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# Risk and protective factors associated with maternal mental health in mothers of children with autism spectrum disorder

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ABSTRACT

*Background:* Mothers of children with Autism Spectrum Disorder (ASD) experience lower maternal mental health outcomes than mothers of children from other populations, including children with intellectual and developmental disorders.
*Objectives:* This study explored risk factors associated with maternal mental health. Several factors including maternal resilience, social support, coping, optimism and family functioning acted as protective factors between child behavioural and emotional problems and maternal mental health.
*Methods:* Mothers of 70 children completed a cross-sectional online survey. Twenty-two children were diagnosed with ASD, 16 children were diagnosed with Dyslexia (DYS) and 32 children had no special educational needs diagnosis (NO SEND).
*Results:* Mothers of children with ASD demonstrated greater maternal mental health problems compared to mothers of children with DYS and NO SEND. Socioeconomic status (SES), child diagnosis, child gender, and child behavioural and emotional problems were significant risk factors associated with reduced maternal mental health. Maternal resilience, family functioning, and practical coping served as protective factors, moderating the relationship between child behavioural and emotional problems and maternal mental health. There is little evidence to suggest social support, optimism, and wishful thinking were protective factors in this relationship between child behavioural and emotional problems and maternal mental health.
*Implications:* There is a need to support mothers of children with ASD through interventions to promote and increase their mental health.

## 1. Introduction

Autism spectrum disorder (ASD) is a neurological disorder characterised by difficulties in social interactions, patterns of communication and repetitive behaviours and/or interests (American Psychological Association, 2013). ASD has an estimated prevalence of approximately 1% of the general population (Green et al., 2005). Children with ASD are reported to experience higher levels of behavioural and emotional difficulties (i.e., anxiety, hyperactivity) when compared to children with intellectual disabilities and typically developing (TD) peers (Brereton et al., 2006; Hastings, 2008; Hebron & Humphrey, 2014). Systematic reviews and meta-analyses have demonstrated an association between child behavioural and emotional problems and parental psychological

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distress among parents of children with ASD (Barroso et al., 2018; Yorke et al., 2018). Junior et al. (2016) found that severe behavioural symptoms in the child increased the likelihood of severe anxiety and depression symptoms in the parents by a factor of 35. Specifically, mothers of children of ASD are at an increased risk of experiencing higher levels of stress, anxiety and depression than mothers of typically developing children, or other neurodevelopmental disorders (e.g., Down's Syndrome) (Blacher & McIntyre, 2006; Kousha et al., 2016; Craig et al., 2016). Blacher and McIntyre (2006) and Hastings (2008) concluded when behavioural problems of children with ASD are controlled for, the psychological well-being of parents is no different from parents of other populations. This may indicate the presence of ASD itself may not be a factor for these differences, but rather the associated behavioural difficulties in children.

Several additional factors have been identified as relevant to this association between child behavioural and emotional problems and maternal mental health, including age, gender, and socio-economic status. Parents of younger children with ASD reported increased levels of stress, and more behavioural problems in their child with ASD, compared to parents of older children (Schieve et al., 2011; Maskey et al., 2013). In addition, mothers of male children with ASD reported poorer mental health and higher stress when compared with mothers of female children with ASD (Zablotsky et al., 2013). Finally, socioeconomic status (SES) has been identified as a risk factor associated with significantly lower maternal mental health among mothers of children with ASD (Zhou et al., 2019). Lower maternal education is related to greater anxiety and depressive symptoms in mothers of children with ASD than of mothers from higher educational backgrounds (Zhou et al., 2019). In a systematic review and meta-analysis, Yorke et al. (2018) identified increased maternal age was associated with lower stress and anxiety among mothers of children with ASD.

However, it should be noted not all mothers of children with ASD and Intellectual and developmental disabilities experience difficulties (Singer, 2006), as a study concluded 60% of mothers of children with IDD did not report clinical levels of emotional disturbances (Totsika et al., 2011b). Therefore, there is variability in the effect of child behavioural and emotional problems on parental psychological outcomes. There remains a limited amount of literature exploring protective factors in the established association between child behavioural and emotional problems and maternal mental health among mothers of children with ASD. Protective factors are defined as reducing negative outcomes and exposure to risk (Fergus & Zimmerman, 2005). The concept of *resilience* may explain why some mothers can successfully adapt to having a child with ASD. Resilience is defined as a "*process wherein individuals display positive adaptation despite experiences of significant adversity or trauma*" (Luthar & Cicchetti, 2000, p. 858). Resilience may act as a protective factor against negative outcomes associated with raising a child with ASD, such as increased anxiety and depression (Bitsika et al., 2013), with positive associations with parental mental health, including lower levels of depression (Ekas et al., 2010).

