ORIGINAL ARTICLE

Prenatal maternal personality as an early predictor of vulnerable parenting style

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Abstract

Perinatal mental health problems, particularly depression, are prevalent and have been a central focus of prevention initiatives. The greater proportion of ongoing annual perinatal mental health economic cost burdens relate to children. A key linking mechanism is mother-infant relationship quality. Perinatal depression symptoms are typically transient. However, personality style, including interpersonal sensitivity, is a more stable construct and predicts proneness to depression and common mental disorders. Building on our previous work, the objective of the present study is to examine the association between specific dimensions of prenatal interpersonal sensitivity and postpartum mother-infant relationship quality in the context of prenatal depression symptoms. We analysed data from the Avon Longitudinal Study of Parents and Children (ALSPAC). Interpersonal sensitivity and depression symptoms were measured at 18 weeks gestation. In a randomly selected 10% subsample of the ALSPAC cohort, mother-infant interaction was measured through standard observation at 12 months postpartum. For the subsample that had complete data at all time points ($n = 812$), multiple regression models examined prenatal interpersonal sensitivity dimensions predicting postpartum mother-infant relationship quality, accounting for depression symptoms. Two dimensions of maternal interpersonal sensitivity modestly predicted mother-infant relationship quality at 12 months postpartum and remained robust when we controlled for depression symptoms. The interpersonal sensitivity subscales were significantly associated with prenatal depression symptoms but more consistently and robustly predicted postnatal mother-infant interaction quality. The inclusion of personality measures may strengthen prenatal mental health assessment to identify vulnerability to suboptimal mother-infant relationship quality.

Keywords Prenatal · Personality · Child · Parenting · ALSPAC

Introduction

Maternal mental health problems during the perinatal period (conception to 12-months postpartum) are associated with a range of health and relational complications for mothers and their children (Howard et al. 2014; Prince et al. 2007). Perinatal mental health problems incur significant ongoing cost burdens for child-related services (Alink et al. 2009; Bauer et al. 2016, 2014, 2015; Moss et al. 2011). Owing to their high prevalence (estimates of 20%) and associated burdens (Bauer et al. 2014), it is imperative to undergo perinatal mental health screening (Brockington et al. 2017; Guintivano et al. 2018; Kendig et al. 2017; Long et al. 2018).

Depression symptoms, whilst linked to diagnosed perinatal depression (O'Connor et al. 2016), may also be an indicator of a woman's vulnerability to lifetime mental health problems (Patton et al. 2015). Severe and persistent maternal depression symptoms are associated with adverse mental health outcomes for children (Goodman et al. 2011; Netsi et al. 2018; Wang et al. 2017). A likely moderating factor is mother-infant relationship quality which encompasses dyadic processes, maternal sensitivity, responsivity or infant attachment (Provenzi et al. 2018; Raby et al. 2015; Shonkoff et al. 2009; Stein et al. 2014; Swain et al. 2014).

Perinatal depression symptoms typically fluctuate in intensity (Matthey and Ross-Hamid 2012). Personality traits, in contrast, are relatively stable over time and across situations

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(Fajkowska 2018) and therefore may more consistently associate with parenting style. Dysfunctional maternal personality traits have been linked to child and adolescent depression, anxiety and self-harm (Pearson et al. 2018a) and are considered more predictive of adverse child outcomes than other parental psychopathology (Rutter and Quinton 1984). Maternal personality disturbance has been related to risk for perinatal depression, suboptimal mother-infant relationship quality and impaired parenting style (Apter et al. 2012; Laulik et al. 2013; Smith-Nielsen et al. 2015, 2016). One personality trait of interest is interpersonal sensitivity.

Interpersonal sensitivity has been defined as 'undue and excessive awareness of, and sensitivity to, the behaviour and feelings of others' (Boyce and Parker 1989). As a personality trait, interpersonal sensitivity predicts proneness to depression in adults in general (Boyce et al. 1992) and women specifically during the perinatal period (Boyce et al. 1991b; Boyce 1994; Evans et al. 2005). It is predictive of at-risk mental state for psychosis (Masillo et al. 2012) and adult attachment insecurity (Otani et al. 2014). Interpersonal sensitivity is also associated with dysfunctional and overprotective parenting style (Otani et al. 2009a, b) and quality of maternal-infant caregiving (Boyce et al. 1991a).

Our previous analysis of Avon Longitudinal Study of Parents and Children (ALSPAC) data (Raine et al. 2016) found that a single assessment of prenatal interpersonal sensitivity provided a stronger independent predictor of mother-infant interaction quality at 12 months postnatal than depression symptoms measured at 18 and 32 weeks gestation and 8 and 21 months postpartum. A question emerged regarding which aspects of prenatal interpersonal sensitivity may be more predictive of postnatal mother-infant interaction quality, a question that is the focus of this investigation.

The focus of the present investigation is to build on our previous research to determine which aspects of prenatal interpersonal sensitivity are most predictive of postnatal mother-infant interaction quality. As interpersonal sensitivity was initially conceptualised as proneness to depression, we controlled for depression symptoms. The objective was to ascertain which interpersonal sensitivity subscales may contribute to prenatal identification of vulnerable mother-infant relationship quality.

