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REVIEW PAPER

Paternal Depressive Symptoms and Parenting Behaviors: An Updated Meta-Analysis

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Abstract

Objectives The primary objective of the current study was to provide a summary of the strength of the relationship between paternal depressive symptoms and parenting behaviors. The secondary objective of this study was to examine whether specific factors moderate the magnitude of this relationship.

Methods A series of meta-analyses were conducted to examine the strength of the association between paternal depressive symptoms and parenting behaviors. 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, informant of parenting behaviors, and bibliographic factors.

Results 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 behaviors. The relationship between paternal depressive symptoms and overall parenting behaviors was significantly moderated by the informant of the parenting behavior, where father-reports of parenting behaviors (vs. child-reports, mother-reports, or observation) were associated with larger effect sizes.

Conclusions The results of this study suggest that practitioners should be mindful of the relationship between paternal depressive symptoms and parenting behaviors when working with families. Suggestions for future research and treatment implications are provided.

Keywords Paternal depression · Parenting behaviors · Parenting · Meta-analysis

Over the past few decades, the literature 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 and Wang 2013; Pew Research Center 2015). Given the notable links between maternal depression and family-related dysfunction (e.g., Goodman et al. 2011; Letourneau et al. 2013) and that about one in ten fathers experience depression (Cameron et al. 2016; Lee et al. 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 and Theule 2018; Dette-Hagenmeyer and Reichle 2014; Nelson et al. 2009).

Another difficulty commonly experienced by mothers with depression is engaging in positive and effective parenting behaviors (Wilson and Durbin 2010). Parenting behaviors are defined as actions or strategies that parents engage in when raising their children and can be categorized as either positive (e.g., acceptance, engagement, involvement, nurturance, sensitivity, support, warmth) or negative (e.g., hostile, intrusive, lax, non-involved, psychological control, rejection) based on the impact that the behavior has on the development of the child. Dix and Meunier's (2009) action-control framework provides an explanatory structure for the association between maternal

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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 behaviors. Studies have demonstrated a relationship between paternal depressive symptoms and several forms of negative parenting behaviors, including inconsistent discipline (Dette-Hagenmeyer and Reichle 2014), utilization of psychological control (Aunola et al. 2015; Herr et al. 2007), and rejection (Elgar et al. 2007). Paternal depression has also been found to be inversely associated with positive parenting behaviors, such as nurturance (Elgar et al. 2007), monitoring (Elgar et al. 2007; Onatsu-Arvilommi et al. 1998), and parental acceptance (Herr et al. 2007; White et al. 2009).

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

Although the results from Wilson and Durbin's (2010) meta-analysis align with the consensus that paternal depression and negative parenting behaviors 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. For example, given that some research found that paternal depressive symptoms were more strongly associated with negative parenting behaviors 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 et al. (2007) demonstrated that child age was positively associated with parental rejection and negatively associated with parental nurturance. Moreover, in Wilson and Durbin's (2010) meta-analysis, the mean age of the child sample approached significance, with samples of younger children tending to be associated with a larger relationship between paternal depression and negative parenting behaviors.

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 behaviors, such that samples of younger fathers yielded larger effect sizes. The authors speculated that exhibiting negative parenting behaviors 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 and Chung 2013), the racial or ethnic background of the father or child sample might also influence the relationship. For example, Chang et al. (2009) found that compared to White parents, parents who were of an ethnic minority demonstrated higher levels of parental intrusiveness and detachment behavior. 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 behaviors. 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 et al. 2009). Taken together, this suggests that SES might also moderate this relationship.

There are also several family-related factors that might influence the strength of the association, such as the relationship status of the father. Single fathers tend to have higher rates of depression (Bronte-Tinkew et al. 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 also tend to give themselves lower ratings of parental efficacy than working mothers (Parker and Wang 2013). Given that parental self-efficacy is associated with depressive symptoms (Sevigny and Loutzenhiser 2010) and parenting behavior (Glatz et al. 2017), single fathers with depression may be especially susceptible to struggling with specific parenting behaviors.

