this moderator analysis approached significance, it is important to note that at least 3 of the 15 unpublished manuscripts included in this analysis were later published (Kouros, 2008; Marchand, 1998; Sevigny, 2007). Some of the unpublished and published manuscripts identified in our searches were considered overlapping samples. Given that the unpublished manuscripts provided a more comprehensive set of information than the published versions, the published versions were excluded from the current meta-analysis.

Newer manuscripts were expected to produce stronger effects than older manuscripts. This hypothesis was based on a recent survey that found that not only are fathers more involved as parents (Pew Research Center, 2015), but they are also reporting greater work-life conflict than ever before (Parker & Wang, 2013). Researchers have demonstrated that greater role overload (Padilla et al., 2017; Ransford et al., 2008) and work-family conflict (Koh et al., 2013) are associated with depression. Shockley and Allen (2018) also found that a lower proportion of childcare tasks completed by wives were associated with increased depressive symptoms among fathers. Alternatively, research has identified positive benefits to greater paternal involvement, such as higher levels of marital commitment and father-child connectedness (i.e., feeling socially and emotionally connected; Sheldon, 2015). Studies have also revealed that the time fathers spend with their children is negatively correlated with paternal depressive symptoms (Goodman, 2009) and positively correlated with marital satisfaction (Fagan & Lee, 2014; Goodman, 2009; Sheldon, 2015), potentially washing out any potential findings.

Finally, the country of the study did not significantly moderate this relationship. Most of the studies included in this meta-analysis were conducted in the U.S., and therefore, any differences between the countries of studies would be difficult to discern. The eligibility criteria of only including manuscripts that were reported, prepared, and indexed in English likely reduced the possibility of identifying and ultimately including studies from a wide range of countries. A post-hoc database search revealed that almost 700 search results from PsycINFO were excluded because they were not reported in English.

Strengths and Limitations

This study has several strengths, with the most notable strength being that this is the first meta-analysis on paternal depressive symptoms and marital quality. Another strength was

examining marital quality on a continuum (i.e., inversing quantitative comparisons using negative forms of marital quality) as opposed to examining negative and positive forms of marital quality separately. Amalgamating positive and negative forms of marital quality within the same analysis provided a more comprehensive understanding of the relationship and increased the number of individual effects used in the moderator analyses. Examining mother- and father-ratings of marital quality separately was also a strength of this study as it allowed us to explore differences between spousal reports. The current study also demonstrated high reliability of manuscript retrieval and data extraction. Finally, we included unpublished manuscripts to address issues related to publication bias (Card, 2012).

The current study also has several limitations. Including unpublished manuscripts may be viewed as a limitation due to potential concerns around study quality; however, the type of publication was not a significant moderator. This finding suggests that the inclusion of unpublished manuscripts did not significantly impact the findings of this study, and therefore using unpublished manuscripts in this study was more of a strength than a limitation. All of the studies relied on self-ratings of paternal depressive symptoms, which could have affected the results. The participant samples across the manuscripts included in this meta-analysis generally lacked diversity with respect to educational attainment, race/ethnicity, and type of recruitment. The results of our meta-analysis may not be generalizable to all fathers as it largely illustrates the relationship between paternal depressive symptoms and marital quality in White, highly educated, community samples. The results could also be an underestimation of the true strength of the relationship given that the sample of fathers who were not widely represented in the studies (e.g., lower SES, racialized backgrounds, clinical samples) often have higher levels of depressive symptoms and marital difficulties (e.g., Fagan, 2009; Sheldon, 2015; Sotomayor-

Peterson et al., 2011; Taylor et al., 2005). Additionally, the exclusion of manuscripts that were not prepared, reported, and indexed in English limited our ability to examine this relationship across different countries and cultures. Other factors that were not explored in this study, especially those identified in the CFMD (e.g., marital support, hostility) might have influenced the strength of the relationship. For example, given that depression tends to co-occur with other mental disorders (De Jong, Sportel, De Hullu, & Nauta, 2010; Najt, Poli, & Brambilla, 2011; Rytwinski, Scur, Feeny, & Youngstrom, 2013; Spinhoven, van Balkom, & Nolen, 2011), it is possible that symptoms of other types of mental disorders (e.g., anxiety, posttraumatic stress disorder, substance-related disorders) could have impacted the strength of the relationship. The outcomes of this study also cannot determine whether marital quality gives rise to paternal depressive symptoms, or whether declining levels of marital quality are the result of depressive symptoms. Finally, we must acknowledge that this study was unfortunately limited by the heterosexist worldview present in the available literature (primary studies). The underlying assumption in the included studies was that families are comprised of a father, a mother, and their children. The varied and diverse composition of families including same-sex parents, adopted, blended, and foster families, and non-parental caregivers was not well addressed in the literature. Only a few eligible studies included a small proportion of blended and adopted families, and none of the eligible studies included families with same-sex parents.

Clinical Implications

The results of this research provide support for the relationship between paternal depressive symptoms and marital quality and suggest that clinicians should be cognizant of this link. Based on the results of this study, treatment options that reduce depressive symptoms may also enhance marital quality, and vice versa. Indeed, a Cochrane review by Barbato and

D'Avanzo (2006) demonstrated that individual psychotherapy and pharmacological options for treating depression were not superior to marital therapy. The authors also found lower rates of attrition among individuals in marital therapy compared to those using pharmacological treatment options. Advocates of marital therapy have also emphasized that marital therapy establishes a sense of "we-ness," where partners feel connected as opposed to being disconnected by the issues related to depression (Cordova & Gee, 2001). The sense of "we-ness" also relieves the partner struggling with depression from being blamed and criticized for marital difficulties as the symptoms, not the person, are viewed as the problem. Not surprisingly, research continues to support the use of marital- or family-focused approaches to therapy over individual treatment (for a review see Beach, 2014). Family therapy has even been recognized as the ideal treatment option for peripartum paternal depression (Freitas & Fox, 2015).

The finding that the relationship between paternal depressive symptoms and father-ratings of marital quality was larger than mother-ratings also has some clinical implications. Believing that one's partner is dissatisfied in their marriage might exacerbate depressive symptoms, marital conflict, and marital dissatisfaction. Therefore, identifying cognitive distortions and challenging misperceptions has the potential to be therapeutic in and of itself. Additionally, marital therapy that includes an intervention where each member has the opportunity to express their satisfaction with the relationship would be especially effective for challenging any misperceptions.

Directions for Future Research

Like most of the studies on paternal depression, the majority of the participant samples included in this meta-analysis were White American heterosexual fathers who were highly educated. Researchers should examine the relationship between paternal depression and marital

quality with more diverse samples (i.e., various SES, educational, sexual, and racial/ethnic backgrounds). Future meta-analyses on this topic could also address the lack of diversity by including manuscripts that were not originally reported in English. Given that the number of studies on paternal depression has increased over the past few decades, this trend will likely continue. Therefore, researchers conducting meta-analyses on this topic in the future should re-examine the moderators explored in this study and consider other moderators that might also have an impact on the magnitude of the relationship, such as the recruitment method (community vs. clinical), parental involvement, role overload, work-life conflict, and cut-off points of different measures.

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Table 1

Moderator Analyses for the Relationship between Paternal Depressive Symptoms and Father-Rated Marital Quality

Sample moderators	*k*	*Q*	*p*	R^2
Paternal education (% of fathers who completed post-secondary education)	11	1.21	.271	0.05
Racial/ethnic background composition of the father sample (% White)	15	0.01	.943	0.00
Maternal depression (% of mothers with depression)	10	2.75	.098	0.23
Mean number of children	13	1.19	.274	0.14
Measurement and outcome moderators				
Timing of paternal depression (during or outside of the postpartum period)	38	0.01	.916	0.00
Bibliographic moderators				
Type of publication (unpublished vs. published)	39	3.80	.051	0.12
Year of publication	39	2.07	.151	0.00
Country of study	39	7.44	.115	0.11

Note. *k* = number of effect sizes.