Method

Data and sample

We analysed data from the ALSPAC, a longitudinal prospective study of women, their partners and index child (Boyd et al. 2013; Fraser et al. 2013). Details are available through a fully searchable data dictionary (http://www.bristol.ac.uk/alspac/researchers/our-data/). The ALSPAC cohort was 14,541 pregnant women residing in Avon, United Kingdom

(UK), with expected dates of delivery between 1 April 1991 and 31 December 1992. An estimated 85–90% of the eligible population took part (Heron et al. 2004). Of the initial pregnancies, there were a total of 14,676 foetuses, resulting in 14,062 live births and 13,988 children who were alive at year one (Boyd et al. 2013; Fraser et al. 2013). The ALSPAC cohort has been tracked from pregnancy to the present. A randomly selected 10% sample chosen from the last 6 months of ALSPAC births known as the Children in Focus (CiF) group attended clinics (1432 families attended at least one CiF clinic). Excluded were those mothers who had moved out of the area or were lost to follow-up and those partaking in another study of infant development in Avon.

At the clinic, parent-child interactions were observed using the Thorpe Interaction Measure (TIM) (Thorpe et al. 2003). The TIM is the outcome measure of focus for the present study. The prenatal predictor variables were depression symptoms measured by the Edinburgh Postnatal Depression Scale (EPDS) (Cox et al. 1987) and interpersonal sensitivity using the Interpersonal Sensitivity Measure (IPSM) (Boyce and Parker 1989).

Measures

Mother-infant interaction quality was assessed using the TIM, an observation protocol assessing both the way the parent instructs her young child and the qualities of the emotional relationship between them. The TIM observes a standard parenting activity, sharing a novel, 10-page picture book (without words). The book shows photographs of equivalent-age children (in this case 12 months) engaging in a range of activities typical for the child's age group (e.g. at a supermarket with mother). Using standard wording, the TIM asks the mother to share the book with her child in a way she would normally do at home. Interactions are coded in two ways:

I. *Engagement* of the interaction focuses on sustained shared interaction about the content including linking to the child's own world and is coded for presence (score 1) or absence (score 0) of seven behaviours for each of the ten pages: labelling/describing; short elaboration of pictures; long elaboration of pictures; concept structuring of pictures; linking pictures to child experiences; involving child *basic* (e.g. pointing/asking 'what', 'where', 'why') and involving child *engaged* (actively involves and extends, e.g. 'can you make a face like that'). The *Engagement* coding yields seven scores corresponding to each of the seven behavioural items (range 0–10). Higher scores correspond to greater engagement.

II. *Responsivity* coding of the interaction encompasses eight global ratings: physical proximity; non-verbal communication; verbal communication; control; warmth; mother's motivation; mother's reaction and familiarity with task. Initial scores are rated on a range of scales hence were rescaled to

a range of 0–10 and summed. Items were reversed when necessary so that higher scores corresponded to greater responsivity.

The TIM was developed for inclusion in the ALSPAC to capture qualities of parent-child interaction at scale and for which there is limited data on psychometric properties. During development, associations between both maternal mental health and child development outcomes were explored on small samples (Berryman and Windridge 1998). Data suggest the TIM is sensitive to differences in behaviour of mothers who are depressed versus non-depressed and is also predictive of child language outcomes (Thorpe et al. 2003). Contributions to psychometrics and predictive validity of the measure are ongoing (Pearson et al. 2012; Puckering 2004; Puckering et al. 2014; Thomson et al. 2014). All interactions ($N = 1400$) were video recorded to allow checking of individual coding. These recordings remain within the ALSPAC raw data stores. The TIM video data were coded by ALSPAC researchers trained in the rating method and blind to the status including the mental health of families. A subset ($n = 25$) was observed in situ by two raters (Patrick Bell and Karen Thorpe). Inter-rater reliability was calculated on this sample with high reliability (kappa < 0.7).

Depression symptoms were measured using the EPDS, a 10-item self-report scale that has been extensively used and shown to be valid in and outside the postnatal period. The EPDS was developed to counter the limitations of other well-established generic adult depression scales, has been validated by standardised psychiatric interviews with large samples and has well-documented reliability and validity (Affonso et al. 2000). The EPDS has 10 items, scored on a scale from 0 to 3 yielding a possible score range of 0 to 30. The EPDS score ranges are defined as follows: normal (0–9), sub-clinical/at-risk (10–12) and clinical (13–30).

Interpersonal sensitivity was assessed using the IPSM which comprises 36 items and five subscales: *Interpersonal-Awareness*, *Need-for-Approval*, *Separation-Anxiety*, *Timidity* and *Fragile-Inner-Self*.

It is an adult self-report questionnaire that takes approximately 5–10 min to complete. Each of the 36 items is scored on a 4-point Likert scale. The total score is the sum of item scores (range 36–144). Subscale scores are derived by adding the items loading on each factor. For both the total score and individual subscale scores, higher scores indicate higher interpersonal sensitivity. Boyce and Parker (1989) reported Cronbach's alpha of .85 in a cohort of general practice attendees. The Cronbach alpha for the subscales ranged from .67 to .80. Face validity for the IPSM was evaluated using clinical judgement and concurrent validity supported by its association with related personality constructs such as neuroticism.