In addition to sample characteristics, several measurement and outcome factors might moderate the strength of the relationship between paternal depressive symptoms and parenting behaviors. Considering issues related to paternal adjustment during the transition to parenthood (Doss et al. 2009; Parfitt 2013), the timing of paternal depression (i.e., postpartum versus non-postpartum paternal depression)

might moderate the relationship. Father-reports of parenting behaviors may be associated with a larger relationship between paternal depression and parenting behaviors given that the relationship between paternal depressive symptoms and parenting behaviors has been stronger when studies used father-reports of parenting behavior than when using observation (Conger et al. 1992; Conger et al. 1995; Harvey et al. 2011) or child-reports (Du Rocher Schudlich 2004; Epkins and Harper 2016; Leinonen et al. 2002) of paternal parenting behaviors. Wilson and Durbin's (2010) results echoed these results for negative, but not positive, parenting behaviors.

Additional insight into the variation in the magnitude of the relationship between paternal depression and parenting behaviours across the studies 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 studies with null results (i.e., publication bias; Franco et al. 2014). Therefore, published studies will likely be associated with a larger relationship between paternal depression and parenting behaviors than unpublished studies. The year the research was published might also moderate the strength of the relationship given historical shifts in fatherhood and caregiving (Pew Research Center 2015). Specifically, there has been an increase in (a) paternal involvement in caregiving (Pew Research Center 2015) and (b) the number of single and stay-at-home fathers (Parker and Wang 2013). Therefore, the strength of the relationship may be closer to the strength found for maternal depressive symptoms ($r = .22$; Wilson and Durbin 2010) in newer studies than older studies. 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 and Chung 2013). For example, researchers have found that Asian parents tend to endorse authoritarian parenting styles (Park et al. 2010). Additionally, Domenech Rodríguez et al. (2009) reported that Hispanic parents scored higher on measures of warmth and demandingness and lower on autonomy granting than White parents.

We aimed to build on Wilson and Durbin's (2010) meta-analysis in several ways. First, our study provided an updated meta-analysis on the relationship between paternal depressive symptoms and parenting behaviors. Wilson and Durbin's meta-analysis only included studies published up to 2008 and current guidelines suggest that meta-analyses should be updated every two to five years (Hopewell et al. 2008). Moreover, the substantial growth in the number of studies examining paternal depression, and the increase in parental responsibilities among fathers in recent years (Pew Research Center 2015) may have impacted these relationships. Additionally, Wilson and Durbin only searched two databases, PsycINFO and ProQuest Dissertations & Theses. We searched two additional databases to retrieve relevant studies, 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 were not included in past meta-analyses (Hopewell et al. 2008). We examined several moderators (i.e., mean years of paternal education, timing of paternal depression, type of parenting behavior informant, year of publication, country of study) that were not originally assessed by Wilson and Durbin. 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 excluded studies that did not assess parenting behaviors through father-reports or observational methods. Instead of excluding these studies, we used the type of informant of paternal parenting behaviors (e.g., father, partner, child, clinician, observational) as a moderator. Including studies with informant reports of paternal parenting behaviors provided the opportunity to examine whether the relationship between paternal depression and parenting behaviors are significantly moderated by the type of informant. Fourth, Wilson and Durbin divided their analyses by examining parenting behaviors in terms of positive and negative types; however, parenting behaviors can also be viewed on a continuum. Overall negative parenting might consist of either the absence of positive parenting behaviors or the presence of negative parenting behaviors. Alternatively, overall positive parenting could consist of an absence of negative parenting behaviors or the presence of positive parenting behaviors. Therefore, in addition to examining the positive and negative parenting behaviors separately (i.e., as done in Wilson and Durbin's study), the present study also examined overall parenting behaviors by including positive and negative parenting behaviors within the same analysis. Fifth, Wilson and Durbin examined the relationship between paternal depressive symptoms and parenting behavior using studies that assessed these variables at diverse time points, most investigating the link between past paternal depressive symptoms and current parenting behaviors. We only included studies that explored paternal depressive symptoms and parenting behaviors concurrently because we were interested in examining the current relationship between paternal depressive symptoms and parenting behaviors as opposed to examining the association between the two variables at different time-points.

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 behaviors? (2) How large is the association between paternal depressive symptoms and negative parenting behaviors? and (3) How large is the association between paternal depressive symptoms and overall parenting behaviors? 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 overall parenting behaviors: (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) timing of paternal depression (postpartum vs. non-postpartum), (i) parenting behavior informant (father- vs. other-report), (j) type of publication (published vs. unpublished), (k) year of publication, and (l) country of study.

