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Resilience in high-risk adolescents of mothers with recurrent depressive disorder: The contribution of fathers

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ABSTRACT

This study examines the role of paternal emotional support as a resilience promoter in offspring of mothers with depression by considering the role of fathers' mental health and the quality of the couple relationship. Two hundred and sixty-five mothers with recurrent unipolar depression, partners and adolescents from Wales were assessed. Paternal emotional support, couple relationship quality, and paternal depression were assessed at baseline; adolescent mental health symptoms were assessed using the Child and Adolescent Psychiatric Assessment at follow-up. Results showed evidence of an indirect pathway whereby couple relationship quality predicted paternal emotional support ($\beta = -.21$, 95% CI $[-.34, -.08]$; $p = .002$) which in turn predicted adolescent depression ($\beta = -.18$, 95% CI $[-.33, -.04]$; $p = .02$), but not disruptive behaviours ($\beta = -.08$, 95% CI $[-.22, .07]$; $p = .30$), after controlling for relevant confounders. The findings highlight that fathers and the broader family system play an important role in enhancing resilience to depression symptoms in at-risk adolescents.

1. Introduction

Maternal depression is a common and consistently replicated risk factor for adolescent depression and antisocial behaviour (Garber, 2006; Goodman & Gotlib, 1999; Mars et al., 2012). However, whilst many young people with a depressed mother do experience serious and enduring psychological difficulties, others exhibit good mental health outcomes (Collishaw et al., 2016; Lewandowski et al., 2014; Pargas, Brennan, Hammen, & Le Brocque, 2010). Understanding factors that help promote resilience can

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be informative for designing preventative interventions (Beardslee, Solantaus, Morgan, Gladstone, & Kowalenko, 2012).

One area that has received little attention is the role that fathers play in promoting resilience in offspring of depressed mothers. A recent study of offspring of depressed parents identified paternal emotional support (i.e., the emotional relationship with the child reflecting warmth, support and responsiveness) as being strongly associated with adolescent mental health resilience (Collishaw et al., 2016). This initial finding is of potential significance in terms of implications for family-based prevention of adolescent depression, but also raises some important questions that remain unaddressed. The first of these considers the interplay between paternal emotional support and other family-based processes related to children's adjustment in the context of maternal depression. Related issues are the extent to which father's own mental health and the quality of the inter-parental relationship help enhance fathers' emotional support to adolescents, and the extent to which paternal emotional support helps explain links between these broader family factors and offspring adjustment. Second, it remains unclear whether the association between paternal emotional support and adolescent mental health simply reflects 'reverse causation', i.e. young people with better mental health seeking out or evoking greater paternal emotional support. The third question considers whether apparent beneficial effects of paternal emotional support might be better explained in terms of effects on mothers' depression symptom course? If alternative explanations such as these can be ruled out, this would provide much clearer evidence for the potential benefits of including fathers in family-based interventions aimed at preventing adolescent depression and disruptive behaviours. This study addresses each of these questions.

1.1. Resilience in young people with a depressed mother

Interest in resilience arises from findings showing substantial variation in outcomes for children and adolescents exposed to psychosocial adversity, with many individuals avoiding problems often associated with a given risk exposure and instead showing positive adaptation (Garmezy, 1971; Rutter, 1979). Definitions of resilience vary across studies (Luthar, Cicchetti, & Becker, 2000; Masten, 2001), but there is common agreement that it should be considered as a dynamic construct involving *better than expected* outcomes given the extent and severity of earlier adversity (Rutter, 2012, 2013).

Resilience processes may vary across development and also for different types of outcomes (e.g. depression and disruptive behaviour). Whilst many resilience studies have compared subgroups of at-risk children with more or less adaptive functioning, another more flexible approach that allows investigation of resilience in specific domains of adaptation involves controlling for the severity of risk or adversity. In particular, models controlling for risk severity can provide a more direct measure of adaptation in specific domains, highlighting better functioning compared with that shown by others experiencing the same level of risk. It has been argued that resilience reflects 'ordinary' adaptive processes that are common and potentially malleable, for example good quality family relationships (Masten, 2001), and as such might have important implications for preventative interventions (Collishaw et al., 2016).

Most previous studies of resilience to maternal depression have examined the characteristics of subgroups of children and adolescents exposed to depression who avoid emergence of mental health problems. These studies suggest that biological, psychological, and family factors are all important (Collishaw et al., 2016; Lewandowski et al., 2014; Pargas et al., 2010; Silk et al., 2007). Previous research has emphasised the importance of the child's relationship with the depressed parent, as well as broader aspects of the family system such as marital conflict and family communication (Beardslee, Gladstone, Wright, & Cooper, 2003; Pargas et al., 2010; Shelton & Harold, 2008). Less is known about whether and how fathers can help promote resilience when the child's mother suffers from depression.

1.2. The role of fathers in promoting resilience

Maternal depression is hypothesised to impact on risk of child and adolescent psychopathology through genetic and environmental routes (Lewis, Rice, Harold, Collishaw, & Thapar, 2011; Silberg, Maes, & Eaves, 2010; Tully, Iacono, & McGue, 2008), and it is becoming increasingly recognised that fathers might also contribute to risk processes underlying offspring depression and antisocial behaviour (Farrington, Jolliffe, Loeber, Stouthamer-Loeber, & Kalb, 2001; Ramchandani, Stein, Evans, & O'Connor, 2005). To date, however, very little is known about the role fathers play in promoting resilience in adolescents affected by maternal depression. Understanding whether fathers can help mitigate the cross-generational transmission of psychopathology associated with maternal depression may help inform intervention and prevention efforts. Importantly, whilst a number of family-based interventions already exist, these rarely include both parents and do not specifically focus on fathers as a possible source of resilience for children and young people (Beardslee et al., 2012).