There are two coping styles; *problem-focused coping* (e.g. planning, taking-action), and *emotion-focused coping* (e.g. denial, wishful thinking) (Folkman & Lazarus, 1986). Coping styles have been reported to be a moderator between stressors (e.g. life events) and negative outcomes (e.g. depression) among parents of children with ASD (Dunn et al., 2001). An emotion-focused coping style has been reported to have a negative relationship with well-being among mothers of pre-school aged children with ASD (Smith et al., 2008). Similarly, parents utilising a problem-focused coping style have been reported as having more positive mental health outcome than parents using an emotion-focused coping style (Abbeduto et al., 2004; Smith et al., 2008). However, Hastings et al. (2005) found no significant difference in avoidance coping (similar construct to emotion-focused coping) in parents of pre-schoolers and school-aged children. Therefore, the literature has indicated the type of coping style utilised is associated with the variation in parental psychological outcomes.

Social support has been reported to have moderating effects on child behavioural problems and parenting stress (Plant & Sanders, 2007). Social support is an environmental variable that may act as a buffer or act as a protective factor to parental mental health and well-being (Dunn et al., 2001). Halstead et al. (2018a) reported when social support was perceived as greater, it moderated the relationships between child behavioural and emotional problems and maternal outcomes, including depression and life satisfaction. Furthermore, family support is associated with increased optimism, a predictor of positive maternal outcomes and a decline in maternal outcomes, including depression and stress (Ekas et al., 2010). Personality traits are correlated with stress in the form of either optimism or pessimism. Optimism is a sense of hope for the future, a key resilience process for families (Walsh, 2003). In a longitudinal study, optimism was reported to moderate the relationship between child behavioural and emotional problems and maternal well-being among mothers of children with developmental delays and disabilities (Blacher et al., 2013).

Sobotková (2004) has identified family functioning to influence family resilience. Mothers of children with ASD perceived lower levels of family adaptability (Gau et al., 2012) and family cohesion (Higgins et al., 2005). In addition,positive family functioning mediated the effect of stress on mental health among parents of children with ASD (Johnson et al., 2011). The literature into coping and social support serving as protective factors are emerging, while the evidence of optimism and family functioning remain limited. However, it can be demonstrated that these factors are associated with maternal mental health and children behavioural and emotional problems.

The current study explored two hypotheses. First, that mother's characteristics (age, SES, family size) and child characteristics (age, gender, diagnosis and child behavioural and emotional problems) are risk factors associated with maternal mental health in mothers of children with ASD. Second, that maternal resilience, social support, coping, optimism and family functioning would serve as moderating/protective factors, between child behavioural and emotional problems and maternal mental health. Specifically, when the protective factors are high, maternal mental health will be greater.

## 2. Methodology

### 2.1. Participants

Participants included 70 mothers of children aged between 6-16 years old ($M = 10.83$, $SD = 2.99$) who reported their child to have a primary diagnosis with either ASD ($N = 22$), DYS ($N = 16$) or NO SEND ($N = 32$). Fifty-four percent of the children were male, with 30% reported to have a secondary diagnosis present (e.g., attention deficit hyperactive disorder), and 10% reported to have an additional health condition(s) (e.g., eczema). The NO SEND group was defined as having no primary diagnosis of ASD or dyslexia. Mothers reported their child ethnicities as White (30%), Mixed (11%), Black (13%), Asian/South Asian (21%), Arab (9%), Hispanic/Latino (4%) and other (12%). All mothers identified themselves as primary caregivers and were aged between 27- 52 years ($M = 38.5$, $SD = 6.08$). The majority were of white ethnicity (36%; see Table 1). If families had more than one child, mothers completed data on their eldest child, and were instructed to complete the survey once. A full summary of the mothers' demographic information including ethnicity, education, marital status, family size, employment and income is presented in Table 1.