Method

Search Strategy and Study 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 et al. 2009). The following four databases were systematically searched for both published and unpublished studies prepared up to December 2017: PsycINFO, ERIC, ProQuest Dissertations & Theses, and Google Scholar. Considering the magnitude of search results often generated by Google Scholar, studies were reviewed for eligibility up to 200 consecutively irrelevant studies. 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 studies: parent, father*, parental, paternal, depression, major depression, depressi*, depression (emotion), parenting, caregiver* behavior, parent* behavior*, 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 studies. Backward and forward reference searches were completed to identify studies that were not found in the initial database searches (Card 2012). A backward reference search refers to reviewing the reference list of eligible studies for other potential studies that meet the inclusion criteria listed below. A forward reference search consists of evaluating studies that cited an eligible study.

Inclusion Criteria and Determining Eligibility

We included studies 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 behaviors, including positive (e.g., parental warmth, acceptance, support, nurturance) or negative (e.g., rejection, hostility, psychological control, over-reactivity, inconsistent discipline) behaviors. Types of parenting styles (e.g., permissive, authoritarian), completion of specific childrearing tasks, quality of the parent-child relationship, parental self-efficacy, and attachment styles were not considered parenting behaviors. Harsh physical punishment or corporal discipline (e.g., spanking, grabbing, shoving) were not included as negative parenting behaviors in isolation (i.e., unless they were included as part of a larger measure on parenting behavior). To be included in this study, father-reports, informant-reports, or observation of parenting behavior were required. Vignettes or hypothetical situations of parenting behaviors were excluded. Studies must have quantitatively considered the relationship between concurrent paternal depressive symptoms and parenting behaviors. We defined fathers as the primary male caregiver in the home, and included biological fathers, stepfathers, and adoptive fathers. Studies focusing on non-resident fathers were not eligible. As an attempt to avoid the "apples to oranges" problem outlined by Lipsey and Wilson (2001), studies 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 birthweight, chronic pain, asthma, diabetes, endocrine disorders) were not eligible. Studies that included a small number of fathers or children with specific health conditions were eligible. We also excluded studies 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 (e.g., schizophrenia). These samples were excluded given that these populations often differ from other populations on several relevant factors, such as family dysfunction (e.g., Crea et al. 2014), SES (e.g., Druss et al. 2011), and mental and physical health (e.g., Cheung et al. 2018; Edidin et al. 2012; Turney et al. 2012).

Studies were screened for eligibility at three stages. First, duplicates of studies identified across the databases were recorded and excluded. Second, studies were screened