A longitudinal community-based study of children (assessed on four occasions from infancy to pre-school) examined paternal involvement (comprising of warmth, control or amount of time spent with infant) as a potential moderator of the association between maternal depression and children's emotional and behavioural difficulties (Mezulis, Hyde, & Clark, 2004). Findings showed that increased father involvement in infancy mitigated the impact of maternal depression when fathers' parenting was characterised by greater warmth and control, but exacerbated problems when fathers were themselves depressed. Studies extending into adolescence are an urgent priority, given that adolescence is a period of major psychological, biological and social change for young people, and a time of particular risk for the development of depression and other psychiatric problems (Kessler et al., 2007; Patton & Viner, 2007).

Our previous study of parents with recurrent depressive disorder highlighted cumulative influences of child, family, and peer influences on mental health resilience in a high-risk sample of adolescents (Collishaw et al., 2016). Paternal emotional support emerged as a particularly strong predictor of good mental health, contributing over and above other protective factors and maternal depression severity. The objective here is to address a number of important additional questions related to the role of paternal emotional support in enhancing resilience in families affected by maternal depression.

The first question considers which contextual family factors influence paternal emotional support when mothers are depressed and the extent to which paternal emotional support predicts offspring outcomes when correlated family factors are taken into account. Maternal depression is often correlated with paternal depression and with the quality of the parent couple relationship, both of which have additional impacts on child and adolescent mental health (Harold et al., 2013; Ramchandani et al., 2005). It seems likely that both would also influence fathers' supportive relationships with adolescents, but this has not been tested. Understanding whether paternal emotional support has protective effects for at-risk young people thus requires taking account of both paternal mental health and the quality of the relationship between mothers and fathers. We hypothesise that both paternal depression and mother-father relationship quality will influence levels of paternal emotional support, which in turn will influence offspring adjustment.

The second question concerns the direction of associations between paternal emotional support and youth mental health. It is well-established that young people's mood and behaviour also impacts on the quality of parent-child relationships (Branje, Hale, Frijns, & Meeus, 2010; Hipwell et al., 2008). For example, evidence suggests that parents of children with behavioural and emotional difficulties show a tendency to disengage by reducing levels of guidance and monitoring across adolescence and this in turn further increases risk for youth antisocial behaviour (Dishion, Nelson, & Bullock, 2004). An important consideration therefore is the possibility of bidirectional influences, with lower paternal emotional support at least in part influenced by children's own prior behaviour. However, no study to date has tested whether associations between family protective factors (such as paternal emotional support) and mental health resilience in at-risk adolescents simply reflect reverse causation.

The third question considers whether mothers living with more supportive fathers show a more benign depressive illness course, and that it is this that accounts for more adaptive outcomes in young people. This has not been tested. It is possible that emotionally supportive fathers can act as an important 'risk buffer' relative to the potentially deleterious influences that are associated with maternal depression and young people's adjustment in adolescence. Supportive fathers may protect their partner against a depressive relapse (Misri, Kostaras, Fox, & Kostaras, 2000).

The final question considers whether specific patterns of influence may vary when different offspring outcomes are considered. For example, pathways linking associations between family processes such as the quality of the parental couple relationship, parental distress and parent-child relationships and child outcomes may vary depending on whether youth internalising or externalising problems are considered (Davies & Windle, 1997; Harold & Conger, 1997; Kouros, Merrilees, & Cummings, 2008). It is therefore also important to consider whether resilience mechanisms linked to paternal emotional support specifically, and family relationships more generally, vary by offspring outcome.

The aim of this study was to further examine the role paternal emotional support plays as a promoter of better mental health in adolescents of mothers with recurrent depression. The study hypotheses were that 1) paternal emotional support to offspring will be influenced by family contextual factors including paternal symptoms of depression and quality of the couple relationship; 2) that paternal emotional support will in turn be associated with fewer symptoms of offspring depression and disruptive behaviour even when accounting for paternal mental health, contextual family factors, and the severity and course of maternal depression; and 3) that influences of paternal emotional support will not simply reflect reverse causation or influences on maternal depression illness course.

2. Method

2.1. Participants and procedures

The Early Prediction of Adolescent Depression (EPAD) study comprised of 337 parents with a history of recurrent unipolar depression and their offspring aged 9–17 years at baseline. Participants were recruited predominantly from general practices across South Wales (78%), via a previous study of unipolar depression (19%), and a variety of other resources (3%). Interviews at baseline confirmed that all mothers in our sample met criteria for multiple lifetime episodes of major depressive disorder. Parents were required to have suffered from recurrent unipolar depression on at least two occasions which were later confirmed by diagnostic interview. The adult sample consisted of 315 mothers and 22 fathers (age 26–55 years, mean 41.7 years). Eighty of the 337 index parents (24%) met DSM-IV criteria for depression at baseline. Family composition was comparable to UK norms, with 70% of families in the study living in 2-parent households (vs. 77% nationally (Social Trends, 2009)). All index parents were biologically related to and living with the study adolescent. For the purposes of our study, 22 families where the index parent was a father with depression were omitted from the present analyses.