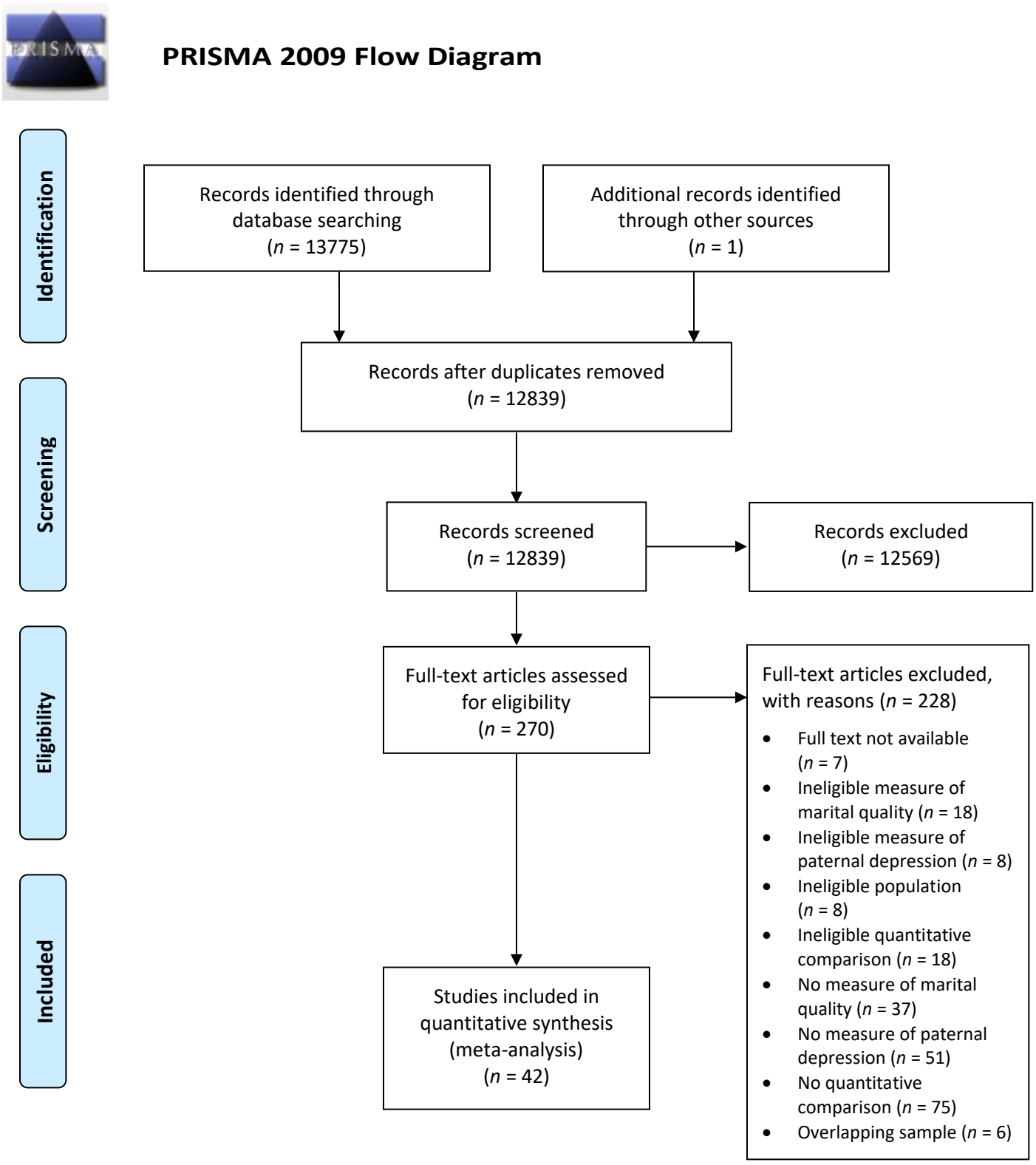


Figure 1. PRISMA Flow Chart. Adapted from "PRISMA 2009 Flow Diagram" by Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Annals of Internal Medicine, 151,* 264–269. doi:10.7326/0003-4819-151-4-200908180-00

Appendix A

Coding Manual for the Meta-Analysis on Paternal Depression and Marital Quality

General Coding Notes: Record the Study ID number at the top of every page used to code a given study. For every item starting at #5, indicate the page number where the information was found. Ranges are acceptable when needed. Note that most studies will not provide information in all the categories. Record as much information as is available.

I. Study Level Descriptors (Moderator Analyses)

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 "Paternal Depression and Marital Quality Meta-Analysis Tracking File."

3. Type of publication:
   a. Journal article
   b. Book chapter
   c. Conference paper
   d. Thesis or doctoral dissertation
   e. Unpublished data
   f. Other

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

4. Publication year: _____; Indicate if only published online to date: Yes/No

5. Place study conducted in: (pg. _____)
   a. US
   b. Canada
   c. UK
   d. Europe: _____
   e. Other: _____

Please indicate the country where the study was conducted.

6. Paternal depression diagnosis (pg. _____)
    a. Current diagnosis
    b. Past diagnosis
    c. No explicit diagnosis *(skip question #7)*

Please indicate whether the fathers included in the sample have a current or past diagnosis of depression.

7. Paternal depression diagnosed/confirmed by *(circle all that apply)*: (pg. _____)
    a. Previous diagnosis by a qualified health professional *(e.g., psychologist, family physician, pediatrician, psychiatrist)*
    b. DISC *(this is a diagnostic interview)*
    c. Study Clinician interview *(any activity undertaken by a qualified professional involved in the study to establish or confirm a diagnosis of depression, other than the DISC)*
    d. Questionnaire (e.g., BDI, BDI-II, CES-D): _____
    e. Other: _____
    f. None

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

8. Paternal depressive symptoms rated by: (pg. _____)
    a. Self
    b. Clinician *(psychologist, psychiatrist, family physician)*
    c. Partner
    d. Other *(student, lay interviewer):* _____

Please indicate who rated the fathers' depressive symptoms.

9. Marital quality rated by:
    a. Self
    b. Mother/Partner
    c. Other: _____

Please indicate who rated the marital quality. If the manuscript included ratings from several different informants, please provide this information in the quantitative section below.

10. Type of sampling method referral (pg. _____)
    a. Community
    b. Clinical

Please indicate whether the sample was recruited from a community sample or a clinical sample. Clinical samples are defined as participants who were recruited for the study based on their clinical presentation (e.g., "fathers with depression were recruited for this study"). Community samples refer to participants who were recruited from the community (e.g., schools).

11. Fathers' age (in years) (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate the mean age of the fathers and any subsamples as appropriate. Also indicate the standard deviation (SD) and sample size (n) where this information is available. If no age information is provided please write, "doesn't specify" beside father age.

12. Partners' age (in years) (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate the mean age of the partners and any subsamples as appropriate. Also indicate the standard deviation (SD) and sample size (n) where this information is available. If no age information is provided please write, "doesn't specify."

13. Fathers' racial/ethnic background (pg. _____)

	White (%)	Black (%)	Hispanic (%)	Asian (%)	Other (%)
Total Sample					
Depression group					
Comparison group:					
Other group:					

Indicate the racial/ethnic background of the paternal sample. Only code this moderator if the study specifically states the racial/ethnic background of the father sample. Please do not include the racial/ethnic background if the study only refers to the "the sample" or the parental sample.

14. Fathers' level of education (in years) (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate the mean number of years of education obtained by the father sample.

15. Father's level of education (pg. _____)

	Less than high school (%)	High school (%)	Some post-secondary education (%)	Completed post-secondary education (%)	*n*
Total Sample					
Depression group					
Comparison group:					
Other group:					

Indicate the percentage of fathers in the sample who completed the different levels of education. post-secondary education includes trade, college, university certificate, diploma, university degree, associates' degree.

16. Length of marriage or relationship (in years) (pg. _____)

	Mean	*SD*	Range	Marriage or relationship
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate the mean number of years that couples have been married or in a relationship. Also indicate whether the study refers to the length of marriage ***or*** *overall relationship.*

17. Percentage of partners (mothers or fathers) in the sample with depression (pg. _____)

	%	*n*	*N*	Depression defined by:
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate the percentage of partners in the sample who have a current diagnosis of depression or meet the cut-off criteria for having depression. Note how the diagnosis/measure of depression was assessed (e.g., ≥ 16 on the CES-D).

18. Number of children in the family (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

Indicate the mean number of children in the family samples.

19. Percentage of families in the sample with more than one child (pg. _____)

	%	*n*
Total Sample		
Depression group		
Comparison group:		
Other group:		

Indicate the percentage of families in the sample that have more than one child.

II. Quantitative Considerations (Main Analyses)

1. Group Comparison Studies, Continuous DV

1. Total *N* (both/all groups): _____
2. Compared to/between fathers with depression and fathers without depression
3. Type of data effect size based on:
   a. *Means* and *SD*
   b. *t*-test
   c. 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.

Paternal depression measured with: _____

Measure of paternal postpartum depression: yes/no ***(****Please indicate whether the symptoms of paternal depression were assessed within the postpartum period as defined as the first 12 months of the birth of a child.)*

Marital quality measured with: _____

Comparison	*Mean*	*SD*	*n*	*t*	*F*	*df*	*p*
Depression							
Nonclinical							

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 one-way 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.*

2. Correlational Studies

Note: Partial correlations are an ineligible quantitative comparison for this meta-analysis.

1. Sample
    a. Depression only
    b. Depression and non-depression
    c. Other: _____

Indicate whether the study investigated marital quality solely in a depression group, in a combined depression and non-depression group (where depressive symptoms were then included as a correlation), or in a differently composed group (in which case, please specify).

2. *N*: ____ *(if n differs from N above, please note appropriate n).*

3. Correlations with increased marital quality. *If study used a measurement in which lower numbers translate to higher degree of positive marital quality, check here and highlight so that effects can be reversed*: _____

Paternal depression measured with: _____

Measure of paternal postpartum depression: yes/no ***(****Please indicate whether the symptoms of paternal depression were assessed within the postpartum period as defined as the first 12 months of the birth of a child).*

Marital quality measured with: _____

r	*n*	Marital Quality Outcome	Rater of Marital Quality	Positive *or* Negative

Please indicate the type of marital quality outcome measured (e.g., marital satisfaction, marital adjustment, marital dissatisfaction, marital conflict), the measure used to assess marital quality, and who rated the marital quality (father or mother). Please indicate whether the form of marital quality being assessed is positive (e.g., marital satisfaction, marital adjustment) or negative (e.g., marital dissatisfaction, marital conflict).

