Impact of dysfunctional maternal personality traits on risk of offspring depression, anxiety and self-harm at age 18 years: a population-based longitudinal study

R. M. Pearson1*, A. Campbell1, L. M. Howard2, M. H. Bornstein3, H. O'Mahen4, B. Mars1 and P. Moran1

1Centre for Academic Mental Health, School of Social and Community Based Medicine, University of Bristol, Bristol, UK
2Women’s Mental Health, Kings College London, London, UK
3Eunice Kennedy Shriver National Institute of Child Health and Human Development, Bethesda, MD, USA
4Mood Disorders Centre, University of Exeter, Exeter, UK

Background. The impact of underlying parental psychological vulnerability on the future mental health of offspring is not fully understood. Using a prospective cohort design, we investigated the association between dysfunctional parental personality traits and risks of offspring self-harm, depression and anxiety.

Methods. The association between dysfunctional parental personality traits (monotony avoidance, impulsivity, anger, suspicion, and detachment), measured in both mothers and fathers when offspring were age 9 years, and risk of offspring depression, anxiety and self-harm at age 18 years, was investigated in a population-based cohort (ALSPAC) from over 8000 parents and children.

Results. Higher levels of dysfunctional maternal, but not paternal, personality traits were associated with an increased risk of self-harm, depression, and anxiety in offspring. Maternal associations were best explained by the accumulation of dysfunctional traits. Associations were strongest for offspring depression: Offspring of mothers with three or more dysfunctional personality traits were 2.27 (1.45–3.54, \( p < 0.001 \)) times as likely to be depressed, compared with offspring of mothers with no dysfunctional personality traits, independently of maternal depression and other variables.

Conclusions. The accumulation of dysfunctional maternal personality traits is associated with the risk of self-harm, depression, anxiety in offspring independently of maternal depression and other variables. The absence of associations for equivalent paternal traits makes a genetic explanation for the findings unlikely. Further research is required to elucidate the underlying mechanism. Mothers with high levels of dysfunctional personality traits may benefit from additional support to reduce the risk of adverse psychological outcomes occurring in their offspring.

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Introduction

Common mental disorders, notably depression, are among the leading causes of global disease burden (Whiteford et al. 2015). Understanding childhood risk factors for these disorders is essential to develop effective prevention and intervention strategies. A number of maternal characteristics are acknowledged risk factors for offspring mental health disorders, including young maternal age, low maternal education and income, and maternal mental health problems (Stein et al. 2014). Risk associated with such maternal factors appears to operate, at least in part, through the link between these characteristics and parenting style. Problematic parenting behaviours are, in turn, associated with offspring risk of developing mental health disorders (Kazdin, 1997; Collins et al. 2000). To date, some key maternal characteristics remain relatively overlooked. One prominent candidate is maternal personality. The American Psychological Association defines personality as ‘individual differences in characteristic patterns of thinking, feeling and behaving’. Personality determines behaviours towards others, and so aspects of maternal personality that are less functional in the role of motherhood are likely to exert an adverse influence on the emotional development of children.
Previous cross-sectional studies report that maternal neuroticism is associated with lower mother-reported parenting competence and satisfaction and offspring behavioural problems (Nigg & Hinshaw, 1998). However, there are many other aspects of personality that are not so intimately linked to the depression/anxiety/neuroticism cluster and have not been investigated in relation to offspring mental health problems. Of particular interest are personality traits associated with less affectionate parenting (Leerkes et al., 2015), such as suspicion (Sanz et al., 2010) and anger (Meier & Robinson, 2004; Ode et al., 2008), as well as impulsivity/sensation seeking, which are associated with inconsistent and over-reactive parenting (Chen & Johnston, 2007).

Although there is little research into the impact of these dysfunctional personality traits in population studies of mothers on child outcomes, a body of research has examined the impact of maternal personality disorders on offspring. Personality disorders represent the extreme end of dysfunctional personality traits and are associated with severe problems with interpersonal functioning. It is important to investigate the role of the underlying dysfunctional personality traits in parents, both because such traits may amplify the adverse effects of parental mental illness on a child but also because they may influence the child irrespective of parental mental health. The most heavily studied category of personality disorder in relation to parenting is Borderline Personality Disorder (BPD), a condition characterised by a pervasive pattern of instability in interpersonal relationships and self-image as well as marked impulsivity, novelty seeking, and suspicion of others. Compared with healthy mothers, previous studies have reported that mothers with BPD are less sensitive (Crandell et al., 2003; Newman et al., 2007), more intrusive (Crandell et al., 2003; Hobson et al., 2005), more hostile (Herr et al., 2008), and more overprotective (Feldman et al., 1995; Elliot et al., 2014) in their interactions with their offspring. Moreover, the children of mothers with BPD are more likely to display a disrupted attachment style (Abela et al., 2005; Hobson et al., 2005; Herr et al., 2008; Hobson et al., 2009; Macfie & Swan, 2009), and social withdrawal and emotion dysregulation (Crandell et al., 2003; White et al., 2011). By middle childhood, offspring of BPD mothers appear to have socio-emotional deficits (Barnow et al., 2006; Schacht et al., 2013; Elliot et al., 2014) as well as display a range of cognitive biases (Abela et al., 2005). All of these characteristics are early precursors of later common mental disorders. Two small clinical cross-sectional studies report associations between BPD in mothers and elevated risk of adolescent depressive disorders (Abela et al., 2005) and suicidal ideation (Barnow et al., 2006).