The youngest eligible adolescent was selected to avoid parental selection bias. Six families were excluded as the study adolescent was not exposed to maternal depression during their lifetime or due to a diagnosis of bipolar disorder in the affected parent. Given the focus of the current analyses on understanding influences of paternal emotional support as well as associated family process factors, only those families where offspring lived with (or reported that they had contact with) fathers at baseline were included ($n = 265$). Mothers, father-figures (consisting of biological- and step-fathers) and youths completed postal questionnaires at wave 1. Partner questionnaires were posted to the index parent (i.e., mother) and were completed by the father-figure (i.e., biological or father-figure).

The mean age of participants was 12.30 years ($SD = 1.98$) at baseline. Analyses focused on data collected at baseline and final follow-up approximately 27 months later ($M = 14.76$ years, $SD = 1.97$). The retention rate across the study period was high with full interview data available on 83% of children (221/265). Attrition was due to a combination of participants declining to complete the interviews and incomplete data on assessments. Assessments included semi-structured, in-person interviews conducted independently

with parents and adolescents by trained interviewers. Separate questionnaires were also mailed to mothers, their partners, and adolescents for completion prior to interview (for a detailed description of the sample see (Mars et al., 2012) and (Sellers et al., 2013)). Ethical approval was granted by the Multi-Centre Research Ethics Committee for Wales. Prior to participation, parents and children were provided with a description of the study. Written informed consent or assent was then obtained from all participants as appropriate.

2.1.1. Family composition

The sample included ‘mother and father’ families (i.e., intact families, $n = 173$; 65%), ‘mother and stepfather’ families ($n = 42$; 16%), ‘mother only’ families (i.e., single parent households, $n = 47$; 18%), and some ‘other’ families (e.g. mother and grandparent; $n = 3$; 1%). For tests of hypotheses related to the quality of the couple relationship, we restricted our analyses to two-parent ‘mother and father’ and ‘mother and stepfather’ families ($n = 215$). For all other analyses, we used information from across all family composition types ($n = 265$).

2.2. Measures

2.2.1. Adolescent mental health

Parent and child versions of the Child and Adolescent Psychiatric Assessment (CAPA), (Angold & Costello, 2000), a well validated semi-structured diagnostic interview was used to assess psychiatric symptoms and disorders over the preceding three months according to DSM-IV criteria (American Psychiatric Association, 1994). Interviews were completed independently with the mother and adolescent at baseline and follow-up. Inter-rater reliability compared interviewer ratings of the presence or absence of psychiatric disorder for 20 CAPA interviews (10 parent rated and 10 child rated). Agreement was excellent for offspring symptoms for child reports of depression (average $\kappa = .90$) and disruptive behaviour disorder (DBD) (average $\kappa = .93$) and for parent reports of offspring depression (average $\kappa = .96$) and DBD (average $\kappa = .95$).

For the purposes of the analyses reported here the CAPA was used to derive dimensional child depression symptom count, defined as the total number of DSM-IV depression symptoms present (range: 0–9). Each symptom was rated as present if reported by parent or by child. Similarly, a child DBD symptom count was defined as the presence of DSM-IV symptoms of conduct disorder or oppositional defiant disorder each reported either by child or parent (range: 0–12).

2.2.2. Parental emotional support

Adolescent-perceived paternal and maternal emotional support was assessed at baseline and at follow-up using a semi-structured interview (Perceived Social Support Scale (Kessler, Kendler, Heath, Neale, & Eaves, 1992). Three items asked: *How much does your father/mother: 1) listen to you if you need to talk about your worries or problems, 2) understand the way you feel and think about things, and 3) go out of the way to help you if you really need it.* Response options included ‘not at all’, ‘a little’, or ‘a lot’ with higher total scores (ranging from 0 to 6) indicating greater perceived emotional support. The original work by (Kessler et al., 1992) identified a parental support factor with high internal reliability ($\alpha = 0.87$) and evidence of construct validity (i.e., the factor was negatively related to depression). Internal consistency for the social support measures in our study was good (paternal: $\alpha = 0.87$; maternal: $\alpha = 0.89$). In this study young people were asked to complete this measure in relation to the person they considered to be their father-figure. In step-father families we do not know if the report relates to step-fathers or biological fathers.

In the main analyses i.e., path model (Fig. 1) and cross-lagged models (Fig. 2a and b), we used paternal emotional support on a continuous scale (range 0–6). For descriptive purposes only, a median-split identified adolescents reporting ‘high’ (4–6) or ‘low’ (0–3) emotional support (Tables 1 and 2).

2.2.3. Paternal depressive symptoms

Paternal depressive symptoms were assessed at baseline using a 9-item self-report questionnaire (Patient Health Questionnaire, PHQ-9; (Kroenke, Spitzer, & Williams, 2001), which asked about respondents' mood and feelings over the past 2 weeks. The response options were: ‘not at all’, ‘several days’, ‘more than half the days’, and ‘nearly every day’. Scores ranged from 0 to 27 with high scores indicating more depressive symptoms. Internal consistency was good ($\alpha = .84$).

2.2.4. Couple relationship quality

For the 215 two-parent families, the quality of the couple relationship was measured using maternal reports of the Marital Adjustment Test (MAT; (Locke & Wallace, 1959). The version used in this study included seven of the original 15-items ($\alpha = .87$). Mothers were asked to state the approximate extent of agreement or disagreement with their partner on the following items: *handling family finances, matters of recreation, demonstration of affection, friends, conventionality, philosophy of life, and ways of dealing with in-laws.* Six response options ranged from ‘always agree’ to ‘always disagree’ with higher total scores (ranging from 0 to 42) indicating more disagreement.

