

# The association between family factors and child behaviour problems using dyadic data

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## Abstract

**Background** Parental psychopathology and family issues are key influence factors to child behaviour problems. This study aimed to investigate the dyadic impact of maternal and paternal depression and perceived family functioning on child behaviour problems.

**Methods** Both maternal and paternal depression, perceived family functioning and reported child behaviour problems were collected, respectively. Because of the interdependent characteristic of dyadic data, structural equation modelling was used to examine the relationship among all variables and the mutual influence between mother and father.

**Results** Results showed that father-perceived family functioning mediated the relationship between parental depression and child behaviour problems, but mother-perceived family functioning did not show this mediation effect. Meanwhile, maternal and paternal depression influenced both of their own and their partner's perceived family functioning.

**Conclusions** The findings indicated that paternal psychopathology and family functioning should not be overlooked in child behaviour development. In addition, this study underscored the importance to investigate the different impact of father and mother on child development within a dyadic unit.

## Keywords

child behaviour problems, dyadic data, family functioning, parent depression

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## Introduction

Parental depression has been demonstrated to be associated with child behaviour problems (e.g. Cummings *et al.* 2000). However, in the past several decades, maternal depression and paternal psychopathology have earned a lot of research attention, but relatively little was known about the effect of paternal depression. Furthermore, the dyadic influence between mother and father has not gained enough exploration yet, which leads to the knowledge separated by parent gender (Cummings *et al.* 2005). Therefore, it is theoretically and practically important to investigate the mutual influence in the family system. The present study aimed to investigate the impact of maternal and paternal depression on child behaviour problems simultaneously using dyadic data.

## Parental depression

Parental depression, especially maternal depression, has been consistently found to be a risk factor of various childhood social, emotional and behavioural problems (Cummings & Davies 1994; Marchand *et al.* 2002; Cummings *et al.* 2005; Goodman 2007). School-aged children and adolescence of depressed mothers have been found more likely to develop externalizing problems and even antisocial behaviours than the offspring of healthy parents (Civic & Holt 2000; Hay *et al.* 2003). Connell and Goodman (2002) argued that the relationship between parental psychopathology and child outcomes depended largely on the gender of the parent. But there is still a lack of research on the effects of paternal psychopathology (Phares *et al.* 2002). Some evidence showed that high levels of

paternal depression were associated with more internalizing and externalizing symptoms in children, too (for reviews of this literature, see Connell & Goodman 2002; Kane & Garber 2004).

Fathers may play a different role from mothers in children's development. For example, fathers have more physical interaction with their children, in the form of play (Lewis & Lamb 2003; Paquette 2004). Fathers' physical involvement can have a positive effect on child behavioural and cognitive development (Amato & Rivera 1999; Shannon *et al.* 2002). Using a community sample, Brennan and colleagues (2002) found that paternal depression had an effect on adolescent externalizing problems as well as maternal depression. Paternal major depression syndrome was associated with greater likelihood of child behaviour problems (Dave *et al.* 2008). Using longitudinal design, Dietz and colleagues (2009) showed that maternal depression was significantly associated with later child externalizing problems when paternal psychopathology was present.

Although it is believed that both maternal and paternal psychopathologies have implications for child outcomes and their effects are different (Connell & Goodman 2002; Kane & Garber 2004; Lewinsohn *et al.* 2005; Ramchandani *et al.* 2008), there remains a concern to be addressed. Most of these studies solely investigated parent-child interaction, either from paternal or maternal side. For example, mother-reported paternal psychopathology data were used in Dietz and colleagues' (2009) study. However, family system theory challenges that research should incorporate broader family unit to understand child development, instead of only focusing on parent-child relationship (e.g. Minuchin 1974). Collecting data from both parents provides an opportunity to investigate the mutual interaction between fathers and mothers and their impact on child psychopathology.

### Family functioning

Numerous studies have shown that different aspects of family issues can be influential to child development. Family functioning has been repeatedly demonstrated to serve as a significant predictor of child and adolescent problems in multiple samples (Greene *et al.* 2002; Marcotte *et al.* 2002). The linkage between family functioning and children's externalizing behaviour has also been found (Johnson 2003; Chapman & Woodruff-Borden 2009).