Appendix B

Coding Form for the Meta-Analysis on Paternal Depression and Marital Quality

I. Study Level Descriptors (Moderator Analyses)

1. Bibliographic reference: _____
_____
_____

2. Study ID number: _____

3. Type of publication:
   a. Journal article
   b. Book chapter
   c. Conference paper
   d. Thesis or doctoral dissertation
   e. Unpublished data
   f. Other

4. Publication year: _____; Indicate if only published online to date: Yes/No

5. Place study conducted in: (pg. _____)
   a. US
   b. Canada
   c. UK
   d. Europe: _____
   e. Other: _____

6. Paternal depression diagnosis (pg. _____)
   a. Current diagnosis
   b. Past diagnosis
   c. No explicit diagnosis

7. Paternal depression diagnosed/confirmed by: (pg. _____)
   a. Previous diagnosis by a qualified health professional
   b. DISC
   c. Study Clinician interview
   d. Questionnaire (e.g., BDI, BDI-II, CES-D): _____
   e. Other: _____
   f. None

8. Paternal depressive symptoms rated by: (pg. _____)
   a. Self
   b. Clinician
   c. Partner
   d. Other: _____

9. Marital quality rated by:
   a. Self
   b. Mother/Partner
   c. Other: _____

10. Type of sampling method referral (pg. _____)
   a. Community
   b. Clinical

11. Fathers' age (in years) (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

12. Partners' age (in years) (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

13. Fathers' racial/ethnic background (pg. _____)

	White (%)	Black (%)	Hispanic (%)	Asian (%)	Other (%)
Total Sample					
Depression group					
Comparison group:					
Other group:					

14. Fathers' level of education (in years) (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

15. Father's level of education (pg. _____)

	Less than high school (%)	High school (%)	Some post-secondary education (%)	Completed post-secondary education (%)	*n*
Total Sample					
Depression group					
Comparison group:					
Other group:					

16. Length of marriage or relationship (in years) (pg. _____)

	Mean	*SD*	Range	Marriage or relationship
Total Sample				
Depression group				
Comparison group:				
Other group:				

17. Percentage of partners (mothers or fathers) in the sample with depression (pg. _____)

	%	*n*	*N*	Depression defined by:
Total Sample				
Depression group				
Comparison group:				
Other group:				

18. Number of children in the family (pg. _____)

	Mean	*SD*	Range	*n*
Total Sample				
Depression group				
Comparison group:				
Other group:				

19. Percentage of families in the sample with more than one child (pg. _____)

	%	*n*
Total Sample		
Depression group		
Comparison group:		
Other group:		

II. Quantitative Considerations (Main Analyses)

1. Group Comparison Studies, Continuous DV (pg. _____)

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

2. Compared to/between fathers with depression and fathers without depression

3. Type of data effect size based on:
   a. Means and SD
   b. *t*-test

Paternal depression measured with: _____
Measure of paternal postpartum depression: yes/no

Marital quality measured with: _____

Comparison	*Mean*	*SD*	*n*	*t*	*F*	*df*	*p*
Depression							
Nonclinical							

_____

2. Correlational Studies (pg. _____)

1. Sample
   a. Depression only
   b. Depression and non-depression
   c. Other: _____

2. *N*: _____

3. Correlations with increased marital quality: _____

Paternal depression measured with: _____
Measure of paternal postpartum depression: yes/no

Marital quality measured with: _____

r	*n*	Marital Quality Outcome	Rater of Marital Quality	Positive *or* Negative

Appendix C

Supplementary Tables

Table C1

Characteristics of Studies Comparing Father-Ratings of Marital Quality of Fathers with Higher Depressive Symptoms and Fathers with Lower or No Depressive Symptoms (Research Question #1)

Study	*n*[b]	*n*[c]	Pub status[e]	Country of study	Measure of marital quality	Measure of depression	PPD[f]	*d* (95% CI)	*p*
Bielawska-Batorowicz & Kossakowska-Petrycka (2006)[a]	22	58	P	Poland	MBS	EPDS	Yes	–1.89 (–2.46, –1.32)	< .001
DeMontigny et al. (2013)	17	188	P	Canada	DAS	EPDS	Yes	–1.04 (–1.55, –0.53)	< .001
Dudley et al. (2001)	11-16[d]	76-82[d]	P	Australia	DAS	BDI; EPDS	Yes	–0.83 (–1.25, –0.42)	< .001
Nishimura et al. (2015)	110	697	P	Japan	QMI	EPDS	Yes	–0.73 (–0.93, –0.53)	< .001
Ramchandani et al. (2011)	19	99	P	UK	DAS	EPDS	Yes	–0.95 (–1.45, –0.44)	< .001
			I^2	tau^2	Q(df)			*d* (95% CI)	*p*
Summary Effect			72.48%	0.11	14.54(4), p = .006			–1.04 (–1.39, –0.69)	< .001
Trimmed Summary Effect			0.00%	0.00	1.66(3), p = .645			–0.80 (–0.96, –0.64)	< .001

Note. BDI = Beck Depression Inventory; CI = confidence intervals; DAS = Dyadic Adjustment Scale; EPDS = Edinburgh Postnatal Depression Scale; MBS = Marital Bonds Scale; QMI = Quality of Marriage Index; UK = United Kingdom.

[a]This manuscript was identified as a potential outlier and not included in the trimmed summary effect size distribution. [b]Sample size of fathers who met or exceeded cut-off criteria for depression. [c]Sample size of fathers who did not meet cut-off criteria for depression. [d]Ranges for *n*s are provided when different sample sizes were used for different measures of depression. [e]Pub status = Publication

status (P = Published; U = Unpublished). [f]PPD = Were the paternal depressive symptoms assessed during the postpartum period? (Yes = paternal depressive symptoms were assessed during the postpartum period).

Table C2

Characteristics of Manuscripts Included in the Analysis of the Association Between Paternal Depressive Symptoms and Father-Rating of Marital Quality (Research Question #2)

Study	*N*	Pub status[b]	Country of study	Measure of marital quality	Measure of depression	PPD[c]	*r* (95% CI)	*p*
Beach et al. (2003)	166	P	US	MAT	CES-D	No	–.29 (–.42, –.14)	< .001
Bielawska-Batorowicz & Kossakowska-Petrycka (2006)[a]	80	P	Poland	MBS	EPDS	Yes	–.62 (–.74, –.46)	< .001
Block (2016)[a]	78	U	US	DAS	CES-D	No	–.67 (–.78, –.53)	< .001
Bower et al. (2013)	93	P	US	DAS	BDI	Both[d]	–.44 (–.55, –.32)	< .001
Carro et al. (1993)	70	P	US	DAS	BDI	Yes	–.25 (–.46, –.02)	.037
Devall (1990)	72	U	US	DAS	CES-D	No	–.46 (–.63, –.26)	< .001
Fishman & Meyers (2000)	461	P	US	NSFH	CES-D	No	–.34 (–.42, –.26)	< .001
Formoso (2002)	115	U	US	DAS	CES-D	No	–.46 (–.59, –.30)	< .001
Goldberg (1990)	96	P	US	DAS	CES-D	No	–.19 (–.38, .01)	.064
Goodman (2008)	128	P	US	DAS	EPDS	Yes	–.23 (–.38, –.05)	.010
Hawkins (2002)	164	U	US	KMS	SCL-90-R	No	–.34 (–.47, –.20)	< .001
Hessler (2008)	130	U	US	MAT	CES-D	No	–.33 (–.48, –.17)	< .001
Isacco et al. (2010)	742	P	US	MDSS	CIDI-SF	Yes	–.10 (–.17, –.03)	.006
Jones et al. (2001)	96	P	US	DAS	BDI	No	–.21 (–.39, –.01)	.040
Kirk (1986)	40	U	US	MAT-SF	BSI	No	–.19 (–.47, .13)	.242
Kouros (2008)	296	U	US	MAT	CES-D; SCL-90-R	No	–.29 (–.36, –.21)	< .001
Kovacs (2003)	72	U	US	MAT	CES-D	No	–.19 (–.40, .04)	.110
Lodder (1994)	74	U	US	EMS Scale	BDI	No	–.42 (–.59, –.21)	< .001
Marchand (1998)	42	U	US	MCLI	CES-D	No	–.50 (–.70, –.23)	.001
Nelson et al. (2009)	101	P	US	RDAS	SCL-90-R	No	–.40 (–.55, –.22)	< .001
Padilla et al. (2017)	246	P	US	AMLQ	CES-D	No	–.27 (–.38, –.15)	< .001
Pancer et al. (2000)	69	P	Canada	MAT	CES-D	Yes	–.44 (–.61, –.23)	< .001

Ramchandani et al. (2011)	153	P	UK	DAS	EPDS	Yes	–.35 (–.48, –.20)	< .001
Ransford et al. (2008)	156	P	US	AMLQ	CES-D	No	–.23 (–.37, –.08)	.004
Saxbe et al. (2017)	149	P	US	DAS	EPDS	Yes	–.32 (–.46, –.17)	< .001
Schmidt (1988)	100	U	US	MAT	SDS	No	–.05 (–.25, .15)	.608
Sevigny (2007)	62	U	US	DAS	BDI-II	No	–.37 (–.57, –.13)	.003
Sheldon (2015)	300	U	US	QMI	CES-D	No	–.42 (–.51, –.33)	< .001
Shockley & Allen (2018)	137	P	US	QMI	QS10	No	–.31 (–.45, –.15)	< .001
Simons et al. (1990)	63	P	US	DAS	BSI	No	.00 (–.25, .25)	1.000
Smith et al. (2013)	705	P	UK	DAS	EPDS	Yes	–.32 (–.38, –.25)	< .001
Soliday et al. (1999)	51	P	US	DAS-SF	CES-D	Yes	–.16 (–.42, .12)	.264
Stevenson-Hinde et al. (2007)	93	P	UK	DAS	HADS	No	–.17 (–.36, .03)	.103
Stoneman et al. (1989)	70	P	US	DAS	BDI	No	–.28 (–.48, –.05)	.019
Top et al. (2016)	84	P	Turkey	MAT	EPDS	Yes	–.34 (–.52, –.14)	.001
Wade (1997)	570	U	US	MAT	CES-D	No	–.38 (–.45, –.31)	< .001
Webster-Stratton & Hammond (1990)	70	P	US	MAT	BDI	No	–.31 (–.51, –.08)	.009
Weinfield et al. (2009)	45	P	US	DAS	CES-D	No	–.01 (–.30, .28)	.948
Yang (1997)	398	U	US	DAS & MII	PLMMDS	No	–.35 (–.43, –.26)	< .001
		I^2	tau^2	Q(df)			r (95% CI)	p
Summary Effect		68.69%	0.01	121.37(38), p < .001			–.32 (–.36, –.27)	< .001
Trimmed Summary Effect		59.86%	0.01	89.68(36), p < .001			–.30 (–.34, –.26)	< .001

Note. AMLQ = The Aspects of Married Life Questionnaire (recently known as the Domains of Satisfaction in Marriage); BDI = Beck Depression Inventory; BDI-II = Beck Depression Inventory, Second Edition; BSI = Brief Symptom Inventory; CES-D = The Center for Epidemiologic Studies Depression Scale; CI = confidence intervals; CIDI-SF = Composite International Diagnostic Interview – Short Form; DAS = Dyadic Adjustment Scale; DAS-SF = Dyadic Adjustment Scale – Short Form; EMS Scale = ENRICH Marital Satisfaction Scale; EPDS = Edinburgh Postnatal Depression Scale; HADS = Hospital Anxiety and Depression Scale; KMS = Kansas Marital Satisfaction Scale; MAT = Marital Adjustment Test; MAT-SF = Marital Adjustment Test – Short Form; MBS = Marital Bonds Scale; MCLI = Marital Comparison Level Inventory; MDSS = Adaptation of the Multi-Dimensional Support Scale; MII = Marital Instability Index; NSFH = National Survey of Families and Households measure of marital satisfaction; PLMMDS = Pearlin, Lieberman, Menaghan, and Mullen's Depression Scale; QMI = Quality of Marriage Index; QS10 = Quinn and Shepard's 10-item scale; RDAS = Revised Dyadic Adjustment Scale; SCL-90-R = Symptom Checklist-90-Revised; SDS = Self-Rating Depression Scale; UK = United Kingdom; US = United States.