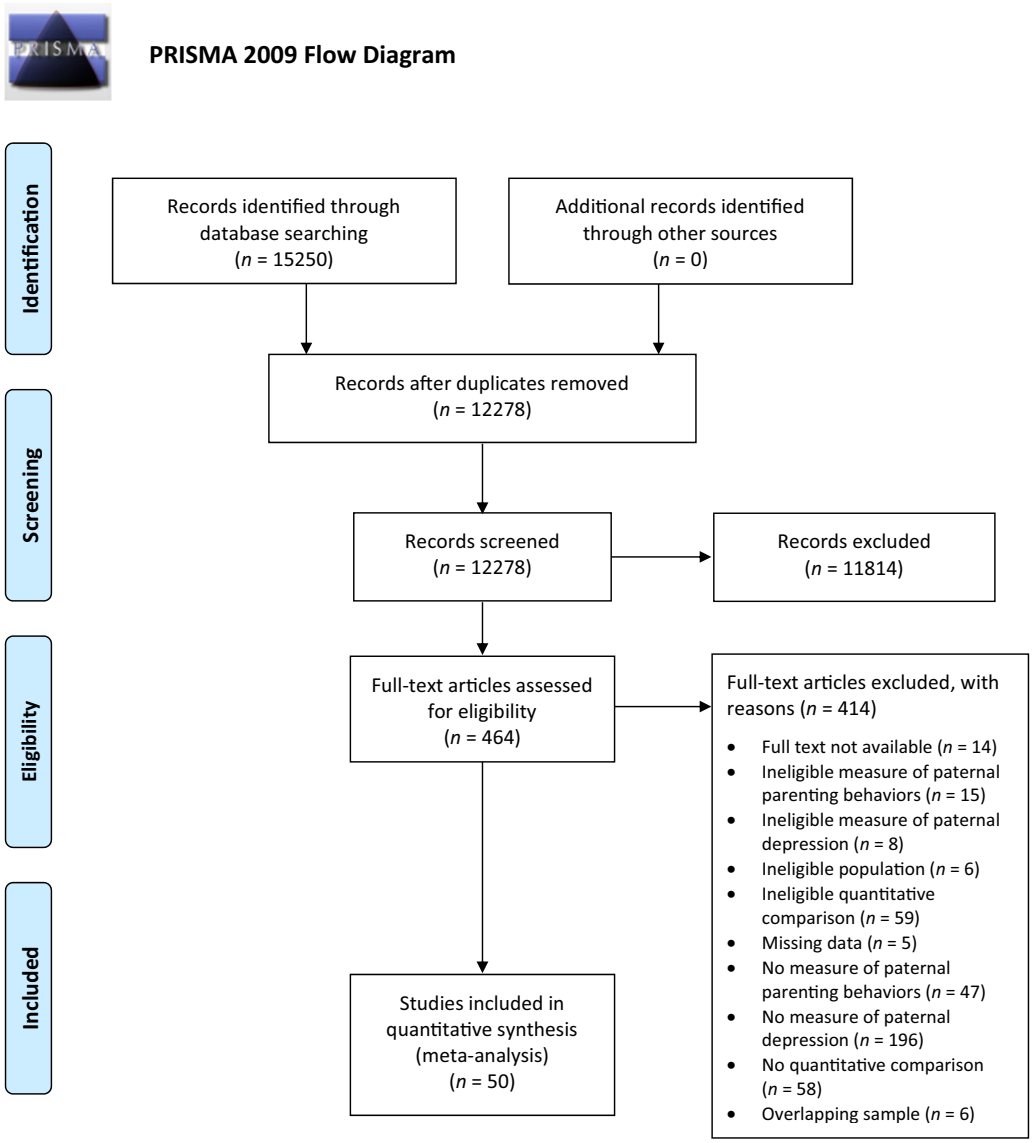

Fig. 1 PRISMA Flow Chart. Adapted from the "PRISMA 2009 Flow Diagram" by (Moher et al. 2009)

based on their titles and abstracts using the inclusion criteria above. Third, the studies were then reviewed in their entirety and deemed eligible or ineligible based on the inclusion criteria. Studies that adhered to the inclusion criteria were included in the final analyses. The number of studies that were included and excluded at each stage was recorded on the PRISMA flow diagram (see Fig. 1). Explanations for why studies were excluded from the final eligibility stage are also provided in the PRISMA flow diagram.

Data Extraction and Reliability

A Ph.D. level student with extensive training in meta-analyses (i.e., the primary coder) conducted the data extraction. A coding manual and form were used to extract the (a) quantitative data used to calculate an effect size and (b) study characteristics used for moderator analyses (i.e., bibliographic, measurement and outcome, and sample characteristics) from each of the eligible studies. The data were then inputted into and analyzed using the Comprehensive Meta-Analysis (CMA) software 3.0 (Borenstein et al. 2013).

Overlapping Data

We addressed overlapping data (i.e., when the same dataset was used across different studies), in one of two ways. Data from the eligible studies that used the same dataset were analyzed as an individual effect (i.e., aggregated) in CMA when each of the studies contributed unique data (e.g.,

different subsamples or outcome measures). For example, Conger et al. (1992) and Conger et al. (1995) used the same dataset but reported on different types of parenting behaviors. Therefore, both of these studies were included, and their data were aggregated to produce an individual effect. Alternatively, when one study included a more comprehensive set of information than other studies that used the same dataset, the study with the most comprehensive set of information was included, and the other studies were excluded. For example, Du Rocher Schudlich and Cummings (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 whereas the latter was excluded.

Missing Data

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

Reliability of Study Retrieval and Data Extraction

We assessed the reliability of the study retrieval process and the initial search strategy by the results of the backward and forward reference searching. As noted above, the purpose of conducting backward and forward reference searches is to retrieve studies that were missing from the initial database searches. Therefore, the reliability of these two procedures is related to the number of studies identified through backward and forward referencing. No additional studies were obtained through the backward and forward reference searches, suggesting that the study 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 studies. There were no disagreements between the primary and secondary coders (i.e., 100% agreement on all of the data extracted).