Although family functioning is a complex construct, specific dimensions have been identified to be associated with child externalizing problems. For example, Gorman-Smith and colleagues (1997) have found that violent adolescents reported to have poor discipline, less cohesion and less involvement in

their families. Moreover, marital discord, coping strategies, parenting behaviour and other dimensions have been investigated in the body of family functioning research (Davies & Windle 1997; Cummings *et al.* 2005; Wilson & Durbin 2010).

Family functioning can be influenced by parental psychopathology, so it often plays a mediating role between parental psychopathology and child outcomes. Family functioning, including diversity dimensions, has been found to mediate relations between maternal depression and child behaviour problems (Davies & Windle 1997; Brennan *et al.* 2002; Burstein *et al.* 2012).

However, previous research either combined data from the mother and father by averaging or summing or only had one informant in their estimation of family functioning (Davies & Windle 1997; Burstein *et al.* 2012), which may lead to insufficient understanding of the whole family dynamic influence. Family functioning is a systematic concept that can be affected by everybody in the family.

### Dyadic research design

There is increasing recognition of the non-independent characteristic of variables in family studies (Knafl *et al.* 2009; Kenny 2011). For some family variables, such as family functioning, the data reported by a family member do reflect not only the respondent but also the other family members and the respondent's relationship with them. The strategy of previous research to get rid of the dependence was to collect data from one person or to do separate analyses for the two dyad members. Both strategies have a problematic assumption that the result based on one members' data will not be influenced by the existence of the other member. This assumption may miss some important findings.

Rather than trying to eliminate the interdependency of the data, it is better to perform a real dyadic analysis (Kenny *et al.* 2006). Structural equation modelling (SEM; Bollen 1989; Lee 2007; Song & Lee 2012) is one of the most sufficient approaches to analyse dyadic data. It allows the simultaneous estimation of the effect that a respondent's predictor has on his or her own outcome score and the effect of the partner's predictor on the respondent's outcome score.

### Current study

This study aimed to investigate the mutual effect of parents' depression and perceived family functioning on child behaviour problems. Using SEM, not only the effect of one side of the parent's psychopathology on perceived family functioning and

children outcomes can be examined but also the other side's effect can be simultaneously examined. The objectives of this study were as follows: (1) to examine a structural model of relationship between parental depression and child behavioural problems in a community sample; (2) to test the potential mediating role of perceived family functioning. Importantly, the relationship among variables was tested simultaneously for mothers and fathers to investigate the different and mutual influence of maternal versus paternal depression and perceived family functioning on child behaviour problems.

## Method

### Participants and procedure

The study was conducted in two primary schools in the urban-rural integration area of a city in Hebei province, China. The research assistant randomly drew 20 student ID numbers from every grade. Therefore, 240 students from all six grades in two schools participated in this study. They were asked to take the survey materials to their parents, including research explanation and instruction, informed consent and questionnaires. Both sides of the parents were asked to complete the questionnaires separately. It was noted that the study was independent from school management and students' school performance. The questionnaires were taken back by students the next day.

From the total enrolment of 240 dyads of parents, 196 dyads returned valid questionnaires. Eighty-seven of the children were boys and 109 were girls. The children's mean age was 9.66 years [standard deviation (SD) = 2.18], from 6 to 14. One hundred sixty-eight children were from the only child family. The mothers' mean age was 34.86 years (SD = 3.99), from 27 to 55, and the fathers' age was 36.38 years (SD = 4.25), from 28 to 62. Four families were remarried and the others were all in their first marriage.

### Measures

#### *Parents' depression*

Parents' depression was assessed by the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff 1977). The CES-D is a 20-item self-report questionnaire to assess the frequency of depression symptoms in non-clinical samples. Participants were asked to rate the frequency of depression symptoms over the past week from 0 (rarely or none of the time, <1 day) to 3 (most or all of the time, 5–7 days). In the current sample, Cronbach's alpha was 0.85 for father and 0.83 for mother.

#### *Family functioning*

Family functioning was assessed through the general functioning subscale of the McMaster Family Assessment Device (FAD; Epstein *et al.* 1983). The McMaster FAD was designed to evaluate the transactional and systemic properties of family system according to the McMaster Model of Family Functioning (Epstein *et al.* 1983). The general functioning subscale of FAD was used in this study. It contains 12 items, with higher scores indicating worse family functioning. In the current sample, Cronbach's alpha was 0.76 for father and 0.78 for mother.

