

HISTORY OF CHILDHOOD ABUSE AND MOTHER-INFANT INTERACTION: A
SYSTEMATIC REVIEW OF OBSERVATIONAL STUDIES

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Abstract

Literature that has examined maternal self-reported history of abuse and an observational assessment of infant-mother interaction were reviewed. Electronic databases were searched and studies that met pre-defined criteria were included. A total of 13 studies were included and assessed for quality using the EPHPP tool. Nine of the 13 studies found a relationship between self-reported abuse and observed caregiving. Due to variation in sample characteristics and measurement the ability to compare studies is limited; however, results suggest an emerging pattern of an indirect effect of maternal abuse history on caregiving via stress reactivity or depressive symptoms. Results of this review suggest that self-reported abuse history in the mother is a risk factor for non-optimal caregiving behaviours but there is a need for greater understanding of the pathways that are responsible for this effect. The current review discusses strengths and limitations of the existing literature and offers suggestions for future research.

Introduction

An extensive body of research has demonstrated the importance of mother-infant interactions in relation to a variety of developmental outcomes for children (Alink, Mesman, van Zeijl, Stolk, Juffer et al., 2009; Lyons-Ruth, Wolfe, & Lyubchik, 2008; Moss, Dubois-Comtois, Cyr, Tarabulsky, St-Laurent et al., 2011; Murray, Fiori-Cowley, Hooper, & Cooper, 1996; Murray, Woolgar, Cooper, & Hipwell, 2001). Furthermore, a number of longitudinal studies have demonstrated the pertinence of maternal behaviour within the infancy period in particular, showing the enduring impact of these early interactions even when later parenting quality and other risks have been taken into account (Carlson, Jacobovitz & Sroufe, 1995; Dutra, Bureau, Holmes, Lyubchik, & Lyons-Ruth, 2009; Fan, Buka, Kosik, Chen, Wang et al., 2014; Morrell & Murray, 2003; Murray, Halligan, Goodyer, & Herbert, 2010). This draws attention to early caregiving behaviours and the importance of understanding what may place a mother at risk for non-optimal interactions with her infant.

The ability of a mother to be responsive, sensitive and engaged with her infant relies on a sophisticated and co-ordinated behavioural response (Ainsworth, Bell, & Stayton, 1974). First, a mother must accurately perceive her infant's cues, she must then appraise them as meaningful and as requiring a response, and then select a response from a range of possible behaviours based on what she ascertains the underlying need of the infant to be. The mother must also be able to monitor her response, assess and perceive when a chosen response is no longer needed (e.g., by correctly perceiving that the infant is no longer distressed) or when the selected response was not "right", and adjust her behaviour accordingly. The mother must do this while also balancing other competing demands and her own internal and external cues (George & Solomon, 2008). As a result of all that is required for caregiving behaviour, many factors may influence the quality of its execution.

Difficulties may arise in the mother's ability to detect her infant's signals (Barrett & Fleming, 2011; Healy, Lewin, Butler, Vaillancourt, & Seth-Smith, 2015), in her appraisal of the infant's need (Leerkes, Parade, & Gudmundson, 2011), in balancing other competing motivational systems (George & Solomon, 2008) or in her ability to monitor her behaviour and be flexible (Main, 2000). As such, caregiving behaviours are complex and arise from interplay between biological (e.g., hormones),

social (e.g., marital relationship, social support), interpersonal (e.g., attachment representations), cognitive (e.g., attention, executive functioning) and affective (e.g., mood) factors (Barrett & Fleming, 2011; Belsky, 1984; George & Solomon, 2008).

One factor that is assumed to influence these caregiving abilities is a mother's own experience of being cared for and protected in childhood. A number of different theoretical positions have considered the mechanism through which early experiences may influence the caregiving abilities of that individual when they become a parent. One of these perspectives is attachment theory, which has dedicated a great deal of conceptual and empirical inquiry to the intergenerational transmission of relationships (Bretherton, 1990; Main, Kaplan, & Cassidy, 1985). In addition to attachment research are more general theories of developmental psychology and psychopathology, as well as neurobiological perspectives of caregiving behaviours, which have considered how relational experiences might be transmitted through generations. The following section will briefly review these perspectives, offer a rationale for bringing these related, but different aspects of research together, and outline the parameters of this review.

Experiences of Childhood Abuse and Attachment Theory

Bowlby (Bowlby, 1969, 1973, 1980) postulated that interaction patterns with parents starting from the first year of life are what lead to the construction of "internal working models" of self and other from which the individual then interprets and experiences other attachment relationships. Thus, from this perspective, a mother when presented with the task of developing a relationship with her infant will be influenced by the nature of this internal working model of attachment in terms of guiding how she responds to and engages with her infant. Due to Mary Ainsworth's pivotal observational research in the 1970s (Ainsworth, Blehar, Waters, & Wall, 1978; Ainsworth et al., 1974) and the demonstrated importance of early 'sensitive' caregiving in the development of secure attachment relationships, interest shifted to understanding how individual differences in maternal responses could be explained.

It was then that research became interested in how a mother "represents" her own early attachment experiences and how that relates to the quality of the relationship that she develops with her child (Main et al., 1985). Indeed, research across a number of studies has demonstrated that maternal

representations of attachment can explain a moderate proportion of her behavioural engagement with her infant. Adults who are themselves securely attached (or that is, have a secure state of mind with respect to attachment as measured by the Adult Attachment Interview) have been observed to engage in more sensitive caregiving practices and to develop secure attachment relationships with their own children (De Wolff & van IJzendoorn, 1997; Madigan et al., 2006; van IJzendoorn, 1995). In contrast, adults with insecure states of mind with respect to attachment and who may devalue their early experiences (dismissing), be overwhelmed, confused or angry by their early experiences (pre-occupied) or remain ‘unresolved’ with regards to past trauma or loss, have been observed to struggle in various degrees in their ability to be openly available and responsive to the needs of their child.

Mothers with dismissing or preoccupied states of mind may be more likely to engage in various ‘insensitive’ behaviours such as intrusive or unresponsive caregiving (Isabella & Belsky, 1991). In addition to these generally ‘insensitive’ caregiving patterns are caregiving behaviours that have been specifically observed in mothers with unresolved states of mind in relation to trauma or loss.

Individuals with unresolved states of mind have been found to have particularly high rates of childhood abuse (Bailey, Moran, & Pederson, 2007; Madigan, Vaillancourt, McKibbin, & Benoit, 2012; Stovall-McClough & Cloitre, 2006) and when talking about these experiences during the Adult Attachment Interview will demonstrate lapses in reasoning or discourse. It is hypothesised that these linguistic characteristics reflect the mother’s unintegrated representations of meaning in relation to the event and that this fragmented representation can lead to unusual or contradictory caregiving responses (Main & Hesse, 1990). In particular, mothers with unresolved states of mind have been observed to engage in frightening, frightened or atypical behaviours when interacting with their infants, particularly when the infant displays attachment behaviours (Lyons-Ruth, Bronfman, & Parsons, 1999). These maternal behaviours are believed to be independent of maternal sensitivity (Moran, Forbes, Evans, Tarabulsy, & Madigan, 2008), and have been most strongly associated with disorganised infant-mother attachment relationships (Fearon, Bakermans-Kranenburg, Van IJzendoorn, Lapsley, & Roisman, 2010; Van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). It is hypothesized that mothers who have experienced loss or abuse in their own childhoods,

and remain ‘unresolved’ with respect to these experiences, may be challenged by the infant’s display of vulnerability and distress, due to the activation of disintegrated and powerful affect associated with their own early experiences. The consequence of the evocation of (or attempts to distance from) their own unresolved feelings can be a number of caregiving behaviours that are frightening for the infant or that result in the mother being unable to adopt the necessary parental role and modulate the infant’s stress response (Lyons-Ruth et al., 1999; George & Solomon, 2008). In sum, attachment theory would suggest that there is likely to be an impact of childhood abuse on the caregiving system and that this may manifest in specific types of early caregiving behaviour.

