Gulenc Alisha (Orcid ID: 0000-0003-0884-5246)

Title: Paternal psychological distress, parenting and child behaviour: A population based, cross-sectional study.

Short title: Paternal psychological distress, parenting and child behaviour.

Authors: Alisha Gulenc, Emma Butler, Anna Sarkadi, Harriet Hiscock

Author 1: Ms Alisha Gulenc, BPsychSc (Hons)
Project Coordinator
Centre for Community Child Health
The Royal Children's Hospital, Melbourne, VIC 3052, AUSTRALIA
Ph: +61 3 9345 6530
E: alisha.gulenc@mcri.edu.au

Author 2: Ms Emma Butler, BBiomed (Hons)
Medical Student
Australian National University - Medical School
Building 4, The Canberra Hospital, Garran ACT 2605, AUSTRALIA
Ph: 0419 743 727
E: emma.kate.butler@gmail.com

Author 3: Professor Anna Sarkadi, MD, PhD
Professor
Department of Public Health and Caring Sciences
Box 256, 75135
Uppsala University, Uppsala, SWEDEN
Ph: + 46 0706113692
E: anna.sarkadi@pubcare.uu.se

Author 4: Professor Harriet Hiscock, MB BS, FRACP, MD
Group Leader, Community Health Services Research Group, Murdoch
Children's Research Institute and Associate Director of Research, Centre for
Community Child Health. The Royal Children's Hospital, Melbourne, VIC
3052, AUSTRALIA
Ph: +61 93456910
E: harriet.hiscock@rch.org.au

Corresponding author:

Alisha Gulenc, Centre for Community Child Health, Royal Children's Hospital Melbourne,
Parkville, AUSTRALIA 3052

Ph: +61 3 9345 6530, Fx: +613 9345 5900, Email: alisha.gulenc@mcri.edu.au

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CONFLICT OF INTEREST

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Professor
Department of Public Health and Caring Sciences
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Uppsala University, Uppsala, SWEDEN
Ph: + 46 0706113692
E: anna.sarkadi@pubcare.uu.se

Author 4: Professor Harriet Hiscock, MB BS, FRACP, MD
Group Leader, Community Health Services Research Group, Murdoch
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Community Child Health. The Royal Children's Hospital, Melbourne, VIC
3052, AUSTRALIA
Ph: +61 93456910
E: harriet.hiscock@rch.org.au

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Ph: +61 3 9345 6530, Fx: +613 9345 5900, Email: alisha.gulenc@mcri.edu.au

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ABSTRACT

Background: Child behaviour problems are common and can lead to later mental health problems. Poor maternal mental health and adverse parenting practices are known risk factors for child behaviour problems. Less is known about the association between paternal mental health and parenting, and child behaviour. We aimed to explore the association between paternal psychological distress and parenting (harsh discipline, low warmth, unreasonable expectations and overinvolved/protectiveness), with children's internalising and externalising behaviour at 3 years of age.

Methods: Cross-sectional surveys of 669 (80% response) fathers of 3-year-old children, nested within a randomised controlled trial. Main outcome measures of behaviour (Child Behavior Checklist; CBCL), parenting (Parent Behavior Checklist & Overinvolved/protective parenting scale) and psychological distress (Kessler-6). Regression modelling examined the associations between paternal factors and child behaviour, adjusting for maternal mental health and parenting, as well as child and family variables.

Results: In adjusted analyses, paternal psychological distress ($b=0.43$, 95% Confidence Interval (CI) 0.26-0.60, $p<0.001$), harsh discipline ($b=0.20$, 95%CI 0.13- 0.27, $p<0.001$) and maternal mental health ($b=0.08$, 95%CI 0.03- 0.12, $p=0.001$) were associated with externalising symptoms. However, only paternal psychological distress, harsh discipline and being a boy were associated with borderline/clinical levels of externalising problems (all $p<0.05$). Paternal psychological distress, harsh discipline, overinvolved parenting, maternal

mental health and difficult child temperament were associated with internalising symptoms (all $p < 0.05$). However, only paternal harsh discipline and overinvolved parenting were associated with borderline/clinical internalising problems.

Conclusions: Paternal mental health and parenting are independently associated with child behaviour. Treatments for children with behavioural problems should also address paternal mental health and parenting.