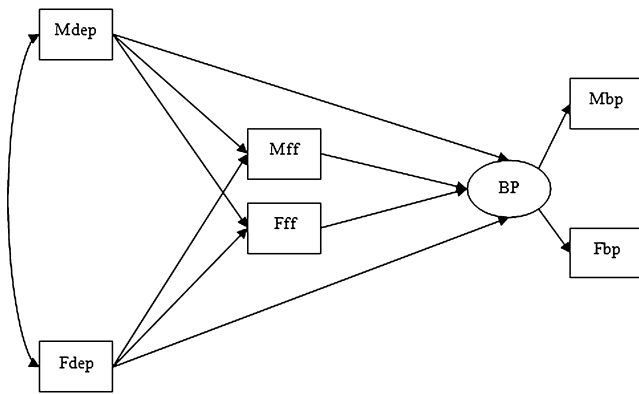
#### *Children's behaviour problems*

Children's behaviour problems were measured by the Rutter Parental Scale (Rutter *et al.* 1970). The Rutter Parental Scale contains 31 items rating on a scale of 0–2. The two subscales of Rutter Parental Scale can be used to identify children's 'internalizing' (neurotic) and 'externalizing' (antisocial) behaviour. The total score of this scale was used in this study. In the current sample, Cronbach's alpha was 0.86 for father and 0.86 for mother.

### Statistical analysis

Firstly, correlations between father-reported and mother-reported data were examined to test their interdependence for further analysis. Then, SEM was used to examine the relationship among parental depression, family functioning and child behaviour problem in Mplus version 6 (Muthén & Muthén 1998–2010).

SEM provides a flexible framework for modelling multivariate data by a few unobserved latent factors. In general, it has two major components. The first component is a measurement model, which is basically a confirmatory factor analysis model. In this study, the measurement model described the relationship between observed variables of father and mother's ratings of child behaviour problems and the latent factor 'child behaviour problem', and the second component is a structural model, which examines the inter-relationship among latent factors and other observed variables. In this study, a structural model was used to describe the relationship between *child behaviour problem* and other observed father and mother's variables, such as general family functioning and depression. In diagrams, latent factors are represented by ovals while observed variables are by rectangles. The path diagram of our proposed model was depicted in Fig. 1.



**Figure 1.** Path diagram of the proposed structural equation modelling. BP, child behaviour problems; Fbp, father-reported child behaviour problems; Fdep, father's depression; Fff, father-perceived family functioning; Mbp, mother-reported child behaviour problems; Mdep, mother's depression; Mff, mother-perceived family functioning.

The goodness of fit of the proposed model was evaluated using the following indices and criteria: comparative fit index (CFI; Bentler 1990), Tucker–Lewis index (TLI; Tucker & Lewis 1973), root mean square error of approximation (RMSEA; Steiger & Lind 1980) and standardized root mean square residual (SRMR; Browne & Cudeck 1993). CFI and TLI values in the range of 0.90–0.95 and RMSEA values in the range of 0.06–0.10 indicate that adequate model fit is achieved (Brown 2006). The SRMR, ranging from 0 to 1.0, can be considered adequate with values less than 0.08 (Hu & Bentler 1998). Fan and Sivo (2005) emphasized that the use of multiple, albeit complementary, indices is highly recommended. These values are not absolute, and ought to be considered only as guidelines, because values of these indices have been found to fluctuate as a function of modelling conditions, and thus the values that are slightly out of the ranges indicated above can still be considered acceptable (Hu & Bentler 1998; Brown 2006).

**Results**

**Correlations**

The interdependence of mother- and father-reported data was examined through correlations between two samples on the same variable. The correlations were shown in Table 1, as well as mean and SD of two samples. The correlations among variables were examined separately by parent gender and were also shown in Table 1.

**Structural equation modelling**

SEM was used to examine the effect of parents' depression on child behaviour problem and the mediating effect of parents' general family functioning. The model was over-identified  $\chi^2(3) = 3.206, P = 0.361, CFI = 0.999, TLI = 0.997, RMSEA = 0.019, 90\% CI (0.000, 0.123); P$ -value of close-fit test for null hypothesis of  $RMSEA \leq 0.05$  was 0.558,  $SRMR = 0.016$ . In sum, the data fit the model well regarding the comparative fit and parsimony correction statistics, providing support for the proposed theoretical model. The standardized estimated path coefficients were depicted in Fig. 2.