Data Analyses: Calculation and Analysis of Effect Sizes

A series of meta-analyses were conducted to integrate and analyze the association between paternal depressive symptoms and parenting behaviors. Random effects models were used throughout the analyses to account for heterogeneous features across the studies included in the final analyses (Borenstein et al. 2010; Lipsey and Wilson 2001). Heterogeneity was assessed using the Q statistic, I^2 statistic, and tau^2 statistic. Research questions one, two, and three were addressed using Pearson product-moment correlation coefficients to investigate the association between paternal depressive symptoms and levels of parenting behaviors. Research questions one and two examined positive and negative parenting behaviors separately. Research question three examined overall parenting behaviors, where the effect sizes of positive parenting behaviors were reversed so that lower levels of positive parenting behaviors were assessed as being negative. The effect sizes were first transformed to Fisher's z-scale to consider the variance in correlational data (Borenstein et al. 2010) and later transformed back to correlation coefficients for interpretation and reporting.

Multiple Outcomes

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

Outliers

Outliers were defined as individual effect sizes with standardized residuals greater than 1.96 (Viechtbauer and Cheung 2010). Effect sizes from studies that were identified as outliers were trimmed (i.e., removed) from the weighted mean 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 behaviors (Research question three). Meta-regressions, which evaluate the degree to which a moderator influences the magnitude of an effect size, were used to conduct the moderator analyses. Data from a minimum of 10 individual effects were

Table 1 Summary of the meta-analyses of the degree of the association between paternal depressive symptoms and parenting behaviors

	I^2	tau^2	Q(df)	r (95% CI)	k	p-value
Positive parenting behaviors	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 behaviors	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 behaviors	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

CI confidence interval, I^2 I^2 statistic, k number of effect sizes, $Q(df)$ Q statistic (degrees of freedom), r Pearson product-moment correlation coefficient, tau^2 tau^2 statistic, *Trimmed SESD* trimmed summary effect size distribution

required to conduct each moderator analysis based on recommendations from the Cochrane Handbook (Higgins and Green 2011).

Results

Sample and Bibliographic Characteristics

Search results from the four databases generated 12,278 unique studies and 464 full-text articles were selected for review and screened for eligibility. The current study includes 50 studies (37 published, 13 unpublished) that were produced between 1990 and 2017 (see Fig. 1). See the Supplementary File for a complete list of the studies included in this meta-analysis. 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 studies 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 only three studies were clinical samples. The composition of the paternal (61.6 to 100.0%) and child (58.1 to 100.0%) samples were predominately White.

Measurement and Outcome Characteristics

Paternal Depressive Symptoms

All of the studies 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 studies used the Edinburgh Postnatal Depression Scale, the Hospital Anxiety and Depression Scale, and the Symptom Checklist-90-Revised. Most of these fathers fell below the clinical cut-off levels on the measures. Few studies examined paternal depressive symptoms during the postpartum period ($n = 4$) and only one of the studies assessed whether the fathers met criteria for major depressive disorder using a structured interview.

Parenting Behaviors

Most studies included father-reports of parenting behaviors ($n = 37$), while other studies assessed parenting behaviors using child-reports ($n = 11$), mother-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 studies included in the final analyses provided a myriad of specific types of parenting behaviors with more studies reporting on positive types of parenting behaviors than negative.

Paternal Depressive Symptoms and Parenting Behaviors

The results were interpreted and categorized based on Cohen's (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 behaviors ($r = –.16$; 95% CI [–.20, –.13]; $k = 35$; $Q(34) = 129.16$; $I^2 = 73.68$; $tau^2 = 0.01$) and a small positive relationship between paternal depressive symptoms and negative parenting behaviors ($r = .17$; 95% CI [.13, .21]; $k = 28$; $Q(27) = 81.60$; $I^2 = 66.91$; $tau^2 = 0.01$; see Table 1). The relationship between paternal depressive symptoms and overall parenting behaviors 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 1). See Supplementary

Tables 1 and 2 for additional details. 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 studies were identified as outliers (Dette-Hagenmeyer and Reichle 2014; McElwain and Volling 1999; Medeiros et al. 2016; Rice et al. 2013) and trimmed from the weighted mean SESD. The difference between the untrimmed and the trimmed SESD across all three research questions were negligible, and therefore, the untrimmed findings were used in the final analyses.