Experiences of Childhood Abuse and Maternal Mental Health

Perspectives from developmental psychopathology would also suggest that early childhood abuse has the potential to undermine caregiving capacities. Research is increasingly demonstrating the myriad of psychological consequences of childhood trauma including impaired cognitive flexibility, attentional biases to threat and difficulties with emotional regulation (see Pechtel and Pizzagalli, 2011 for a review). Childhood abuse is also highly associated with mental health disorder (Kessler, McLaughlin, Green, Gruber, Sampson et al., 2010; Keyes, Eaton, Krueger, McLaughlin, Wall et al., 2012), in particular recurrent depression and trauma related symptomatology (Cloitre, Miranda, Stovall-McClough, & Han, 2005; Cloitre, Stolbach, Herman, van der Kolk, Pynoos et al., 2009; Dorahy, Middleton, Seager, McGurrin, Williams et al., 2014; Nanni, Uher, & Danese, 2012). Moreover, due to the commonly chronic nature of childhood abuse, it is often associated with more pervasive psychological sequelae, such as personality disorder or “complex PTSD”. Complex Post-traumatic Stress Disorder (PTSD) is characterised by nonspecific difficulties across a number of domains including emotional regulation, interpersonal functioning and identity (Herman, 1992). This diffuse psychological profile is mirrored by research that has shown that adults with childhood abuse histories tend to report high symptomology across a number of different domains, including mood and anxiety symptoms, substance misuse, dissociation and interpersonal relationships (Anda, Felitti, Bremner, Walker, Whitfield et al., 2006; Briere & Elliott, 2003; Powers, Cross, Fani, & Bradley, 2015). In light

of the psychological and interpersonal consequences of childhood trauma, there is potential for any number of these factors to impact on the quality of caregiving behaviours.

Childhood trauma is not only associated with depression in general but also depressive symptoms in the perinatal period (Alvarez-Segura, Garcia-Esteve, Torres, Plaza, Imaz et al., 2014; Benedict, Paine, Paine, Brandt, & Stallings, 1999; Buist & Janson, 2001; Choi & Sikkema, 2015; Plant, Barker, Waters, Pawlby, & Pariante, 2013). The impact of depressed mood on caregiving has been consistently demonstrated with research showing that depressed mothers are less synchronous in their interactions with their infants, are more likely to be disengaged/withdrawn or intrusive, and provide less tactile stimulation to their infants (Field, 1998; Murray, Fiori-Cowley, Hooper & Cooper, 1996; Reck, Hunt, Fuchs, Weiss, Noon et al., 2004). Thus, another way in which childhood abuse may impact the quality of the infant-mother relationship is in the form of depressive symptoms or psychological (psychobiological) correlates of depression that may undermine the ability of a mother to optimally engage with her infant.

The impact of trauma symptoms on caregiving in the infancy period has received comparatively less research attention than that of maternal depression, and the research that does exist is mixed. Making sense of this literature is further complicated by the fact that not all of this research was in relation to maternal childhood abuse specifically, but considers ongoing or more proximal abuse as well¹. Some research has reported relationships between trauma symptoms and self-reported parenting (Banyard, Williams, & Siegel, 2003; Muzik, Bocknek, Broderick, Richardson, Rosenblum, et al., 2013), where other research has not found a relationship with PTSD symptoms and observed caregiving (Lyons-Ruth & Block, 1996; McGinnis, Bockne, Beeghly, Rosenblum, & Muzik, 2015). Despite the little research in relation to maternal PTSD symptoms and mother-infant interaction, there is some evidence that maternal PTSD is associated with negative representations of the self as a mother and of the infant (Huth-Bocks, Levendosky, Theran, & Bogat, 2004; Schechter, Coates, Kaminer, Coots, Zeanah, et al., 2008) and an increased risk of disorganised mother-infant attachment (Enlow, Egeland,

¹ There is a greater volume of research that has examined the impact of parental post-traumatic stress symptoms (PTSS) and clinical disorder (PTSD) associated with non-childhood trauma (e.g., war, natural disasters, domestic violence) (see review of Leen-Feldner et al., 2013).

Carlson, Blood & Wright, 2014), suggesting a possible role of the caregiving environment. In addition, maternal PTSD symptoms have been related to disrupted cardiorespiratory regulation in the infant during and following a stressor (Still-Face) procedure, which may also influence caregiving behaviour (Enlow, Kullowatz, Staudenmayer, Spasojevic, Ritz et al., 2009).

In spite of the sparse literature that has examined maternal PTSD symptoms and parenting in the infancy period, research would suggest that those who have been abused in childhood may have cognitive-affective difficulties that could interfere with caregiving. Research has demonstrated that those with childhood abuse histories are more likely to show heightened attentional and affective (specifically amygdala) responses to fearful and angry faces, to make negative attributions about the self and others, to have difficulty holding information in mind in the presence of distracting emotional information and to show impaired top-down cortical regulation of emotional arousal (Caldwell, Krug, Carter, & Minzenberg, 2014; Cromheeke, Herpoel, & Mueller, 2014; Dannlowski, Stuhrmann, Beutelmann, Zwanzger, Lenzen et al., 2012; Glashouwer & De Jong, 2010; Grant, Cannistraci, Hollon, Gore, & Shelton, 2011; Hart & Rubia, 2012; Johnson, Gibb, & McGeary, 2010). Together, this suggests that individuals with abuse histories are more likely to have disrupted affective responses in the context of emotional signals (e.g., a crying infant) and may also be compromised in their ability to recruit cognitive resources at these times.

In sum, early childhood trauma may impact the quality of the caregiving behaviours through depressive and trauma-related symptoms or associated psychological processes. One might expect the influence of these symptoms on caregiving to vary under different levels of stress or in the presence of specific infant cues.

Early Life Stress and Neurobiological Systems of Mothering

Finally, increasingly research is elucidating the importance of early adverse experiences on the biological systems of mothering, including hormonal and neural systems associated with stress reactivity, reward and social behaviour (Barrett & Fleming, 2011). In primate and non-primate animal research there is evidence of transmission of parenting quality, so that those animals that have received sensitive (e.g., in the form of licking and grooming) caregiving themselves are the ones that

then demonstrate sensitive caregiving to their own offspring. These differences in maternal caregiving behaviours have been found to be associated with differences in glucocorticoid and serotonergic activity, systems that appear to be disrupted as a consequence of early life stress (Champagne, 2008; Maestripieri, Lindell, & Higley, 2007; Suomi, 1997). More recently, individual differences in these biological systems have also been described in human mothers (Bakermans-Kranenburg & van IJzendoorn, 2008; Feldman, Weller, Zagoory-Sharon & Levine, 2007; Laurent, Stevens, & Ablow, 2011), with some research examining caregiver's own experiences in childhood in relation to these systems. For example, maternal genotype of the serotonin transporter gene has been related to less sensitive caregiving, especially in mothers who also reported early childhood stress (Mileva-Seitz et al., 2012) and plasma and saliva oxytocin has been linked to self-reported attachment style and observed synchrony and engagement with the infant (Feldman, Gordon, & Zagoory-Sharon, 2011). This research suggests that a history of childhood stress may disrupt hormonal fluctuations that characterise effective stress modulation, consequently interfering with the employment of affiliative processes and social behaviour required for sensitive mother-infant interactions. Therefore, another reason why one might expect to observe a relationship between early adverse experiences and later caregiving practices is that early adverse experiences may undermine caregiving by making the parent less robust in the face of stress or interfere with the functioning of normative biological systems associated with caregiving motivation.

In sum, there is a strong theoretical rationale to predict that early life experiences, particularly negative childhood experiences like abuse, would place a mother at risk for non-optimal engagements with her infant. In spite of the varied theoretical arguments for an association between these two factors, relatively little empirical research has been dedicated to this topic, particularly studies that have involved observational measures of caregiving. One possible reason for the paucity of research on this topic is that predictors of observed infant-mother interaction quality have largely focused on other factors, such as maternal attachment status or postnatal depression (Field, 2010; Lovejoy, Graczyk, O'Hare, & Neuman, 2000; Madigan et al., 2006; Van IJzendoorn, 1995). Despite the fact that both maternal depression and adult attachment status can be associated with abusive childhood

experiences, studies have tended to not account for this factor. At present, we are aware of no reviews or meta-analyses that have focused on the relationship between the mother's own self-reported experience of abuse in childhood and the quality of interaction with her infant.

Current Review

The main aim of the current review is to collate research that has examined maternal self-reported history of childhood abuse and maternal caregiving behaviours to ascertain if the literature does support this hypothesised relationship. A secondary aim of the review is to determine the state of the literature with respect to possible mediators for such an association. The current review will also consider the extent to which the literature has accounted for confounding variables, particularly maternal depressive symptoms, in quantifying the strength of the relationship between maternal self-reported abuse history and observed parenting behaviours. This is due to the robust association between childhood abuse and subsequent adult depression (Nanni, et al., 2014) and maternal depressed mood and impaired caregiving (Lovejoy et al., 2000).