2.2.5. Risk severity (maternal depression)

Interviews at baseline assessed impairment of the worst two lifetime depression episodes for mothers using the Global Assessment of Functioning (GAF) scale (American Psychiatric Association, 1994). This measures psychological, social and occupational functioning on a scale of 0–100, with lower scores indicating lower functioning. To account for maternal depression severity in the analyses (see below) ‘severe’ maternal depression was defined as an episode involving either severe impairment (GAF ≤ 30) or

hospitalisation due to depression in accordance with previous criteria (Hammen & Brennan, 2003; Mars et al., 2012). Information was collected retrospectively at baseline and also provided information about age of maternal depression onset.

2.2.6. Sensitivity analyses

Maternal depression was assessed using the 21-item Beck's Depression Inventory at baseline ($M = 15.6$, $SD = 10.8$, range = 0–46) and follow-up ($M = 15.5$, $SD = 13.5$, range = 0–60) (Beck, Rush, Shaw, & Emery, 1979). The Schedules for Clinical Assessment in Neuropsychiatry (SCAN) was also included to assess DSM criteria for past-month major depressive disorder. At baseline assessment, $n = 46/215$ (21%) women reached DSM criteria for major depressive disorder. Child-related maternal emotional support was derived in the same way as paternal emotional support.

2.3. Statistical analysis

Preliminary analyses indicated that several variables were not normally distributed and were log transformed prior to analyses. Analyses were conducted using *Mplus* v8 (Muthén & Muthén, 2016). Standardised path coefficients and bias-corrected bootstrapped standard errors were estimated using bootstrapping (5000 models) using a maximum likelihood estimator.

2.3.1. Definition of resilience

Mental health resilience was operationalised as having fewer mental health symptoms given the severity of the risk exposure. In this way, all models controlled for maternal age of depression onset, family history of depression (asking parents about all first-degree relatives of the child i.e., siblings, parents and grandparents), and maternal depression severity (i.e., GAF score of ≤ 30 or hospitalisation).

2.3.2. Path analytic model

We used a path model to test indirect pathways linking the quality of the couple relationship and paternal depression with adolescent adjustment via paternal emotional support. Specifically, the model tested associations between paternal depression, couple relationship and paternal emotional support (measured at baseline), and adolescent depression and disruptive behaviour symptom scores (measured at follow-up), while also accounting for, maternal age of depression onset, family history of depression, and maternal depression severity.

2.3.3. Cross-lagged models

We used cross-lagged models to examine the direction of associations between paternal emotional support and offspring depressive and disruptive behaviour symptoms, respectively. The models involved simultaneously estimating the contribution of each variable at baseline (e.g. paternal emotional support and offspring depressive symptoms) in accounting for the other variable at follow-up whilst controlling for previous levels and covariance of the same constructs. Models controlled for maternal age of depression onset, family history of depression, and maternal depression severity.

2.3.4. Sensitivity analysis

The study employed a number of sensitivity checks to ensure the robustness of our findings. First, we examined whether the associations were influenced by offspring gender. Second, given the relatively wide age range of the offspring, we examined the association between paternal emotional support and offspring mental health outcomes while controlling for offspring age. Third, we examined whether maternal depression episode at baseline influenced the relationship between paternal emotional support and offspring outcomes. Fourth, given that emotional support from fathers could be more important to offspring who do not receive emotional support from their mothers, we examined whether the influence of paternal emotional support varied according to levels of maternal support. Finally, we used cross-lagged models to examine whether paternal emotional support influenced the course of maternal symptoms across the study period.

2.3.5. Missing data

There was a modest amount of occasional missing data on each of the main variables used in the analyses: depression at follow-up: 31/215 (14.5%); DBD at follow-up: 35/215 (16.3%); paternal emotional support: 3/215 (1.3%); couple relationship quality: 26/215 (12.1%); paternal depressive symptoms: 53/215 (24.7%). There was minimal missing data for maternal depression severity, maternal age of onset, and family history of depression, ranging from 0% to 7%. Taken together, the path model had 43% missing (92/215). There was less missing data in the cross-lagged models (offspring depression model: 57/265, 22% missing and offspring disruptive behaviour model: 66/265, 25% missing).

Since using complete data can result in biased estimates (Sterne et al., 2009), we examined whether the data were missing at random using Little's test of missing data (Little, 1988), using the *mcartest* in Stata version 13 (StataCorp, 2013). This showed that data were missing completely at random given the variables included in the models e.g., offspring depression and disruptive behaviour path model (Fig. 1): Little's MCAR: $\chi^2(33) = 39.45$, $p = .20$; offspring depression cross-lagged model (Fig. 2a): Little's MCAR: $\chi^2(23) = 18.17$, $p = .75$; offspring disruptive behaviour cross-lagged model (Fig. 2b): Little's MCAR: $\chi^2(28) = 20.40$, $p = .85$; Given the nature of the missing data, full information maximum likelihood (FIML) which produces unbiased estimates when data are missing completely at random (MCAR) (Enders & Bandalos, 2001) was used on the full eligible sample ($n = 265$ for cross-lagged models and $n = 215$ for the path model).

Table 1
Paternal emotional support according to sample demographic factors at baseline.