Moderator Analyses

Table 2 displays the results of the 11 meta-regressions. A moderator analysis was not conducted on the composition of the relationship status of the father sample because there was limited range across the studies that provided information on this moderator (i.e., 99 to 100% of fathers in the sample were partnered). The informant of the parenting behaviors (father-ratings vs. informant-ratings or observation) was statistically significant ($Q = 4.37$, $p = .037$, $k = 36$). Studies that used father-ratings of parenting behaviors had a 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.

Table 2 Moderator analyses for overall parenting behaviors

Sample moderators	k	Q	p-value	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
Measurement and outcome moderators				
Timing of paternal depression (postpartum vs. non-postpartum depression)	48	1.26	.533	0.00
Parenting behavior informant (father- 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

Bolded values represent moderators that were significant

k number of effect sizes, Q Q statistic, R^2 proportion of the total variance

Discussion

The current study updates our understanding of the association between paternal depressive symptoms and parenting behaviors. Overall, the results of this study corroborate with 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 behaviors ($r = –.16$) and a similar relationship between negative parenting behaviors ($r = .17$). 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 studies published up 2008 and the current study includes studies published up to 2018. Additionally, only 18 of the 28 studies 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 behaviors, and (c) ineligible quantitative comparisons between paternal depressive symptoms and parenting behaviors (i.e., measures were not assessed at the same time). Considering that about one-third of the studies included in the current study are the same as those included in Wilson and Durbin's study, the overall findings across the two studies are still strikingly similar.

Based on the assumption that Dix and Meunier's (2009) framework would generalize to fathers with depression, it was anticipated that strength of the relationship between paternal depressive symptoms and parenting behaviors would more closely resemble the relationship between maternal depression and parenting behaviors as paternal involvement in childcare has increased over time. We found that the strength of the associations between paternal depressive symptoms and parenting behaviors were not as strong as the relationship between maternal depressive symptoms and parenting behaviors as reported by Wilson and Durbin (2010). The finding that the year of publication did not significantly moderate the relationship supports this finding. Although paternal involvement in childcare has increased over the years (Parker and Wang 2013), this result is expected given that mothers continue to be perceived as the primary caregiver (Pew Research Center 2015). Mothers tend to experience a higher degree of parenting stress (Vismara et al. 2016) and report higher rates of depression (Sotomayor-Peterson et al. 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 in 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 behaviors (Wilson and Durbin 2010). This outcome suggests that the relationship between paternal depressive symptoms and parenting behaviors is similar to the association between maternal depressive symptoms and parenting behaviors established by Wilson and Durbin.

The type of informant of the parenting behaviors was the only moderator that significantly influenced the strength of the association between paternal depressive symptoms and overall parenting behaviors. Studies that used father-reports of negative parenting behaviors were associated with larger effect sizes than informant-reports or observations. This result is similar to Wilson and Durbin's (2010) finding that father-reports of parenting behaviors 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. Indeed, Wilson and Durbin found that the length of the observation significantly moderated the relationship between paternal depressive symptoms and positive parenting behaviors, such that longer observations yielded larger effects than shorter observations. In other words, fathers tended to engage in fewer positive parenting behaviors the longer the observation, which likely increases the validity of the measure as individuals may struggle to maintain positive presentation styles. This result also aligns with the cognitive aspects of Dix and Meunier's (2009) action-control framework, which 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). 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 negative appraisals of one's children, self-critical tendencies, and 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 behaviors. 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 behaviors) rather than considering other aspects of the situation, such as positive features (i.e., positive parenting behaviors; Beck 1972). Fathers with depressive symptoms may also be overemphasizing the extent to which they engage in negative parenting behaviors (i.e., magnification) and disqualify the degree to which they exhibit positive parenting behaviors (i.e., minimization; Beck 1972). Future research will be necessary to examine the proposed connections.

The remaining 10 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 behaviors as opposed to overall parenting behaviors. We examined different types of parenting behaviors 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 and Durbin 2010). Wilson and Durbin (2010) found that samples of fathers with younger mean ages tended to engage in more negative parenting behaviors 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 and Welsh 2010). Additionally, the age of first-time fathers has increased over the past 30 years (Khandwala et al. 2017) and therefore, the mean age of father samples from older studies may not be comparable to newer studies.