As part of the ALSPAC, depression symptoms were assessed at numerous time points across the prenatal and parenting period. The present study used the measures of depression symptoms (EPDS) and interpersonal sensitivity (IPSM) obtained at 18 weeks gestation. Measurement of mother-infant interaction (*TIM-Engagement* and *TIM-Responsivity*) was assessed at 12 months postnatal. From the 36-item IPSM, we explored the association of mother-infant interaction quality (TIM) with each of the five IPSM subscales.

Analyses

Depression symptoms (EPDS) were controlled for in all analyses. Means, standard deviations and Pearson product moment correlations were examined for all study variables. IPSM subscales were entered as predictors in regression models based on significant correlations with the outcome variable. Models were assessed using the coefficient of determination (R^2). Multiple regression models predicting *TIM-Engagement* and *TIM-Responsivity* were conducted to determine the relative importance of the IPSM subscales. Individual models were constructed to predict TIM outcomes for each significantly associated IPSM subscale. This yielded three models for *TIM-Engagement* and a further three models for *TIM-Responsivity.* In each case, a fourth model then investigated the relative importance of these predictors when entered together. Statistical software used for the analyses was SPSS version 25.0 (IBM 2017).

Results

Complete data were available for 812 mother-infant dyads. Key demographic factors and maternal, perinatal and infant variables for the study and whole cohort ($N = 14,541$) are presented in Table 1. Whilst broadly similar, there are some modest differences.

Table 1 Maternal, perinatal and infant variables for study and whole cohorts. Data are means (SD) or percentages as appropriate

	Study cohort ($n = 812$)	Whole cohort ($N = 14,541$)
Birth weight (g)	3442.13 (513.33)	3392.01 (559.38)
Gestation (weeks)	39.51 (1.62)	39.39 (1.93)
Maternal age at delivery	29.06 (4.50)	27.99 (4.96)
Child gender male	51.4%	51.3%
Singleton	98.9%	97.4%
Primiparous	46.8%	44.6%
House mortgaged or owned	81.5%	73.4%
Marital status 1st marriage	73.8%	68.5%
Total married	80.9%	75.0%
Ever smoked	47.0%	50.7%
Education (highest) A level	25.6%	22.5%
Education degree or above	14.8%	12.9%
Ethnicity (mother) white	98.3%	97.4%

Table 2 Descriptive statistics and inter-correlations for all variables (*n* = 812)

	M	SD	TIM E	TIM R	IA	NA	SA	TM	FI	EPDS
TIM E	17.61	7.48	1	.663**	.112**	.128**	.015	.162**	.051	− .054
TIM R	56.17	11.60		1	.092**	.162**	− .001	.140**	.010	− .039
IA	18.34	4.64			1	.509**	.645**	.609**	.650**	.332**
NA	25.81	3.57				1	.314**	.537**	.223**	.103**
SA	16.22	4.63					1	.442**	.716**	.491**
TM	20.55	4.51						1	.386**	.107**
FI	8.67	2.98							1	.391**
EPDS	6.42	4.44								1

M mean, *SD* standard deviation, *TIM* Thorpe Interaction Measure, *TIM E* TIM-Engagement, *TIM R* TIM-Responsivity, *EPDS* Edinburgh Postnatal Depression Scale, *IA* interpersonal awareness, *NA* need for approval, *SA* separation anxiety, *TM* Timidity, *FI* Fragile Inner self. **$p < .01$

Descriptive statistics and inter-correlations for all measures are presented in Table 2. Correlations with EPDS scores and IPSM-subscales *Separation-Anxiety* and *Fragile-Inner-Self* scores were low and nonsignificant. Significant correlations in the range .10–.16 emerged for *Interpersonal-Awareness*, *Need-for-Approval* and *Timidity*. The IPSM-subscale *Timidity* was most strongly correlated with *TIM-Engagement* and the *Need-for-Approval* subscale was most strongly correlated with *TIM-Responsivity*. EPDS scores evidenced low-moderate association with all IPSM-subscales but not with TIM.

Whilst the correlations shown in Table 2 suggest IPSM subscales *Interpersonal-Awareness*, *Need-for-Approval* and *Timidity* and not EPDS are associated with TIM, the significant association of EPDS and IPSM presents the possibility of a more complex interrelationship. As scores on these IPSM subscales increase, there is a tendency for TIM scores to increase. Unsurprisingly, interpersonal sensitivity subscales and depression symptoms were associated. Previous research has

reported associations between depression symptoms and mother-infant interaction quality (Campbell et al. 2004; Carter et al. 2001; Murray et al. 2010, 1996). Considering this, regression analyses were conducted to determine the extent to which the IPSM subscales *Interpersonal-Awareness*, *Need-for-Approval* and *Timidity* predicted TIM (*Engagement* and *Responsivity*) scores whilst controlling for depression symptoms (models 1, 2 and 3). Inspection of residual histograms confirmed normal distribution for each of these models, satisfying the normality assumption as it applies to least squares regression. Results showing predictors of *TIM-Engagement* are presented in Table 3 and those showing predictors of *TIM-Responsivity* in Table 4.