	Adolescents reporting high paternal emotional support (> 3)		
	(%)	OR (95% CI)	<i>p</i> value
Child gender:			
Boys	56.5		
Girls	44.8	.62 (.38, 1.02)	.06
Maternal depression, any severe episode (GAF < 30 or hospitalisation):			
Low	51.4		
High	45.3	.78 (.46, 1.34)	.38
Family composition:			
Mother and father	56.1		
Mother and stepfather	34.2	.41 (.20, .82)	< .05
Mother only	42.6	.58 (.30, 1.11)	.10
Child age:			
< 13 years	58.2		
13 years +	38.8	.45 (.27, .75)	< .001

3. Results

3.1. Adolescent mental health and paternal emotional support

Adolescent mental health problems were common in this high-risk sample; 80% met criteria for a psychiatric diagnosis, exhibited suicidal ideation, or had elevated symptoms of depression or disruptive behaviours across the study period, including approximately one in five young people ($n = 57/265$, 22%) with a diagnosis of a psychiatric disorder at the time of follow-up.

As shown in Table 1, paternal emotional support did not vary by offspring gender or maternal depression severity. Offspring from ‘mother and stepfather’ families perceived their father-figures to be less emotionally supportive compared to offspring of ‘mother and father’ (i.e. intact) families. Older adolescents perceived their father-figure to be less emotionally supportive.

As previously reported (Collishaw et al., 2016), greater paternal emotional support at baseline was associated with fewer adolescent mental health problems at follow-up given mothers' depression risk profiles (Table 2). High paternal emotional support was associated with fewer symptoms of depression at follow-up ($\beta = -.21$; 95% CI $[-.34, -.06]$; $p < .001$); but not with disruptive behaviours at follow-up ($\beta = -.13$; 95% CI $[-.28, .01]$; $p = .07$). High paternal emotional support was also associated with a reduced likelihood of adolescent psychiatric disorder at follow-up (OR = .68; 95% CI $[.56, .83]$; $p < .001$).

Accounting for family contextual factors - path analytic models (hypotheses 1 and 2) Descriptive data and inter-correlations for the two-parent families included in the path models are presented in Table 3.

Fig. 1 illustrates the associations between paternal emotional support at baseline and offspring depression and disruptive behaviour symptoms at follow-up while additionally adjusting for the quality of the couple relationship and paternal depressive symptoms and covariates. Paternal emotional support was concurrently associated with couple relationship quality ($\beta = -.21$, 95% CI $[-.34, -.08]$; $p = .002$), but not paternal depressive symptoms ($\beta = -.02$, 95% CI $[-.17, .14]$; $p = .86$) at baseline. A significant negative association was found between paternal emotional support and offspring depressive symptoms ($\beta = -.18$, 95% CI $[-.33, -.04]$; $p = .02$), indicating that greater paternal emotional support (at baseline) was associated with fewer depressive symptoms at follow-up. This model also takes into account the quality of the couple relationship, paternal depressive symptoms and co-occurring symptoms of disruptive behaviour. There was a significant indirect effect between couple relationship quality, paternal emotional support and offspring depressive symptoms ($\beta = .04$, 95% CI $[.01, .09]$; $p = .05$), suggesting that paternal emotional support partly explains the relationship between couple relationship quality and offspring depressive symptoms. Again, there was no significant association between paternal emotional support at baseline and later offspring disruptive behaviour within this model ($\beta = -.08$, 95% CI $[-.22, .07]$; $p = .30$).

Table 2
Offspring symptoms of psychopathology at follow-up comparing adolescents with low and high levels of baseline paternal emotional support.

	Paternal emotional support		β (95% CI)	<i>p</i> value
	Low (< 3)	High (3+)		
Depression symptoms at follow-up, mean (sd)	2.39 (2.32)	1.49 (1.71)	-.21 (-.34, -.06)	< .001
Disruptive behaviour at follow-up, mean (sd)	3.03 (2.85)	2.80 (2.63)	-.13 (-.28, .01)	.07
			OR (95% CI)	<i>P</i> value
Any psychiatric problem, <i>n</i> (%)	168 (63.4)	57 (21.5)	.68 (.56, .83)	< .001

Note: Models were adjusted for baseline maternal depression severity indicators.

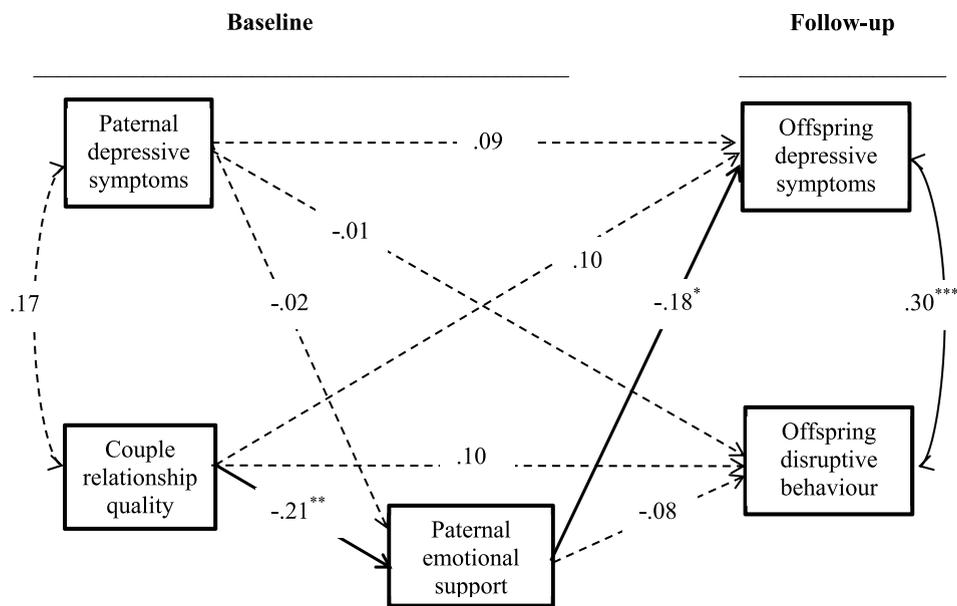
Table 3
Intercorrelations, means and standard deviations for path models (n = 215).