[a]Manuscripts were identified as potential outliers and not included in the trimmed summary effect size distribution. [b]Pub status = Publication status (P = Published; U = Unpublished). [c]PPD = Were the paternal depressive symptoms assessed during the postpartum period? (Both = paternal depressive symptoms and marital quality were assessed during and outside of the postpartum period; No = paternal depressive symptoms were not assessed during the postpartum period; Yes = paternal depressive symptoms were assessed during the postpartum period). [d]This manuscript provided correlational data for the relationship between paternal depressive symptoms and marital quality as assessed during and outside of the postpartum period. For the purpose of this analysis, the effects were aggregated, and this manuscript contributed one effect size to the overall summary effect.

Table C3

Characteristics of Manuscripts Included in the Analysis of the Association Between Paternal Depressive Symptoms and Mother-Rating of Marital Quality (Research Question #3)

Study	*N*	Pub status[a]	Country of study	Measure of marital quality	Measure of depression	PPD[b]	*r* (95% CI)	*p*
Beach et al. (2003)	166	P	US	MAT	CES-D	No	–.26 (–.40, –.11)	.001
Block (2016)	78	U	US	DAS	CES-D	No	–.14 (–.35, .09)	.222
Bower et al. (2013)	93	P	US	DAS	BDI	Both[c]	–.29 (–.41, –.15)	< .001
Carro et al. (1993)	70	P	US	DAS	BDI	Yes	–.16 (–.38, .08)	.186
Formoso (2002)	115	U	US	DAS	CES-D	No	–.27 (–.43, –.09)	.003
Hessler (2008)	130	U	US	MAT	CES-D	No	–.29 (–.44, –.12)	.001
Kouros (2008)	296	U	US	MAT	CES-D; SCL-90-R	No	–.22 (–.30, –.14)	< .001
Kovacs (2003)	72	U	US	MAT	CES-D	No	–.20 (–.41, .03)	.092
Marchand (1998)	42	U	US	MCLI	CES-D	No	–.20 (–.48, .11)	.205
Nelson et al. (2009)	101	P	US	RDAS	SCL-90-R	No	–.31 (–.48, –.12)	.002
Ramchandani et al. (2011)	153	P	UK	DAS	EPDS	Yes	–.19 (–.33, –.03)	.022
Saxbe et al. (2017)	149	P	US	DAS	EPDS	Yes	–.14 (–.29, .02)	.089
Sevigny (2007)	62	U	US	DAS	BDI-II	No	–.10 (–.34, .15)	.441
Smith et al. (2013)	705	P	UK	DAS	EPDS	Yes	–.24 (–.31, –.17)	< .001
Soliday et al. (1999)	51	P	US	DAS-SF	CES-D	No	–.08 (–.35, .20)	.579
Stevenson-Hinde et al. (2007)	93	P	UK	DAS	HADS	No	–.16 (–.35, .05)	.126
Weinfield et al. (2009)	45	P	US	DAS	CES-D	No	–.11 (–.39, .19)	.474
Yang (1997)	398	U	US	DAS & MII	PLMMDS	No	–.23 (–.32, –.13)	< .001
		I^2	tau^2	Q(df)			*r* (95% CI)	*p*
Summary Effect		0.00%	0.00	8.26(17), p = .961			–.22 (–.26, –.19)	< .001

Note. BDI = Beck Depression Inventory; BDI-II = Beck Depression Inventory, Second Edition; CES-D = The Center for Epidemiologic Studies Depression Scale; CI = confidence intervals; DAS = Dyadic Adjustment Scale; DAS-SF = Dyadic Adjustment Scale – Short Form; EPDS = Edinburgh Postnatal Depression Scale; HADS = Hospital Anxiety and Depression Scale; MAT = Marital

Adjustment Test; MCLI = Marital Comparison Level Inventory; MII = Marital Instability Index; PLMMDS = Pearlin, Lieberman, Menaghan, and Mullen's Depression Scale; RDAS = Revised Dyadic Adjustment Scale; SCL-90-R = Symptom Checklist-90-Revised; UK = United Kingdom; US = United States.

[a]Pub status = Publication status (P = Published; U = Unpublished). [b]PPD = Were the paternal depressive symptoms assessed during the postpartum period? (Both = paternal depressive symptoms were assessed during and outside of the postpartum period; No = paternal depressive symptoms were not assessed during the postpartum period; Yes = paternal depressive symptoms were assessed during the postpartum period). [c]This manuscript provided correlational data for the relationship between paternal depressive symptoms and marital quality as assessed during and outside of the postpartum period. For the purpose of this analysis, the effects were aggregated, and this manuscript contributed one effect size to the overall summary effect.

Appendix D

Additional Analyses

Research Questions

The following research questions were originally proposed, but not included in the journal submission:

(1) Does the type of sampling method (community or clinical) moderate the relationship between paternal depressive symptoms and father-ratings of marital quality?

(2) Does the type of informant of paternal depressive symptoms moderate the relationship between paternal depressive symptoms and father-ratings of marital quality?

(3) Do mothers of fathers with higher depressive symptoms report lower levels of marital quality than mothers of fathers with lower or no depression symptoms? If so, how large is this effect?

(4) How large is the association between paternal depressive symptoms and father-ratings of negative marital quality?

(5) How large is the association between paternal depressive symptoms and father-ratings of positive marital quality?

(6) How large is the association between paternal depressive symptoms and mother-ratings of negative marital quality?

(7) How large is the association between paternal depressive symptoms and mother-ratings of positive marital quality?

Statistical Analysis

Statistical analysis of Research Questions #1 and 2 were not conducted due to limited variability. Research Question #3 was answered using a standardized mean difference to assess the degree of the association between higher levels of paternal depressive symptoms (meets or exceeds cut-off criteria) and lower levels of or no depressive symptoms (does not meet cut-off criteria) and levels of marital quality as reported by the mothers in the sample. Research Questions #4 to 7 were addressed using a Pearson product-moment correlation coefficient to compute the association between paternal depressive symptoms and marital quality (i.e., negative and positive marital quality separately). Research Questions #4 and 5 assessed this relationship by using father-reports of negative and positive forms of marital quality, respectively. Research Questions #6 and 7 examined the relationship by using mother-reports of negative and positive forms of marital quality, respectively. The correlational effect sizes for Research Questions #4 to 7 were transformed to Fisher's *z*-scale (Borenstein et al., 2009) and converted back to correlations for reporting and interpretation.

Results

Mother-ratings of marital quality did not significantly differ between fathers with higher depressive symptoms and fathers with lower or no depressive symptoms (d = –0.78; 95% CI [–1.80, 0.25]; k = 2; $Q(1)$ = 9.84, p = .002; I^2 = 89.84%; tau^2 = 0.49; see Table D1). The relationship between paternal depressive symptoms and father-ratings of negative forms of marital quality was medium (r = –.35; 95% CI [–.40, –.30]; k = 5; $Q(4)$ = 5.65, p = .227; I^2 = 29.23%; tau^2 = 0.00; see Table D2). Table D3 shows a medium effect between paternal depressive symptoms and father-ratings of positive forms of marital quality (r = –.31; 95% CI [–.36, –.26]; k = 34; $Q(33)$ = 110.99, p < .001; I^2 = 70.27%; tau^2 = 0.02). Two of the manuscripts

were identified as outliers and removed for the trimmed SESD (see Table D3). The relationship between paternal depressive symptoms and mother-ratings of negative forms of marital quality was small (r = –.25; 95% CI [–.31, –.19]; k = 3; $Q(2)$ = 0.54, p = .762; I^2 = 0.00%; tau^2 = 0.00; see Table D4). Finally, Table D5 displays a small relationship between paternal depressive symptoms and mother-ratings of positive forms of marital quality (r = –.21; 95% CI [–.25, –.17]; k = 15; $Q(14)$ = 6.53, p = .951; I^2 = 0.00%; tau^2 = 0.00).

Table D1

Characteristics of Studies Comparing Mother-Ratings of Marital Quality of Fathers with Higher Depressive Symptoms and Fathers with Lower or No Depressive Symptoms (Additional Research Question #3)

Study	n^a	n^b	Pub status[d]	Country of study	Measure of marital quality	Measure of depression	PPD[e]	*d* (95% CI)	*p*
Dudley et al. (2001)	11-16[c]	76-82[c]	P	Australia	DAS	BDI; EPDS	Yes	–1.29 (–1.72, –0.86)	< .001
Ramchandani et al. (2011)	19	99	P	UK	DAS	EPDS	Yes	–0.25 (–0.74, 0.25)	.326
			I^2	tau^2	Q(df)			*d* (95% CI)	*p*
Summary Effect			89.84%	0.49	9.84(1), p = .002			–0.78 (–1.80, 0.25)	.137

Note. BDI = Beck Depression Inventory; CI = confidence intervals; DAS = Dyadic Adjustment Scale; EPDS = Edinburgh Postnatal Depression Scale; UK = United Kingdom.