Limitations of previous work

The majority of studies reporting adverse impacts of maternal personality traits on offspring outcomes have been limited to small clinical samples and cross-sectional designs. Clinical samples may be subject to selection bias and represent a particularly poorly functioning subset of women in need of help from clinical services. This inability to function, rather than personality dysfunction per se, may explain associated poorer child and parenting outcomes. Cross-sectional designs cannot provide information regarding temporal associations. Furthermore, these studies have not had adequate sample sizes or included data to separate the effects of dysfunctional personality traits from the confounding effects of surrounding adversities. Mothers with dysfunctional personality traits and disorders are more likely to parent in the context of significant additional risk factors (Barnow et al., 2006; Crittenden & Newman, 2010; White et al., 2011), and the indirect effects of those circumstances could lead to poorer child outcomes. Finally, genetic vulnerability may account for both maternal dysfunctional personality and child mental health, but prior studies have not explored this possibility. Given these methodological limitations, relations between dysfunctional maternal personality traits and later offspring outcomes at the level of the general populations remain unclear.

Using data from a large population study, we set out to investigate the relation between dysfunctional maternal personality traits measured at age 9 years and key mental health outcomes (depression, anxiety and self-harm) of their children at age 18 years. The study also aimed to investigate whether, if present, the associations were independent of maternal depression and other key surrounding adversities. The social and health burden associated with personality disorder is closely linked to the severity of underlying disturbance, as indexed by the number of underlying dysfunctional traits (Yang et al., 2010; Tyrer et al., 2015; Moran et al., 2016). With this in mind, we tested whether the risks of offspring depression, anxiety and self-harm were associated with the number of maternal dysfunctional personality traits. To assess the specificity of any maternal effects, we investigated the role of equivalent paternal personality traits. If genetic or environmental confounding explains associations with maternal factors, comparable associations would be expected for equivalent paternal factors. This is because father and mothers provide equal contribution to child DNA and usually share the home environment. In contrast, maternal-specific associations would provide evidence for maternal dominant environmental pathways. One potentially maternal dominate pathway is parenting given that mothers are usually the primary care-giver especially in the early years.
Hypotheses

We set out to test the following primary hypothesis:

(1) At the level of the general population, dysfunctional maternal personality traits at child age 9 years will be associated with an increased risk of offspring mental health problems at age 18 years.

We also set out to test the following secondary hypotheses:

(2) That greater risk will be associated with the presence of greater numbers of dysfunctional maternal personality traits.

(3) That any associations will be independent of maternal depression.

Method

The sample comprised participants from the Avon Longitudinal Study of Parents and Children (ALSPAC), an ongoing population-based study. The study website contains details of all data available through a fully searchable data dictionary (http://www.bris.ac.uk/alspac/researchers/data-access/data-dictionary). Ethical approval for the study was obtained from the ALSPAC Ethics and Law Committee and the Local Research Ethics Committees. In total, 15,247 pregnant mothers residing in the former Avon Health Authority in the south-west of England with expected dates of delivery between 1 April 1991 and 31 December 1992 were recruited to the study. These pregnancies resulted in 14,775 live births, of which 14,701 were alive at 1 year of age. (For further details on the cohort profile, representativeness, and phases of recruitment, see Boyd et al. 2012; Fraser et al. 2012).

Here, we used data from ALSPAC mothers and offspring where mothers completed a personality assessment when the child was age 9, of these mothers 3629 offspring participants also completed the CIS-R at 18 years. Complete data for the exposure, outcome, and all covariates were available for 2793 mothers and children and 1857 fathers and children. However, using the substantial information on missing data and repeated measures we were able to impute missing data up to the sample of mothers and children with complete maternal personality data at age 9 and at least one previous measure of offspring self-harm and depressed mood (n = 8035).