For models 1, 2 and 3, the respective IPSM subscale remained a significant positive predictor when controlling for depression symptoms (Table 3). Further, in each case, EPDS scores contributed less variance to the model, reaching significance for models 1 and 3 being the models including *Interpersonal-Awareness* and *Need-for-Approval* respectively. Model 4 included the three

Table 3 Multiple regression models predicting TIM-Engagement

Model	Predictors	R^2	p_{model}	B	SE B	β
1	Interpersonal-Awareness	.022	< .001	0.235	0.059	.146***
	EPDS			− 0.172	0.062	− .102**
2	Need-for-Approval	.021	< .001	0.283	0.073	.135***
	EPDS			− 0.114	0.059	− .067
	Timidity	.031	< .001	0.281	0.058	.170***
3	EPDS			− 0.121	0.059	− .072*
	Interpersonal-Awareness	.035	<.001	0.067	0.078	.042
4	Need-for-Approval			0.110	0.089	.052
	Timidity			0.195	0.077	.118*
	EPDS			− 0.144	0.062	− .085*

TIM Thorpe Interaction Measure, *EPDS* Edinburgh Postnatal Depression Scale

*$p < .05$; **$p < .01$; ***$p < .001$

Table 4 Multiple regression models predicting TIM-Responsivity

Model	Predictors	R^2	p_{model}	B	SE B	β
1	Interpersonal-Awareness	.014	.004	0.294	0.093	.118**
	EPDS			−0.204	0.097	−.078*
2	Need-for-Approval	.029	< .001	0.545	0.113	.168***
	EPDS			−0.147	0.091	−.056
3	Timidity	.023	< .001	0.376	0.090	.146***
	EPDS			−0.143	0.091	−.055
4	Interpersonal-Awareness	.034	< .001	−0.002	0.120	−.001
	Need-for-Approval			0.409	0.139	.126**
	Timidity			0.205	0.120	.080
	EPDS			−0.157	0.097	−.060

TIM Thorpe Interaction Measure, *EPDS* Edinburgh Postnatal Depression Scale

*$p < .05$; **$p < .01$; ***$p < .001$

IPSM subscales *Interpersonal-Awareness*, *Need-for-Approval* and *Timidity* again controlling for depression symptoms. *Timidity* emerged as the strongest predictor of *TIM-Engagement*. In the presence of *Timidity*, *Interpersonal-Awareness* and Need-for-Approval did not make significant additional contributions to the model, whilst depression symptoms made a significant but smaller contribution.

For models 1, 2 and 3, the respective IPSM subscale remained a significant positive predictor when controlling for depression symptoms (Table 4). Further, in each case, EPDS scores contributed less variance to the model, only reaching significance in model 1, being the model including *Interpersonal-Awareness*. Model 4 included the three IPSM subscales *Interpersonal-Awareness, Need-for-Approval* and *Timidity* again controlling for depression symptoms. *Need-for-Approval* emerged as the strongest predictor of *TIM-Responsivity*. In the presence of *Need-for-Approval*, *Interpersonal-Awareness* and *Timidity* did not make significant additional contributions to the model. Similarly, depression symptoms did not make a significant contribution to the model. We also investigated the possibility of interaction between IPSM subscale scores and EPDS. In all cases, the interaction term was nonsignificant; hence, moderation models are not reported.

Discussion

We examined relations between interpersonal sensitivity (IPSM) subscales measured at 18 weeks gestation and mother-infant relationship quality (TIM) assessed 12 months postnatal. The IPSM subscales *Interpersonal-Awareness*, *Need-for-Approval* and *Timidity* were all found to be modestly and positively associated with postnatal TIM. Associations remained robust when controlled for prenatal depression symptoms. The three IPSM subscales each associated with prenatal depression symptoms but more consistently and robustly predicted postnatal TIM scores.

It is known that dysfunctional maternal personality traits are associated with adverse child mental health outcomes (Pearson et al. 2018a). We propose that dysfunctional maternal personality traits are a pathway to adverse child mental health outcomes through mother-infant interaction quality. It is possible that personality variations within the range of normality are also important and may signal vulnerable mother-infant relationship quality. The findings may reflect the unstable nature of depression symptoms and concurrent mental state at the time of TIM observation, or more complex interrelationships between variables. Our detailed exploration of prenatal interpersonal sensitivity subscales found different patterns of association for *TIM-Engagement* (a shared interaction measure focussed on contingency with infant in verbal and nonverbal maternal sensitivity inputs) and *TIM-Responsivity* (a global rating capturing emotional warmth and reciprocity in a relationship).

TIM-Engagement was significantly and positively associated with three interpersonal sensitivity subscales: *Timidity, Need-for-Approval* and *Interpersonal-Awareness*. Depression symptoms were negatively associated. *Timidity* and depression-symptoms remained predictors in a combined model. *Timidity* is a subdomain that measures lack of assertiveness for fear of upsetting others. The finding that higher *Timidity* subscale scores were associated with higher *TIM-Engagement* scores may be a methodological artefact reflecting the maternal response to being observed in a clinical setting. That is, higher *Timidity* associating in the direction of optimal maternal-infant engagement may be explained by a greater maternal focus on her infant (rather than the observation task). Focusing on the infant does not require interpersonal assertion and may favour observation and engaged mother-infant interactive behaviour.