INTRODUCTION

Child behaviour problems are typically classified as internalising (e.g. social withdrawal and anxiety) and externalising (e.g. disobedience, inattention and defiant behaviour) (Campbell, 1995). Internalising and externalising problems are estimated to affect 10 – 14% of children in the preschool years (Brauner & Stephens, 2006). Up to 50% of early child behaviour problems persist into primary school and adolescence (World Health Organisation, 2003). It is well established that poor maternal mental health and negative parenting practices are key modifiable risk factors for child behaviour problems (Brenner & Fox, 1998; Cowan, Cowan, Schulz, & Heming, 1994). Poor maternal mental health (depression, anxiety and general psychological distress) can disrupt positive parenting practices (e.g. warmth and nurturing), that improve child behaviour (Lovejoy, Graczyk, O'Hare, & Neuman, 2000), and increase the likelihood of negative parenting practices (e.g. low warmth, harsh discipline, overinvolved/protective parenting and unreasonable expectations), which are associated with both externalising and internalising child behaviours (Bayer, Hiscock, Ukoumunne, Price, & Wake, 2008; Bayer, Sanson, & Hemphill, 2006).

Paternal mental health and child behaviour problems

Fathers can also experience poor mental health and there is increasing evidence that poor paternal mental health is a risk factor for early child behaviour problems. In a systematic review, 2-18% of fathers met diagnostic criteria for an anxiety disorder in the first year after their child was born (Leach, Poyser, Cooklin, & Giallo, 2016). In Australia, a nationally representative study found that 10% of fathers experience clinical levels of psychological

distress in the first five years of their child's life (Giallo et al., 2012); similar to international depression rates of fathers in the first year after their child is born (Paulson & Bazemore, 2010).

In a large sample of Australian families (N=2620), father's depressive symptoms at child age 3-19 months negatively affected children's outcomes (e.g. hyperactivity, emotional, peer and conduct problems) at age 4-5 years; independent of maternal depressive symptoms (Fletcher, Feeman, Garfield, & Vimpani, 2011). A Norwegian study found that after controlling for fathers' age and education and maternal mental health, high levels of *prenatal* paternal psychological distress were correlated with higher levels of child emotional and behavioural problems at age 3 years (Kvalevaag et al., 2013). Similar associations between mothers' and fathers' mental health and child behaviour problems were seen in a US survey (Amrock & Weitzman, 2014). A study of low-income families found that both maternal and paternal depressive symptoms were associated with externalising child behaviour problems at age 3, whilst taking into account shared parenting stress (Vallotton, Harewood, Froyen, Brophy-Herb, & Ayoub, 2016). However, none of these studies examined parenting practices.

The link between paternal mental health, parenting styles and child behaviour problems

Paternal depressive symptoms are significantly associated with less warm parenting, more criticism (Wilson & Durbin, 2010), and increased likelihood of subsequent child emotional and behavioural problems; even after controlling for maternal depression (Fletcher et al.,

2011; Ramchandani, Stein, Evans, O'Connor, & ALSPAC study team, 2005; Ramchandani et al., 2008; Smith, Eryigit-Madzwamuse, & Barnes, 2013).

A large study from the Longitudinal Study of Australian Children (LSAC) investigated the effects of paternal postnatal psychological distress on subsequent parenting and child behaviours, and found that fathers' hostility (e.g. anger, frustration) towards children mediated the relationship between paternal psychological distress and child emotional and behavioural outcomes; as measured by maternal report at age 5 years (Giallo, Cooklin, Wade, D'Esposito, & Nicholson, 2013). The relationship remained significant after adjusting for fathers' concurrent psychological distress and mothers' postnatal mental health. Another study from LSAC found that high postnatal paternal psychological distress was associated with more hostile and less consistent parenting when children were 4-5 years old (Rominov, Giallo, & Whelan, 2016). These negative paternal parenting practices were subsequently associated with greater emotional and behavioural problems and less prosocial behaviour at child age 8-9 years (Rominov et al., 2016). A Swedish study found that both paternal and maternal symptoms of depression, anxiety, and stress, as well as over-reactive parenting styles were associated with child behaviour problems at age 3-5 years (Salari, Wells, & Sarkadi, 2014). However, in adjusted analyses, only paternal and maternal over-reactive parenting styles remained significantly associated with child behaviour problems. Notably, analyses were conducted separately for mothers and fathers, thereby limiting conclusions about the independent contributions of each parent (Salari et al., 2014).