This review will focus on research that has used an observational measure of parenting and will exclude studies which only include self-reported measures of parenting, child abuse potential or substantiated child abuse. Observational measures of parenting are considered to be less influenced by bias (Bailey, DeOliveira, Wolfe, Evans, & Hartwick, 2012) and in older children have been shown to be better predictors of child outcome than parenting self-reports (Zaslow, Weinfield, Gallagher, Hair, Ogawa et al., 2006). In addition, the review will focus only on research that has conducted observations within the infancy period (i.e., children at or younger than 24 months of age) due to the shift in the child's needs and capabilities that takes place after the second year of life and the importance of this period for subsequent child development. Finally, this review seeks to include studies where the definition of maternal early experience was as consistent and similar as possible by only including those studies that used a measure of abuse specifically, rather than early experience in general (i.e., perceived acceptance or rejection by parents). Although there is undoubtedly evidence that perceived emotional aspects of child experience impact psychological functioning and caregiving behaviour (e.g., Belsky, Youngblade, & Pensky, 1989; Crockenberg, 1987) only studies that included

a measure of physical and sexual abuse were selected to ensure all studies could be identified through electronic searching and to be as precise as possible in an operational definition of childhood abuse.

Method

Procedure

Search Strategy

Articles were primarily identified using PsycINFO, MEDLINE and EMBASE using the following search terms for the two main variables of interest: maternal history of childhood abuse (“child abuse”, “child maltreatment”, “child trauma”, “early life experience”, “adverse life experience”, “family of origin”, “child history”, “family history”, “PTSD” “post-traumatic stress”) and observation of infant-mother interaction (“parenting”, “caregiving”, “infant-mother interaction”, “mother-child interaction”, “mother-child communication”, “infant-mother relationship”, “observation”, “maternal sensitivity”, “maternal behaviour”, “maternal responsiveness”). Search terms were used both as keywords and as words within abstracts and combined in various ways. Search terms were exploded (e.g., “child abuse” exploded to include specific forms of abuse) and wild cards used where appropriate. Searches were limited to studies within peer-reviewed journals and involving human samples, published from 1970 through until January 2015. The search was repeated in September 2015. A few papers were identified manually through Google Scholar and searching key journals. Finally, the reference lists of a number of related reviews (e.g., Buist, 1998b; Laulik, Chou, Browne, & Allam, 2013; Lovejoy et al., 2000; Wilson, Rack, Shi, & Norris, 2008) and the reference lists of all included papers were examined as another way to identify possible relevant papers.

Inclusion Criteria

A total of 3635 articles were returned with 3160 records screened once duplicates were removed. Records were screened based on title and abstract to determine if the study met criteria for the present review 1) sample participants were a parenting population, 2) the measure of maternal childhood abuse history was a self-report, 3) the measure of parenting was observational and 4) the mean age of the children was 24 months or younger at the time of observation. Studies that commonly arose within the search but did not meet inclusion criteria were studies with samples of maltreating parents where

there was not a measure of parent's own experience of abuse in childhood, or which focused on child abuse potential or substantiated child abuse rather than observed mother-child interactions. Other reasons for exclusion were studies that only used self-report measures of parental behaviour/attitudes/self-efficacy, studies where the definition of trauma exposure was not restricted to childhood (e.g., lifetime trauma exposure) and studies where the infant age range extended beyond, and the mean age was greater than, 24 months.

Those records where it was not clear from the abstract if they met inclusion criteria were retained and the full-text was acquired. Where multiple publications of the same sample existed [e.g., articles from the Maternal Anxiety in Childbearing Years (MACY) and Maternal Adversity, Vulnerability and Neurodevelopment (MAVAN) studies²], only one was selected to include in this review. For one sample which was assessed longitudinally (Moehler, Biringen & Poustka, 2007 and Fuchs, Mohler, Resch & Kaess, 2015), only the most recent publication was included because it reported observational caregiving from the earlier publication. One exception to this was a study that examined different aspects of maternal caregiving from one sample (maternal sensitivity and frightened/frightening maternal behaviour) in two separate publications (Jacobvitz, Leon, & Hazen, 2006; Leon, Jacobvitz, & Hazen, 2004) and therefore both papers were included.

Of the 117 studies that were examined closely, only 13 were included in the final review. Figure 1 displays the flow of studies through the review selection process. Of note is that there are a number of papers that measured the two relevant variables (maternal history of abuse and observational caregiving) but did not report associations between them, as this was not the primary focus of the study (e.g., Ammerman, Putnam, Chard, Stevens & Van Ginkel, 2012; Beverley Cassidy & Mark Zoccolillo, 1996; Cassidy et al., 2010; Emery, Paquette, & Bigras, 2008; Huebner, 2002; Pajulo, Pyykkönen, Kalland, Sinkkonen, Helenius, & Punamäki, 2011; Schechter, Suardi, Manini, Cordero, Rossignol, et al., 2015).

[INSERT FIGURE 1 ABOUT HERE]

² Other publications from the MACY sample include Muzik, et al., 2013 and McGinnis et al., 2015. Other publications from the MAVAN study include Mileva-Seitz et al., 2012 and Mileva-Seitz et al., 2013.

Data Extraction and Quality Assessment

All included articles were reviewed following the PRISMA checklist (Moher, Liberati, Tetzlaff, & Altman, 2009) and key study characteristics were extracted. A summary of the extracted study and measurement characteristics are outlined in Tables 1 and 2. In addition, each paper was quality assessed using a modified version of the EPHPP (Effective Public Health Practice Project) Quality Assessment Tool for Quantitative Studies (National Collaborating Centre for Methods and Tools, 2008). The EPHPP was selected because it provided an appropriate set of domains with which to evaluate an observational study and has been found to have very good reliability in terms of the overall quality rating (Armijo-Olivo, Stiles, Hagen, Biondo & Cummings, 2012). The EPHPP measure was used to assess studies across five domains: representativeness of the sample, methodological or statistical control of confounding factors, reliability and validity of measurement tools, blindness of assessors, and suitability of analyses³ to inform the questions of this review. Additional criteria were included within the validity and reliability domains of the measure to account for specific issues relevant to observational parenting research such as inter-rater reliability and the nature of the coding scheme used. Studies that were longitudinal or represented a sample that had participated in an intervention were also rated on an additional three-point scale to assess how those who dropped out were accounted for and the degree of attrition. In terms of confounding factors, particular attention was given to maternal depression in addition to demographic variables (particularly socio-economic status) because of the high overlap between childhood history of abuse and depression and the impact of depression on caregiving. A total quality rating was calculated by summing the scores given for each domain. A ‘strong’ overall rating was given when there were no weak ratings across any domain. A ‘moderate/acceptable’ rating was given when one domain was deemed ‘weak’. A ‘weak’ overall rating was given when two or more domains were rated as weak.

³ Note: Ratings of statistical analyses do not necessarily reflect the appropriateness of the analyses for the research questions that were the focus of the paper. This item as rated here reflects the quality of the analysis to determine an association between maternal childhood abuse experiences and quality of the interaction.

Results

The following sections describe the included studies in terms of design, sample characteristics, measurement and main findings and should be read in conjunction with Tables 1 and 2.

Overview

The twelve independent studies (excludes the repeated sample of Jacobvitz et al., 2006) represent a total sample of 6205 mother-infant dyads, with sample sizes ranging from 41 to 4351 participants. Nearly all studies were conducted in North America (75%), in addition to two studies from Europe (UK & Germany) and one from Australia.

Design

The majority of studies (75%) were longitudinal with the remainder using a cross-sectional design. Four studies represented samples that were engaged in some form of home-visiting programme aimed at improving maternal and infant outcomes. Of the intervention studies (Dixon, Hamilton-Giachritsis, & Browne, 2005; Lesser & Koniak-Griffin, 2000; Lyons-Ruth & Block, 1996), all participants had received the intervention or the authors demonstrated no difference between key variables in those who did or did not receive the intervention.

Sample Characteristics

There was variation in terms of socio-economic risk across studies. Four studies specifically targeted at-risk mothers (young parents or those at risk for social service involvement), one study included a psychiatric in-patient sample and was described as of relatively low socio-economic status (but did not formally report), four studies represented low-risk middle class samples and the remaining four were diverse in risk or descriptions of economic status were not explicitly stated. The mean age of mothers for the majority of studies ranged from 26-33 years, with the exception of three studies where the mean age of mothers was below 21 years.

For those studies where the main focus was to examine a relationship between maternal childhood abuse and the quality of caregiving, the majority of studies matched groups or otherwise controlled within their analyses for demographic factors. Two studies (Nuttall, Valentino, & Borkowski, 2012;

Stacks et al., 2014) did not examine these variables as the main focus of the study and therefore the associations reported between the variables did not control for demographic factors.