[a]Sample size of fathers who met or exceeded cut-off criteria for depression. [b]Sample size of fathers who did not meet cut-off criteria for depression. [c]Ranges for *n*s are provided when different sample sizes were used for different measures of depression. [d]Pub status = Publication status (P = Published; U = Unpublished). [e]PPD = Were the paternal depressive symptoms assessed during the postpartum period? (Yes = paternal depressive symptoms were assessed during the postpartum period).

Table D2

Characteristics of Manuscripts Included in the Analysis of the Association Between Paternal Depressive Symptoms and Father-Rating of Negative Forms of Marital Quality (Additional Research Question #4)

Study	*N*	Pub status[a]	Country of study	Measure of marital quality	Measure of depression	PPD[b]	*r* (95% CI)	*p*
Formoso (2002)	115	U	US	DAS	CES-D	No	–.46 (–.59, –.30)	< .001
Nelson et al. (2009)	101	P	US	RDAS	SCL-90-R	No	–.40 (–.55, –.22)	< .001
Padilla et al. (2017)	246	P	US	AMLQ	CES-D	No	–.27 (–.38, –.15)	< .001
Smith et al. (2013)	705	P	UK	DAS	EPDS	Yes	–.32 (–.38, –.25)	< .001
Wade (1997)	570	U	US	MAT	CES-D	No	–.38 (–.45, –.31)	< .001
		I^2	tau^2	*Q*(df)			*r* (95% CI)	*p*
Summary Effect		29.23%	0.00	5.65(4), $p = .227$			–.35 (–.40, –.30)	< .001

Note. AMLQ = The Aspects of Married Life Questionnaire (recently known as the Domains of Satisfaction in Marriage); CES-D = The Center for Epidemiologic Studies Depression Scale; CI = confidence intervals; DAS = Dyadic Adjustment Scale; EPDS = Edinburgh Postnatal Depression Scale; MAT = Marital Adjustment Test; RDAS = Revised Dyadic Adjustment Scale; SCL-90-R = Symptom Checklist-90-Revised; UK = United Kingdom; US = United States.

[a]Pub status = Publication status (P = Published; U = Unpublished). [b]PPD = Were the paternal depressive symptoms assessed during the postpartum period? (No = paternal depressive symptoms were not assessed during the postpartum period; Yes = paternal depressive symptoms were assessed during the postpartum period).

Table D3

Characteristics of Manuscripts Included in the Analysis of the Association Between Paternal Depressive Symptoms and Father-Rating of Positive Forms of Marital Quality (Additional Research Question #5)

Study	*N*	Pub status[b]	Country of study	Measure of marital quality	Measure of depression	PPD[c]	*r* (95% CI)	*p*
Beach et al. (2003)	166	P	US	MAT	CES-D	No	–.29 (–.42, –.14)	< .001
Bielawska-Batorowicz & Kossakowska-Petrycka (2006)[a]	80	P	Poland	MBS	EPDS	Yes	–.62 (–.74, –.46)	< .001
Block (2016)[a]	78	U	US	DAS	CES-D	No	–.67 (–.78, –.53)	< .001
Bower et al. (2013)	186	P	US	DAS	BDI	Both[d]	–.44 (–.55, –.32)	< .001
Carro et al. (1993)	70	P	US	DAS	BDI	Yes	–.25 (–.46, –.02)	.037
Devall (1990)	72	U	US	DAS	CES-D	No	–.46 (–.63, –.26)	< .001
Fishman & Meyers (2000)	461	P	US	NSFH	CES-D	No	–.34 (–.42, –.26)	< .001
Goldberg (1990)	96	P	US	DAS	CES-D	No	–.19 (–.38, .01)	.064
Goodman (2008)	128	P	US	DAS	EPDS	Yes	–.23 (–.38, –.05)	.010
Hawkins (2002)	164	U	US	KMS	SCL-90-R	No	–.34 (–.47, –.20)	< .001
Hessler (2008)	130	U	US	MAT	CES-D	No	–.33 (–.48, –.17)	< .001
Isacco et al. (2010)	742	P	US	MDSS	CIDI-SF	Yes	–.10 (–.17, –.03)	.006
Jones et al. (2001)	96	P	US	DAS	BDI	No	–.21 (–.39, –.01)	.040
Kirk (1986)	40	U	US	MAT-SF	BSI	No	–.19 (–.47, .13)	.242
Kouros (2008)	592	U	US	MAT	CES-D; SCL-90-R	No	–.29 (–.36, –.21)	< .001
Kovacs (2003)	72	U	US	MAT	CES-D	No	–.19 (–.40, .04)	.110
Lodder (1994)	74	U	US	EMS Scale	BDI	No	–.42 (–.59, –.21)	< .001
Marchand (1998)	42	U	US	MCLI	CES-D	No	–.50 (–.70, –.23)	0.001
Pancer et al. (2000)	69	P	Canada	MAT	CES-D	Yes	–.44 (–.61, –.23)	< .001
Ramchandani et al. (2011)	153	P	UK	DAS	EPDS	Yes	–.35 (–.48, –.20)	< .001
Ransford et al. (2008)	156	P	US	AMLQ	CES-D	No	–.23 (–.37, –.08)	.004

Saxbe et al. (2017)	149	P	US	DAS	EPDS	Yes	–.32 (–.46, –.17)	< .001
Schmidt (1988)	100	U	US	MAT	SDS	No	–.05 (–.25, .15)	.608
Sevigny (2007)	62	U	US	DAS	BDI-II	No	–.37 (–.57, –.13)	.003
Sheldon (2015)	300	U	US	QMI	CES-D	No	–.42 (–.51, –.33)	< .001
Shockley & Allen (2018)	137	P	US	QMI	QS10	No	–.31 (–.45, –.15)	< .001
Simons et al. (1990)	63	P	US	DAS	BSI	No	.00 (–.25, .25)	1.000
Soliday et al. (1999)	51	P	US	DAS-SF	CES-D	Yes	–.16 (–.42, .12)	.264
Stevenson-Hinde et al. (2007)	93	P	UK	DAS	HADS	No	–.17 (–.36, .03)	.103
Stoneman et al. (1989)	70	P	US	DAS	BDI	No	–.28 (–.48, –.05)	.019
Top et al. (2016)	84	P	Turkey	MAT	EPDS	Yes	–.34 (–.52, –.14)	.001
Webster-Stratton & Hammond (1990)	70	P	US	MAT	BDI	No	–.31 (–.51, –.08)	.009
Weinfield et al. (2009)	45	P	US	DAS	CES-D	No	–.01 (–.30, .28)	.948
Yang (1997)	398	U	US	DAS & MII	PLMMDS	No	–.35 (–.43, –.26)	< .001

	I^2	tau^2	Q(df)	r (95% CI)	p
Summary Effect	70.27%	0.02	110.99(33), $p < .001$	–.31 (–.36, –.26)	< .001
Trimmed Summary Effect	59.69%	0.01	76.90(31), $p < .001$	–.29 (–.33, –.24)	< .001

Note. AMLQ = The Aspects of Married Life Questionnaire (recently known as the Domains of Satisfaction in Marriage); BDI = Beck Depression Inventory; BDI-II = Beck Depression Inventory, Second Edition; BSI = Brief Symptom Inventory; CES-D = The Center for Epidemiologic Studies Depression Scale; CI = confidence intervals; CIDI-SF = Composite International Diagnostic Interview – Short Form; DAS = Dyadic Adjustment Scale; DAS-SF = Dyadic Adjustment Scale – Short Form; EMS Scale = ENRICH Marital Satisfaction Scale; EPDS = Edinburgh Postnatal Depression Scale; HADS = Hospital Anxiety and Depression Scale; KMS = Kansas Marital Satisfaction Scale; MAT = Marital Adjustment Test; MAT-SF = Marital Adjustment Test – Short Form; MBS = Marital Bonds Scale; MCLI = Marital Comparison Level Inventory; MDSS = Adaptation of the Multi-Dimensional Support Scale; MII = Marital Instability Index; NSFH = National Survey of Families and Households measure of marital satisfaction; PLMMDS = Pearlin, Lieberman, Menaghan, and Mullen's Depression Scale; QMI = Quality of Marriage Index; QS10 = Quinn and Shepard's 10-item scale; SCL-90-R = Symptom Checklist-90-Revised; SDS = Self-Rating Depression Scale; UK = United Kingdom; US = United States.

[a]Manuscripts were identified as potential outliers and were not included in the trimmed summary effect size distribution. [b]Pub status = Publication status (P = Published; U = Unpublished). [c]PPD = Were the paternal depressive symptoms assessed during the postpartum period? (Both = paternal depressive symptoms were assessed during and outside of the postpartum period; No = paternal depressive

symptoms were not assessed during the postpartum period; Yes = paternal depressive symptoms were assessed during the postpartum period). [d]This manuscript provided correlational data for the relationship between paternal depressive symptoms and marital quality as assessed during and outside of the postpartum period. For the purpose of this analysis, the effects were aggregated, and this manuscript contributed one effect size to the overall summary effect.