Thus, whilst there is good evidence that negative paternal parenting practices, such as hostility, low consistency and over-reactiveness, are associated with behavioural problems in children, we do not know if other adverse paternal parenting practices such as overinvolved/protective parenting (e.g. shielding children from normal challenges, excluding external influences and encouraging dependence on parents), and unreasonable expectations of child development (e.g. unrealistic beliefs of children's competencies), are associated with behaviour problems (Azar & Rohrbeck, 1986; Bayer et al., 2006; Bayer et al., 2011).

We therefore aimed to quantify the associations between paternal psychological distress and parenting (harsh discipline, low warmth, unreasonable expectations and overinvolved/protectiveness), with children's internalising and externalising behaviour, accounting for maternal parenting and mental health. We focused on associations at child age 3 years, given the lack of evidence in this age group where detection could ideally lead to early intervention before a child reaches school. We hypothesised that paternal psychological distress and negative parenting practices would be associated with child externalising and internalising behaviours/problems at child age 3 years, even after taking into account maternal and family variables.

METHODS

Participants

Participants were fathers of 3-year-old children recruited from the *Families in Mind* study, a three-arm population-based randomised controlled trial of two parenting programs designed to prevent child behavioural and emotional problems by school entry. Methods for this trial have been reported elsewhere (Hiscock et al., 2012; Hiscock et al., 2018). Briefly, the trial comprised Arm A (a combination of a universal group parenting program delivered from child age 15- to 24-months, followed by a targeted one-on-one program for children at risk of behaviour problems after 24-months); Arm B (targeted program only); and Arm C (usual care in the community). Data for this paper were drawn from the questionnaire at child age 3 years across all three arms, as no differences were seen in child behaviour between the different arms at baseline or later data collection waves (Hiscock et al., 2012; Hiscock et al., 2018).

Procedures

Briefly, families were invited to take part in *Families in Mind* at their routine, well-child 8-month nurse visit, which is attended by >85% of families in the state of Victoria, Australia. Primary carers enrolled in the trial completed baseline questionnaires and follow-up questionnaires at child age 2, 3 and 4.5 years (Hiscock et al., 2012). At child age 3 years, we asked secondary carers to complete a questionnaire on child behaviour, and their own mental health and parenting practices. This questionnaire was sent with the primary carer's pack from November 2012 to April 2013. Primary carers indicated on their questionnaire whether there was a secondary carer and if so, whether they did or did not pass the questionnaire onto them. Reminder questionnaires were sent two weeks later. A final reminder questionnaire was sent a further two weeks later. Written consent was obtained by

secondary carers selecting “yes” to the question “I voluntarily consent to completing this survey”. Ethics approval was received from The Royal Children’s Hospital (#29144) and Deakin University (#2010-156) Human Research Ethics Committees.

Measures

Child behaviour. Father report of child behaviour (primary outcome) was measured using the Child Behavior Checklist (CBCL; 1.5-5 years); (Achenbach & Rescorla, 2000), a 99-item measure of externalising (Cronbach alpha from the present study: $\alpha.89$, 24-items e.g. “Destroys things belonging to his/her family or other children”) and internalising ($\alpha.84$, 36-items e.g. “Nervous, highstrung, or tense”) behaviours. Raw scores were converted to standardised T-scores (Mean (M)=50, Standard Deviation (SD)=10). T-scores of ≥ 60 were considered borderline/clinical for externalising or internalising problems. Externalising and internalising behaviours were examined both continuously (symptoms) and categorically (borderline/clinical cut-off scores of problems) to allow for analysis at both subclinical and clinical levels, respectively.

Parenting practices. Paternal and maternal parenting practices were assessed by the Parent Behavior Checklist (PBC; (Fox, 1994)) and Bayer’s overinvolved/protective scale (Bayer et al., 2006). The PBC consists of 32-items measuring three subscales: harsh discipline ($\alpha.76$, 10-items e.g. “I yell at my child for whining”); warmth and nurturing ($\alpha.77$, 10-items e.g. “I praise my child for learning new things”); and developmental expectations ($\alpha.79$, 12-items e.g. “My child should be old enough to share toys”) with responses to items summed for each subscale and converted to T-scores (M=50, SD=10; (Brenner & Fox,

1998)). Bayer's parenting scale is a 17-item measure of overinvolved/protective parental behaviours ($\alpha.80$, e.g. "I try to prevent my child having contact with children who may be a bad influence") with responses to items summed and then averaged. Scores range from 0 to 68 and higher scores indicate more overinvolved parenting (Bayer et al., 2006).