There was variability in the degree to which studies measured and controlled for maternal depression. Sixty-nine percent of all studies included a measure of depression, although of these, one study (Dixon, et al., 2005) did not use a standardised measure of depressive symptoms and one (Leon et al., 2004) used the depression subscale from the Parenting Stress Index. One study (Fuchs et al., 2015) did not measure depression explicitly but reported a measure of ‘psychological distress’. Studies varied in how they accounted for the potential impact of depression/symptoms on the quality of the infant-mother relationship and are discussed in greater detail within the main findings.

Measurement

Observation Characteristics

The age of infant at the time of observation varied between studies. Eight of the twelve independent studies involved infants under 12 months of age, with the remainder involving infants between 12-18 months. Nearly all (75%) observations took place in the home, with the average length of observation being 30 minutes (Range: 5-120 minutes). Only five studies used purely unstructured interactions (asking mothers to play with their child as they normally would), the remainder used a combination of tasks including free play and some form of divided attention (e.g., completing questionnaire during play), teaching or stressor task. No studies discriminated between different components of the observation when reporting caregiving results. Three studies (Dixon et al., 2005; Fuchs et al., 2015; Lesser & Koniak-Griffin, 2000) measured caregiving more than once within the infancy period. The most common domain of parenting measured across studies was sensitivity; however the precise definition and coding scheme used varied. Three studies used more than one coding scheme and combined scores, either creating composite variables (Madigan, Wade, Plamondon, & Jenkins, 2015) or doing so statistically, using cluster or principal components analysis (Driscoll & Easterbrooks, 2007; Lyons-Ruth & Block, 1996). Most studies used standardised coding schemes that have previously demonstrated validity and reliability. An exception is the study from Stacks et al. (2014) who developed a scheme specific to the MACY project. This scheme was based on previously well-

established parent-infant observation measures, was standardised and closer inspection suggests that dimensions were consistent with the Ainsworth Scales of sensitivity (e.g., sensitivity, cooperativeness, accessibility, acceptance). Two studies based their ratings on observations during a clinical visit (Dixon et al., 2005) or within a clinical setting (Buist, 1998a) and were not video-recorded precluding robust coding and double rating. Dixon et al. (2005) report that all assessors completed training that included a two-day workshop on parent-infant observation but there is no mention of assessors achieving reliability for the use of any particular tool. Buist (1998a) coding scheme is described as a modified version of the Bethlem Mother-Infant Interaction scale (Stocky, Tonge, & Nunn, 1996) but no details are provided about the degree to which raters (nursery nurses) were trained in the use of this tool.

All but one study had raters who were unaware of maternal characteristics or study hypotheses and report good to high inter-rater reliability. Only in the large study by Dixon et al. (2005) were ratings given by professionals involved in the care of the families and thus the raters were aware of maternal characteristics. Dixon et al. (2005) report acceptable to high internal consistency for each subscale of parental behaviour but did not have a second rater. Finally, it was unclear if Lesser and Koniak-Griffin (2000) had a second rater as they did not report inter-rater reliability in the publication but do state that all raters were unaware of the mother's abuse history.

Self-Reported History of Childhood Abuse

In line with the inclusion criteria of this review, measures of maternal childhood abuse across studies were self-reports, and for most, the measure of abuse was restricted to physical and/or sexual abuse in childhood. Exceptions to this are three studies that used overall scores on the Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998). One of these, Gonzalez, Jenkins, Steiner, and Fleming (2012a), did not exclusively use the CTQ but created a composite score which combined the CTQ with a measure of consistency in care (the Life History Calender; Caspi, Moffitt, Thornton, Freedman, Amell et al., 1996). Based on these composites, mothers were categorised as experiencing one or two forms of adverse early life experience. Early life experiences were defined as moderate-severe abuse as measured by the CTQ, or more than one family arrangement as measured by the Life History

Calendar. It was not clear from the reported results how many mothers were categorised as experiencing one form of abuse, multiple family arrangements or both.

Of those studies that did not use a standardised measure of childhood maltreatment, three used a measure of childhood abuse based on descriptions given during the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996). These studies rated the severity of abuse described at any time during the AAI using standardised criteria. These ratings were made by an independent rater who was unaware of AAI status. In contrast to studies by Nancy Hazen and her research group, Lyons-Ruth and Block (1996) describe the inclusion of additional questions within the AAI to specifically prompt for abuse related experiences.

Lesser and Koniak-Griffin (2000) also used an interview to measure childhood abuse but instead of using the AAI, asked questions adapted from the Conflict Tactics Scale (Straus, Hamby, Boney-McCoy, & Sugarman, 1996) and Finkelhor & Araj, (1986) questions on sexual abuse. Responses were then rated based on operationally defined criteria and only those with severe ratings were classified within the abused group. Buist (1998a) measured abuse as part of a psychiatric interview completed at admission to the inpatient ward and used operationalised definitions of sexual, physical and emotional abuse. Dixon et al. (2005) also used an interview format to measure abuse; however, in this case it was in the context of an 'Index of Need' assessment as part of the home visiting programme. This involved one single question about whether or not they had experienced physical or sexual abuse in their own childhood and no definitions were provided.

[INSERT TABLES 1 & 2 HERE]

Main Findings

Direct association

Six of the twelve studies demonstrated a direct association between maternal history of childhood abuse and maternal behaviour. Within Lyons-Ruth and Block (1996) high-risk sample of mothers who were referred for intensive home-visiting, those mothers who had experienced more severe abuse in their own childhood were more likely to display low levels of involvement (maternal withdrawal) with their infant during a home observation ($r = -.33, p < .03$). This effect was particularly strong for sexual abuse ($r = -.35, p < .05$) whereas the severity of other abuse experiences, including physical abuse, did not reach significance. In contrast, severity of physical abuse in childhood was significantly associated with hostile-intrusive behaviour ($r = .31, p < .05$), where the overall severity of childhood abuse was not, nor was sexual abuse or neglect. These effects remained when regression analyses were run to include overall demographic risk factors (ethnicity, age, marital status, income, parity). Although sexual abuse was associated with demographic risk, the relationship between sexual abuse and maternal withdrawal remained significant after accounting for demographic risk. Although depression has been reported in other publications describing this cohort (Lyons-Ruth, Connell, Grunebaum, & Botein, 1990), the authors did not include depressive symptoms in this investigation, leaving some ambiguity about the extent to which these specific abuse-parenting style relationships would remain if maternal mood was also taken into account.

Buist (1998a) reported a significant difference between abused and non-abused mothers from a Mother-Baby Unit (MBU) in terms of observed maternal behaviour ($p < .05$). The author does not report correlation co-efficients but examination of the means suggests the effect size was moderate. There was no difference in maternal behaviour between mothers with a sexual abuse history versus those with a physical or emotional abuse history, but it is not clear to what extent mothers may have experienced more than one form of abuse within these categories. All mothers in this study had a primary diagnosis of major depression, adjustment disorder or atypical depression (DSM-IV; APA, 2000) and depressive symptoms were measured using the Beck Depression Inventory. It is stated that

the abused group of mothers reported greater depressive symptoms but the author does not report associations between depressive symptoms and observed maternal behaviour.

Dixon et al. (2005) found a relationship between mother's report of abuse in childhood and observed maternal behaviours in the home at two time periods within the first year of life (odds ratio = 3.63). In addition, a number of risk factors (young maternal age, parental history of mental illness, depression and violence in the home) were all found to partially mediate the effect of abuse on caregiving behaviour, but these risk factors were not based on standardised measures. A self-reported history of mental illness and domestic violence were particularly significant in mediating the relationship between history of abuse and caregiving behaviours when caregiving was dichotomised to those who displayed poor caregiving at both time points versus those who did not. When all three risk variables were controlled, the effect of the model was reduced and the direct pathway between abuse history and caregiving behaviour was no longer significant.

In Driscoll and Easterbrooks (2007) community sample of young mothers, those with a history of physical abuse were twice as likely as mothers with no such history (odds ratio = 2.01) to engage in inconsistent-directive caregiving specifically. These mothers differed from mothers who were sensitive and provided a moderate level of scaffolding (sensitive-engaged group) and mothers characterised by high levels of intrusiveness and prohibitions (intrusive-prohibitive group) in that they showed greater impairment in being able to optimally structure the interaction and follow the infant's lead. There was no effect of history of abuse on the likelihood that mothers would engage in intrusive-prohibitive caregiving behaviours. Although depressive symptoms were also associated with the likelihood of being in the inconsistent-directive group (odds ratio: 1.8), prior analyses had indicated no significant difference between parenting clusters on depressive symptoms or other demographic variables.