Parental personality at age 9

Dysfunctional personality traits in mothers and fathers were assessed using the Karolinska Scales of Personality (KSP) inventory (Gustavsson, 1997). The KSP is a self-report questionnaire measuring 15 personality traits relevant to psychological functioning and vulnerability to psychiatric disorders. It was developed to measure aspects of personality related to vulnerability for psychopathology rather than providing comprehensive coverage of all personality dimensions and has been widely used in psychopathology research. The 15 traits are measured in sub-scales for somatic anxiety, psychic anxiety, muscular tension, psychasthenia, inhibition of aggression, irritability, guilt, socialization, social desirability, monotony avoidance, impulsivity, verbal aggression, indirect aggression, suspicion and detachment. The majority of these sub-scales relate to neuroticism, a trait which itself is strongly related to state depression/anxiety (Luciano et al. 2012). Trait and state depression/anxiety and neuroticism are widely reported to be associated with offspring mental health. Therefore, we selected five traits a priori [Monotony Avoidance (novelty seeking), Impulsivity, Verbal Anger, Suspicion and Detachment] reflective of relational and affect dysregulation, and which are theoretically distinct from the neuroticism domain. Correlations between these personality traits and depressed mood are given in etable1 and as demonstrated by the relatively low correlations (r < 0.5), the traits are related but distinct from depressed mood. With the exception of impulsivity, maternal and paternal personality traits showed small positive correlations (ranging from r correlations of 0.1–0.2).

Outcome measures at age 18

Children completed a self-administered computerized version of the Clinical Interview Schedule – Revised (CIS-R; Lewis, 1994). This interview assesses symptoms across multiple domains, and computer algorithms are used to identify current psychiatric disorders according to ICD-10 diagnostic criteria. This computerized version demonstrates good agreement with interviewer assessment (Lewis, 1994). The following outcomes were investigated.

Depressive disorder

A binary variable (depressed, not depressed); cases were those with a primary diagnosis of mild, moderate, or severe depression.

Anxiety disorders

A binary variable (presence, absence) of any of the following five anxiety disorders: generalized anxiety disorder, social phobia, specific (isolated) phobia, panic disorder, or agoraphobia according to ICD-10 criteria.
Self-harm

Assessed using the CIS-R, participants were classified as having a lifetime history of self-harm if they responded positively to the question ‘have you ever hurt yourself on purpose in any way (e.g. by taking an overdose of pills or by cutting yourself)?’

Potential confounding variables

We adjusted on a priori grounds for the following socio-demographic and family factors: maternal education (highest level achieved), maternal age at child birth (years), maternal binge drinking in offspring’s early childhood (frequency mother drinks more than 4 units of alcohol), maternal depression during the postnatal period taken as the average score on the Edinburgh Postnatal Depression Scale (EPDS) measured at 2 months and 8 months postpartum as used in previous studies (see Stein et al. 2014), maternal smoking (mother ever smoked), financial difficulties, family income, maternal reports of intimate partner violence and child gender.

Statistical analysis

First, we conducted a series of separate logistic regression analyses to test associations between each maternal personality trait (standardised continuous scores) and risk of offspring self-harm, depression, and anxiety. These models were repeated, mutually adjusting for other personality traits to investigate whether any particular trait-outcome association was independent of the effects of other personality traits. These models were repeated in the same way for paternal personality traits.

To investigate the cumulative impact of combined maternal personality traits, we grouped women’s scores on each personality trait into quartiles. We then identified women having a score in the top quartile as being high on that trait and derived a count of the number of top quartile personality traits. This ordinal variable was then regressed on each outcome in further logistic regression models. The risk of outcomes at each level of this variable and the linear association across levels were explored. Finally, we adjusted all associations for potential confounding variables.

To extend these analyses and further understand the role of having high levels across all dysfunctional personality traits, rather than the effects of each trait in isolation, we derived a latent factor representing the shared variance in all personality traits. Individuals who are high on this latent variable would show high scores across all traits. We initially derived latent factors for each of the five maternal personality constructs using confirmatory factor analysis. To model the variance shared amongst these factors, a bi-factor, latent variable based on shared variance among these five factors was derived by cross loading all items onto their specific factor as well as a general factor (using confirmatory factor analysis), see Fig. 1. Model fit for this variable was good RMSEA < 0.01 and CFI > 0.8. This model is shown in Fig. 1. We then explored the association between this general latent factor for personality dysfunction and observed binary variables as above for depression, anxiety, and self-harm at 18, using a weighted least squares (WLSMV) estimator due to categorical outcomes. However, to aid interpretation of the latent approach alongside the regression models, we also extracted the factor score generated from the latent model and regressed this onto the binary outcomes using logistic regression models.

Characteristics of the complete case sample compared with partial responders and the rest of the ALSPAC sample have been explored in detail elsewhere and there is evidence that missing data are predictable from partial observed data. We therefore examined the impact of missing data on our results by repeating analyses using 60 datasets with multiply imputed missing values by chained equations (Royston, 2009; see online Supplement for full details). We imputed up to a sample with complete maternal personality measures and at least one offspring mood and self-harm measure at any time point (n = 8035). All analyses were undertaken using Stata v15 and MPlus (for the latent variable analysis).

Results

Characteristics of mothers according to number of dysfunctional personality traits are given in Table 1. There were clear dose-response associations between the number of high dysfunctional maternal personality traits and high-risk maternal characteristics, with particularly noticeable differences in mothers with three or more high personality traits.