Psychological distress. Paternal psychological distress was measured by the Kessler-6 (K-6; (Kessler et al., 2010)), a 6-item measure ($\alpha.83$) with total scores ranging from six (no distress) to 30 (severe distress).

Mental health. Maternal mental health was measured on the primary carer questionnaire by the Depression Anxiety Stress Scale (DASS; (Lovibond, 1995)), a 21-item measure with three subscales (7-items each) of depression ($\alpha.83$, e.g. "I felt down-hearted and blue"), anxiety ($\alpha.71$, e.g. "I felt I was close to panic") and stress ($\alpha.83$, e.g. "I found it hard to wind down"). Subscale scores are summed to give a total mean score ranging from 0 to 21.

Socioeconomic Status (SES). Family postcode was used to calculate SES via the Socio-Economic Index for Areas (SEIFA) scores of relative disadvantage (national mean = 1000, SD = 100). Higher scores indicate less disadvantage (Australian Bureau of Statistics, 2013).

Child temperament. Child temperament was measured by a global rating scale, which is moderately correlated with the revised Australian Infant Temperament Questionnaire ($r=.51$; (Oberklaid, Sanson, Pedlow, & Prior, 1993). Parents rated their child on a single item, 6-point scale i.e. “Compared to other children, I think my child is...” much easier than average (1) to much more difficult than average (6).

Potential confounders of the relationships between paternal mental health, parenting and child behaviour were identified a priori, based on published literature (Bayer et al., 2008; Bayer et al., 2006; Bogels & Phares, 2008). They included maternal mental health, maternal parenting practices (both measured at child age 3 years), total annual household income, SES, child gender and trial group allocation (all measured at baseline).

Analysis

Means and standard deviations were used to describe continuous variables and numbers and percentages were used to describe categorical variables. Unadjusted regression analyses were performed to explore the relationship between child behaviour, paternal psychological distress and parenting practices. Adjusted regression analyses controlled for maternal mental health and parenting as well as factors associated with child behaviours at $p<0.05$ in the unadjusted analyses. Group allocation and family SES were not included in adjusted models because neither were associated with children externalising/internalising problems at the bivariate level. Due to small numbers, household income of AUD<\$26,000 and \$26,000 - \$51,999 were combined. Linear regressions were used to determine beta coefficients and 95% Confidence Intervals (CI) for continuous outcome measures (i.e.

symptoms of child behaviour). Logistic regressions were used to determine odds ratios (ORs) and 95%CI for dichotomous outcome measures (i.e. borderline/clinical problems). All analyses were conducted using STATA, version 13.

RESULTS

Families participating in the randomised controlled trial were more likely to attend a nurse centre in a higher socioeconomic area than those who chose not to participate. Of the 1,353 families who entered the trial, 1,311 were still enrolled at child age 3 years, and were sent surveys. 1,034 primary carers completed questionnaires and of these, 928 reported passing on the secondary carer questionnaire, of which 774 (83%) were completed. Of the completed questionnaires, 105 were excluded from analyses due to completion by a secondary carer other than the child's father or step-father (n=87); not specifying who the secondary carer was (n=4); and not specifying the family ID preventing demographic information being accessed from the study database (n=14). The final response rate was 669 of 841 (80%) fathers or step-fathers.

Summary characteristics for the sample are outlined in Table 1. The mean age of fathers was 38.2 years (SD=5.2) and almost half had a tertiary education (49%). Family neighbourhood socioeconomic status did not differ between responders and non-responders, and participating fathers lived in a broad range of socioeconomic areas. The mean child age was slightly higher in non-responders than responders ($p<0.001$). On respective measures, 18.7% of mothers and 13.2% of fathers reported clinical levels of poor mental health. Co-occurring child

externalising and internalising problems were reported by 43% and 30% of fathers and mothers, respectively.

Relationship between paternal psychological distress and parenting practices with child externalising and internalising behaviours (symptoms).