Pereira et al. (2012) report an association between overall CTQ scores and maternal sensitivity as measured using the Maternal Behaviour Q-Sort (MBQS; Pederson, Moran, & Bento, 1999) ($r = -.13$, $p < .05$). Results indicated a particularly strong association between the physical abuse subscale of the CTQ and sensitivity scores ($r = -.17$, $p < .005$) and a smaller but significant association between the

emotional neglect subscale and maternal sensitivity. These results were not confounded by associations with marital status, family income, infant gender or parity. There was however an association between CTQ scores and parenting stress. In this sample, both parenting stress and maternal history of abuse significantly predicted maternal sensitivity, and mediation analyses showed that the direct effect of maternal abuse history was no longer significant once the effect of parenting stress was taken into account. The possibility that parenting stress could also serve as a potential moderator of this association was also explored, but the model was not significant. Mediation analysis was repeated using depressive symptoms as a potential mediator but this model was not significant.

In their community sample of German women, Fuchs et al. (2015) reported a significant effect of maternal history of abuse on caregiving behaviours, particularly at infant age 12 months. When mothers were observed at 5 months, abused mothers did not differ from non-abused mothers on the Emotional Availability Scales (EA; Biringen, Robinson, & Emde, 2000), with the exception of the intrusive dimension. However, at 12 months, mothers with a history of childhood physical or sexual abuse scored significantly lower on almost all of the EA scales. Large effect sizes were reported for sensitivity ($d=1.12$, $p<.001$), non-intrusiveness ($d=1.23$, $p<.001$) and responsiveness ($d=.87$, $p<.001$). Scales of structuring and non-hostility showed a medium effect size and were highly significant. It was only the scale of involvement that did not significantly differ between mothers with and without an abuse history. These effects could not be explained by demographic factors as the abused and non-abused groups were matched for child gender, maternal age, marital status, maternal education and parity. The authors also tested if symptoms of psychological distress as measured using the Symptom Checklist 90- Revised (Franke & Derogatis, 2002) mediated or moderated this relationship, however neither of these models were significant. Regression analyses showed an effect for emotional abuse on overall EA scores at infant age 12 months, above and beyond mother's history of physical and/or sexual abuse ($\beta=-.029$, $p=.0007$).

Indirect or partial association

Three studies reported an indirect or partial effect of maltreatment history on caregiving behaviour. Nuttall et al. (2012) did not set out to examine the effect of maternal history of abuse in relation to

caregiving specifically, but rather the intergenerational transmission of parentification or role-reversal within familial relationships. However, as part of this investigation, the authors included a measure of general maltreatment history as a control and conducted analyses separately by gender. Correlations indicate that mothers with greater experiences of childhood physical or sexual abuse displayed less warm-responsiveness in home interactions with their infants, but only if infants were male ($r = -.22$, $p < .05$). Given that the authors only measured general maltreatment history as a control variable in this study, they do not report how demographic variables were related to either the caregiving variable or CTQ scores.

Two different Canadian samples observed no direct effect of maternal history of abuse in relation to caregiving, but did find an indirect relationship via other related variables. Using path analysis, Gonzalez et al. (2012) reported no direct effect between maternal early life experiences of abuse and/or multiple family arrangements and maternal sensitivity, but did report a significant indirect effect when HPA function (higher levels of diurnal cortisol) was tested as a mediator between the two variables ($\beta = .22$, $p < .05$, abuse to HPA function; $\beta = -.22$, $p < .05$, HPA function to maternal sensitivity). The effect emerged even controlling for depressive symptoms and household income, which were the only demographic and mood variables significantly associated with sensitivity. In another sample, Madigan et al. (2015) used path analysis in relation to data from a longitudinal dataset and observed that the relationship between maternal history of abuse and responsive maternal behaviours only existed via depressive symptoms ($\beta = .18$, $p < .01$, abuse to maternal depression; $\beta = -.16$, $p < .05$, depression to caregiving). This effect was specific to physical abuse and remained even when the effects of household income, child gender, maternal age and sexual abuse history were controlled. In contrast to physical abuse, depression did not emerge as a significant mediator between sexual abuse and responsive maternal behaviour.

No association

Four studies failed to find any association between mother's self-report history of childhood abuse and current caregiving behaviour. Within Lesser and Koniak-Griffin (2000) high-risk adolescent sample, childhood physical and sexual abuse was unrelated to home observations of maternal

behaviour using the Nursing Child Assessment Teaching Scale (Barnard, 1978). Although those mothers who had been abused were more likely to be depressed and depression was associated with caregiving behaviour at the first observation at 4-6 weeks postpartum ($r=-.26, p=.04$), no mediation or moderation analyses were completed.

Stacks et al. (2014) also failed to find an association between maltreatment history and maternal sensitivity in their sample of women selected to participate in a longitudinal study examining the effect of perinatal mental health (depressive and post-traumatic stress symptoms) and early childhood abuse in relation to the infant-mother relationship. The focus of this study was to examine the relationship between reflective functioning, maternal sensitivity and infant attachment security, but in addition to these factors associations between childhood abuse history and maternal sensitivity were also examined. Correlations revealed no significant relationship between overall CTQ scores and either sensitive ($r=-.07$) or intrusive ($r=.06$) maternal behaviours, and these associations were reported without demographic factors being partialled out. A composite of demographic risk (single parent, young maternal age, low education, poverty) was associated with parenting. Childhood abuse was significantly associated with trauma symptoms and depressive symptoms in the sample (respectively, $r=.22, p<.05$ and $r=.31, p<.01$), but these symptoms were unrelated to caregiving sensitivity.

Finally, two papers involving the same sample of low risk mothers, found no association between those who had experienced severe physical or sexual abuse in childhood and two aspects of maternal behaviour. First, results are reported in relation to maternal sensitivity and results from regression analyses indicate that mothers did not differ in observed sensitivity if they had a history of physical or sexual abuse in childhood (Leon et al., 2004). Similarly, in their subsequent publication (Jacobvitz et al., 2006), when severity of physical or sexual abuse was examined in relation to frightened or frightening ("FR") maternal behaviour there was no association. It was only if mothers were unresolved with respect to abuse (as measured during the Adult Attachment Interview) that abuse was

related to FR behaviour ($\beta=.35, p<.001^4$). The influence of unresolved status remained when other risk factors (loss of a parent, severity of abuse, number of frightening experiences) were controlled.

Quality Assessment of Included Studies

Methodological quality was assessed using an adapted version of the EPHPP tool (2007) for quantitative studies. Each study was evaluated in six methodological domains: sample, confounds, tools, bias, analyses and attrition (with *lower* scores indicating higher quality). The overall quality rating for each study is indicated in the last column of Table 1. A total of six studies (46% of those included in this review) achieved an overall ‘strong’ quality rating, with four of these studies receiving low scores across all domains, indicative of the highest quality. The remaining studies were found to be of moderate (N=5) or weak (N=2) quality. Major limitations associated with a weak or moderate overall rating were less generalizable samples (N=6), the use of less rigorous assessment tools (N=2), a lack of blind assessors (N=2), failure to account for the influence of measured or non-measured confounding variables (N=6) and insufficient statistical analyses to draw clear conclusions (N=3). Figure 2 reflects the quality of the study in terms of whether or not a significant association between maternal abuse history and caregiving was found.

[INSERT FIGURE 2 ABOUT HERE]

Discussion

The current review sought to collate and assess the literature that has examined maternal history of childhood abuse in relation to observational caregiving behaviours within the first two years postpartum. A specific aim of this review was to determine if there is empirical support for the theoretical association between maternal childhood abuse experiences and later caregiving risk. In particular, this review considered the extent to which this association existed apart from confounding variables by systematically examining if studies had accounted for factors known to be associated with childhood abuse and caregiving (especially maternal depression and socio-economic risk). A

⁴ The regression co-efficient was only reported for any unresolved status (i.e., loss or abuse); however the authors state in the discussion that analyses were repeated for loss and abuse separately and this relationship remained significant

secondary objective was to describe potential mechanisms for the association between self-reported childhood abuse and caregiving to guide future research. The current review is distinct from other reviews which have examined parental abuse history in relation to later perpetration of maltreatment (Thornberry, Knight, & Lovegrove, 2012). Furthermore, this review wished to exclusively examine research that has measured caregiving from observation rather than studies which have reported child abuse potential or self-reported parenting variables, and to focus on caregiving behaviours within the infancy period. A total of 13 studies were identified and met inclusion criteria for the current review. The small number of studies may be a reflection of the greater resources required to conduct observational research, especially where the effect may be expected to be small and larger samples are required.