Associations between individual maternal personality traits and offspring mental health

Main effects

As shown in Table 2, higher scores across most dysfunctional maternal personality traits were associated with increased risk of offspring mental health problems. Mutually adjusted models suggested that most associations were not independent. However, high levels of maternal suspicion had an independent effect across outcomes and maternal impulsivity had an independent effect on offspring depression.
As shown in Table 3, there was no evidence for an association between any dysfunctional personality traits in fathers and offspring mental health. We did not explore paternal variables in any further analyses.

The impact of mothers having multiple dysfunctional personality traits on offspring mental health

Accumulation of high traits

As shown in Table 4, dose-response associations emerged between the number of high dysfunctional maternal personality traits and offspring risk of self-harm, depression, and anxiety. There was evidence that associations with self-harm and anxiety weakened with confidence intervals (CIs) including the null following adjustments, indicating that these associations may be confounded by surrounding adversities. With the additional power (and reduction of bias) in the post-imputation sample, however, we found evidence for an association with self-harm. Clear associations were observed for offspring depression even after including adjustment variables and in both complete case and imputed data (Fig. 2).

Latent variable approach

We explored the association between the shared variance latent variable for dysfunctional personality traits (Fig. 1) and self-harm, depression, and anxiety using regression in a structural equation model using Mplus. There was strong statistical evidence that this latent variable was associated with offspring mental health outcomes, standardised path coefficient (can be interpreted as correlations) = 0.161 \( p < 0.001 \) for depression; 0.159 \( p < 0.001 \) for self-harm; and 0.141 \( p = 0.001 \) for anxiety disorders. We also investigated the association between the saved factor score and outcomes in a logistic regression model to aid comparability with the main analysis described.
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Frequencies and characteristics of mothers with increasing numbers of high personality dysfunction traits

| Trait Description | Low/moderate on all personality traits N = 3290 (42%) | High on 1 N = 2024 (26%) | High on 2 N = 1301 (17%) | High on 3+ N = 1248 (16%) | p value for differences across groups, using χ^2 |
|-------------------|-----------------------------------------------------|---------------------------|--------------------------|---------------------------|-----------------------------------|
| Low maternal education (only GCSES) | N = 1620 (54%) | N = 977 (55%) | N = 646 (57%) | N = 640 (64%) | p < 0.001 |
| Low family income (based on median split of absolute income) | N = 1329 (49%) | N = 774 (48%) | N = 528 (52%) | N = 545 (62%) | p < 0.001 |
| Financial problems | N = 453 (14%) | N = 363 (19%) | N = 228 (19%) | N = 267 (25%) | p < 0.001 |
| Young mother at birth of child (<20 years) | N = 138 (4%) | N = 115 (6%) | N = 86 (7%) | N = 114 (10%) | p < 0.001 |
| Daily drinking postnatally (+4 units) | N = 77 (3%) | N = 56 (3%) | N = 27 (3%) | N = 56 (6%) | p < 0.001 |
| Postnatal depression (>12 EPDS score) | N = 126 (4%) | N = 155 (8%) | N = 149 (13%) | N = 197 (19%) | p < 0.001 |
| Maternal smoking (ever smoked) | N = 1554 (51%) | N = 947 (52%) | N = 626 (55%) | N = 631 (62%) | p < 0.001 |
| Maternal suicide attempt (mother reported) | N = 21 (0.7%) | N = 23 (1%) | N = 27 (2%) | N = 52 (5%) | p < 0.001 |
| Maternal self-harm (child reported) | N = 16 (0.8%) | N = 11 (1%) | N = 2 (0.3%) | N = 25 (4%) | p < 0.001 |
| Never married | N = 278 (9%) | N = 213 (12%) | N = 143 (12%) | N = 190 (19%) | p < 0.001 |
| No partner during pregnancy | N = 19 (1%) | N = 10 (1%) | N = 8 (1%) | N = 18 (2%) | p = 0.009 |
| Physically abused by partner (mother reported) | N = 93 (3%) | N = 77 (4%) | N = 62 (5%) | N = 103 (10%) | p < 0.001 |
| Emotionally abused by partner (mother reported) | N = 157 (5%) | N = 118 (6%) | N = 101 (9%) | N = 150 (15%) | p < 0.001 |
| Mum sexually abused as child (mother reported) | N = 79 (3%) | N = 78 (4%) | N = 66 (6%) | N = 79 (7%) | p < 0.001 |
| Mum physically abused as child (mother reported) | N = 83 (3%) | N = 84 (5%) | N = 80 (7%) | N = 111 (11%) | p < 0.001 |