Several paternal (e.g. psychological distress), maternal (e.g. mental health) and family factors (e.g. household income) were associated with externalising and internalising behaviour (symptoms) in the unadjusted analyses (Table 2). However, most significant associations attenuated for externalising symptoms, with only paternal psychological distress, paternal harsh discipline and maternal mental health remaining significant (all $p < 0.01$). Specifically, for every unit increase in paternal psychological distress, paternal harsh discipline, and maternal mental health, there was a 0.67, 0.20 and 0.08 standard deviation unit increase in child externalising behaviours, respectively. Similarly, paternal psychological distress, paternal harsh discipline, paternal overinvolved/protective parenting, maternal mental health and difficult child temperament (at aged 8-months) remained significant for internalising symptoms after adjusting for *a priori* confounding variables.

Relationship between paternal psychological distress and parenting practices with child borderline/clinical externalising and internalising problems.

When categorised into clinical cut-points of borderline/clinical problems, similar relationships were seen for paternal but not maternal variables (Table 3). For externalising borderline/clinical problems, paternal psychological distress, paternal harsh discipline and

being a boy remained significant in the adjusted analyses (all $p < 0.05$). Paternal harsh discipline and overinvolved/protective parenting increased the likelihood of an internalising problem (both $p < 0.05$).

DISCUSSION

To our knowledge, this is the first study to quantify the relationship between paternal overinvolved/protective parenting and unreasonable expectations and child behaviour, in addition to known negative parenting styles, and paternal and maternal mental health. Our study found that 13.2% of fathers of 3-year-old children had elevated levels of psychological distress. Paternal psychological distress was independently associated with an increased risk of child externalising and internalising symptoms, and borderline/clinical externalising problems, over and above maternal mental health and parenting, and child and family variables. Similarly, in adjusted analyses, paternal harsh discipline was associated with both symptoms of and borderline/clinical externalising and internalising problems. Paternal overinvolved/protective parenting was associated with internalising symptoms and borderline/clinical problems.

In contrast, poor maternal mental health was significantly associated with symptoms of externalising and internalising behaviours but not clinical cut-points. This suggests that at the more extreme end of behaviour problems, fathers' psychological distress and harsh parenting have stronger associations, particularly for male children who were also more likely to have

externalising problems compared to female children. Similarly, paternal but not maternal overinvolved/protective parenting was associated with internalising symptoms/problems.

Previous studies have also found that poor paternal mental health (e.g. Giallo et al., 2013; Kvalevagg et al., 2013) and over-reactive (harsh) parenting are associated with child externalising behaviour problems (Salari et al 2014). Some of the associations we found between fathers' parenting and child behaviour are similar to those reported for maternal parenting (e.g. maternal harsh discipline and overinvolved/protective parenting with child externalising behaviour problems (Brenner & Fox, 1998), and maternal overinvolved/protective parenting with child internalising problems (Bayer et al., 2008)). However, our study is the first to examine and demonstrate relationships between father's overinvolved/protective parenting and preschool children's internalising behaviours (symptoms and clinical problems), in conjunction to other parenting styles and paternal mental health. Fathers who are overinvolved/protective may believe they are helping their child by protecting them, unaware of the negative associations with children's mental health. With high prevalence (Brauner & Stephens, 2006) and persistence of childhood internalising problems (World Health Organisation, 2003), greater understanding of why fathers' overinvolved/protective parenting occurs and how to modify it are needed.

Similarly, a significant association was found between paternal harsh discipline and child internalising symptoms and clinical problems, in contrast to previous studies of maternal discipline. This may be because children react differently to fathers' and mothers' harsh

discipline, or that fathers more commonly exercise harsh discipline than mothers and thus, this relationship is more readily quantifiable. Whilst previous studies have reported an association between mothers' unreasonable expectations about their child's capabilities and behaviour (Brenner & Fox, 1998; Hiscock et al., 2008), we did not find this association for fathers. Fathers reported fewer unreasonable expectations than mothers, which may explain this difference.

Our study has several strengths. We recruited a large sample of fathers from broad socioeconomic backgrounds. We achieved a higher response rate (80%) than most previous studies, analysed paternal reports (rather than maternal) of child behaviour and used more detailed measures of child behaviour and/or parenting (e.g. Ramchandani et al., 2005; Kvalevaag et al., 2013). More detailed measures allowed for examination of associations with clinical and subclinical levels of child behaviours and a clearer understanding of which parental parenting practices to target in child behaviour interventions (Kane & Garber, 2004).