Table D4

Characteristics of Manuscripts Included in the Analysis of the Association Between Paternal Depressive Symptoms and Mother-Rating of Negative Forms of Marital Quality (Additional Research Question #6)

Study	*N*	Pub status[a]	Country of study	Measure of marital quality	Measure of depression	PPD[b]	*r* (95% CI)	*p*
Formoso (2002)	115	U	US	DAS	CES-D	No	–.27 (–.43, –.09)	.003
Nelson et al. (2009)	101	P	US	RDAS	SCL-90-R	No	–.31 (–.48, –.12)	.002
Smith et al. (2013)	705	P	UK	DAS	EPDS	Yes	–.24 (–.31, –.17)	< .001
		I^2	tau^2	Q(df)			*r* (95% CI)	*p*
Summary Effect		0.00%	0.00	0.54(2), p = .762			–.25 (–.31, –.19)	< .001

Note. CES-D = The Center for Epidemiologic Studies Depression Scale; CI = confidence intervals; DAS = Dyadic Adjustment Scale; EPDS = Edinburgh Postnatal Depression Scale; RDAS = Revised Dyadic Adjustment Scale; SCL-90-R = Symptom Checklist-90-Revised; UK = United Kingdom; US = United States.

[a]Pub status = Publication status (P = Published; U = Unpublished). [b]PPD = Were the paternal depressive symptoms assessed during the postpartum period? (No = paternal depressive symptoms were not assessed during the postpartum period; Yes = paternal depressive symptoms were assessed during the postpartum period).

Table D5

Characteristics of Manuscripts Included in the Analysis of the Association Between Paternal Depressive Symptoms and Mother-Rating of Positive Forms of Marital Quality (Additional Research Question #7)

Study	*N*	Pub status[a]	Country of study	Measure of marital quality	Measure of depression	PPD[b]	*r* (95% CI)	*p*
Beach et al. (2003)	166	P	US	MAT	CES-D	No	–.26 (–.40, –.11)	.001
Block (2016)	78	U	US	DAS	CES-D	No	–.14 (–.35, .09)	.222
Bower et al. (2013)	186	P	US	DAS	BDI	Both[c]	–.29 (–.41, –.15)	< .001
Carro et al. (1993)	70	P	US	DAS	BDI	Yes	–.16 (–.38, .08)	.186
Hessler (2008)	130	U	US	MAT	CES-D	No	–.29 (–.44, –.12)	.001
Kouros (2008)	592	U	US	MAT	CES-D; SCL-90-R	No	–.22 (–.30, –.14)	< .001
Kovacs (2003)	72	U	US	MAT	CES-D	No	–.20 (–.41, .03)	.092
Marchand (1998)	42	U	US	MCLI	CES-D	No	–.20 (–.48, .11)	.205
Ramchandani et al. (2011)	153	P	UK	DAS	EPDS	Yes	–.19 (–.33, –.03)	.022
Saxbe et al. (2017)	149	P	US	DAS	EPDS	Yes	–.14 (–.29, .02)	.089
Sevigny (2007)	62	U	US	DAS	BDI-II	No	–.10 (–.34, .15)	.441
Soliday et al. (1999)	51	P	US	DAS-SF	CES-D	Yes	–.08 (–.35, .20)	.579
Stevenson-Hinde et al. (2007)	93	P	UK	DAS	HADS	No	–.16 (–.35, .05)	.126
Weinfield et al. (2009)	45	P	US	DAS	CES-D	No	–.11 (–.39, .19)	.474
Yang (1997)	398	U	US	DAS & MII	PLMMDS	No	–.23 (–.32, –.13)	< .001
		I^2	tau^2	Q(df)			*r* (95% CI)	*p*
Summary Effect		0.00%	0.00	6.53(14), p = .951			–.21 (–.25, –.17)	< .001

Note. BDI = Beck Depression Inventory; BDI-II = Beck Depression Inventory, Second Edition; CES-D = The Center for Epidemiologic Studies Depression Scale; CI = confidence intervals; DAS = Dyadic Adjustment Scale; DAS-SF = Dyadic Adjustment Scale – Short Form; EPDS = Edinburgh Postnatal Depression Scale; HADS = Hospital Anxiety and Depression Scale; MAT = Marital Adjustment Test; MCLI = Marital Comparison Level Inventory; MII = Marital Instability Index; PLMMDS = Pearlin, Lieberman, Menaghan, and Mullen's Depression Scale; SCL-90-R = Symptom Checklist-90-Revised; UK = United Kingdom; US = United States. [a]Pub status = Publication status (P = Published; U = Unpublished). [b]PPD = Were the paternal depressive symptoms assessed during the postpartum period? (Both = paternal depressive symptoms were assessed during and outside of the postpartum period; No =

paternal depressive symptoms were not assessed during the postpartum period; Yes = paternal depressive symptoms were assessed during the postpartum period). [c]This manuscript provided correlational data for the relationship between paternal depressive symptoms and marital quality as assessed during and outside of the postpartum period. For the purpose of this analysis, the effects were aggregated, and this manuscript contributed one effect size to the overall summary effect.

Chapter 5 – Conclusions and Implications

Research Summary

The current dissertation provided five key findings. First, the relationship between paternal depressive symptoms and child externalizing behaviours was small (Study 1). Second, there was a small relationship between paternal depressive symptoms and parenting behaviours (Study 2). Third, this relationship was significantly moderated by the type of parenting behaviour assessment and the informant of the parenting behaviour. Parenting behaviours assessed with questionnaires (vs. observations) and father-ratings of parenting behaviours (vs. child-ratings, mother-ratings, or observation) were associated with larger effect sizes. Fourth, there was a medium negative relationship between paternal depressive symptoms and father-rated marital quality (Study 3). Fifth, the relationship between paternal depressive symptoms and father-rated marital quality was stronger than the relationship between paternal depressive symptoms and mother-rated marital quality.

Distinct Contribution to the Literature

The current dissertation provided a distinct contribution to the literature on paternal depression by providing the most updated meta-analyses on paternal depression and child externalizing behaviours, and paternal depression and parenting behaviours. The Cochrane Collaboration guidelines suggest that meta-analyses should be updated every two to five years depending on the stability of the research findings and the frequency at which the studies of a given topic are being published (Hopewell et al., 2008). The most recent meta-analyses on paternal depression and child externalizing behaviours, and paternal depression and parenting behaviours were completed by Kane and Garber (2004) and Wilson and Durbin (2010), respectively. Based on these recommendations, meta-analyses on both of these topics required

updating. Specifically, the first and second study from this dissertation updated the past meta-analyses by including 17 and 10 years of additional research, respectively. Both of these studies re-examined moderators included in the past meta-analyses and explored other moderators that were not previously considered. Exploring the year of publication as a moderator was of great interest for both of these studies given the historical changes in fatherhood and families over the past few decades (Pew Research Center, 2015). The overall results of the updated meta-analyses on paternal depression and child externalizing behaviours, and paternal depression and parenting behaviours replicated the findings of the past meta-analyses (Kane & Garber, 2004; Wilson & Durbin, 2010). This dissertation also provided a novel contribution to the literature by presenting the first meta-analysis on paternal depression and marital quality. The most comparable meta-analysis to date was completed by Whisman (2001) on depression and marital quality among couples. Whisman's meta-analysis tends to be frequently cited in the paternal depression literature although only two of the twenty-six studies included in the meta-analysis focused on fathers.

Theoretical Implications

Family systems theory. The overall findings of the current dissertation support family systems theory (Bowen, 1978), which holds that each family member influences the functioning of other members and the family as a system. Family systems theory predicts that the presence of paternal depression in the family contributes to an imbalance in the family unit due to its impact on each of the individual family members, the relationships and interactions within the family system, and the family as a whole. Family systems theory also predicts that paternal depressive symptoms would have an impact on or would be impacted by externalizing behaviours exhibited by the child in the family, the parenting behaviours of fathers, and the

quality of the marital relationship. Indeed, the results of this dissertation provide support for family system theory by demonstrating that paternal depression has an impact on the functioning of the family at multiple levels (i.e., children, parenting, and the marital relationship). Based on family systems theory, the significant associations between paternal depressive symptoms and the family-related outcomes explored in this dissertation also suggest that as paternal depressive symptoms increase, child externalizing behaviours increase, and positive parenting behaviours and marital quality decreases. Moreover, the finding that mother-rated marital quality was associated with paternal depressive symptoms provides an example of the impact that depression in the family has on other family members, and in this case, the marital satisfaction of mothers of partners with high levels of depressive symptoms.

It is also important to recognize that other research has shown that these family-related outcomes are also associated with each other. For example, negative paternal parenting behaviours have been linked to child externalizing behaviours (Marchand-Reilly, 2012; Ponnet, 2014; Salari, Wells, & Sarkadi, 2014) and reduced marital quality (Linville et al., 2010), and marital quality is negatively correlated with child externalizing behaviours (Salari et al., 2014). Taken together, the finding that these four factors (i.e., paternal depression, child externalizing behaviours, parenting behaviours, and marital quality) are all interconnected suggests that family systems are complex and multidirectional. That said, the tangle of family-related difficulties as reported in the current dissertation and past literature are promising for treatment from a family systems theory perspective because each of these issues has an impact on and extends to the other family-related difficulties.

Although the overall findings of the current dissertation support family systems theory (Bowen, 1978), it is important to acknowledge that this dissertation could not formally analyze

the multi-directional nature of the theory (i.e., meta-analytic techniques cannot examine multiple relationships simultaneously). Resultingly, there is a disconnect between the current dissertation and the theory. Additionally, paternal depressive symptoms were positively correlated with child, parenting, and marital outcomes; however, the results of this dissertation do not inform us about whether other family-related factors or other family members influenced one or all of these factors. Family systems theory holds that family members may act or respond to a parent in a way that increases or decreases their symptoms of depression. The theory also suggests that the way in which fathers with depressive symptoms engage with other family members could influence the way in which the family members interact with and respond to their father, and vice versa. For example, although paternal depressive symptoms were positively associated with negative parenting behaviours, the results do not specifically portray the impact that paternal depressive symptoms have on the children who are experiencing these behaviours. Positive or negative interactions with a child may impact the degree to which the child exhibits externalizing behaviours and the father engages in specific parenting behaviours. Alternatively, having a child with externalizing behaviors, engaging in negative parenting behaviors, or experiencing lower levels of marital quality could also give rise to or contribute to the exacerbation of paternal depressive symptoms. The results of this dissertation are also limited in that they do not provide us with additional information beyond the significant relationship between paternal depressive symptoms and family-related outcomes. Additionally, this dissertation does not offer us further insight into the direction or the complexity of the pathways between the variables. Likewise, the findings do not fully reflect the impact of paternal depressive symptoms or the family-related outcomes on the entire family system. Regardless of these limitations, the overall results of this dissertation are consistent with the theory. This dissertation also provides a stepping stone to

better understanding the impact of paternal depression on the functioning of the family and the family system.