Strengths and limitations

To our knowledge, this is the first prospective large-scale longitudinal study of the long-term impact of dysfunctional maternal personality traits on risk of offspring mental health problems. The associations were independent of paternal personality traits. Inclusion of a wide range of covariates, and latent variable analysis to examine the impact of offspring depression (OR 1.3 (1.2–1.7, p < 0.001)) and anxiety (OR 1.4 (1.2–1.4, p < 0.001)) with these dysfunctional personality traits, was no evidence for any association between personality and offspring depression. Overall, however, the importance of the combined variance between all five maternal traits and offspring depression was best explained by the combination of multiple dysfunctional personality traits. Indeed, there was no evidence for any association with paternal personality traits in middle childhood. Discussion

In this large population cohort, high levels of dysfunctional maternal personality traits at age 18 years were associated with increased risk of serious mental health problems in offspring. The associations were strongest for offspring depression and self-harm (OR 1.5 (1.2–1.7, p < 0.001)). This analysis further supports the interpretation that the combined variance explained by latent variables, including personality, is most important for offspring mental health.
Monotony avoidance measured early in the child’s life. We did adjust for maternal depression taken at the same time as the personality factors. In addition, there was no measure of maternal depression taken at the same time as the personality measures, however, we did adjust for maternal depression measured early in the child’s life. We were also not able to look at parenting measures. Although ALSPAC recorded parenting, these data were collected many years prior to the assessment of personality, and thus did not allow us to investigate the mediating effect of parenting. It would be important to investigate the mediating role of parenting in future studies of personality and offspring outcomes.

Another limitation is the potential role of bias due to high attrition in ALSPAC. However, given that there is substantial information on the characteristics of mothers and offspring who drop out, the nature of this bias can be explored by using this existing information to impute missing values. Results were similar using imputed data suggesting that the effects of this potential bias were not substantial.

**Potential explanations and mechanisms**

Observational studies alone cannot provide evidence that maternal personality traits cause offspring mental health problems. However, some informed speculation of mechanisms is possible. Mothers with dysfunctional personality traits may live in adverse circumstances per se. That said, we adjusted for a wide range of variables in regression models, and the associations remained relatively unchanged, suggesting that surrounding

| Table 2. Logistic regression to test associations between maternal personality traits (standardised continuous scores) and risk of offspring self-harm, depression, and anxiety at 18, firstly in separate models and then mutually adjusted for other personality traits |
|---|---|---|
| | Odds ratio (95% CI) for child self-harm at 18 | Odds ratio (95% CI) for child depression at 18 | Odds ratio (95% CI) for child anxiety at 18 |
| | Unadjusted | Mutually adjusted | Unadjusted | Mutually adjusted | Unadjusted | Mutually adjusted |
| Monotony avoidance | 1.14 (1.05–1.24) | 1.06 (0.95–1.17) | 1.21 (1.07–1.35) | 1.12 (0.99–1.28) | 1.04 (0.89–1.22) | 1.00 (0.84–1.19) |
| p = 0.003 | p = 0.289 | p = 0.002 | p = 0.082 | p = 0.001 | p = 0.589 | p = 0.972 |
| Suspicion | 1.21 (1.11–1.32) | 1.17 (1.06–1.3) | 1.23 (1.09–1.38) | 1.15 (0.99–1.35) | 1.29 (1.11–1.5) | 1.19 (0.98–1.46) |
| p = 0.000 | p = 0.002 | p = 0.001 | p = 0.072 | p = 0.001 | p = 0.001 | p = 0.081 |
| Impulsivity | 1.07 (0.98–1.17) | 0.98 (0.89–1.09) | 1.25 (1.11–1.4) | 1.17 (1.03–1.33) | 1.1 (0.94–1.27) | 1.07 (0.91–1.26) |
| p = 0.112 | p = 0.749 | p = 0.000 | p = 0.014 | p = 0.227 | p = 0.424 |
| Anger | 1.14 (1.04–1.24) | 1.08 (0.97–1.19) | 1.15 (1.02–1.4) | 1.04 (0.91–1.19) | 1.03 (0.88–1.2) | 0.97 (0.82–1.16) |
| p = 0.005 | p = 0.144 | p = 0.021 | p = 0.558 | p = 0.747 | p = 0.752 |
| Detachment | 1.09 (1.00–1.19) | 1.08 (0.99–1.18) | 1.16 (1.03–1.3) | 1.05 (0.91–1.2) | 1.2 (1.04–1.39) | 1.12 (0.94–1.33) |
| p = 0.046 | p = 0.092 | p = 0.013 | p = 0.508 | p = 0.014 | p = 0.219 |