Our study had some limitations. Results are based on a self-selected sample participating in a trial. Fathers reported on their child's behaviour and those with poor mental health may have been more negative in their reporting. Additionally, fathers may not have wanted to portray their own parenting in a negative light, and so may have under-reported their negative parenting practices. Nonetheless, this would mean that the association between negative paternal parenting practices and child behaviour problems would be stronger than our analyses demonstrate. We excluded fathers with insufficient English to complete

questionnaires, thus our results may not generalise to this population. Our analyses controlled for family income measured at baseline, but financial circumstances may have changed over time. As this study was cross-sectional, we cannot assume causality.

Our study has implications for early prevention/intervention. Most parenting programs aimed at early prevention of child behaviour problems, primarily target or tend to reach mothers (Wells, Sarkadi, & Salari, 2016). However, in families where both parents have a parenting role – irrespective of living arrangements – both parents’ mental health and parenting practices must be considered when designing and delivering programs aiming to reduce child behaviour problems. Our findings, in conjunction with others (e.g. Rominov et al., 2016), suggest these preventative programs should commence before children are 3 years old, when these behaviours problems are apparent.

In addition, engaging fathers in traditional parenting programs is challenging. Fathers may find it difficult to express emotions or seek help for their parenting, as they certainly do for their mental health (O’Brien et al., 2017; Robertson, Bagnall, & Walker, 2015). To engage fathers in parenting programs and services, we need public health messages to normalise help-seeking behaviour, co-design and implementation of specific strategies to motivate fathers to seek support, and services that are father-friendly, e.g. offering out of hours or online appointments (Burstow, Newbigging, Tew, & Costello, 2018; Giallo et al., 2012; O’Brien et al., 2017; Robertson et al., 2015).

Future research should include measures of both parents' mental health and should determine the contribution of fathers' parenting (including overinvolved/protectiveness) and mental health in longitudinal studies, to determine causality. The impacts of addressing father's parenting and mental health on child behaviour should be evaluated in rigorous, controlled trials. In the meantime, clinicians managing children with clinical or subclinical levels of behaviour problems should consider both maternal *and* paternal mental health, and parenting practices as possible risk factors.

Key Messages

- Fathers' psychological distress was independently associated with child externalising symptoms and borderline/clinical problems, as well as internalising symptoms, at age 3 years, after accounting for maternal mental health.
- Fathers' harsh discipline and over-involved/protective parenting were independently associated with externalising and internalising behaviours, even when accounting for maternal parenting.
- Interventions and services aiming to improve child behaviour should proactively address fathers' as well as mothers' mental health and parenting practices.

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TABLES

Table 1. Sample Characteristics

Variable	Responders (n=669)	Non-Responders (n=172)	<i>p</i> -value
Father			
Age in years, mean $\pm$ SD(range)	38.2 $\pm$ 5.2 (24.3, 55.2)	-	-
Education status (%)			-
Did not complete high school	22.3	-	
Completed high school	28.7	-	
Completed tertiary/postgraduate degree	49.0	-	
Psychological distress (median, IQR)	8 (6, 30)	-	-
Parenting variable, (mean $\pm$ SD)			-
Harsh discipline (PBC)	38.1 $\pm$ 8.6	-	
Warmth and nurturing (PBC)	47.0 $\pm$ 10.2	-	
Unreasonable expectations (PBC)	35.0 $\pm$ 9.6	-	
Over-involved/protective	2.4 $\pm$ 0.4	-	
Mother ^{\$%}			
Age in years (mean $\pm$ SD, range)	36.3 $\pm$ 4.3 (22.1, 49.4)	35.8 $\pm$ 4.3 (23.7, 45.1)	0.14
Anglo-Australian cultural identity (%)	84.0	83.0	0.67
Language other than English at home (%)	3.6	6.4	0.10
Education status (%)			0.41
Did not complete high school	7.6	4.6	
Completed high school	23.0	24.7	
Completed tertiary/postgraduate degree	69.4	70.8	
Mental health (mean DASS total score $\pm$ SD)	14.1 $\pm$ 12.1	15.9 $\pm$ 14.5	0.09
Parenting variable (mean $\pm$ SD)			
Harsh discipline (PBC)	36.6 $\pm$ 8.2	37.0 $\pm$ 7.6	0.52