TIM-Responsivity positively associated with *Timidity, Need-for-Approval* and *Interpersonal-Awareness* but not with depression symptoms. In a combined model, *Need-for-Approval* was the single remaining predictor. The personality subdomain *Need-for-Approval* identifies a dimension of wanting to be liked by others. As with *TIM-Engagement*, the finding may reflect a response relating to the clinic observation method, but this is unlikely. *TIM-Responsivity* is a global rating capturing emotional warmth and reciprocity in the relationship. As the infant is considered an integral part of the coding, the scale is less subject to coder bias. Higher *Need-for-Approval* associating in the direction of optimal maternal-infant responsivity may be explained by maternal desire to please and accept her infant's behaviour rather than controlling it.

Collectively, *TIM-Engagement* and *TIM-Responsivity* yield a score of mother-infant interaction quality analogous to a rating of maternal sensitivity (Bretherton 2013). The coding in both TIM scales is compared with other measures of maternal sensitivity (Ainsworth et al. 1978; Murray et al. 1996; Page et al. 2010). However, we acknowledge substantial variance in measurement methodology specific to mother-infant dyadic interaction (Provenzi et al. 2018). Our findings align with prior reports that personality traits associate with parenting style (Laulik et al. 2013; McCabe 2014; Prinzie et al. 2009). Importantly, they show that specific domains of interpersonal sensitivity may be more predictive of mother-infant interaction quality viz. maternal sensitivity. Other research shows that maternal sensitivity during infancy associates with children's social and academic competence through to adulthood (Raby et al. 2015). Prenatal identification of interpersonal sensitivity characteristics identified in the present study may enhance opportunities to identify women who may benefit from intervention to support mother-infant interaction with a view to optimising child outcomes. Given our study was conducted within a normative population and we treated interpersonal sensitivity as a continuous variable, our results suggest that it is mothers who evidence lower scores on the interpersonal sensitivity subscales (*Timidity* and *Need-for-Approval*) that are at greater risk for suboptimal relationship quality with their infant.

Strengths and limitations

We are confident that our study is important for theoretical reasons, in determining prenatal precursors of suboptimal parenting style. The ALSPAC provides a large population cohort from which we report that two dimensions of prenatal personality relating to interpersonal sensitivity (IPSM) predict postpartum mother-infant interaction quality (TIM). Whilst the ALSPAC dataset has many self-reported measures of parenting, the TIM is the only independent observational measure. Our findings are derived from a uniquely large parenting observation sample with data on prenatal interpersonal

sensitivity and depression symptoms. A limitation is that the TIM was specifically developed for observation at scale for which there is limited data on psychometric properties.

The associations between prenatal IPSM subscales and postnatal TIM may be attributable to other variables, including demographic factors, not investigated in the current study. Also, the ALSPAC cohort, recruited during pregnancy in 1991 from Avon, Britain, was largely white women who spoke English as their first language and, accordingly, the EPDS and IPSM self-report measures would have presented familiar language and concept styles. We acknowledge the need for studies specifically engaging contemporary and culturally diverse, including immigrant and refugee cohorts.

Notwithstanding limitations, these data suggest that the two IPSM subscales, each comprising 8-items, could be administered as a 16-item prenatal self-report measure. Recent publications have emphasised a refocusing of perinatal mental health initiatives to more specifically identify at-risk parenting style and thereby appropriately target mother-infant relational interventions (Judd et al. 2018b). The inclusion of a brief personality measure in prenatal mental health screening may enhance targeting of interventions for vulnerable parenting style.

Our findings suggest that prenatal personality style may be detected in the absence of depression symptoms. Personality measures should not be construed as an alternative to perinatal depression screening. Perinatal depression symptoms are increasingly prevalent (Pearson et al. 2018b), may be a marker of other psychopathology (Judd et al. 2018a) and psychological factors such as insecure attachment (Monk et al. 2008) or interpersonal violence (Woolhouse et al. 2012), and therefore potentially deleterious for mothers and children.

Conclusions

Our findings show that aspects of the personality domain, interpersonal sensitivity, measured early-mid pregnancy associate with postnatal mother-infant interaction quality. A measure of maternal personality traits may strengthen prenatal mental health screening to more appropriately guide targeting of early relational interventions potentially leading to a reduction in human and economic costs associated with maternal and child mental health problems.

Compliance with ethical standards

References

Affonso DD, De AK, Horowitz JA, Mayberry LJ (2000) An international study exploring levels of postpartum depressive symptomatology. J Psychosom Res 49:207–216. https://doi.org/10.1016/s0022-3999(00)00176-8

Ainsworth MDS, Blehar MC, Waters E, Wall SN (1978) Patterns of attachment: a psychological study of the strange situation. Earlbaum, Hillsdale

Alink LRA, Mesman J, van Zeijl J, Stolk MN, Juffer F, Bakermans-Kranenburg MJ, van IJzendoorn MH, Koot HM (2009) Maternal sensitivity moderates the relation between negative discipline and aggression in early childhood. Soc Dev 18:99–120. https://doi.org/10.1111/j.1467-9507.2008.00478.x

Apter G, Devouche E, Gratier M, Valente M, Le Nestour A (2012) What lies behind postnatal depression: is it only a mood disorder? J Personal Disord 26:357–367

Bauer A, Parsonage M, Knapp M, Iemmi V, Adelaja B (2014) The costs of perinatal mental health problems. Centre for Mental Health and London School of Economics, London