| Table 3. Logistic regressions to test associations between paternal personality traits (standardized continuous scores, so the OR represent increased odds for each 1 s.d. increase in the score) and risk of offspring self-harm, depression, and anxiety at 18. |
|---|---|---|
| Paternal traits | Odds ratio (95% CI) for child self-harm at 18 | Odds ratio (95% CI) for child depression at 18 | Odds ratio (95% CI) for child anxiety at 18 |
| | Unadjusted | Mutually adjusted | Unadjusted | Mutually adjusted | Unadjusted | Mutually adjusted |
| Monotony avoidance | 1.11 (0.98–1.26) | 0.85 (0.70–1.02) | 1.12 (0.90–1.39) |
| p = 0.089 | p = 0.084 | p = 0.325 |
| Suspicion | 1.07 (0.94–1.22) | 0.88 (0.72–1.07) | 1.08 (0.86–1.35) |
| p = 0.317 | p = 0.186 | p = 0.511 |
| Impulsivity | 1.10 (0.97–1.25) | 0.87 (0.72–1.05) | 1.13 (0.91–1.40) |
| p = 0.130 | p = 0.150 | p = 0.275 |
| Anger | 1.08 (0.95–1.23) | 0.83 (0.69–1.01) | 1.06 (0.84–1.33) |
| p = 0.215 | p = 0.056 | p = 0.616 |
| Detachment | 0.98 (0.86–1.12) | 0.96 (0.79–1.15) | 0.91 (0.72–1.15) |
| p = 0.756 | p = 0.643 | p = 0.452 |

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### Table 4. Logistic regressions to test associations between the number of dysfunctional maternal personality traits and offspring self-harm, depression, and anxiety at 18. Complete cases (n = 2793 in all models) and post imputation for missing data (n = 8035)

| Low/moderate on all personality dysfunction | Odds ratio (95% CI) for child self-harm by 18 | Odds ratio (95% CI) for child depression by 18 | Odds ratio (95% CI) child anxiety at 18 |
|--------------------------------------------|---------------------------------------------|---------------------------------------------|----------------------------------------|
|                                            | Unadjusted | Adjusted* | Adjusted model | Unadjusted | Adjusted* | Adjusted model | Unadjusted | Adjusted* | Adjusted model |
| Low on 1                                   | REF        | REF       | REF           | 1.14 (0.88–1.49) | 1.11 (0.85–1.46) | 1.10 (0.92–1.32) | 1.42 (0.98–2.07) | 1.42 (0.97–2.08) | 1.28 (0.99–1.65) |
| High on 1                                  |            |           |               | 1.28 (1.14–1.58) | 1.26 (1.04–1.41) | 1.26 (1.04–1.58) | 1.42 (1.22–2.72) | 1.77 (1.17–2.68) | 1.57 (1.17–2.11) |
| High on 2                                  |            |           |               | 1.34 (1.26–1.75) | 1.28 (0.94–1.73) | 1.26 (1.04–1.41) | 1.82 (1.22–2.72) | 1.77 (1.17–2.68) | 1.57 (1.17–2.11) |
| High on 3+                                 |            |           |               | 2.33 (1.53–3.53) | 2.27 (1.45–3.54) | 2.27 (1.45–3.54) | 1.94 (1.39–2.7)  | 1.57 (1.17–2.11) | 1.57 (1.17–2.11) |
| Linear trend                               | p = 0.007  | p = 0.088  | p = 0.014     | p < 0.001         | p < 0.001         | p < 0.001         | p < 0.001         | p < 0.001         | p < 0.001         |

![Adjusted model](https://doi.org/10.1017/S0033291717001246)

*Maternal education (highest level achieved), maternal age (years), maternal binge drinking in offspring’s early childhood (frequency mother drinks more than 4 units of alcohol), maternal depression (EPDS), maternal smoking (mother ever smoked), child gender, family income, financial problems and mothers report of partner violence during the index child’s childhood.

**Implications**

The current findings demonstrate the potential importance of supporting mothers with high levels of dysfunctional maternal personality traits. Although we did not explore parenting in this study, we hypothesize that there may be a small positive correlation between maternal personality traits and offspring mental health, and thus a different impact on parenting. Our findings could suggest that the personality traits found to be most predictive of offspring mental health may be explained by personality traits having a different meaning or manifestation in mothers and fathers, and thus a different impact on parenting. Our findings may be explained by personality traits having a different meaning or manifestation in mothers and fathers, and thus a different impact on parenting.

Finally, harsh punishment and hostile parenting may be related to anger, impulsivity, and suspiciousness in mothers. The lack of association between paternal personality traits and offspring mental health may be explained by personality traits having a different meaning or manifestation in fathers, and a different impact on parenting. Our findings may be explained by personality traits having a different meaning or manifestation in fathers, and a different impact on parenting.

Second, inconsistent or chaotic maternal parenting (i.e., behaviors that oscillate between high stimulation and disengagement) may be a consequence of under- and overstimulation, with elevated stress and poor emotional regulation in mothers. Early punishment is associated with elevated stress and poor emotional regulation in mothers, and thus a different impact on parenting.

Third, maternal personality traits may manifest in behavior and thus a different impact on parenting. Our findings suggest that the personality traits found to be most predictive of offspring mental health may be explained by personality traits having a different meaning or manifestation in mothers and fathers, and thus a different impact on parenting.