Warmth and nurturing (PBC)	53.8 ± 10.6	52.5 ± 10.2	0.16
Unreasonable expectations (PBC)	39.3 ± 10.6	39.2 ± 11.4	0.96
Over-involved/protective	2.3 ± 0.4	2.4 ± .4	0.24

Family

Family annual household income \$AUD (%) [§]			0.63
< \$26,000	1.3	1.3	
\$26,000 - \$51,999	11.7	9.1	
\$52,000 - \$88,400	32.8	29.9	
> \$88,400	54.2	59.7	

Neighbourhood			0.65
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Disadvantage score (SEIFA) (mean ± SD)	1041.9 ± 39.9	1043.4 ± 40.0	
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Child

Age in years (mean ± SD, range)	3.08 ± .1 (2.2, 3.6)	3.14 ± .1 (2.2, 3.6)	<0.001
Male (%)	49.2	48.0	0.51
First-born (%)	53.5	54.1	0.90

[§] Maternal age, mental health, parenting and SEIFA scores measured at 3-years.

[%] All other maternal variables measured at baseline.

[§] Family household income (reported in Australian Dollars (AUD) 2010-2011), child gender, and child birth order measured at baseline.

Table 2. Unadjusted and adjusted linear regressions of the association between paternal psychological distress, mental health and child behaviour symptoms.

	Externalising symptoms						Internalising symptoms					
	Unadjusted			Adjusted			Unadjusted			Adjusted		
	b ^{\$}	95% CI	p value	b ^{\$}	95% CI	p value	b ^{\$}	95% CI	p value	b ^{\$}	95% CI	p value
Paternal reported variables												
Psychological distress	0.67	0.52 , 0.82	< 0.001	0.43	0.26, 0.60	< 0.001	0.35	0.23, 0.47	< 0.001	0.17	0.04, 0.30	0.01
Parenting												
Harsh discipline	0.24	0.18,0.29	< 0.001	0.20	0.13, 0.27	< 0.001	0.15	0.11, 0.19	< 0.001	0.12	0.07, 0.18	< 0.001
Nurturing	-0.09	-0.14, -0.04	< 0.001	-0.02	-0.07, 0.04	0.55	-0.06	-0.10, -0.02	0.001	-0.04	-0.08, 0.003	0.07
Unreasonable expectations	0.03	-0.02, 0.08	0.26	-0.01	-0.07, 0.06	0.87	0.03	-0.01, 0.07	0.122	0.01	-0.04, 0.05	0.85
Overinvolved/protective	0.87	-0.44, 2.19	0.19	0.26	-1.24, 1.75	0.74	1.42	0.44, 2.41	0.01	1.76	0.61, 2.91	0.003
Maternal reported variables												
Mental health	0.12	0.08, 0.17	< 0.001	0.08	0.03, 0.12	0.001	0.10	0.06, 0.13	< 0.001	0.07	0.03, 0.10	< 0.001
Parenting												
Harsh discipline	0.15	0.08, 0.21	< 0.001	-0.02	-0.09, 0.06	0.65	0.08	0.04, 0.13	0.001	-0.04	-0.10, 0.01	0.13
Nurturing	-0.06	-0.11, -0.01	0.01	-0.001	-0.05, 0.05	0.98	-0.04	-0.08, -0.004	0.03	-0.01	-0.05, 0.03	0.77
Unreasonable	-0.01	-0.06, 0.04	0.79	-0.002	-0.06, 0.05	0.94	0.01	-0.03, 0.05	0.58	0.01	-0.03, 0.05	0.58

expectations													
Overinvolved/protective	-0.14	-1.48, 1.19	0.83	-1.21	-2.71, 0.29	0.11	0.39	-0.62, 1.40	0.45	-0.81	-1.97, 0.34	0.17	
Family and child variables [%]													
Income [§]													
\$52,000 - \$88,400	-0.31	-2.08, 1.46	0.73	-0.50	-2.20, 1.20	0.57	-0.43	-1.77, 0.90	0.52	-0.69	-2.00, 0.61	0.30	
More than \$88,400	-1.64	-3.31, 0.02	0.05	-0.82	-2.43, 0.79	0.32	-1.44	-2.70, -0.18	0.03	-1.01	-2.25, 0.23	0.11	
Child Gender													
Male	1.11	0.08, 2.13	0.03	0.87	-0.14, 1.87	0.09	0.25	-0.53, 1.03	0.53	-0.04	-0.81, 0.73	0.92	
Temperament													
Average	0.96	-0.12, 2.05	0.08	0.75	-0.32, 1.81	0.17	0.77	-0.05, 1.58	0.07	0.47	-0.34, 1.29	0.25	
Difficult	1.67	-0.40, 3.73	0.11	1.85	-0.17, 3.88	0.07	2.01	0.46, 3.57	0.01	2.45	0.89, 4.00	0.002	

[§] Regression coefficient.
[%] Maternal reported baseline variables.
[§] Income reported in Australian Dollars (AUD) 2010-2011.