Maternal depression predicted high levels of father-perceived general family functioning ( $\beta = 0.135, P = 0.045$ ), which in turn predicted more child behaviour problems ( $\beta = 0.206, P = 0.029$ ). Paternal depression predicted high levels of father-perceived general family functioning ( $\beta = 0.454, P < 0.001$ ), which in turn predicted more child behaviour problems. Paternal depression predicted high levels of mother-perceived general family functioning ( $\beta = 0.265, P < 0.001$ ), and mother depression predicted high levels of mother-perceived general family functioning ( $\beta = 0.435, P < 0.001$ ). However, mother-perceived general family functioning did not predict child behaviour problems ( $\beta = 0.019, P = 0.877$ ). This model explained a total of 37.6 and 28.7% of the variance in mother-perceived general family functioning and father-perceived general family functioning,

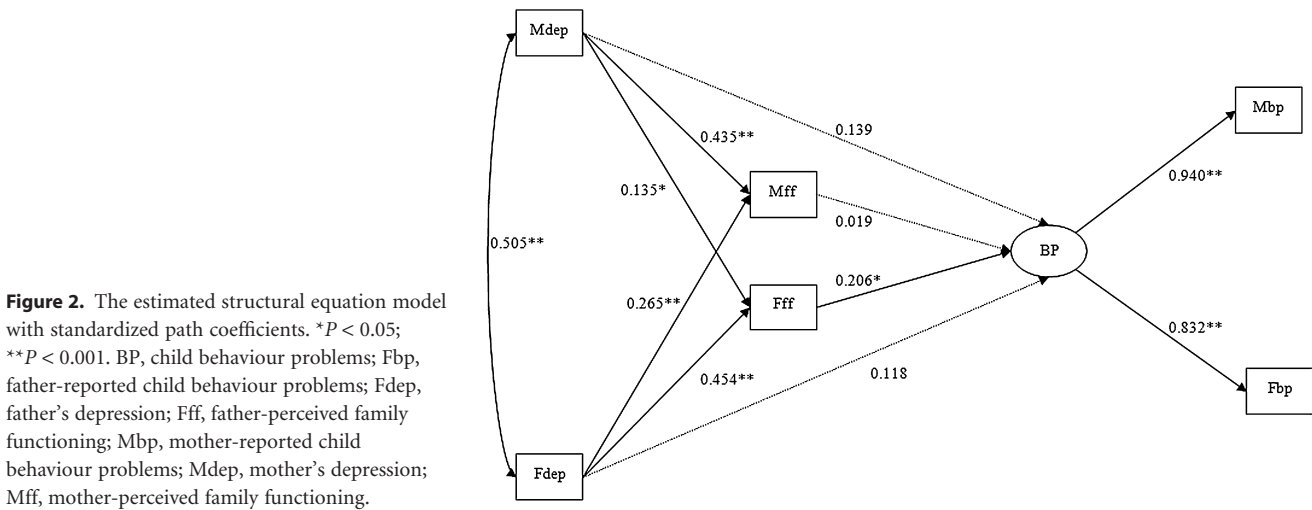
	Mother		Father		r†	1	2	3
	Mean	SD	Mean	SD				
1 Depression	11.47	6.73	11.51	7.62	0.505**		0.524**	0.289**
2 Family functioning	23.34	5.04	23.92	5.12	0.663**	0.584**		0.281**
3 Behaviour problem	10.75	6.85	10.16	6.99	0.779**	0.257**	0.294**	

**Table 1.** Means, SD and correlations of measures for mother and father

The correlations for mother sample were presented under diagonal, whereas the correlations for father sample were presented above diagonal.

\*\* $P < 0.01$ ; \* $P < 0.05$ , two-tailed.

†The correlations of same variables between mother and father. SD, standard deviation.



respectively. And 15.0% of the variance in child behaviour problems was also explained.

## Discussion

Previous research has examined the relationship among parental psychopathology, family functioning and child behaviour problems, mostly with the one informant data (e.g. Burstein *et al.* 2012). The current study further examined their relationship with dyadic data and aimed to expand the knowledge under systemic family background.