### 2.2. Procedure

Mothers were recruited via social media (e.g. Twitter, Facebook) targeting parental support groups and networks, and all mothers were UK residents. Mothers were asked to complete a consent form to progress into the online survey via Qualtrics © due to wide accessibility and uptake. Data were collected cross-sectionally to broaden participation numbers. Eligibility criteria were mothers of children aged between below 16 years that had no diagnosis of any learning disability or difficulty, or a diagnosis of dyslexia, or autism spectrum disorder. All participants provided informed consent and were debriefed at the end of the survey. Ethical approval for the study was obtained by a UK institutional review board.

### 2.3. Measures

#### 2.3.1. Demographics questionnaire

Demographic information for children included age, gender, ethnicity, primary and secondary diagnoses. Mother's demographic information included age, ethnicity, educational level, marital status, family size, employment status and monthly income (see *participants*).

#### 2.3.2. Child behavioural and emotional problems

The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) was used to measure child behavioural and emotional problems. The SDQ is a 25-item questionnaire which consists of five subscales (*Emotional Symptoms*, *Conduct Problems*, *Hyperactivity/Inattention*, *Peer Relationships*, *Prosocial Behaviour*, and *Total Difficulties Score*. The 3-point Likert scale range from 0 (*not true*) to

**Table 1**
Sociodemographic information of mothers.

| Variable | | *n* | % |
|---|---|---|---|
| Ethnicity | White | 25 | 36 |
| | Mixed | 1 | 1 |
| | Black | 11 | 16 |
| | Asian/South Asian | 16 | 23 |
| | Arab | 6 | 9 |
| | Hispanic/Latino | 3 | 4 |
| | Other | 8 | 11 |
| Educational Level | Masters/Doctoral Level | 11 | 16 |
| | Degree level | 31 | 44 |
| | A-levels (or equivalent) | 13 | 19 |
| | GCSEs level | 9 | 11 |
| | No Education/Qualifications | 6 | 9 |
| Marital Status | Single/in a relationship/separated/ divorced/widowed | 27 | 39 |
| | Married | 43 | 61 |
| Family Size | $\leq 2$ | 4 | 6 |
| | 3-4 | 31 | 45 |
| | 5 | 22 | 32 |
| | $\geq 6$ | 12 | 17 |
| Employment Status | Full-time | 36 | 51 |
| | Part-time | 17 | 24 |
| | Self-employed | 1 | 1 |
| | Unemployed | 16 | 23 |
| Monthly Income | $\leq$ £1,600 (low) | 27 | 44 |
| | £1,600-£3,000 (medium) | 23 | 38 |
| | $\geq$ £3000-£4,000 or above (high) | 11 | 18 |

2 (*certainly true*). A total difficulties score was summed together using all subscales, excluding prosocial behaviour, with higher scores indicating greater difficulties. The items relate to child behaviours present in the last six months. Good internal consistency (.79) has been found for the SDQ (Emerson & Einfeld, 2010). In the current study, the Cronbach's alpha for each subscale was *Emotional Symptoms* (.82), *Conduct Problems* (.83), *Hyperactivity/Inattention* (.79), *Peer Relationships* (.64), *Prosocial Behaviour* (.74) and *Total Difficulties Score* (.93).

#### 2.3.3. Maternal mental health

The General Health Questionnaire (GHQ-12; Goldberg & Williams, 1988) was used to measure maternal mental health difficulties and well-being in mothers, from measuring daily functioning (e.g. 'capable of making decisions) to psychological distress (e.g. 'feeling unhappy or distressed'). The GHQ-12 contains 12 items, with a 4-point Likert scale that range from 0 (*better than usual*) to 3 (*much less than usual*). The items relate to events which occurred 'recently', therefore, dependent on the mother's interpretation for a time frame. Higher scores indicate lower maternal mental health. The GHQ-12 has been used to examine mental health and well-being in mothers of children with ASD (Totsika et al., 2011b). Totsika et al. (2011b) found adequate internal consistencies (.76). The Cronbach's alpha coefficient for this study was.82.

#### 2.3.4. Maternal resilience

The Brief Resilience Coping Scale (Sinclair & Wallston, 2004) was utilised to measure maternal resilience. For the four items, the 5-point Likert scale ranges from 0 (*does not describe you at all*) to 5 (*it describes me very well*), with higher scores indicating greater maternal resilience. There is adequate internal consistency (.76), and test-retest reliability (.71) for this scale (Sinclair & Wallston, 2004). The Cronbach's alpha coefficient for the present study was.90.