Table 3. Unadjusted and adjusted logistic regressions of the association between paternal psychological distress, mental health and child behaviour problems.

	Externalising problems						Internalising problems					
	Unadjusted			Adjusted			Unadjusted			Adjusted		
	OR ^{\$}	95% CI	p value	OR ^{\$}	95% CI	p value	OR ^{\$}	95% CI	p value	OR ^{\$}	95% CI	p value
Paternal reported variables												
Psychological distress	1.19	1.12, 1.27	< 0.001	1.12	1.03, 1.21	0.008	1.13	1.06, 1.21	< 0.001	1.07	0.99, 1.15	0.11
Parenting												
Harsh discipline	1.09	1.05, 1.12	< 0.001	1.08	1.03, 1.13	0.001	1.08	1.04, 1.11	< 0.001	1.05	1.01, 1.10	0.02
Nurturing	0.96	0.94, 0.99	0.01	0.98	0.95, 1.02	0.29	0.97	0.94, 1.00	0.03	0.98	0.95, 1.01	0.21
Unreasonable expectations	1.02	0.99, 1.05	0.17	1.00	0.96, 1.04	0.93	1.02	0.99, 1.05	0.17	1.01	0.98, 1.05	0.48
Overinvolved/protective	1.77	0.90, 3.50	0.10	1.50	0.58, 3.89	0.40	2.12	1.10, 4.09	0.02	2.63	1.10, 6.31	0.03
Maternal reported variables												
Mental health	1.02	1.01, 1.04	0.01	1.02	0.99, 1.04	0.19	1.03	1.01, 1.05	0.001	1.02	1.00, 1.04	0.09
Parenting												
Harsh discipline	1.05	1.02, 1.09	0.002	0.99	0.95, 1.04	0.79	1.04	1.01, 1.08	0.01	1.00	0.95, 1.04	0.92
Nurturing	0.99	0.96, 1.01	0.28	1.00	0.97, 1.04	0.84	0.98	0.96, 1.01	0.15	0.99	0.96, 1.03	0.65
Unreasonable expectations	0.99	0.97, 1.02	0.54	0.99	0.96, 1.03	0.65	1.01	0.98, 1.03	0.57	1.01	0.98, 1.04	0.60
Overinvolved/protective	1.11	0.54, 2.25	0.78	0.67	0.26, 1.73	0.41	1.72	0.89, 3.33	0.11	1.00	0.43, 2.34	1.00
Family and child variables [%]												
Income ^{\$}												

	\$52,000 - \$88,400	0.61	0.27, 1.36	0.23	0.59	0.23, 1.52	0.27	1.04	0.44, 2.47	0.92	1.48	0.52, 4.18	0.46
	More than \$88,400	0.42	0.19, 0.90	0.03	0.47	0.19, 1.20	0.12	0.75	0.33, 1.73	0.50	1.24	0.45, 3.41	0.68
Child Gender													
	Male	1.84	1.04, 3.24	0.04	2.01	1.02, 3.95	0.04	1.21	0.71,2.06	0.49	1.20	0.65, 2.21	0.56
Temperament													
	Average	1.22	0.68, 2.18	0.50	1.19	0.60, 2.38	0.62	1.28	0.73, 2.25	0.39	1.07	0.56, 2.05	0.85
	Difficult	1.46	0.53, 4.01	0.46	1.46	0.44, 4.83	0.54	1.72	0.67, 4.42	0.26	2.13	0.76, 5.97	0.15

^{\$} OR: Odds Ratio.
[%] Maternal reported baseline variables.
^{\$} Income reported in Australian Dollars (AUD) 2010-2011.

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Author/s:

Gulenc, A;Butler, E;Sarkadi, A;Hiscock, H

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