	1	2	3	4	5	6
1. Couple relationship quality ^a	1					
2. Paternal depression symptoms ^a	.12	1				
3. Maternal depression severity ^a	.15*	.01	1			
4. Paternal emotional support ^a	-.21**	-.01	-.11	1		
5. Offspring depressive symptoms ^b	.16**	.13	.22**	-.21**	1	
6. Offspring disruptive behaviour ^b	.10	.04	.10	-.14	.34***	1
Mean	31.45	3.11	0.28	2.99	1.72	2.73
SD	6.19	3.82	0.45	2.74	1.93	2.67

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

^a Baseline assessment.

^b Follow-up assessment.



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

Fig. 1. Path model examining the association between couple relationship quality, paternal depressive symptoms, paternal emotional support, and offspring depression and disruptive behaviour symptom scores. Model is adjusted for family history of depression, maternal age of depression onset, and maternal depression severity (all measured at baseline) ($n = 215$).

3.2. Cross-lagged models testing direction of associations across time

Inter-correlations, means, and standard deviations are shown in Table 4.

Cross-lagged models estimated the direction of effects between paternal emotional support and offspring depression (Fig. 2a) and disruptive behaviour (Fig. 2b) symptom scores, respectively. As shown in Fig. 2a, paternal emotional support and offspring depression were significantly associated at baseline ($r = -.22, p < .001$). Stability coefficients for offspring depressive symptoms ($\beta = .34, 95\% \text{ CI } [.19, .49]; p < .001$) and paternal emotional support ($\beta = .39, 95\% \text{ CI } [.26, .52]; p < .001$) were moderate. No differences were found between the stability coefficients for offspring depressive symptoms and paternal emotional support using the Wald test ($\chi^2(1) = .71, p = .40$). A significant cross-lagged effect was evident between paternal emotional support at baseline and offspring depressive symptoms at follow-up ($\beta = -.13, 95\% \text{ CI } [-.24, -.01]; p = .03$), but not vice versa ($\beta = -.03, 95\% \text{ CI } [-.16, .10]; p = .67$). Significant cross-sectional associations were found between offspring depressive symptoms and paternal emotional support at follow-up ($r = -.15, p = .02$).

Fig. 2b shows the results of the cross-lagged model for paternal emotional support and offspring disruptive behaviour. A significant association was found between paternal emotional support and offspring disruptive behaviour at baseline ($r = -.18, p < .01$). Stability coefficients for offspring disruptive behaviour ($\beta = .56, 95\% \text{ CI } [.45, .68]; p < .001$) and paternal emotional support ($\beta = .40, 95\% \text{ CI } [.27, .60]; p < .001$) were moderate and did not differ ($\chi^2(1) = 2.64, p = .11$). We found no evidence for a

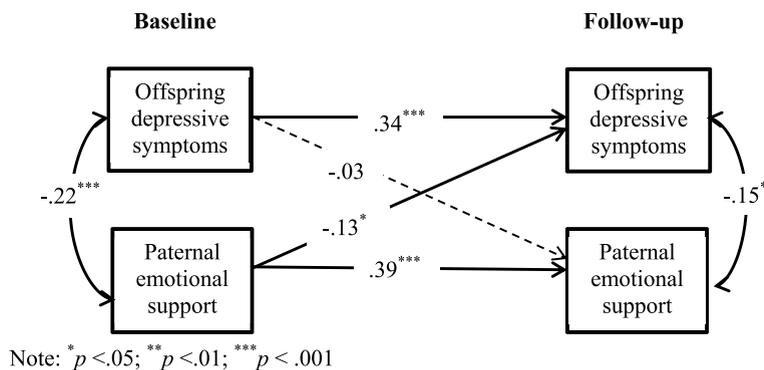
Table 4
Intercorrelations, means and standard deviations for cross-lagged models (n = 265).

	1	2	3	4	5	6	7
1. Maternal depression severity ^a	1						
2. Paternal emotional support ^a	-.07	1					
3. Paternal emotional support ^b	-.16*	.42***	1				
4. Offspring depression symptoms ^a	.21***	-.23***	-.17*	1			
5. Offspring depression symptoms ^b	.25***	-.23***	-.25***	.42***	1		
6. Offspring disruptive behaviour ^a	.12	-.18**	-.11	.40***	.31***	1	
7. Offspring disruptive behaviour ^b	.08	-.10	-.10	.19**	.34***	.56***	1
Mean	0.29	2.88	2.77	1.64	1.94	2.98	2.92
SD	0.45	2.72	2.81	1.82	2.05	2.43	2.71

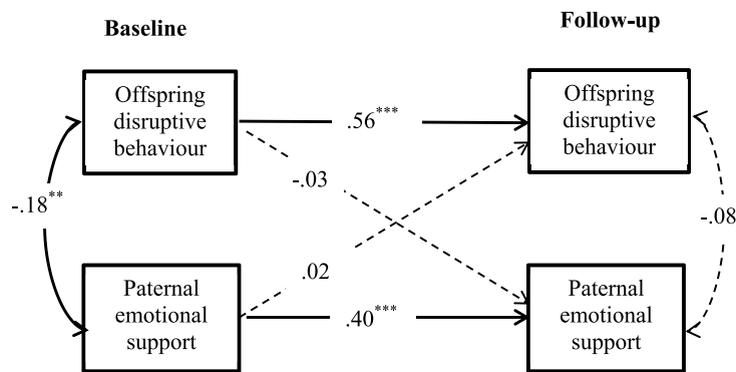
Note: * $p < .05$; ** $p < .01$; *** $p < .001$.

