Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

eMethod

Multiple Imputation for Missing Data

Given that there is substantial information on socio-demographic variables in ALSPAC which predict missingness, missing information can be assumed dependent on observed data. Thus, we employed a fully conditional specification using the MICE [1] algorithm in STATA 11 to impute missing data. Each imputation model used all variables in the analyses (including interactions), socio-demographic indicators of missingness and predictors of maternal, paternal and offspring depression (full list available on request) to predict missing data across 75 imputed datasets. Earlier measures of offspring adolescent depression and early temperament were used to predict later offspring depression at 18 [1]. Monte-Carlo errors were less than 10% of the standard error and FMI values were no larger than 0.7 [1]. Analyses were conducted post-imputation, combining estimates across the 75 imputed data sets using Rubin's rules[1].

eResults 1

Association Between Maternal Depression and Confounding Variables

Compared to women scoring below EPDS thresholds, women exceeding thresholds antenatally were more likely to: have low education (chi^2 (1) 83, p<0.001), lower social classes (chi^2 (5) 90, p<0.001), be multiparous (chi^2 (1) 16, p<0.001), have a history of depression (chi^2 (1) 473, p<0.001), smoke (chi^2 (1) 173, p<0.001) and were on average one year younger (95% CI 0.9 to 1.3 years , p<0.001). Similar effects were seen for PND. Amongst women exceeding thresholds for PND, those with high education compared to those with low education, were more likely to breastfeed (chi2=241, p<0.001) and to use non-parental childcare (chi2 64, p<0.0001).

Women exceeding thresholds postnatally, were more likely to have low education (chi^2 (1) 16, p<0.001), to come from lower social classes (chi^2 (5) 38, p<0.001), be multiparous (chi^2 (1) 26, p<0.001), to have a history of depression (chi^2 (1) 372, p<0.001), to smoke (chi^2 (1) 84, p<0.001) and were on average 0.3 years younger (95% CI 0.1 to 0.5 years , P = .007).

eTable 1. Demographic Variables of the Sample With and Without Outcome Data for the Child at 18 Years

	Core ALSPAC Sample Lacking Exposure or Outcome Data n=4680	Exposure Data Available n=8937	Exposure and Outcome Data Available n=3374
Female offspring	2245 (48%)	4347 (49%)	1883 (56%)
Maternal Education			
Up to 16 only	1927 (68%)	5146 (60%)	1664 (51%)
Up to 18 or more	902 (32%)	3380 (40%)	1626 (49 %)
Social Class			
1	86 (4%)	493 (6%)	265 (9%)
2	618 (29%)	2466 (32%)	1142 (37%)
3	1057 (50%)	3906 (51%)	1399 (46%)
4 or 5	350 (17%)	832 (11%)	255 (8%)
Mean (SD) Age of Mother	27 (5.2)	29 (4.6)	30 (4.4)
Mean (SD) Mothers Depression Score during pregnancy	8.1 (4.9)	6.7 (4.3)	6.3 (4.1)
First Born	1709 (45%)	3951 (45%)	1610(48%)

eResults 2

Moderation Effects

The aim of this analysis was to replicate the moderation effects (see Results section of the main paper) using a different approach. In this secondary analysis, the interaction between maternal education and both AND and PND was investigated in a *combined* model. In order to include both effects in the same model, we derived a single categorical variable representing the mother's pattern of AND and PND. Binary measures of depression (see below) in each period were used to create 4 groups representing each possible pattern of AND and PND. This resulted in a 4 level categorical variable: L/ L (low levels at both timings), H/ L (high levels at the antenatal timing only), L/H (high levels at the postnatal timing only) and H/H (high levels at both timings). L/L was the reference category. This categorical variable is referred to as the pattern of AND and PND. The interaction between the pattern of AND and PND and maternal education was investigated to test the hypothesis that there is an interaction between maternal education and postnatal-only (L/H) and *not* antenatal-only (H/L) depression.

For this analysis only, we used the lower (>9) threshold to define high and low levels of maternal depression. We used this threshold because validation studies show that this threshold maximizes sensitivity for including milder depression[2;3]. This in turn increased the power to compare antenatal-only and postnatal-only groups in this more complex model.

As shown in eTable 1, there was evidence for an interaction between the pattern of AND and PND and maternal education. This interaction was explained by an interaction between maternal education and postnatal only (L/H) but *not* antenatal-only (H/L) depression. Stratified analyses show that the effect of postnatal-only depression was limited to mothers with low education. This pattern of results replicates the primary moderation analyses.

eTable 2. Odds Ratios for Offspring Depression According to Mothers' Pattern of Antenatal and Postnatal Depression, Stratified by Maternal Education

Pattern of AND and PND	Group Comparison	Whole Sample N=3335	High Maternal Education N=1644	Low Maternal Education N=1691	Interaction Term	Test for Interaction Using Likelihood Ratio Test for Model With and Without Interaction
Antenatal only (n=436)	(H/L compared to L/L)	1.46 (1.02 to 2.08) P = .040	1.42 (0.88 to 2.28) P = .144	1.58 (0.91 to 2.73) P = .103	1.1 (0.54 to 2.30) P = .774	Overall interaction chi2 = 9.92 P = .022
Postnatal only (n=170)	(L/H compared to L/L)	1.16 (0.64 to 2.09) P = .62	0.33 (0.08 to 1.37) P = .127	2.14 (1.08 to 1.37) P = .028	0.15 (0.03 to 0.75) P = .020	
Both (n=358)	(H,H compared to L/L)	1.68 (1.16 to 2.43) P = .006)	1.14 (0.59 to 2.19) P = .694	2.11 (1.33 to 3.34) P = .001	0.54 (0.24 to 1.20) P = .130	

eReferences

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3. Hewitt C, Gilbody S, Brealey S, et al. Methods to identify postnatal depression in primary care: an integrated evidence synthesis and value of information analysis. Health Technology Assessment 13[36], 1-230. 2009. England, NLM.