#### 2.3.5. Social support

The Short Support Functions Scale (Dunst et al., 1988) assesses 12 different types of support assistance, including financial, emotional, instrumental and informational support. The 5-point Likert scale ranges from 1 (*never*) to 5 (*quite often*), with higher total scores indicating greater perceived support. Halstead et al. (2018a) found strong internal consistency (.88) for this scale in a study of mothers with ID/ASD. The current study found excellent internal consistency.93.

#### 2.3.6. Coping

The Shortened Ways of Coping Questionnaire (Hatton & Emerson, 1995) measures coping. With 14-items, containing 2 subscales; *Wishful Thinking* (emotion-based coping style) and *Practical Coping* (problem-focused coping style). There is no total score for both subscales. The 4-point Likert scale ranges from 1 (*not used*) to 4 (*used a great deal*). The Cronbach's alpha for *Practical Coping* was.56 and *Wishful Thinking* was.86.

#### 2.3.7. Optimism

Mother's optimism was measured using The Life Orientation Test-Revised (Scheier et al., 1994). Of the total 10-items, 3 items measure optimism, 3 items measure pessimism and 4 items were neutral and acts as fillers. The 4-point scale ranges from 0 (*strongly disagree*) to 4 (*strongly agree*). The 'pessimism' items were reverse scored. The 'filler' items did not measure optimism or pessimism, therefore, was not included in the total score. The Cronbach's alpha for this scale ranges from.72 to.78 (Gustems-Carnicer et al., 2017). The Life Orientation Test (original scale) has been used to measure optimism among mothers of children with ASD (Ekas et al., 2010). The Cronbach's alpha coefficient was.82 in the present study.

#### 2.3.8. Family functioning

The Family Assessment Device (FAD) from the McMaster Model of Family Functioning (MMFF) (Epstein et al., 1983) assesses family functioning. With 12-items, the 4-point Likert scale ranges from 1 (*strongly agree*) to 4 (*strongly disagree*). Higher scores indicate lower family functioning. Scores between 0-2 are considered as 'healthy' family functioning, while scores above 2.01 are considered as 'unhealthy' family functioning. The Cronbach's alpha coefficient for the current study was. 87.

### 2.4. Data analysis

Preliminary analysis consisted of non-parametric tests to assess for any differences/relationships between demographic variables ( see Table 1) and maternal mental health. Significant bivariate relationships were included as covariates in analyses. Some variables were recoded dichotomously into the following: ethnicity (*white* vs. *all other ethnicities*), maternal education (*degree level or above* vs. *lower than degree level*), marital status (*married or in a relationship* vs. *not in a relationship*) and maternal employment (*employed* vs. *not in employment*). For diagnosis: *ASD present* vs. no *ASD present* and *DYS present* vs. *no DYS present* were coded. A total score for family size was generated by computing the number of adult(s) and child(ren) living in one household. SES was measured by computing a total score on the following indicators; educational level (0 = *high, university education or above* vs. 1 = *low, college or below*), monthly income (0 = *high, £3000 or above*; 1 = *intermediate, £1,600-£3,000* vs. 2 = *low, £1,600 or less*) and employment (0 = *employed* vs. 1 = *not employed*). A lower score indicates higher SES (Halstead et al., 2018b). 9 respondents chose a '*prefer not to say*' option for monthly income, therefore, a SES score could not be established for these individuals.

IBM Statistical Package of the Social Science (SPSS) © version 26 (IBM Corp., 2019) was utilised to conduct all statistical analysis. The alpha level (α) was set at $p < .05$. To address our first hypothesis, a hierarchical regression was conducted to examine the potential

risk factors on maternal mental health. To address our second hypothesis, moderation analyses were conducted to examine potential protective factors between child behavioural and emotional problems and maternal mental health. The 'PROCESS' macro was installed into SPSS (Hayes, 2018). The predictor and moderator variables were automatically mean-centred.

## 3. Results

Among the demographic variables, child gender was significant with maternal mental health, $U = 423.00$, $p = .028$. Mothers of male children ($Mdn = 18.5$) had higher maternal mental health scores than mothers of female children ($Mdn = 15$). Child diagnosis was significant with maternal mental health scores, $H = 32.50$, $p = <.001$, mothers of children with ASD ($Mdn = 20$) reported greater maternal mental health scores than mothers of children with DYS ($Mdn = 1$) and NO SEND ($Mdn = 5$).