The cognitive theory of depression. In addition to the results of the current dissertation supporting family systems theory (Bowen, 1978), this dissertation also aligns with the three fundamental mechanisms of the cognitive theory of depression: (a) the "cognitive triad," (b) negative schemas, and (c) cognitive distortions (Beck, 1972). The key finding that father-ratings of (a) parenting behaviours and (b) marital quality were associated with larger effects than informant-ratings especially corresponds with this theory. Items measuring parenting behaviours and marital quality require respondents to reflect on their behaviours and thoughts. The first component of the "cognitive triad" (i.e., a negative view of the self) suggests that fathers with depressive symptoms are likely to answer questions about themselves more negatively than informants without depressive symptoms. Low scores on marital quality measures might also be related to the third component of the "cognitive triad" (i.e., a negative view of the future) given the number of future-oriented questions used in common marital quality measures. Additionally, considering the correlational nature of the relationship, greater severity of depressive symptoms would likely result in a more negative view of themselves and the future, and ultimately lower scores on positive family-related outcomes.

The differences between father- and informant-ratings of family-related outcomes also fit with the other mechanisms of the cognitive theory of depression (Beck, 1972). For example, holding negative schemas would likely impact the way in which fathers interpret the behaviour of other family members, as well as their perceptions of their interactions and relationships with different family members. Considering cognitive distortions, fathers with depressive symptoms may also feel guilty about or at fault for negative parenting or marital experiences, which

coincides with arbitrary interference (Beck, 1972). Indeed, some forms of marital therapy for depression focus on relieving the guilt and self-blame often experienced by partners with depression (Cordova & Gee, 2001).

Limitations of the Paternal Depression Literature

On top of aligning with the same guiding theories, the studies presented in the current dissertation also had two main limitations in common: (a) lack of diverse quantitative comparisons, and (b) lack of diverse samples. The first limitation observed across the three studies was the lack of eligible manuscripts that examined the relationship between paternal depression diagnostic status (i.e., fathers with depression and without depression) and family-related outcomes. This dissertation initially sought to investigate whether levels of child externalizing behaviours, parenting behaviours, and marital quality differed between groups of fathers with and without depression. Unfortunately, there was insufficient data available to examine these relationships. Exploring between group differences often requires larger sample sizes than that needed for correlational data and the lack of studies that use paternal depression status to examine the association between paternal depression and family-related outcomes might speak to issues with recruitment. To obtain a more complete understanding of the relationship between paternal depression and family-related outcomes, future researchers may want to explore these factors between groups of fathers with and without depression.

The second limitation found across the three studies pertains to the characteristics of the participant samples. The composition of the samples across all three studies was primarily White, highly educated, American participants who were recruited from two-parent families in the community (i.e., as opposed to clinical samples). This finding is consistent with other areas of research that tend to include participants from western, educated, industrialized, rich, and

democratic (WEIRD) societies (Henrich, Heine, & Norenzayan, 2010). Additionally, the family composition of the samples from the three studies also lacked diversity and primarily aligned with the heterosexist worldview. That is, most of the eligible manuscripts included in this dissertation consisted of two-parent families (i.e., one mother and one father) with one to two biological children. Indeed, many of the eligible manuscripts excluded participants who were not from two-parent families. The current dissertation attempted to be more inclusive of diverse family compositions by proposing to include moderator analyses on the percentage of partners in the samples who have depression (i.e., as opposed to the percentage of mothers in the samples with depression). Unfortunately, all of the studies with two-parent households consisted of a mother and father, and the term maternal depression was used for simplicity. Given the lack of diversity across the manuscripts, it was not surprising that most of the moderator analyses conducted were non-significant. When considering the similarities across the participant samples, fathers who participate in research may differ from those that do not as they seem to largely be from WEIRD populations (Henrich et al., 2010). Although this speculation cannot be formally confirmed or tested, the best estimate we have comes from the characteristics of individuals who frequently tend to drop-out of research studies. From this information, we can deduce that fathers who engage in research are somewhat different from those that prematurely drop-out of ongoing research studies. For example, researchers have found that fathers with the following characteristics tend to have lower response rates than their counterparts: (a) divorced (Tully, Iacono, & McGue, 2008), (b) not romantically involved with their child's mother (Carlson, McLanahan, & Brooks-Gunn, 2007), and (c) lower levels of family income and education (Bower, Jia, Schoppe-Sullivan, Mangelsdorf, & Brown, 2013; Padilla et al., 2017). To address the lack of diversity in the paternal depression literature, future researchers should

explore the family functioning of more diverse family samples (i.e., various SES, educational, sexual, and racialized backgrounds).

Historical Changes in the Family

It is also important to consider the results of this dissertation within the context of the changes experienced by the family system in relation to the historical changes of the family (Pew Research Center, 2015). One such change is an increase in paternal involvement in childcare and maternal employment outside the home, which may promote greater shared household responsibility. Indeed, recent surveys found that the gap between the proportion of household and childcare-related tasks completed by mothers and fathers is shrinking (Parker & Wang, 2013). Shockley and Allen (2018) found that the congruence between mothers' expectations for, and actual division of, fathers' paid labor and childcare labor was positively associated with mothers' marital satisfaction and negatively related to maternal depressive symptoms. Although similar results were not found for fathers (i.e., congruence of the division of labor completed by their wife was not significantly associated with fathers' marital satisfaction or depressive symptoms; Shockley & Allen, 2018), the above results have implications for the family system. Taken together and based on the theories guiding this dissertation, the increasing overlap between the roles of mothers and fathers appear to be beneficial for the entire family system.

Gender Differences in Depression

In addition to considering the historical and societal changes in the family and fatherhood, the current dissertation also focused explicitly on paternal depression (i.e., as opposed to parental or maternal depression) because of the notable gender differences in the symptom presentation of depression (American Psychiatric Association, 2013; for reviews see Edward, Castle, Mills, Davis, & Casey, 2015; Spector, 2006). When considering family systems

theory (Bowen, 1978), family members and the family unit are not necessarily impacted by depression as a disorder, but more by the symptoms of depression. Therefore, the way in which the family is impacted by having a parent with depression may vary based on the specific presentation of the depressive symptoms. Interestingly, the symptom presentations of males with depression seem to be more closely aligned with the family-related outcomes explored in this dissertation than the symptom presentation commonly seen in females. For example, compared to females, males often exhibit more symptoms of irritable mood, withdrawal, hostility, and cynicism, all of which are forms of, or at least associated with, externalizing behaviours, negative parenting behaviours, and marital stress. This observation poses the question of whether some of the outcomes examined in this dissertation measured the intended constructs, or if they potentially examined depressive symptoms as seen in men. Although child externalizing behaviours are not symptoms of paternal depression, the results of this dissertation demonstrate that paternal depression and child externalizing behaviours are strongly linked.

The gender differences in depressive symptoms also suggest that paternal depressive symptoms may have a different impact on the family system than maternal depressive symptoms. Although the strength of the associations between paternal depression and family-related outcomes reported in this dissertation are comparable to the most recent findings from the maternal depression literature (Goodman et al., 2011; Lovejoy, Graczyk, O'Hare, & Neuman, 2000), the strength of the associations do not provide specific information about the transactional relationship between depressive symptoms and family functioning. For example, depressive symptoms could (a) impair the degree to which a mother provides nurturance for her child and (b) exacerbate a father's tendency to engage in hostile parenting behaviours. Both of these tendencies could be quantitatively similar (i.e., lead to lower scores on positive parenting

behaviours measures); however, the qualitative nature of these interactions would be different, suggesting that paternal depression and maternal depression could have different effects on the family system. Unfortunately, this dissertation could not explore the qualitative and transactional differences between the impact of paternal depression and maternal depression on family functioning. Future research is needed to examine these differences.

Clinical Implications

The findings of the current dissertation have several clinical implications. Considering the interconnection between the family-related factors as demonstrated in this dissertation, family systems theory would suggest that treating any one of these difficulties (i.e., paternal depression, child externalizing behaviours, negative parenting behaviours, and marital quality) could be advantageous. That said, given that these factors are all family-related, using marital or family therapy might be especially efficacious for several reasons. First, viewing family difficulties from a systems perspective may alleviate some blame and guilt experienced by fathers with depressive symptoms as treating the system rather than the individual would be the focus of therapy. Second, considering that men have lower rates of treatment attendance and help-seeking behaviours than women (Mackenzie, Gekoski, & Knox, 2006; Wang et al., 2007), offering marital or family therapy, as opposed to individual treatment, would likely increase treatment attendance of fathers who would be attending with their partners or other family members. Indeed, researchers have found lower rates of attrition among individuals in marital therapy than those using pharmacological treatment options (Barbato & D'Avanzo, 2006). Third, attending therapy as a family or a couple would provide the therapist with the opportunity to observe the system and gain valuable insight into the degree to which depression impacts the family. Based on the findings from this dissertation, we would expect that therapists would

quickly learn that individuals initially referred for treatment for depression may also be experiencing difficulties with child externalizing behaviours, parenting behaviours, and marital quality. Fourth, family or marital therapy also provides the therapist with the opportunity to work with the system or dyads within the system. Fifth, attending sessions together may also be a demonstration of support in and of itself and further promote a sense of "we-ness" (Cordova & Gee, 2001). Sixth, family systems theory holds that a shift in one aspect of the system should result in a change in other parts of the system; therefore, it is possible that shifting more than one individual or dyad could lead to more favorable progress in treatment. In other words, we can expect that positive changes in a dyad (i.e., father-child, father-mother) would be beneficial for the entire family system and other dyads within the system. Indeed, a study by Peltz, Rogge, Rogosch, Cicchetti, and Toth (2015) demonstrated that treatment for parent-child dyads was related to better marital satisfaction outcomes. Finally, the findings from the current study demonstrated that the relationship between paternal depressive symptoms and marital quality was the strongest among the other family-related outcomes explored (i.e., child externalizing behaviors and parenting behaviors). Therefore, the marital quality of the parents and the parent-dyad in the family may be especially important to consider when working with families of fathers with depressive symptoms.