Summary of Main Findings

Although there was variation in methodological quality across studies, of those that found an effect ($n=8$), five were rated as strong. Of those, four studies had especially strong methodological quality (Fuchs et al., 2015; Gonzalez et al., 2012; Madigan et al., 2015; Pereira et al., 2012). These studies were comprised of a representative sample, used well-validated measures with raters unaware of participant characteristics and used statistical analyses and/or methods that controlled for potential confounding factors. These four studies also examined possible mediating factors, including depressive symptoms, parenting stress (subjective reports or biological stress reactivity) or psychological distress. Three of the four studies reported an indirect effect of maltreatment history on caregiving via stress or depressive symptoms. Of those studies that did find an indirect effect (a total sample of 870 mother-infant dyads) there is evidence of a small but significant effect of maternal history of maltreatment on later parenting behaviour through maternal (psychological or biological) factors. An exception to this pattern is the Fuchs et al (2015) study which found a direct but not indirect effect of maternal abuse history on caregiving via psychological distress. It is possible that difference in the measurement of maternal psychological variables (distress versus depression/stress) or differences in sampling methodology could be responsible for this inconsistent finding.

Of those studies that did find a direct association between maternal history of abuse and caregiving behaviour, a substantial proportion were samples of higher risk (i.e., due to young maternal age, poverty, mental illness) and potential indirect pathways to explain these associations were not tested. Of those that recruited mothers of higher risk (Buist, 1998a; Driscoll & Easterbrooks, 2007; Lesser & Koniak-Griffin, 2000; Lyons-Ruth & Block, 1996; Nuttall et al., 2012), it was only the Lesser study that did not find a direct effect; however this study did report that chronicity of depressive symptoms was associated with the abused group and that chronicity of depression was associated with lower caregiving scores at both observations. The study did not conduct any mediation analyses to test if depressive symptoms could account for an association between maternal history of abuse and caregiving. More recent studies in this review (e.g., Gonzalez, Jenkins, Steiner, & Fleming, 2012b; Madigan et al., 2015) suggest that modern ways of thinking about intervening variable effects (e.g., Hayes, 2009) will help to elucidate mechanisms of transmission by not prematurely precluding investigation of indirect effects (e.g., when there is no evidence of a simple association between maternal history of abuse and caregiving outcomes).

Of the total 13 studies reviewed, the majority reported some kind of association between maternal history of abuse and observed caregiving. However, even with attempts to select relatively comparable studies in this review (e.g., in terms of infant age and definition of maternal abuse), comparisons are still difficult due to variations in measurement and varying characteristics of the samples. Studies included in this review varied in terms of how abuse was measured, with the majority using questionnaires (most commonly the Childhood Trauma Questionnaire) and a proportion using an interview format. Although most studies focused on physical abuse, sexual abuse or both, there were three studies that included all items of the CTQ and one that also included a measure of 'consistency of care' (defined as the mother having lived with both biological parents until age 16). It is not clear from these studies if there is something specific about experiences of sexual and physical abuse that compromises caregiving capacity or if the effects of these experiences could be accounted for by emotional abuse or neglect (Bailey et al., 2012; Fuchs et al., 2015). An emerging evidence base is identifying the salient influence of childhood emotional abuse on later emotional

processing, even when history of physical and sexual abuse is accounted for (van Harmelen, de Jong, Glashouwer, Spinhoven, Penninx et al., 2010; van Harmelen, van Tol, Demenescu, van der Wee, Veltman et al., 2013). Thus, it is possible that early experiences beyond physical and sexual abuse may also influence factors that are relevant to caregiving capacity and should be considered in subsequent research.

In addition to issues of measurement in relation to maternal abuse, there are a number of considerations in terms of measures of maternal behaviour. Although the majority of studies included in this review measured some form of maternal sensitivity, the coding schemes used varied substantially and many of these constructs included a number of different aspects of maternal behaviour (e.g., responsiveness, intrusiveness, promotion of joint attention) making comparisons difficult. It is likely that these global and varied measures of sensitivity also account for some of the inconsistent findings in this review. Of note is that some studies reviewed here included both structured and unstructured components to their observations; however, no papers considered how maternal behaviour may differ within these different situational demands. In addition to challenges associated with the varied measurement of sensitivity, it is also likely that caregiving behaviours beyond sensitivity need to be considered in studies that are measuring maternal behaviour in samples of mothers who have been abused. As was the case for one sample presented in this review, it was only frightening (FR) maternal behaviours that were related to maternal abuse. Although this study found that it was only being unresolved with respect to the abusive experience (Jacobvitz et al., 2006; Leon et al., 2004) that was associated with FR behaviour, across most other studies it has not been sufficiently examined if abuse itself is a risk factor for disrupted caregiving (i.e., frightened/frightening and atypical maternal behaviours) or if it is specifically when the mother is unresolved with respect to such abuse (Bernier & Meins, 2008). At present, FR or anomalous maternal behaviours have primarily been explored in relation to unresolved states of mind and have not been considered in relation to self-reported abuse or in clinical samples where abuse is likely to be high (with some exceptions such as Hobson et al., 2009). In sum, it is possible that global measures of

sensitivity measured under low stress observation conditions overlook or do not account for specific aspects of caregiving that are likely to be disrupted in mothers with an abuse history.

Future Directions

This review raises a number of important considerations for future research. First, it asks for consideration of *what* is expected to be disrupted in abused women that may place them at risk for non-optimal caregiving. This question is important in terms of identifying what it is that studies should be measuring and how to design studies that will be sensitive to these effects. In the absence of good theory and specific hypotheses, studies are likely to be less comparable and findings more difficult to interpret. Arguably the attachment literature has provided the best attempt to do this so far, by offering the hypothesis that a lack of integration of a traumatic memory into a coherent representation results in disrupted caregiving behaviour due to the infant triggering these unintegrated traumatic memories. A significant research base has demonstrated associations between unresolved states of mind with respect to loss or abuse from an attachment figure (Madigan et al., 2006; Van Ijzendoorn et al., 1999); however this model still has limitations and a lack of explanatory power (see Bernier and Meins, 2008 for a review of these issues). Moreover, other models beyond attachment are relevant and need to be considered. Indeed, this review would suggest that theories of psychopathology and neurobiology have a great deal to offer in terms of providing more specific hypotheses about what we might expect to be disrupted in abused mothers and how that might interfere with their ability to care for their infant.

Achieving greater specificity in predictions and pathways from maternal abuse experiences to later caregiving risk can be informed by research from neuroscience and cognitive/emotional processing (e.g., attentional biases), as these literatures offer clues as to which capacities are likely to be disrupted as a consequence of developmental abuse experiences. For example, these perspectives suggest that developmental experiences of abuse are particularly damaging in that they affect systems associated with stress reactivity and emotional processing. It follows then that abused mothers may be most likely to have difficulty in responding under conditions of stress and/or in the face of emotional infant cues. Of course, the importance of maternal responses to infant signals of distress has been

considered within the attachment literature. Research within general parenting samples has highlighted how mothers differ in their ability to be sensitive to infant cues of distress and non-distress and under conditions of low and high stress (Leerkes, 2011; Leerkes et al., 2011; Leerkes, Blankson & O'Brien, 2009; Madigan, Moran, & Pederson, 2006; McElwain & Booth-LaForce, 2006; Smith & Pederson, 1988). Moreover, the measurement of atypical maternal behaviours has placed a particular emphasis on the relevance of infant vulnerability in eliciting disrupted caregiving behaviour (Lyons-Ruth et al., 1999). An integration of these two bodies of research strongly suggests that the direction for future research is for mothers with abuse histories to be observed interacting with their infants under varying levels of stress and for the quality of these interactions to be compared and to be related to relevant psychological variables in the mother.

Secondly, this review would suggest that there is a need to move beyond associations to models of explanation by considering potential mediating pathways between maternal abuse experiences and later caregiving behaviours. It is clear that not all mothers who were abused show caregiving difficulties but what is less clear is why some are able to be sensitive caregivers, while others are not. Attachment theory would infer that it is the ability of the mother to be able to integrate or reflect on her early traumatic experiences that enables her to perceive and respond to her infant in a non-defensive, open and accurate way. Only one study in this review (Stacks et al., 2014) considered reflective functioning but did not consider it as a possible mediational variable between self-reported abuse and observed maternal behaviour. Greater research is needed that will test factors, such as reflective functioning, that may place women with abuse histories at greater or lesser risk of engaging in non-optimal caregiving.

As discussed in this review, additional mechanisms of transmission between maternal abuse history and later caregiving could be through mental health symptoms and/or compromised cognitive and affective processes associated with childhood abuse. A challenge of testing models that include childhood abuse, psychopathology (e.g., depression) and stress responsivity, is the high overlap between these three variables. The current review highlights how very few studies have measured all three of these factors in relation to caregiving within one sample. Only the studies by Pereira et al.