Mothers from lower SES reported lower maternal mental health scores ($r_s = -.47$, $p = <.001$). Significant differences in SES scores between child diagnosis groups were found; mothers of children with ASD reported lower SES scores ($Mdn = 2.5$) compared to mothers of children with DYS ($Mdn = 2$) and NO SEND ($Mdn = 1$), $H(2) = 6.07$, $p = .048$. Child behavioural and emotional problems was significant on maternal mental health ($r_s = -.67$, $p = <.001$). No significant relationships were found between child age, ethnicity, mother age, marital status and family size on maternal mental health scores. (Table 2)

**Hypothesis 1**. . Risk factors on Maternal Mental Health.

The hierarchical multiple regression revealed at Model 1, SES contributed significantly to the regression model, $F(1,59) = 15.19$, $p = <.001$, accounting for approximately 21% of variance to maternal mental health scores. In Model 2, child gender and child diagnosis added an additional 30% of significant variation into the regression model, $F(1,57) = 17.38$, $p = <.001$. Finally, in Model 3, child behavioural and emotional problems explained an additional 7% of significant variation to maternal mental health scores, $F(1,56) = 8.48$, $p = .005$. Together, all variables accounted for 57% of significant variance in maternal mental health scores, but only SES and child behavioural and emotional problems were independently significant in this model.

**Hypothesis 2**. Protective Factors towards Maternal Mental Health.

Moderation analyses were conducted on maternal mental health scores (see Table 3). After controlling for diagnosis, child gender and SES, child behavioural and emotional problems were a significant predictor of maternal mental health scores when practical coping ($p = .034$), wishful thinking ($p = .050$), optimism ($p = .019$) and maternal resilience ($p = .025$) were moderators. Child behavioural and emotional problems was not a significant independent predictor on maternal mental health scores when social support and family functioning was present. As a main effect, family functioning ($p = .007$) was a significant independent predictor for maternal mental health scores.

There were significant interactions between maternal resilience and child behavioural and emotional problems ($p = .016$) on maternal mental health scores. Furthermore, there were significant interactions between family functioning and peer relationships ($p = .031$) and emotional symptoms ($p = .049$) on maternal mental health scores. Practical coping moderated the relationship between peer relationships and maternal mental health scores ($p = .037$). To examine these interactions, simple slopes analyses was performed (see Figs. 1 and 2).

## 4. Discussion

### 4.1. Risk factors on maternal mental health

Mothers of children with ASD reported lower maternal mental health scores compared to mothers of children with DYS and NO SEND, which supports previous literature (Hebron & Humphrey, 2014; Totsika et al., 2011a). Regarding our first hypothesis, child gender, SES, diagnosis, and behavioural and emotional problems were found to be significant risk factors, together accounting for 57%

**Table 2**
Hierarchical regression analysis for mother and child demographic variables predicting maternal mental health.

| Predictor Variable | B | SE | β | *t* | *R* | $R^2$ | $\Delta R^2$ |
|---|---|---|---|---|---|---|---|
| Model 1: Mother demographics | | | | | .45 | .21 | .19** |
| SES | 1.28 | .33 | .45 | 3.90** | | | |
| Model 2: Child demographics | | | | | .71 | .51 | .48** |
| SES | .87 | .28 | .31 | 3.14* | | | |
| Child Diagnosis | -2.25 | .44 | -.52 | -5.13** | | | |
| Child Gender | -1.09 | .71 | -.15 | -1.54 | | | |
| Model 3: Child Behavioural and Emotional Problems added | | | | | .76 | .57 | .54* |
| SES | .89 | .26 | .31 | 3.40** | | | |
| Child Diagnosis | -.67 | .68 | -.15 | -.98 | | | |
| Child Gender | -.63 | .69 | -.09 | -.91 | | | |
| Child Behavioural and Emotional Problems | .22 | .08 | .46 | 2.91* | | | |

Note. $N = 64$;
* $p < .05$,
** $p \leq .001$.