Bauer A, Pawlby S, Plant DT, King D, Pariante CM, Knapp M (2015) Perinatal depression and child development: exploring the economic consequences from a South London cohort. Psychol Med 45:51–61. https://doi.org/10.1017/s0033291714001044

Bauer A, Knapp M, Parsonage M (2016) Lifetime costs of perinatal anxiety and depression. J Affect Disord 192:83–90. https://doi.org/10.1016/j.jad.2015.12.005

Berryman JC, Windridge KC (1998) Motherhood after 35: mothers and four-year-olds; a report of the Leicester Mother & Child Project. Nestle UK Limited, York

Boyce PM (1994) Personality dysfunction, marital problems and postnatal depression. In: Cox J, Holden JM (eds) Perinatal psychiatry: use and misuse of the Edinburgh Postnatal Depression Scale. Gaskell, London, pp 82–102

Boyce P, Parker G (1989) Development of a scale to measure interpersonal sensitivity Australian and New Zealand. J Psychiatry 23:341–351

Boyce P, Hickie I, Parker G (1991a) Parents, partners or personality - risk-factors for postnatal depression. J Affect Disord 21:245–255. https://doi.org/10.1016/0165-0327(91)90004-c

Boyce P, Parker G, Barnett B, Cooney M, Smith F (1991b) Personality as a vulnerability factor to depression. Br J Psychiatry 159:106–114. https://doi.org/10.1192/bjp.159.1.106

Boyce P, Hickie I, Parker G, Mitchell P, Wilhelm K, Brodaty H (1992) Interpersonal sensitivity and the one-year outcome of a depressive episode. Aust N Z J Psychiatry 26:156–161. https://doi.org/10.3109/00048679209072022

Boyd A, Golding J, Macleod J, Lawlor DA, Fraser A, Henderson J, Molloy L, Ness A, Ring S, Davey Smith G (2013) Cohort profile: the 'children of the 90s'-the index offspring of the Avon Longitudinal Study of Parents and Children. Int J Epidemiol 42:111–127. https://doi.org/10.1093/ije/dys064

Bretherton I (2013) Revisiting Mary Ainsworth's conceptualization and assessments of maternal sensitivity-insensitivity. Attach Hum Dev 15:460–484. https://doi.org/10.1080/14616734.2013.835128

Brockington I, Butterworth R, Glangeaud-Freudenthal N (2017) An international position paper on mother-infant (perinatal) mental health, with guidelines for clinical practice. Arch Womens Ment Health 20: 113–120. https://doi.org/10.1007/s00737-016-0684-7

Campbell SB, Brownell CA, Hungerford A, Spieker SJ, Mohan R, Blessing JS (2004) The course of maternal depressive symptoms and maternal sensitivity as predictors of attachment security at 36 months. Dev Psychopathol 16:231–252. https://doi.org/10.1017/s0954579404044499

Carter AS, Garrity-Rokous EE, Chazan-Cohen R, Little C, Briggs-Gowan MJ (2001) Maternal depression and comorbidity: predicting early parenting, attachment security, and toddler social-emotional problems and competencies. J Am Acad Child Adolesc Psychiatry 40:18–26

Cox JL, Holden JM, Sagovsky R (1987) Detection of postnatal depression - development of the 10-item Edinburgh Postnatal Depression Scale. Br J Psychiatry 150:782–786. https://doi.org/10.1192/bjp.150.6.782

Evans J, Heron J, Lewis G, Araya R, Wolke D, Team AS (2005) Negative self-schemas and the onset of depression in women: longitudinal study. Br J Psychiatry 186:302–307. https://doi.org/10.1192/bjp.186.4.302

Fajkowska M (2018) Personality traits: hierarchically organized systems. J Pers 86:36–54. https://doi.org/10.1111/jopy.12314

Fraser A, Macdonald-Wallis C, Tilling K, Boyd A, Golding J, Davey Smith G, Henderson J, Macleod J, Molloy L, Ness A, Ring S, Nelson SM, Lawlor DA (2013) Cohort profile: the Avon Longitudinal Study of Parents and Children: ALSPAC mothers cohort. Int J Epidemiol 42:97–110. https://doi.org/10.1093/ije/dys066

Goodman SH, Rouse MH, Connell AM, Broth MR, Hall CM, Heyward D (2011) Maternal depression and child psychopathology: a meta-analytic review. Clin Child Fam Psychol Rev 14:1–27. https://doi.org/10.1007/s10567-010-0080-1

Guintivano J, Manuck T, Meltzer-Brody S (2018) Predictors of postpartum depression: a comprehensive review of the last decade of evidence. Clin Obstet Gynecol 61:591–603. https://doi.org/10.1097/grf.0000000000000368

Heron J, O'Connor TG, Evans J, Golding J, Glover V, Team AS (2004) The course of anxiety and depression through pregnancy and the postpartum in a community sample. J Affect Disord 80:65–73. https://doi.org/10.1016/j.jad.2003.08.004

Howard LM, Piot P, Stein A (2014) No health without perinatal mental health. Lancet 384:1723–1724

IBM (2017) IBM SPSS statistics for Windows, version 25.0, released 2017. IBM Corp, Armonk

Judd F, Lorimer S, Thomson RH, Hay A (2018a) Screening for depression with the Edinburgh Postnatal Depression Scale and finding borderline personality disorder. Aust N Z J Psychiatry. https://doi.org/10.1177/0004867418804067