(2012) using a subjective measure of parenting stress, and Gonzalez et al. (2012) which used a biological measure, measured all three of these variables and suggest a role for stress as a mediating mechanism more so than depressive symptoms. This pathway would be consistent with neuroimaging and cognitive research which has reported heightened neural sensitivity to threat in those with a history of abuse, even when depression and anxiety symptoms are controlled (Dannlowski et al., 2012; Johnson et al., 2010). Future research may wish to consider if there are some processes associated with psychopathology that may be better accounted for by early life experiences, and how these processes may influence caregiving. It may be that mothers with mental health problems differ in caregiving quality depending on whether or not there is a history of adverse childhood experiences, a proposition that would be in line with other research which has described different subtypes of depression based on the presence or absence of early life stress (Heim, Newport et al., 2000; Heim, Plotsky, & Nemeroff, 2004). Future research could also consider other aspects of maternal mental health and cognition in relation to childhood abuse (e.g., post-traumatic stress symptoms, dissociation, cognitive flexibility and attention) which may influence caregiving.

There were no specific aims with regards to identifying moderators of the relationship between maternal abuse history and later caregiving. However, interested readers are directed to other papers from samples included in this review that have described gene-environment interactions in relation to early childhood experiences and caregiving behaviours (Mileva-Seitz et al., 2012; Mileva-Seitz et al., 2013). In addition, the paper by Fuch et al (2015) points to the potential relevance of infant age in relation to caregiving in mothers with a history of abuse. In their study, differences in caregiving associated with maternal history of abuse were not marked until infants were 12 months. The authors describe how in this sample, mothers with a history of abuse did not display the commonly seen pattern of increased maternal sensitivity across the infant's first year of life and suggest that the increased locomotion and agency of the toddler may present a greater challenge to mothers with an abuse history (Fuchs et al., 2015). However, another study included in this review that also measured maternal behaviour longitudinally up until infant age 12 months (Lesser & Koniak-Griffin, 2000) did not demonstrate any effect of infant age. Additional robustly designed studies that will measure

caregiving in mothers with an abuse history across the infancy period are necessary. Finally, the role of other potential moderators (e.g., infant temperament, quality of marital relationship, adult experiences of abuse/trauma), should also be considered as it may be that the experience of childhood abuse is only a risk factor in the presence of other additional risk factors.

A final consideration of the current review is that all measures of abuse described here were based on maternal self-report. There are considerations in relation to the validity of retrospective self-report measures of abuse; however it is believed that measures which are standardised and provide well operationalised behavioural definitions of abuse are the least subject to bias and on the whole false positives are believed to be rare (Hardt & Rutter, 2004). Finally, during the process of this review it was noted that several research groups have measured both self-reported abuse and caregiving but the relationship between these variables was not reported or variables were reported separately in different publications. The extent to which this reflects a publication bias or is simply a consequence of these questions not being the primary focus of most studies is not clear.

Given that research is only just beginning to establish an understanding of potential mediating mechanisms between early maternal experiences and later caregiving behaviour, it is perhaps not surprising that findings reported in this review are inconsistent. Future research would benefit from replication using samples of similar socio-economic or clinical risk and with consistent use of measurement. For example, self-report questionnaires such as the CTQ provide an efficient way to measure maternal self-reported history of abuse and allow for comparisons across studies. With respect to measures of observed caregiving, it would be beneficial for authors to clearly outline what maternal behaviours are included in their coding schemes to help readers determine if measures of maternal sensitivity are comparable. Finally, it is essential that studies obtain a measure of stress and psychopathology to be able to tease apart risk associated with a past history of abuse and those with common co-occurring factors. A direction for future research may be to consider what precise maternal behaviours, under what conditions (e.g., high versus low stress) and in which domains (e.g., emotional responding versus other parenting contexts) women with abuse histories are likely to be

most challenged by the caregiving role, as well as consideration of what factors may mediate and moderate this association. The infancy period presents a window of opportunity to intervene and support mothers in developing a relationship with their infant, especially amongst those who may struggle as a consequence of their own early experiences. Further understanding of the mechanisms involved in the intergenerational transmission of caregiving is critical to provide greater specificity in interventions that might be provided.

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Table 1. Overview of Included Studies

Year	Study	Country	Design	Sample Characteristics						Relationship between two variables	Quality Rating ⁶	
				N	Type	Mean maternal age	% Minority	% impoverished	Measure of depression			
1996	Lyons-Ruth & Block	USA	L	41	Selected. Referred by health or social services.	25.6	16%	66%	Not reported	Yes. Overall severity of abuse was related to greater maternal withdrawal. Severity of SA specifically associated with maternal withdrawal. Severity of PA associated with hostile-intrusive behaviour.	8	Mod
1998	Buist	Australia	CS	56	MBU sample.	28.3	not reported	Low SES ⁷	Yes	Yes. Abuse history was related to poorer rated quality of mother-infant interaction.	1 2	Weak
2000	Lesser & Koniak-Griffin	USA	L	95	Community sample. Adolescents recruited from public health. Agreed to participate in home visiting program.	16.8	79%	Most under poverty line	Yes	No. Abuse history not associated with caregiving. Abuse history was associated with depression, and this was associated with caregiving.	8	Strong
2004	Leon et	USA	L	109	Community	29.5	16%	6%	Yes	No. Abuse history not associated	7	Mod

⁶ Overall quality score based on EPHPP quality assessment (see Method section); lower scores indicate better quality⁷ Authors state that MBU admissions tend to be of women of lower socio-economic class

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	al.				sample. Recruited from antenatal classes.					with caregiving sensitivity.		
2005	Dixon et al.	UK	L	4351	Universal community sample. All infants born over 38 month period in an area of England were eligible.	Not reported (7% were 21 or younger)	< 5%	Not stated	Yes	Yes. History of abuse predicted quality of caregiving.	9	Weak
2006	Jacobowitz et al. ±	USA	L	116	Community sample. Recruited from antenatal classes.	29	18%	9%	No	No. Only <i>unresolved</i> childhood abuse predicted FR behaviour.	7	Mod
2007	Driscoll & Easterbrooks	USA	CS	107	Community sample. All first time young mothers were eligible. Participated in home visiting programme.	19.6	47%	Mean per capita income below the poverty line	Yes	Yes. PA associated with inconsistent-directive parenting.	7	Strong
2012	Nuttall, et al.	USA	L	374	Community sample. High-risk first time adolescent and adult mothers recruited from primary care.	21.47	82%	Mean income under poverty line	No	Yes. Association between abuse and caregiving within male infants only.	9	Weak

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2012	Pereira, et al.	Canada	CS	291	Community sample. Recruited from children's centres.	33.4	33%	Mean income-middle class	Yes	Yes. Overall abuse, PA and emotional neglect associated with less sensitive caregiving. Parenting stress mediated the relationship between maltreatment history and sensitivity.	5	Strong
2012	Gonzalez et al.	Canada	CS	89	Community sample. Recruited from antenatal clinics.	31.8	32.8	7.8%	Yes	Yes. Childhood abuse was indirectly related to maternal sensitivity via HPA reactivity.	5	Strong
2014	Stacks et al.	USA	L	83	Community sample but selected for perinatal depressive/PTSD symptoms or difficult childhood experiences. Recruited from antenatal clinics.	30.4	27%	18%	Yes	No. No direct association between abuse history and maternal sensitivity.	9	Moderate
2015	Madigan et al.	Canada	L	490	Universal Community Sample. All newborns born within a two year period.	32.7	43%	Not reported ⁸	Yes	Yes. No direct effect but indirect effect of PA on responsive parenting via depressive symptoms.	5	Strong
2015	Fuchs et al.	Germany	L	119	Universal Community	32.5	Not reported	Not reported	Yes ⁹	Yes. At 5 months, abused mothers more likely to display intrusiveness.	5	Strong

⁸ Although value not reported in the text, authors indicate that SES was controlled for in analyses

⁹ Measure of psychological distress using the Symptom Checklist 90-Revised

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					Sample. All births over a two year period.					At 12 months, abused mothers scored significantly lower on all scales except involvement.		
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Table 2. Measurement Characteristics of Included Studies