**Table 3**
Moderated multiple regression analyses model on maternal mental health.

| | Maternal Mental Health | | | Maternal Mental Health | | | Maternal Mental Health | |
|---|---|---|---|---|---|---|---|---|
| | $R$ =.79, $R^2$ =.62 | | | $R$ =.80, $R^2$ =.64 | | | $R$ =.80, $R^2$ =.64 | |
| | $F$ = 11.09, $n$ = 56 | | | $F$ = 13.37, $n$ = 61 | | | $F$ = 13.18, $n$ = 61 | |
| Variable | β | $p$ | | β | $p$ | | β | $p$ |
| ASD present | -3.06 | **.040** | ASD present | -2.28 | .102 | ASD present | -2.14 | .126 |
| DYS present | .53 | .562 | DYS present | 1.05 | .228 | DYS present | .593 | .484 |
| Child gender | -.485 | .502 | Child gender | -.840 | .224 | Child gender | -.544 | .421 |
| SES | .541 | .067 | SES | .537 | .069 | SES | .719 | **.007** |
| Child behavioural and emotional problems (centered) | .116 | .173 | Child behavioural and emotional problems (centered) | .168 | **.034** | Child behavioural and emotional problems (centered) | .157 | **.050** |
| Social Support (centered) | -.068 | .096 | Practical Coping (centered) | -.237 | .144 | Wishful Thinking (centered) | .182 | .102 |
| Social Support x Child behavioural and emotional problems (interaction) | .004 | .488 | Practical Coping x Child behavioural and emotional problems (interaction) | .039 | .097 | Wishful Thinking x Child behavioural and emotional problems (interaction) | -.014 | .324 |
| | $R$ =.82, $R^2$ =.67 | | | $R$ =.80, $R^2$ =.65 | | | $R$ =.81, $R^2$ =.65 | |
| | $F$ = 14.86, $n$ = 60 | | | $F$ = 13.90, $n$ = 61 | | | $F$ = 14.11, $n$ = 61 | |
| Variable | β | $p$ | | β | $p$ | | β | $p$ |
| ASD present | -3.28 | **.023** | ASD present | -1.91 | .172 | ASD present | -2.14 | .115 |
| DYS present | .653 | .419 | DYS present | .709 | .390 | DYS present | 1.05 | .213 |
| Child gender | -.658 | .327 | Child gender | -.651 | .340 | Child gender | -.595 | .374 |
| SES | .520 | .055 | SES | .566 | **.042** | SES | .578 | .578 |
| Child behavioural and emotional problems (centered) | .099 | .225 | Child behavioural and emotional problems (centered) | .183 | **.019** | Child behavioural and emotional problems (centered) | .177 | **.025** |
| Family Functioning (centered) | 2.21 | **.007** | Optimism (centered) | -.214 | .062 | Maternal Resilience (centered) | -.185 | .170 |
| Family Functioning x Child behavioural and emotional problems (interaction) | -.187 | .129 | Optimism x Child behavioural and emotional problems (interaction) | .017 | .267 | Maternal Resilience x Child behavioural and emotional problems (interaction) | .034 | **.016** |
| | $R$ =.82, $R^2$ =.67 | | | $R$ =.81, $R^2$ =.66 | | | $R$ =.82, $R^2$ =.67 | |
| | $F$ = 15.25, $n$ = 60 | | | $F$ = 14.20, $n$ = 60 | | | $F$ = 15.25, $n$ = 60 | |
| Variable | β | $p$ | | β | $p$ | | β | $p$ |
| ASD present | -4.07 | **<.001** | ASD present | -4.40 | **<.001** | ASD present | -3.48 | **.003** |
| DYS present | .498 | .524 | DYS present | .408 | .643 | DYS present | .824 | .324 |
| Child gender | -.629 | .355 | Child gender | -.936 | .166 | Child gender | -.683 | .326 |
| SES | .457 | .080 | SES | .462 | .091 | SES | .406 | .165 |
| Peer Relationships (centered) | .285 | .313 | Emotional Symptoms (centered) | .070 | .747 | Peer Relationships (centered) | .429 | .137 |
| Family Functioning (centered) | 2.12 | **.009** | Family Functioning (centered) | 2.31 | **.005** | Practical Coping (centered) | -.289 | .074 |
| Family Functioning x Peer Relationships (interaction) | -1.14 | **.031** | Family Functioning x Emotional Symptoms (interaction) | -.662 | **.049** | Practical Coping x Peer Relationships (interaction) | .214 | **.037** |

*Note: Significant* ($p$ <.05) associations are highlighted in boldface.

of the variance in maternal mental health scores. SES and child behavioural and emotional problems were independently significant variables. This supported previous findings which found child behavioural and emotional problems a risk factor to maternal mental health scores (e.g. Brereton et al., 2006; Totsika et al., 2011a).