^a Baseline assessment.

^b Follow-up assessment.



a



b

Fig. 2. a. Cross-lagged models (offspring depression symptoms and paternal emotional support at baseline and follow-up). Model is adjusted for family history of depression, age of depression onset, and maternal depression severity ($n = 265$). **b.** Cross-lagged models (offspring disruptive behaviour and paternal emotional support at baseline and follow-up). Model is adjusted for family history of depression, age of depression onset, and maternal depression severity ($n = 265$).

cross-lagged effect between paternal emotional support at baseline and offspring disruptive behaviour at follow-up ($\beta = .02$, 95% CI $[-.09, .13]$; $p = .72$), or *vice versa* ($\beta = -.03$, 95% CI $[-.16, .09]$; $p = .60$). Finally, there was no cross-sectional association between disruptive behaviour symptom scores and paternal emotional support at follow-up ($r = -.07$, $p = .06$).

3.3. Sensitivity analyses

Post hoc analyses were conducted to investigate whether the findings varied by offspring gender (Figures A1a and A1b; Appendix A). Results indicated that couple relationship quality was associated with paternal emotional support ($\beta = -.27$, 95% CI $[-.48, -.07]$; $p = .003$) and depression symptom scores ($\beta = -.28$, 95% CI $[-.50, -.09]$; $p = .01$) for males only. Paternal emotional support was associated with depression symptom scores in females only ($\beta = -.24$, 95% CI $[-.42, -.06]$; $p = .01$). However, caution is needed when interpreting this, given small sample sizes when stratified by gender. Indeed, when each path was compared across gender we found no evidence for significant gender differences in parameter estimates (Wald test: all p values > 0.05).

We also examined whether the influence of paternal emotional support varied according to levels of maternal emotional support. Maternal and paternal emotional support (measured at baseline) were moderately correlated ($r = .42$, $p < .001$). There was no association between maternal emotional support and offspring depression symptom scores ($\beta = -.07$, 95% CI $[-.19, .07]$; $p = .31$) or disruptive behaviour scores ($\beta = -.08$, 95% CI $[-.24, .08]$; $p = .32$), nor was there evidence for an interaction between maternal and paternal emotional support in the prediction of offspring depression ($\beta = -.02$, 95% CI $[-.07, .03]$; $p = .48$) or disruptive behaviour ($\beta = -.04$, 95% CI $[-.08, .01]$; $p = .06$).

We also examined the possibility that paternal emotional support influenced change in maternal depression symptoms given that this might be one alternative explanation for protective effects on offspring depression symptoms. A cross-lagged model of the associations between maternal depressive severity and paternal emotional support across time is shown in Figure B1 (Appendix B). There was a significant difference between the stability of the constructs over time (Wald test: $\chi^2(1) = 8.06$, $p = .005$), so findings should be interpreted cautiously; however, paternal emotional support was not associated with maternal depression symptoms at either assessment, nor with change in maternal symptoms over time. This suggests that protective influences on offspring are unlikely to be explained by this route.

Finally, additional analyses controlling for offspring age and for maternal depressive episode at baseline showed that neither adjustment altered associations between paternal emotional support and offspring outcomes (Appendix C).

4. Discussion

The findings extend previous research on family risk and protective factors that play a role in the mental health of young people with a depressed mother. Findings showed evidence of an indirect effect between the quality of the parental couple relationship and offspring depressive symptoms through paternal emotional support while controlling for paternal depressive symptoms, maternal depression severity, family history of depression, and age of depression onset. There was no evidence to suggest a similar pathway to disruptive behaviours. Moreover, a significant cross-lagged effect was evident between paternal emotional support at baseline and offspring depressive symptoms at follow-up, but not *vice versa*.

These findings are important because maternal depression is a common and potent risk factor for adolescent psychopathology. Several studies have considered protective processes that may help enhance resilient adaptation in this high-risk group. However, very few studies have considered the role of fathers. Building on previous findings from this sample which demonstrated that greater co-parent support at baseline predicted substantially better mental health at follow-up (Collishaw et al., 2016), this study examined in more detail the role of paternal emotional support as a protective factor with the potential to promote resilience in offspring with a depressed mother. Our analytic strategy extends our previous findings in three important ways; first, by accounting for fathers' own mental health and correlated family factors, second, by highlighting that paternal emotional support itself varies according to the quality of the relationship between mothers and fathers, and third by demonstrating that apparent protective effects were not due to reverse causation. Further checks also demonstrated that paternal emotional support did not influence the course of maternal depression symptoms suggesting that protective influences on offspring are unlikely to be explained by this route.