There are three main areas in which dysfunctional maternal personality traits manifest in behavior and thus a different impact on parenting. First, suspiciousness and detachment on the part of the mother may result in unavailability and disengagement in mothers. Second, inconsistent or chaotic maternal parenting (i.e., behaviors that oscillate between high stimulation and disengagement) may be a consequence of under- and overstimulation, with elevated stress and poor emotional regulation in mothers. Early punishment is associated with elevated stress and poor emotional regulation in mothers, and thus a different impact on parenting.

Increasing difficulties for the child, during interactions with their parents, may be related to anger, impulsivity, and suspiciousness in mothers. Over time this may manifest in self-harm outcomes, particularly relevant in the development of self-harm risk associations. Maternal personality traits may manifest in behavior and thus a different impact on parenting.

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traits could be used to flag specific maternal support needs. The acceptability of routinely identifying this population of mothers requires empirical testing – the potential risks of stigma need to be weighed against the gains (resulting from early effective help). Moreover, an effective intervention is likely to require multiple components tackling not only maternal dysfunctional personality traits (for example by using elements of established treatments such as Dialectical Behavioural Therapy or Mentalization-Based Therapy) but also surrounding environmental adversities, as well as the specific parenting challenges. Nevertheless, our findings shed important light on a hitherto neglected population of mothers and their offspring, whose needs require greater scientific understanding and wider societal acknowledgement.

Fig. 2. Percentage of offspring with self-harm, depression and anxiety disorders at 18 years of age, according to number of maternal personality traits.
Supplementary material

The supplementary material for this article can be found at https://doi.org/10.1017/S0033291717001246.

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References

Abela JR, Skitch SA, Auerbach RP, Adams P (2005). The impact of parental borderline personality disorder on vulnerability to depression in children of affectively ill parents. Journal of Personality Disorders 19, 68–83.

Baram TZ, Davis EP, Obenaus A, Sandman CA, Small SL, Solodkin A, Stern H (2012). Fragmentation and unpredictability of early-life experience in mental disorders. American Journal of Psychiatry 169, 907–915.

Barnow, S, Spitzer C, Grabe HJ, Kessler C, Freyberger HJ, (2006). Individual characteristics, familial experience, and psychopathology in children of mothers with borderline personality disorder. J Am Acad Child Adolesc Psychiatry 45, 965–972.

Boyd A, Golding J, Macleod J, Lawlor DA, Fraser A, Henderson J, Molloy L, Ness A, Ring S, Smith GD (2012). Cohort profile: the ‘children of the 90s’ – the index offspring of the Avon Longitudinal Study of Parents and Children. International Journal of Epidemiology 42, 111–127.

Chen M, Johnston C (2007). Maternal inattention and impulsivity and parenting behaviors. Journal Clinical Child Adolescent Psychiatry 36, 455–468.

Collins WA, Maccoby EE, Steinberg L, Hetherington EM, Bornstein MH (2000). Contemporary research on parenting. The case for nature and nurture. American Psychologist 55, 218–232.

Crandell LE, Patrick MP, Hobson RP (2003). ‘Still-face’ interactions between mothers with borderline personality disorder and their 2-month-old infants. British Journal of Psychiatry 183, 239–247.

Crittenden PM, Newman L (2010). Comparing models of borderline personality disorder: mothers’ experience, self-protective strategies, and dispositional representations. Clinical Child Psychology Psychiatry 15, 433–451.

Delavenne A, Gratier M, Devouche E, Apter G (2008). Phrasing and fragmented time in “pathological” mother-infant vocal interaction. Musicae Scientiae 12, 47–70.

Elliott RL, Campbell L, Hunter M, Cooper G, Melville J, Mccabe K, Newman L, Loughland C (2014). When I look into my baby’s eyes . . . infant emotion recognition by mothers with borderline personality disorder. Infant Mental Health Journal 35, 21–32.

Feldman RB, Zelkowitz P, Weiss M, Vogel J, Heyman M, Paris J (1995). A comparison of the families of mothers with borderline and nonborderline personality-disorders. Comprehensive Psychiatry 35, 157–163.

Fraser A, Macdonald-Wallis C, Tilling K, Boyd A, Golding J, Smith GD, Henderson J, Macleod J, Molloy L, Hess A (2012). Cohort profile: the Avon Longitudinal Study of Parents and Children: ALSPAC mothers cohort. International Journal of Epidemiology 42, 97–110.

Gustavsson JP (1997). Validity and Stability of Self-reported Personality Traits. Contributions to the Evaluation of the Karolinska Scales of Personality. PhD Thesis, Stockholm: Karolinska Institutet.

Hallquist MN, Hipwell AE, Stepp SD (2015). Poor self-control and harsh punishment in childhood prospectively predict borderline personality symptoms in adolescent girls. Journal Abnormal Psychology 124, 549–564.

Herr NR, Hammen C, Brennan PA (2008). Maternal borderline personality disorder symptoms and adolescent psychosocial functioning. Journal Personality Disorder 22, 451–465.