Furthermore, mothers from lower SES and of male children reported higher maternal mental health scores than mothers of female children and higher SES, supporting the findings of Zablotsky et al. (2013). A study conducted by Gau and colleagues (2012) found mothers of children with ASD had a lower education level and higher unemployment than mothers of TD children, which in turn, may be a contributing factor affecting levels of their mental health. There was no relationship found between child age, ethnicity, marital status, family size and mother's age on maternal mental health. This finding is consistent with Ekas et al. (2010), who found mothers' age was not associated with maternal outcomes, including depression and stress. However, Ekas and Whitman (2010) and Hartley et al. (2011) reported child age was a significant risk factor for maternal mental health, as mothers of older children reported less perceived stress and burden than mothers of younger children.

### *4.2. Protective factors on maternal mental health*

Maternal resilience moderated the relationship between child behavioural and emotional problems and maternal mental health

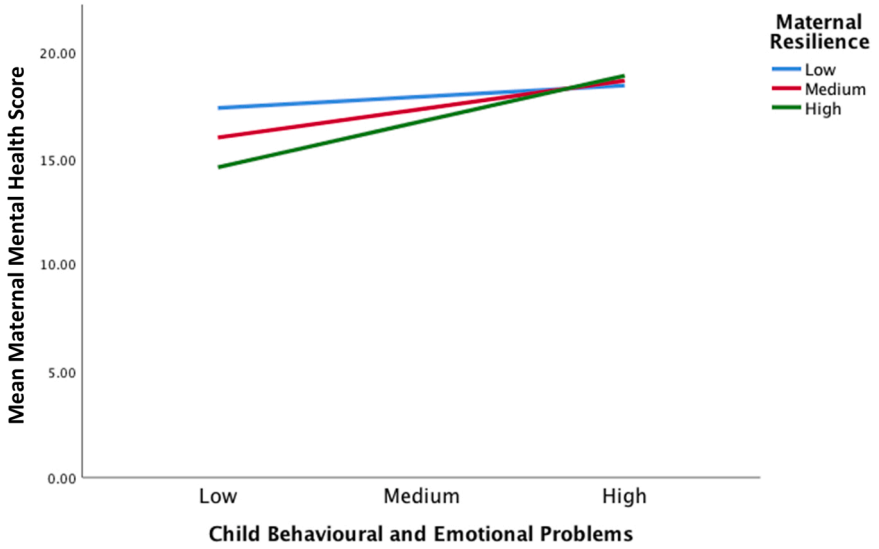


**Fig. 1.** Maternal resilience as a moderator between maternal mental health scores and child behavioural and emotional problems (total SDQ difficulties scores).