These findings extend our understanding of mechanisms that explain why some children demonstrate adaptive outcomes despite being at high-risk. It is clear that there is marked heterogeneity of outcomes in children of depressed parents and previous studies of resilience have identified a range of child, family and peer factors that are associated with better outcomes (Collishaw et al., 2016; Pargas et al., 2010). It is essential to go beyond simply demonstrating associations between proposed protective factors and adaptive child outcomes. The current study is novel in that it was able to capitalise on rich longitudinal assessments to advance our understanding by carefully ruling out a number of alternative explanations, such as the role of correlated family factors, reverse causation and by testing specificity in links with offspring outcomes (Masten, 2011). Of course, observational studies alone cannot provide unequivocal causal evidence, but findings are consistent with other literature that both fathers and mothers are important in predicting children's mental health (Goodman & Gotlib, 1999; Harold et al., 2013). The precise mechanisms by which paternal emotional support promotes resilience does require further testing.

One possibility is that fathers can help promote resilience by providing an alternative source of parental emotional support if maternal emotional support is compromised. Paternal but not maternal support predicted offspring depression in this sample, further highlighting the important role that fathers can play in preventing problems in these at-risk adolescents. We found no evidence for interactive effects between paternal and maternal emotional support, and thus no strong support to suggest that paternal emotional support compensates for lower maternal support (due to maternal depression). Better powered samples will be needed to fully evaluate this possibility.

A different possibility is that the intergenerational transmission of risk for depression is in part mediated by children modelling dysfunctional cognitive and coping styles of their depressed parent or by internalising negative parental attributions about stressful events (Pearson et al., 2014). One explanation for the current findings is that emotionally supportive fathers offer alternative models

of thinking about and coping with problems. For example, fathers who are emotionally supportive may help children reinterpret stressful patterns of family interaction and behaviour in more adaptive ways. We were not able to test this in the current study but understanding the specific mechanisms that explain why paternal emotional support promotes resilience to depression is an important next step.

These findings in relation to offspring depression are all the more informative as we did not identify any main or bi-directional effects when examining the influence of paternal emotional support on offspring disruptive behaviour symptoms. Although previous research using this sample (Mars et al., 2012) found that offspring who were exposed to maternal depression were at increased risk of behavioural problems, this study shows that having an emotionally supportive father-figure does not reduce offspring disruptive behaviour symptoms levels at follow-up. It is noteworthy, that prior research (including previous findings from this sample) has highlighted that other family processes, such as parental hostility or parental monitoring/supervision, are especially relevant for predicting offspring behaviour problems (Combs-Ronto, Olson, Lunkenheimer, & Sameroff, 2009; Gross, Shaw, & Moilanen, 2008; Harold et al., 2014; Sellers et al., 2014). Identifying family processes of particular relevance to depression is thus both theoretically interesting and of practical importance.

Limitations - This study should also be considered in light of some limitations. First, despite excellent sample retention, the combination of data across multiple time points and informants meant that sample attrition is a possible concern. To combat this, we used FIML methods to handle missingness. Second, the sample included a variety of different family situations, with some children living with both their biological parents, and others living in step families or single parent households. We took care to ensure that measures of paternal emotional support were not simply proxies for family composition or lack of contact with non-resident fathers (by only including offspring living in two-parent families or who reported having regular contact with their father). Nevertheless, the sample was not sufficiently powered to directly address whether and how emotional support from fathers might differ in terms of predicting child outcomes between children who live or don't live with their father, or to distinguish differences according to support from biological fathers and from step-fathers. Similarly, when we examined influences of the quality of the couple relationship and paternal emotional support, we omitted 'mother only' families from the analyses, but again caution is required when generalising across diverse family contexts. Third, to explore whether the path models varied by gender we conducted a supplementary set of analyses. Although the relationship between paternal emotional support and offspring depression appeared possibly stronger for girls compared to boys, there were no significant differences in path coefficients for boys and girls. These findings should be considered in light of low power to detect such gender differences. Fourth, it is plausible that the pattern of results would be different if we tested the association between *maternal* emotional support and offspring psychopathology in a sample of depressed fathers. However, the original sample only included 22 index fathers with recurrent depression, and we were therefore unable to test this possibility within this sample. Finally, although the measure of paternal emotional support is widely used and well validated, the measure is based on a few items, and replication across alternative more detailed assessments of paternal emotional support would be desirable.

4.1. Clinical implications and future research

The identification of modifiable risk factors is recognised as a priority for informing interventions to minimise the social and health burden of youth emotional and behavioural problems (O'Connell et al., 2009). It is important to recognise that risk reduction, though desirable, isn't always possible. Many parents with depression may not seek treatment and, even when they do, treatment is not always successful. For example, one randomised control trial examining prevention of depression in at-risk adolescents (Garber et al., 2009) demonstrated a significant prevention effect, but only for those adolescents whose parents were not currently depressed. This suggests that the identification of resilience promoters that may help buffer children from risks associated with maternal depression will be an important adjunct to risk reduction. To date, relatively few intervention programmes for children of depressed parents have focused on incorporating the wider family in preventive interventions (Beardslee et al., 2003, 2012).

The findings from this study are important because they suggest that paternal emotional support is a primary family process related to resilience in offspring of depressed mothers. Our findings provide further evidence for the importance of the couple relationship quality (Shelton & Harold, 2008) – and they suggest that effects may be mediated via emotional support. In practice, however, fathers and the broader family system are often not included in interventions aimed at children at high-risk for depression though there are some exceptions (Beardslee et al., 2003). The findings also point to a number of additional important avenues for future research. Better understanding is needed about which factors help bolster paternal emotional support in the context of maternal depression, the degree to which paternal emotional support is malleable in an intervention/prevention context, as well as the broader interplay between fathers, other family members, peers and young people themselves in promoting resilience in the context of maternal depression.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.adolescence.2018.03.016>.

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