The SEM results showed that depression and perceived family functioning of mother and father did have different roles on child behaviour problems, which supported our hypothesis. Only paternal-perceived family functioning could mediate the relation between parental depression and child behaviour problems. This result was consistent with findings reported by previous research (Brennan *et al.* 2002; Burstein *et al.* 2012), with both community sample and pathological sample. However, in their studies, either mother-reported family functioning was not included or comparisons were performed separately by parent gender, so maternal and paternal impact could not be examined simultaneously. Contradictorily, some other studies found that maternal family functioning could also mediate the relationship between maternal depression and child behaviour outcomes (Cummings *et al.* 2005; Foster *et al.* 2008; Gravener *et al.* 2012). Again, only one member in the family was surveyed in these studies; therefore, the difference between mother and father could not be investigated simultaneously. In order to resolve this problem, in the current study, dyadic data were used, so mother- or father-perceived functioning towards the

same family could be considered. At the same time, using SEM, their unique roles could be examined simultaneously. The result further consolidated that father-perceived family functioning played an important role in child behaviour problems, when considering mother-perceived family functioning.

As mentioned above, one crucial topic on parental psychopathology and child outcomes was the role of fathers in children's development (e.g. Phares & Compas 1992). Our results showed that fathers' depression was indeed associated with child behaviour problems. Meanwhile, the dyadic analysis revealed that beyond the correlation with their own depression (actor effect), mother- or father-perceived family functioning could also be correlated by their partners' depression (partner effect). The current study provided a whole picture of the parents' mutual influence. When considering mother and father simultaneously, although their depression could influence both of their own and their partner's perceived family functioning, father-perceived family functioning served as a more important mediator in the relationship with child behaviour problems.

Considering this study was conducted in a Chinese sample, the cultural background should be a concern. In a Chinese family, although the mother acts as the major caregiver of children, they leave the responsibility of children's discipline to the father. In other words, the father is the real behaviour guidance of children. This perhaps is the reason why father-perceived family functioning plays such an important role in child behaviour problems. However, mother and father's role on child other psychopathology outcomes, such as depression and anxiety, needs further examination, which may have a different mechanism. Whether the current result can be replicated and generalized in other populations needs further examination.

There are several limitations of this study. First, parents served as the only informants of all variables, including child behaviour problems. It may lead to bias in rating children's outcomes because of parental pathological state. Although latent variable was used to conceptualize this outcome variable, it would be more precise to use data reported by a third party, such as children self-reported or teacher-reported data. Second, the model examined in the current study could only serve as one possible representation of the relationship of these variables. Because this was a cross-sectional research, causation cannot be determined. It is possible that there exist bidirectional effects between these factors. Third, the measures used in this study were fairly out of date. Although the three measures used in this study had been validated in a Chinese population, the use of outdated measures may lower the validity of the results. For the further study, more commonly employed measures would be used, such as Strengths and Difficulties Questionnaire for child behaviour problems.

Despite the limitations, the findings of this study have a number of implications for future empirical and clinical work. The current study may contribute to the growing body of the few that aimed to investigate the respective role of maternal and paternal psychopathology to youth outcomes and the possible mechanism (Connell & Goodman 2002; Kane & Garber 2004). With the method of SEM, our findings emphasized the significant role that the father could play in family functioning and child behaviour problems. It is important to note that these findings do not indicate that mothers are irrelevant in child development. Besides their partner's effect on fathers' functioning, it is plausible to believe that the mother can have an indirect actor effect on children's function and adjustment through other factors, such as mother-child attachment and maternal emotion expression (Gravener *et al.* 2012), which need further examination. Nevertheless, the results of the present study indicated the importance of involving fathers in clinical work.

## Conclusion

When simultaneously examining the association between father's and mother's depression and perceived family functioning and child behaviour problems, the father showed a more important role. Paternal family functioning could mediate the relationship between both mother and father's depression and child behaviour problems. Parents' psychopathology showed both actor effect and partner effect on their perceived family functioning.

## Key messages

- Parental psychopathology is a crucial factor of family functioning and child behaviour functioning. Maternal and paternal effect should be examined simultaneously, instead of separately.
- In the family system, each side can have an actor effect on own functioning and a partner effect on the other side's functioning as well.
- In this study, dyadic data were used to investigate the relationship among parental depression, family functioning and child behaviour problems.
- Maternal and paternal depression both had actor and partner effect on their respective perceived family functioning, but no direct association with child behaviour problems.
- Only paternal-perceived family functioning could mediate the relation between paternal depression and child behaviour problems.

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