Judd F, Newman LK, Komiti AA (2018b) Time for a new zeitgeist in perinatal mental health. Aust N Z J Psychiatry 52:112–116. https://doi.org/10.1177/0004867417741553

Kendig S, Keats JP, Hoffman MC, Kay LB, Miller ES, Moore Simas TA, Frieder A, Hackley B, Indman P, Raines C, Semenuk K, Wisner KL, Lemieux LA (2017) Consensus bundle on maternal mental health perinatal depression and anxiety. Obstet Gynecol 129:422–430. https://doi.org/10.1097/aog.0000000000001902

Laulik S, Chou S, Browne KD, Allam J (2013) The link between personality disorder and parenting behaviors: a systematic review. Aggress Violent Behav 18:644–655. https://doi.org/10.1016/j.avb.2013.07.017

Long MM, Cramer RJ, Jenkins J, Bennington L, Paulson JF (2018) A systematic review of interventions for healthcare professionals to

improve screening and referral for perinatal mood and anxiety disorders. Arch Womens Ment Health 22:25–36. https://doi.org/10.1007/s00737-018-0876-4

Masillo A, Day F, Laing J, Howes O, Fusar-Poli P, Byrne M, Bhattacharyya S, Fiori Nastro P, Girardi P, McGuire PK, Valmaggia LR (2012) Interpersonal sensitivity in the at-risk mental state for psychosis. Psychol Med 42:1835–1845. https://doi.org/10.1017/s0033291711002996

Matthey S, Ross-Hamid C (2012) Repeat testing on the Edinburgh Depression Scale and the HADS-A in pregnancy: differentiating between transient and enduring distress. J Affect Disord 141:213–221. https://doi.org/10.1016/j.jad.2012.02.037

McCabe JE (2014) Maternal personality and psychopathology as determinants of parenting behavior: a quantitative integration of two parenting literatures. Psychol Bull 140:722–750. https://doi.org/10.1037/a0034835

Monk C, Leight KL, Fang Y (2008) The relationship between women's attachment style and perinatal mood disturbance: implications for screening and treatment. Arch Womens Ment Health 11:117–129. https://doi.org/10.1007/s00737-008-0005-x

Moss E, Dubois-Comtois K, Cyr C, Tarabulsy GM, St-Laurent D, Bernier A (2011) Efficacy of a home-visiting intervention aimed at improving maternal sensitivity, child attachment, and behavioral outcomes for maltreated children: a randomized control trial. Dev Psychopathol 23:195–210. https://doi.org/10.1017/s0954579410000738

Murray L, FioriCowley A, Hooper R, Cooper P (1996) The impact of postnatal depression and associated adversity on early mother-infant interactions and later infant outcome. Child Dev 67:2512–2526. https://doi.org/10.2307/1131637

Murray L, Arteche A, Fearon P, Halligan S, Croudace T, Cooper P (2010) The effects of maternal postnatal depression and child sex on academic performance at age 16 years: a developmental approach. J Child Psychol Psychiatry 51:1150–1159. https://doi.org/10.1111/j.1469-7610.2010.02259.x

Netsi E, Pearson RM, Murray L, Cooper P, Craske MG, Stein A (2018) Association of persistent and severe postnatal depression with child outcomes. JAMA Psychiatry 75:247–253. https://doi.org/10.1001/jamapsychiatry.2017.4363

O'Connor E, Rossom RC, Henninger M, Groom HC, Burda BU (2016) Primary care screening for and treatment of depression in pregnant and postpartum women evidence report and systematic review for the US Preventive Services Task Force. Jama-J Am Med Assoc 315:388–406. https://doi.org/10.1001/jama.2015.18948

Otani K, Suzuki A, Matsumoto Y, Kamata M (2009a) Parental overprotection increases interpersonal sensitivity in healthy subjects. Compr Psychiatry 50:54–57. https://doi.org/10.1016/j.comppsych.2008.05.009

Otani K, Suzuki A, Shibuya N, Matsumoto Y, Kamata M (2009b) Dysfunctional parenting styles increase interpersonal sensitivity in healthy subjects. J Nerv Ment Dis 197:938–941. https://doi.org/10.1097/NMD.0b013e3181c29a4c

Otani K, Suzuki A, Matsumoto Y, Shibuya N, Sadahiro R, Enokido M (2014) Correlations of interpersonal sensitivity with negative working models of the self and other: evidence for link with attachment insecurity. Ann General Psychiatry 13:5. https://doi.org/10.1186/1744-859x-13-5

Page M, Wilhelm MS, Gamble WC, Card NA (2010) A comparison of maternal sensitivity and verbal stimulation as unique predictors of infant social-emotional and cognitive development. Infant Behav Dev 33:101–110. https://doi.org/10.1016/j.infbeh.2009.12.001

Patton GC, Romaniuk H, Spry E, Coffey C, Olsson C, Doyle LW, Oats J, Hearps S, Carlin JB, Brown S (2015) Prediction of perinatal depression from adolescence and before conception (VIHCS): 20-year prospective cohort study. Lancet 386:875–883. https://doi.org/10.1016/S0140-6736(14)62248-0