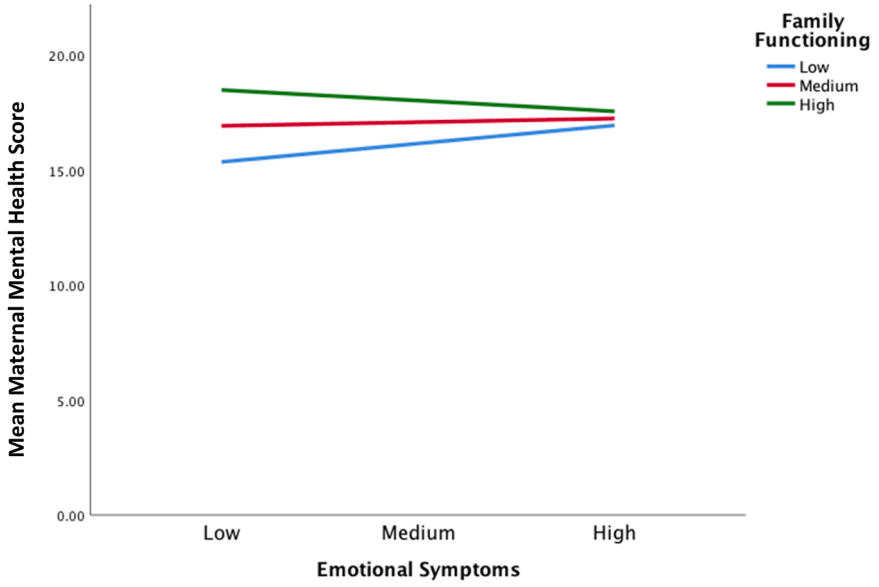


**Fig. 2.** Family functioning as a moderator between maternal mental health scores and emotional symptoms.

scores, acting as a protective factor for maternal mental health scores. As predicted, higher levels of maternal resilience were associated with lower maternal mental health scores when the child behavioural and emotional problems were low. Conversely, Halstead et al. (2018b) found little evidence of maternal resilience serving as a protective factor but acted as a *compensatory factor*. Maternal resilience had a significant main effect relationship with maternal well-being outcomes in mothers of children with ASD and developmental disorders (DD).

Higher levels of family functioning were associated with better maternal mental health scores and well-being scores when peer relationships and emotional symptoms were reportedly lower, indicating family functioning to be protective when these levels were high. Practical coping served as a protective factor for child peer relationships. Higher levels of practical coping were associated with lower maternal mental health difficulties when child peer relationships are low. These findings indicate practical coping and family functioning have a positive impact on maternal outcomes, regardless of child behavioural and emotional difficulties.

Social support did not function as a protective factor, nor did it have independent main effects on maternal mental health. This is inconsistent to the findings from previous research by Plant and Sanders (2007) which demonstrated social support to have moderating effects on parental stress. Halstead et al. (2018a) reported social support moderated the effects on maternal outcomes, including

depression. Our finding may be limited by the cross-sectional nature of this study and protect factors may vary over time. Additionally, the *quality* of social support should be considered, as not all support is equal. Smith et al. (2012) concluded negative support (regarded as not useful) increased the likelihood of mothers to experience depression and negative affect. It should be noted this study was conducted during the COVID-19 pandemic and participation occurred during a national lockdown. This may have directly impacted the findings related to social support, as socialisation was limited at this time.

### *4.3. Limitations and future directions*

Firstly, the identification of child diagnosis relied on maternal report. Therefore, the findings lack clinical ascertainment, as diagnoses were not independently validated. However, online parent-report of the SDQ has been reported to be reliable with clinical diagnosis (Lee et al., 2010). Additionally, mothers were not asked to disclose any mental health diagnoses or history of mental health. Depression and anxiety in parents of children with ASD has been associated with lower levels of social support therefore, this should be considered when interpreting the current findings (Gray & Holden, 1992).

Regarding the sample, most mothers were either married or in a relationship and a large proportion had completed a degree level or above, which may limit the generalisability of findings. Replication is encouraged by using a larger and diverse sample, which is feasible given the cross-sectional survey design of this study. The nature of the design may allow for some responses to be subject to circumstantial influences, therefore, longitudinal analysis is needed to gain a better insight into patterns and relationships across time.

It may be of value for the current study to be considered for a mixed-methods approach, utilising both quantitative (e.g. questionnaires) and qualitative (e.g. interviews) design. Through interviews, it may allow for further exploration of the potential risk factors and protective factors associated with maternal mental health.

Finally, the current study did not consider fathers' perspectives or the wider family, and the investigation on the mental health in fathers of children both with and without neurodevelopmental conditions remains limited. Hastings (2003) concluded mothers of children with ASD reported greater anxiety than fathers, however, no significant differences in stress and depression. Future literature would gain value from both parent's perspectives in understanding potential risk factors and protective factors associated with their mental health.

## 5. Conclusion

Overall, this paper adds to the existing literature exploring the maternal mental health of mothers of children with (and without) ASD. It provides a new insight to suggest maternal resilience, family functioning and practical coping serves as a protective factor on maternal mental health. These findings could have wider applications to inform clinicians, practices and professionals on ways to tailor and target mental health interventions to improve the mental health and well-being among mothers of children with ASD.

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## CRediT authorship contribution statement

**Shakira Nahar:** Conceptualization, Methodology, Data curation, Writing - original draft. **Zoe Zambelli:** Writing - review & editing. **Elizabeth Halstead:** Methodology, Supervision, Writing - review & editing.

## Declarations of interest

None.

## Data availability

Data will be made available on request.

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