Clinical implications for child externalizing behaviours. The reasons why treating paternal depression would be beneficial for child externalizing behaviours can also be understood through family systems theory (Bowen, 1978) and Goodman and Gotlib's (1999) developmental model. Goodman and Gotlib proposed that children of mothers with depression are at a higher risk of being exposed to environmental stressors, which are thought to contribute to family dysfunction and consequently, increase the risk of child psychopathology. Children of

fathers with depression are also more likely to be exposed to environmental stressors than their counterparts; and therefore, family systems theory would suggest that a reduction in paternal depressive symptoms might reduce the chances that the children will be exposed to environmental stressors and develop psychopathology.

Given the bi-directional nature of the relationship between paternal depressive symptoms and child externalizing behaviours, decreasing child externalizing behaviours could also have a positive impact on parental depression. Researchers have found that child externalizing behaviours are linked to factors that are thought to increase marital stress (Beach, 2014; Beach, Sandeen, & O'Leary, 1990), such as marital hostility (Cummings, Cheung, Koss, & Davies, 2014; Franck & Buehler, 2007; Ponnet, 2014) and interparental verbal and physical aggression (Breslend et al., 2016; Ponnet, 2014). Therefore, based on family systems theory (Bowen, 1978), the presence of child externalizing behaviours might increase marital stress, reduce marital quality, and increase depressive symptoms. In other words, it is possible that greater symptom severity of child externalizing behaviours could be related to greater marital discord. Indeed, studies have demonstrated that child behavioural problems are positively correlated with marital stress (Ponnet, 2014) and negatively related to marital satisfaction (Salari et al., 2014).

Clinical implications for parenting. Based on family systems theory (Bowen, 1978) and the action-control framework (Dix & Meunier, 2009), a reduction in paternal depressive symptoms should also have a positive impact on parenting behaviours. Specifically, the action-control framework holds that depressive symptoms interfere with a parent's ability to interpret information at five different stages (see Chapter 1 for a full description; Dix & Meunier, 2009). Therefore, reducing symptoms of depression should, in turn, decrease the degree to which parents engage in ineffective parenting techniques and behaviours. Additionally, based on

family systems theory (Bowen, 1978) and the results of this dissertation, treatments focused on enhancing positive parenting behaviours should also reduce symptoms of depression. Indeed, research on parenting training programs has demonstrated significant reductions in depressive symptoms after the completion of the program (for a review see Beach, 2014).

In addition to the benefits of decreasing paternal depressive symptoms in relation to parenting behaviours, based on family systems theory (Bowen, 1978), positive changes in parenting behaviours might also be beneficial for marital quality. Similar to the research on child externalizing behaviours, negative paternal parenting behaviours are related to factors associated with heightened levels of marital stress, such as marital hostility (Franck & Buehler, 2007; Ponnet, 2014) and verbal aggression (Ponnet, 2014). Indeed, Ponnet (2014) found that positive paternal parenting behaviours were inversely related to both mother- and father-reported relationship stress. Hence, maladaptive parenting behaviours could negatively impact marital quality as suggested by previous research (Linville et al., 2010). With all things considered, treatment focused on enhancing positive and reducing negative parenting behaviours has the potential to increase marital quality.

Clinical implications for the marital relationship. Given that the strength of the association between paternal depression and marital relationship was the strongest among of all the explored outcomes, marital therapy may be the most logical first step for treating families of fathers with depression. Several forms of marital therapy have been found to effective in the reduction of depressive symptoms and enhancement of marital quality, including behavioural marital therapy, couples-based interpersonal psychotherapy, and emotion-focused therapy (for reviews see Beach 2014; Cordova & Gee, 2001). The couple and family model of depression (CFMD) holds that marital stress impairs marital quality (see Chapter 1 for a full description;

Beach, 2014). This framework suggests that depressive symptoms are negatively correlated with features related to lowering marital stress (i.e., marital support; Engle & McElwain, 2013; Ramchandani et al., 2011) and positively correlated with elements that are thought to intensify marital stress (Kouros, Merrilees, & Cummings, 2008; Ponnet, 2014; Ramchandani et al., 2011). Not surprisingly, depressive symptoms are also significantly related to both mother- and father-reports of relationship stress (Ponnet, 2014). Based on family systems theory and the CFMD, a decrease in depressive symptoms should correspond with a reduction in marital stress, and consequently enhance marital quality.

Implications for healthcare policy. The results of the current dissertation also have several implications for healthcare policy. The findings of this dissertation suggest that prevention and intervention of paternal depression are essential for families. Early prevention and intervention might be especially imperative when considering that prolonged exposure to parental depression increases the risk and severity of the development of psychopathology in children (Goodman & Gotlib, 1999). Early intervention could also be advantageous for reducing the financial and emotional costs associated with treating and addressing depression, child externalizing behaviours, parenting difficulties, and marital issues. Given that depressive symptoms and levels of marital dissatisfaction often worsen after the birth of a child (Parfitt, 2013; Top, Cetisli, Guclu, & Zengin, 2016), treating depression and marital issues during pregnancy might reduce the need to attend to child externalizing behaviours or parenting behaviours later. Based on the results of this dissertation, routine screening for depression among fathers across the perinatal period (i.e., during the prenatal and postpartum periods) could be helpful in terms of providing or recommending resources or treatments for families of fathers with depression or depressive symptoms. Some countries and provinces currently recommend

perinatal depression screening among pregnant women and researchers have recently begun to advocate for better efforts of the detection and treatment of perinatal depression in fathers (Charandabi, Mirghafourvand, & Sanaati, 2017; Fisher & Garfield, 2016; Nazareth, 2011).

Directions for Future Research

Future research is also needed to address the overarching gaps in the paternal depression literature that were identified throughout this dissertation. As previously mentioned, more research examining the relationship between paternal depression status and family-related outcomes is needed to enhance our understanding of the differences between the functioning of families of fathers with and without depression. How paternal depression status is defined in the literature should also be addressed by future researchers. One notable difference between the maternal depression and paternal depression literature is the lack of studies on paternal depression that include samples of fathers with a clinical diagnosis of depression. Most of the studies defined paternal depression status as meeting or exceeding a predetermined cut-off point on a given depressive symptom measure, such as the Center for Epidemiologic Studies Depression Scale and the Edinburgh Postnatal Depression Scale (EPDS). Additionally, the cut-off criteria used to categorize participants into depressed and non-depressed groups varied across studies. Studies with higher cut-off points (e.g., EPDS scores equal to or greater than 13; Bielawska-Batorowicz & Kossakowska-Petrycka, 2006) also tended to be associated with larger effects than studies with lower cut-off points (e.g., EPDS scores equal to or greater than 8; Nishimura, Fujita, Katsuta, Ishihara, & Ohashi, 2015). Furthermore, some studies have suggested possible male-specific cut-off points for different measures of depression (e.g., Edmondson, Psychogiou, Vlachos, Netsi, & Ramchandani, 2010; Matthey, Barnett, Kavanagh, &

Howie, 2001). That said, there is still a debate regarding the optimum cut-off point to assess paternal depression.

Another major limitation of the paternal depression literature is the lack of diversity of research participants across and within the studies (e.g., recruitment strategies, socioeconomic status, educational attainment, sexual orientation, and racialized backgrounds). To gain a more generalizable understanding of the relationship between paternal depressive symptoms and family-related outcomes, researchers should examine these relationships with more diverse samples. Future meta-analyses on this topic could also address the lack of diversity by including manuscripts that were not initially reported in English. All of the meta-analyses in this dissertation required that eligible manuscripts were reported, prepared, and indexed in English. This inclusion criterion potentially excluded several eligible manuscripts that were reported or published in other languages. Researchers who update the meta-analyses presented in this dissertation should also consider re-examining the moderators included in the three studies, as well as explore the potential impact of other moderators. Finally, although researchers have identified family therapy as an ideal treatment for paternal depression, studies should be conducted on whether family therapy is, in fact, more beneficial than individual or marital therapy for depression. These findings would help guide clinicians' decisions regarding what form of treatment or services families should receive, and where they should refer families for treatment.

Concluding Remarks

When reflecting on the results of this dissertation, it is important to consider these findings not only in terms of the conservative estimate that one in ten fathers experience depression (Cameron, Sedov, & Tomfohr-Madsen, 2016; Lee, Taylor, & Bellamy, 2012) but also

in the context of families. That is, if one in ten fathers experience depression, then one in ten families are also being impacted by depression. Within each of these families, individual members are directly or indirectly impacted by paternal depressive symptoms. Indeed, the overall findings of the current dissertation demonstrate that the presence of paternal depressive symptoms has negative implications for the individual members (e.g., children, mothers, fathers) and dyads (e.g., father-child, father-mother) within the family system. Overall, the results of this dissertation updated our understanding of the functioning of families of fathers with depression and depressive symptoms. Providing the most recent meta-analyses on paternal depression and family-related outcomes not only adds to the paternal depression literature but also continues the conversation about paternal depression and family functioning.

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