Pearson RM, Melotti R, Heron J, Joinson C, Stein A, Ramchandani PG, Evans J (2012) Disruption to the development of maternal responsiveness? The impact of prenatal depression on mother-infant interactions. Infant Behav Dev 35:613–626. https://doi.org/10.1016/j.infbeh.2012.07.020

Pearson RM, Campbell A, Howard LM, Bornstein MH, O'Mahen H, Mars B, Moran P (2018a) Impact of dysfunctional maternal personality traits on risk of offspring depression, anxiety and self-harm at age 18 years: a population-based longitudinal study. Psychol Med 48:50–60. https://doi.org/10.1017/s0033291717001246

Pearson RM, Carnegie RE, Cree C, Rollings C, Rena-Jones L, Evans J, Stein A, Tilling K, Lewcock M, Lawlor DA (2018b) Prevalence of prenatal depression symptoms among 2 generations of pregnant mothers: the Avon Longitudinal Study of Parents and Children. JAMA Netw Open 1:e180725. https://doi.org/10.1001/jamanetworkopen.2018.0725

Prince M, Patel V, Shekhar S, Maj M, Maselko J, Phillips MR, Rahman A (2007) Global mental health 1 - no health without mental health. Lancet 370:859–877. https://doi.org/10.1016/s0140-6736(07)61238-0

Prinzie P, Stams GJJM, Dekovic M, Reijntjes AHA, Belsky J (2009) The relations between parents' big five personality factors and parenting: a meta-analytic review. J Pers Soc Psychol 97:351–362. https://doi.org/10.1037/a0015823

Provenzi L, Scotto di Minico G, Giusti L, Guida E, Müller M (2018) Disentangling the dyadic dance: theoretical, methodological and outcomes systematic review of mother-infant dyadic processes. Front Psychol 9. https://doi.org/10.3389/fpsyg.2018.00348

Puckering C (2004) Mellow parenting, an intensive intervention to change relationships. Signal 12(1):1–5

Puckering C, Allely CS, Doolin O, Purves D, McConnachie A, Johnson PCD, Marwick H, Heron J, Golding J, Gillberg C, Wilson P (2014) Association between parent-infant interactions in infancy and disruptive behaviour disorders at age seven: a nested, case-control ALSPAC study. BMC Pediatr 14. https://doi.org/10.1186/1471-2431-14-223

Raby KL, Roisman GI, Fraley RC, Simpson JA (2015) The enduring predictive significance of early maternal sensitivity: social and academic competence through age 32 years. Child Dev 86:695–708. https://doi.org/10.1111/cdev.12325

Raine K, Cockshaw W, Boyce P, Thorpe K (2016) Antenatal interpersonal sensitivity is more strongly associated than perinatal depressive symptoms with postnatal mother-infant interaction quality. Arch Womens Ment Health 19:917–925. https://doi.org/10.1007/s00737-016-0640-6

Rutter M, Quinton D (1984) Parental psychiatric disorder - effects on children. Psychol Med 14:853–880

Shonkoff JP, Boyce WT, McEwen BS (2009) Neuroscience, molecular biology, and the childhood roots of health disparities building a new framework for health promotion and disease prevention. Jama-J Am Med Assoc 301:2252–2259

Smith-Nielsen J, Steele H, Mehlhase H, Cordes K, Steele M, Harder S, Vaever MS (2015) Links among high EPDS scores, state of mind regarding attachment and symptoms of personality disorder. J Personal Disord 29:771–793

Smith-Nielsen J, Tharner A, Steele H, Cordes K, Mehlhase H, Vaever MS (2016) Postpartum depression and infant-mother attachment

security at one year: the impact of co-morbid maternal personality disorders. Infant Behav Dev 44:148–158

Stein A, Pearson RM, Goodman SH, Rapa E, Rahman A, McCallum M, Howard LM, Pariante CM (2014) Effects of perinatal mental disorders on the fetus and child. Lancet 384:1800–1819

Swain JE, Kim P, Spicer J, Ho SS, Dayton CJ, Elmadih A, Abel KM (2014) Approaching the biology of human parental attachment: brain imaging, oxytocin and coordinated assessments of mothers and fathers. Brain Res 1580:78–101. https://doi.org/10.1016/j.brainres.2014.03.007

Thomson RM, Allely CS, Purves D, Puckering C, McConnachie A, Johnson PCD, Golding J, Gillberg C, Wilson P (2014) Predictors of positive and negative parenting behaviours: evidence from the ALSPAC cohort. BMC Pediatr 14. https://doi.org/10.1186/1471-2431-14-247

Thorpe K, Rutter M, Greenwood R (2003) Twins as a natural experiment to study the causes of mild language delay: II: family interaction risk factors. J Child Psychol Psychiatry Allied Discip 44:342–355. https://doi.org/10.1111/1469-7610.00126

Wang C, Williams KE, Shahaeian A, Harrison LJ (2017) Early predictors of escalating internalizing problems across middle childhood. Sch Psychol Q 33:200–212. https://doi.org/10.1037/spq0000218

Woolhouse H, Gartland D, Hegarty K, Donath S, Brown SJ (2012) Depressive symptoms and intimate partner violence in the 12 months after childbirth: a prospective pregnancy cohort study. BJOG 119:315–323. https://doi.org/10.1111/j.1471-0528.2011.03219.x