Neither the racial/ethnic background of the child or father samples were significant moderators. The lack of significance for these moderators is likely due to limited variability as almost all of the studies 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 an ethnic minority population (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 behaviors. 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.

None of the bibliographic moderators were significant. Published studies were expected to be associated with a larger relationship between paternal depression and parenting behaviors than unpublished studies; 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 studies were expected to be associated with larger effect sizes than older studies. This prediction was based on the assumption that with an increase in parental demands on fathers over the past couple decades (Parker and Wang 2013; Pew Research Center 2015), the magnitude of the effect sizes would be larger for newer than older studies. Additionally, newer studies 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 behaviors (Putnick et al. 2008). Single and non-partnered fathers may be especially susceptible to experiencing high levels of parenting stress. 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 behaviors among fathers more now than in 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 study was conducted was not a significant moderator. Most studies were conducted in North America and none of the studies included in this meta-analysis were conducted in countries with cultures that tend to be linked to types of parenting styles that differ from Westernized norms (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 behaviors. The current study also examined overall parenting behaviors in addition to examining negative and positive parenting behaviors separately. Viewing parenting behaviors 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 behaviors 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. We also explored several moderators that were not analyzed in Wilson and Durbin's meta-analysis, including publication year and the timing of paternal depression. Another strength of this study is the high reliability of the study retrieval and data extraction. Finally, including unpublished studies 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 studies that did not undergo the peer-review process might be a limitation. That said, the publication status of the studies included in this study was not found to be a significant moderator, suggesting that including unpublished studies did not affect the results of the study. Second, all of the included studies used self-report measures of paternal depressive symptoms, 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. Third, due to the lack of diverse participant samples across the studies, 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 an examination of the relationship between paternal depressive symptoms and parenting behaviors 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 behaviors 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). Fourth, other factors (e.g., social support, parenting stress, parental self-efficacy) 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 behaviors (Singley et al. 2017). Finally, the findings of the current study cannot confirm whether depressive symptoms lead to negative parenting behaviors, or whether engaging in negative parenting behaviors contributes to experiencing greater depressive symptoms.

Clinical Implications

The outcomes of this research provide support for the relationship between paternal depressive symptoms and

parenting behaviors. 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 behaviors and minimize negative parenting behaviors 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 behaviors. Promising results from other areas of family research has supported this concept. For example, a meta-analysis by Theule et al. (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 behaviors could also focus on targeting factors that are associated with both paternal depressive symptoms and negative parenting behaviors, 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.

Finally, the finding that father-reports of negative parenting behaviors was a significant moderator may also inform intervention strategies for fathers with depressive symptoms who are struggling with parenting behaviors. 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 behaviors may also maintain or exacerbate symptoms of depression. Additionally, elevated depressive symptoms may not only increase negative parenting behaviors but could also contribute to a more considerable distortion of negative parenting behaviors, which could ultimately maintain the cycle.

Directions for Future Research

To provide a more extensive understanding of the association between paternal depression and parenting behaviors, 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 ethnic backgrounds, especially within cultures that differ in predominate parenting styles. Researchers may also wish to examine this association with respect to paternal postpartum depression and within clinical samples of fathers formally diagnosed with depression. Examining the relationship between depression and parenting behaviors of fathers who were clinically diagnosed with depression may yield larger effects than those presented in the current meta-analysis. To further examine the link between paternal depression and parenting behaviors, 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 behaviors and vice versa. Finally, future research should explore whether addressing factors related to both paternal depression and parenting behaviors (e.g., parenting stress, parental self-efficacy, social support) would be advantageous in reducing depressive symptoms and negative parenting behaviors.

Data Availability

The coding manual and coding form for this meta-analysis are available at the Open Science Framework (https://osf.io/y5ngm/).

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Author Contributions K.C. designed and executed the study, conducted the data analyses, and wrote the paper. J.T. collaborated with the design of the study, the writing of the study, and the editing of the final manuscript.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval Research involving Human Participants. This article does not contain any studies with human participants performed by any of the authors.

Informed Consent Participants were not recruited for the current study and therefore, obtaining informed consent was not required.

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