Hobson RP, Patrick M, Crandell L, Garcia-Perez R, Lee A (2005). Personal relatedness and attachment in infants of mothers with borderline personality disorder. Developmental Psychopathology 17, 329–347.

Hobson RP, Patrick MP, Hobson JA, Crandell L, Bronfman E, Lyons-Ruth K (2009). How mothers with borderline personality disorder relate to their year-old infants. British Journal of Psychiatry 195, 325–330.

Kazdin AE (1997). Parent management training: evidence, outcomes, and issues. Journal of the American Academy of Child Adolescent Psychiatry 36, 1349–1356.

Leerkes EM, Supple AJ, O’brien M, Calkins SD, Haltigan JD, Wong MS, Fortuna K (2015). Antecedents of maternal sensitivity during distressing tasks: integrating attachment, social information processing, and psychobiological perspectives. Child Development 86, 94–111.

Lewis G (1994). Assessing psychiatric disorder with a human interviewer or a computer. Journal of Epidemiology and Community Health 48, 207–210.

Luciano M, Huffman JE, Arias-Vasquez A, Vinkhuyzen AAE, Middeldorp CM, Giegling I, Payton A, Davies G, Zgaga L, Janzing J, Ke X, Galesloot T, Hartmann AM, Ollier W, Tenesa A, Hayward C, Verhagen M, Willemsen G, Konneth H, Montgomery GW, Hottinga JJ, Korte B, Starr JM, Vitart V, Vos PE, Madden PAF, Petrov V, Bogdanova E, Verhagen M, Horan MA, Porteous DJ, Campbell H, Vermeulen SH, Heath AC, Wright A, Polasek O, Kovacevic SB, Hestie ND, Franke B, Boomsma DI, Martin NG, Rujescu D, Wilson JF, Buitelaar J, Pendleton N, Rudan I, Deary IJ
(2012). Genome-wide association uncovers shared genetic
effects among personality traits and mood states. American
Journal of Medical Genetics Part B-Neuropsychiatric Genetics
159B, 684–695.
Macfie J, Swan SA (2009). Representations of the
caregiver-child relationship and of the self, and emotion
regulation in the narratives of young children whose
mothers have borderline personality disorder.
Developmental Psychopathology 21, 993–1011.
Meier BP, Robinson MD (2004). Does quick to blame mean
quick to anger? The role of agreeableness in dissociating
blame and anger. Personality and Social Psychology Bulletin
30, 856–867.
Moran P, Romaniuk H, Coffey C, Chanen A, Degenhardt
L, Borschmann R, Patton GC (2016). The influence of
personality disorder on the future mental health and
social adjustment of young adults: a
population-based, longitudinal cohort study. Lancet
Psychiatry 3, 636–645.
Newman LK, Stevenson CS, Bergman LR, Boyce P (2007).
Borderline personality disorder, mother-infant interaction
and parenting perceptions: preliminary findings. Australia
N Z Journal Psychiatry 41, 598–605.
Nock MK (2009). Why do people hurt themselves? New
insights into the nature and functions of self-injury. Current
Directions Psychological Science 18, 78–83.
Nigg JT, Hinshaw SP (1998). Parent personality traits and
psychopathology associated with antisocial behaviors in
childhood attention-deficit hyperactivity disorder. Journal
Child Psychology Psychiatry 39, 145–159.
Ode S, Robinson MD, Wilkowsi BM (2008). Can one’s
temper be cooled? A role for agreeableness in moderating
neuroticism’s influence on anger and aggression. Journal of
Research in Personality 42, 295–311.
Royston P (2009). Multiple imputation of missing values:
further update of ice, with an emphasis on categorical
variables. Stata Journal 9, 466–477.
Sanz J, Garcia-Vera MP, Magan I (2010). Anger and hostility
from the perspective of the Big Five personality model.
Scandinavian Journal of Psychology 51, 262–270.
Schacht R, Hammond L, Marks M, Wood B, Conroy S
(2013). The relation between mind-mindedness in mothers
with borderline personality disorder and mental state
understanding in their children. Infant and Child
Development 22, 68–84.
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.
Tyrer P, Reed GM, Crawford MJ (2015). Classification,
assessment, prevalence, and effect of personality disorder.
Lancet 385, 717–726.
White H, Flanagan TJ, Martin A, Silvermann D (2011).
Mother-infant interactions in women with borderline
personality disorder, major depressive disorder, their
co-occurrence, and healthy controls. Journal of Reproductive
and Infant Psychology 29, 223–235.
Whitleford HA, Ferrari AJ, Degenhardt L, Feigin V, Vos T
(2015). The global burden of mental, neurological and
substance use disorders: an analysis from the global burden
of disease study 2010. PLoS ONE 10(2): e0116820.
Yang M, Coid J, Tyrer P (2010). Personality pathology
recorded by severity: national survey. British Journal
Psychiatry 197, 193–199.