Study			Observation Characteristics	Abuse Measurement	
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						Coding Scheme					% abuse ¹⁰
	Infant age	Infant Gender (% male)	Setting	Obs Length	Structure	Measure	Domains of Parenting	Blind coders	Instrument	Type of Abuse ¹¹	
Lyons- Ruth & Block (1996)	18 month s	56%	Home	40 mins	Unstructur ed	Ainsworth Sensitivity Scales and Crittenden Scales	Maternal Involvement and Hostile- Intrusiveness	Yes	Interview- additional abuse questions included based on Antecedent Experiences Questionnaire during the AAI	PA, SA (definitions based on social services guidelines)	47%

¹⁰ proportion of sample with an abuse history

¹¹ Included in analyses

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Buist (1998)	Mean 3.9 month s	Not reported	In- patient hospital	Not clear	Unstructur ed	Monash Scale of Mother- Infant Interaction	Includes quality of physical contact, play, feeding, routine/safety	Yes	Clinical Interview –questions with operationalised criteria	SA, PA and EA	50% SA 16% PEA
Lesser & Konia k- Griffin (2000)	4-6 weeks, 6 month s, 12 month s	(-	Home	Not stated	Structured	Nursing Child Assessmen t Teaching Scale	Overall score (sensitivity to cues, alleviation of distress and socio- emotional growth fostering and cognitive growth	Yes	Interview- questions adapted from Conflict Tactics Scale and Finkelhor, & Araji	PA & SA (study specific definition)	62%

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							fostering)				
Leon, Jacobovitz & Hazen (2004)	8 months	-	Home	20-30 mins	Structured - play, feeding and divided attention	Ainsworth Sensitivity Scales (adapted)	Sensitivity	Yes	AAI	PA & SA (defined using AAI criteria)	25%
Dixon, Hamilton-Giachritsis & Browne	4-6 weeks & 3-5 months	52%	Home	30 mins	Unstructured	3 point rating scale based on CARE index	Sensitivity	No	As part of an 'index of need' assessment –single question if they had experienced physical and/or sexual abuse in their own	PA or SA under 16 years of age (no definitions provided)	3%

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(2005)									childhood		
Jacobovitz, Leon & Hazen (2006) ±	8 months	-	Home	30-40	Structured -feed and play	Main & Hesse (1995)	FR parental behaviour	Yes	AAI	PA & SA (defined using AAI criteria)	Not clear
Driscoll & Easterbrooks (2007)	18 months	54%	Home	5 mins	Unstructured	Emotional Availability (EAS) Scales and Joint Attention (JA)	3 patterns of maternal behaviour on combination of EAS & JA scores: sensitive-engaged, inconsistent-	Yes	Parent-Child Tactics Scale	PA items only	Not clear

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							directive, intrusive- prohibitive				
Nuttall , Valent ino & Borko wski (2012)	18 month s	51%	Home	20 mins	Unstructur ed	Landry et al. (1997)	Contingent responsiveness and warm sensitivity	Yes	CTQ	Scales of PA & SA	35%
Pereira , Vicker s, Atkins on,	16 month s	51%	Home	120 minutes	Structured (frustratio n task and divided attention) and	MBQS	Sensitivity	Yes	CTQ	All scales	7% PA ¹² 11% SA

¹² Proportion of participants with moderate to extreme scores on PA or SA scale

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Gonzalez, Wekerle, & Levitan (2012)					unstructured components						
Gonzalez, Jenkins, Steiner & Fleming (2012)	2-6 months	48%	Home	30 mins	Unstructured & divided attention	Ainsworth Sensitivity Scales	Sensitivity	Yes	CTQ and LHC combined	Moderate-severe overall CTQ score and more than one living arrangement	46% total (30% one; 16% both)

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Stacks et al. (2014)	16 months	Not stated	Lab	10 mins	Unstructured & Structured (clean up task)	MACY Infant Parent Scoring System	Sensitivity & Over-controlling-intrusive	Yes	CTQ	Overall score	38% ¹³
Madigan et al. (2015)	18 months	51%	Lab	15 mins	Structured & Unstructured	CARP & PARCHIS Y	Responsive behaviour composite	Yes	CEVQ	Scales of PA & SA	10% SA 20% PA
Fuchs, Mohler, Resch & Kaess	5 & 12 months	55%	Lab	20 mins	Unstructured	EAS	Sensitivity, Structuring, Non-intrusiveness, non-hostility, responsiveness	Yes	CTQ	MG: Scored above cut off for moderate-severe PA or SA; CG:	49%

¹³ Severe maltreatment

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(2015)							, involvement			score of 0 for PA and SA	
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Abbreviations: Obs=observation; AAI=Adult Attachment Interview; CTQ=Childhood Trauma Questionnaire; LHC=life history calendar; MACY=Maternal Anxiety in the Childbearing Years; CARP=Coding of Attachment Bearing Parenting; PARCHISY= Parent-Child Interaction System; CEVQ=Childhood Experience of Violence Questionnaire; MG= maltreatment group; CG=comparison group

Figure 1. PRISMA Flowchart

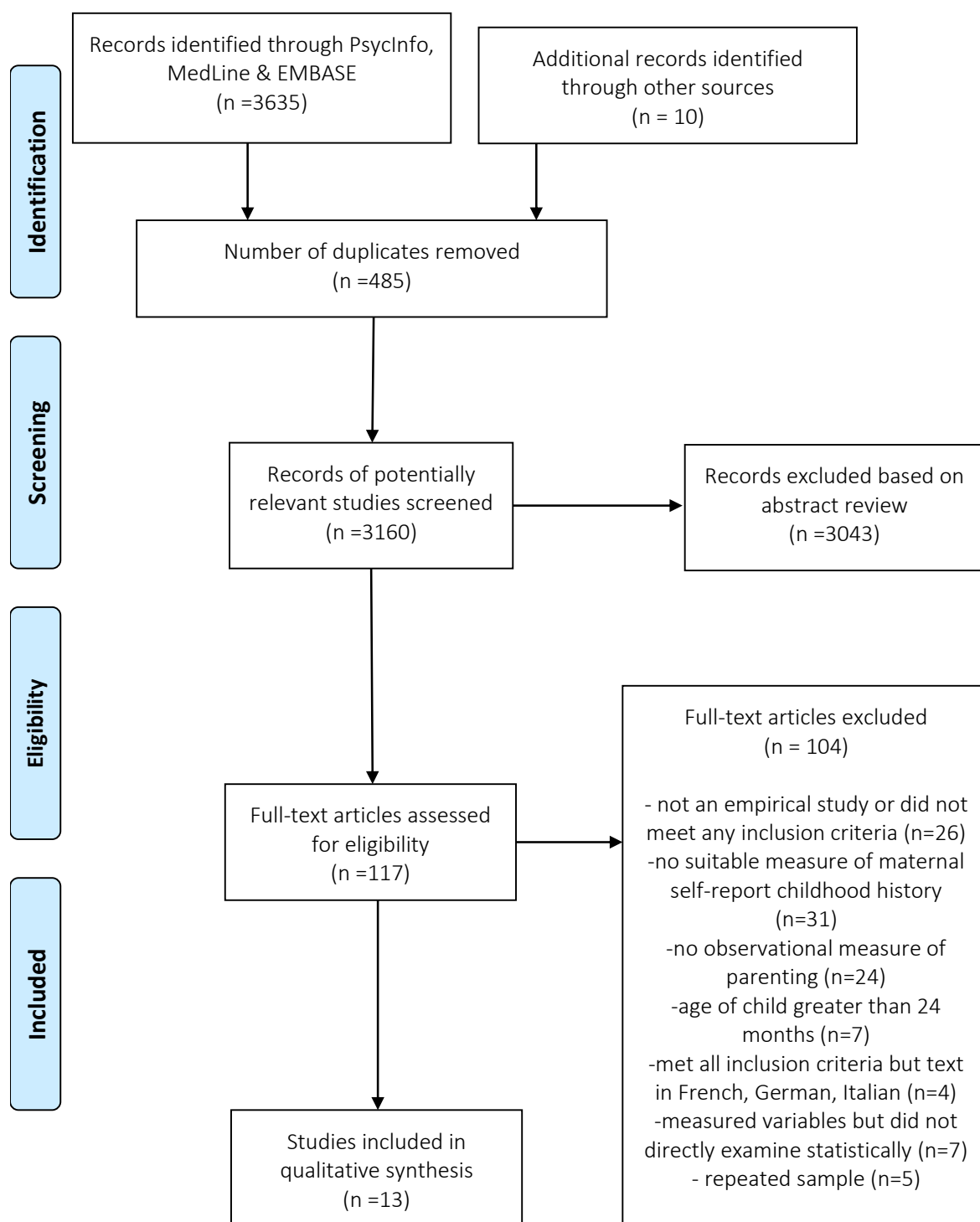


Figure 2. Study Findings by Methodological Quality

