

# Maternal and Paternal Depressive Symptoms and Child Maladjustment: The Mediating Role of Parental Behavior

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**Abstract** This study examined parental behaviors as mediators in links between depressive symptoms in mothers and fathers and child adjustment problems. Participants were 4,184 parents and 6,048 10- to 15-year-olds enrolled in the 1998 and 2000 cycles of the Canadian National Longitudinal Survey of Children and Youth. Mothers and fathers self-reported symptoms of depression at Times 1 and 2 and their children assessed parental nurturance, rejection, and monitoring and self-reported internalizing and externalizing problems and prosocial behavior at Time 2. Hierarchical linear modeling showed evidence of mediation involving all three domains of

parental behavior. Findings supported the hypothesis that the quality of the child's rearing environment is one mechanism that carries risk to children of depressed parents. Interventions for parents whose symptoms of depression interfere with parenting responsibilities could help reduce the risk of some childhood disorders.

**Keywords** Parental depressive symptoms · Parental behavior · Internalizing symptoms · Externalizing symptoms · Prosocial behavior · Mediation

Depressive symptoms in parents and emotional and behavioral disturbances in children are common health problems in the community. About one in five women and one in 10 men will experience a depressive episode during their lifetimes (Kessler et al. 1993) and symptoms are especially common among mothers (Brown and Harris 1978). In children, 6-month prevalence rates of 18–22% for one or more emotional or behavioral disorders have been reported (Breton et al. 1999; Offord et al. 1987). Parental depressive symptoms and child maladjustment also tend to coexist. The presence of parental depressive disorder increases the risk of childhood disorders (Elgar et al. 2003; Goodman and Gotlib 1999) and treatment of parental depression is linked to improvements in child functioning (Weissman et al. 2006).

The effects of parental depressive symptoms on child outcomes have been attributed to several mechanisms: genes, prenatal in utero exposure, attachment, emotion regulation, modeling, family dysfunction, and parenting (Goodman and Gotlib 1999). Among these, considerable research attention has been paid to parent–child relations and parental behavior exhibited by depressed parents (Cummings et al. 2005). Parental nurturance, discipline, and monitoring share transactional associations with paren-

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tal depressive symptoms and child maladjustment (Elgar et al. 2004) and these behaviors are often the focus of treatments for childhood disorders (Cunningham et al. 1995). A theoretical framework for studying the mediating role of parental behavior comes from developmental models of child emotional and behavioral disorders that underscore the role of parental monitoring, discipline, emotional support and nurturance for children's emotion regulation and social development (e.g., Cicchetti and Toth 1998; Patterson et al. 1989).

The expression of depressive symptoms can interfere with parents' abilities to be nurturing, to show firm and consistent discipline, and to avoid "giving in" to child tantrums through negative reinforcement (Lovejoy et al. 2000; Marchand and Hock 1998). We propose that the presence of parental depressive symptoms interferes with parental behavior and is reflected in a lack of nurturance, rejection of the child, and poor monitoring and that these behaviors, in turn, contribute to child maladjustment. A large body of research supports each pathway of this model of mediation. First, the evidence of a relation between parental depressive symptoms and child maladjustment is unequivocal (Elgar et al. 2004; Goodman and Gotlib 1999). Point prevalence rates of psychiatric disorders among children of depressed parents are 2–5 times above normal: 41–77% (Beardslee et al. 1998) and the risk associated with maternal depressive symptoms may be comparable to the risk associated with paternal depressive symptoms (Phares and Compas 1992; Phares et al. 2002). Beck's (1999) meta-analysis of 33 studies that cited correlations between maternal depressive symptoms and child adjustment problems (total  $N=4,561$ ) yielded a mean effect size of 0.29 to 0.35, depending on how samples were weighted. Similar results were found in Kane and Garber's (2004) meta-analyses of 17 studies of paternal depressive symptoms and child internalizing problems (total  $N=1,337$ ; mean effect size=0.24) and 17 studies of paternal depressive symptoms and child externalizing problems (total  $N=1,181$ ; mean effect size=0.19). There could still be differences in maternal and paternal contributions to child outcomes. Some research has suggested that mother–child interactions have more impact on children's self-esteem and emotional well being while father–child interactions have more impact on children's social competencies (e.g., Conger et al. 1995; Kaisa and Jari-Erik 2005). It is worth exploring the effects of parent gender on children's internalizing and externalizing problems and social competencies.

Second, the expression of depressive symptoms can interfere with child rearing. Parental depressive symptoms correlate with lax and inconsistent discipline, and with criticism, hostility, and rejection expressed towards children (Kaslow et al. 1994; Lovejoy et al. 2000; Marchand and Hock 1998). Less is known about these links among fathers

than among mothers but there is evidence of links between paternal depressive symptoms and less paternal warmth and more psychological control (Cummings et al. 2005). Kane and Garber (2004) identified six studies that reported correlations between paternal depressive symptoms and parent–child conflict and calculated a mean effect size of 0.20 based on a total sample of 499 families. Lovejoy and colleagues reviewed 46 studies that showed significant associations between maternal depressive symptoms and parenting deficits (Lovejoy et al. 2000). Both reviews concluded that links between depressive symptoms and parental behavior are stronger for the presence of negative parental behavior (e.g., rejection and hostility) than for the lack of positive parental behavior (e.g., nurturance and monitoring) and that parenting deficits are not specific to depressive disorder and can also be found among parents who exhibit subclinical levels of distress (Kane and Garber 2004; Lovejoy et al. 2000).

Third, significant relations exist between the quality and consistency of parental behavior and child emotional, behavioral, and social outcomes (Dadds 1995; Darling and Steinberg 1993). Three dimensions of parental behavior appear to be especially predictive of adjustment difficulties: (1) lack of nurturance and positive involvement with the child, (2) parent–child hostility and parental rejection of the child, and (3) poor monitoring and supervision of the child's activities (Conger et al. 1995; Cunningham and Boyle 2002; Pettit et al. 1997; Patterson et al. 1989; Sanders 1999). A combination of encouragement, responsiveness, and monitoring is often described as an "authoritative" style of parenting and has been found to contribute to children's self-confidence, emotion regulation, social skills, and low levels of anxious, depressive, and antisocial tendencies (Baumrind 1967). While fathers are also underrepresented in this area of research, studies have demonstrated significant associations between coercive parenting practices or detachment by fathers and child adjustment problems (Dadds 1995; Kane and Garber 2004; Phares and Compas 1992).

Fourth, a small but robust body of evidence supports a model of mediation by parental behavior in links between parental depressive symptoms and child maladjustment. Three studies have tested the significance of this mediation. In one study, researchers measured "maladaptive" parental behavior (e.g., rejection and hostility) and maternal and child psychiatric symptoms in a cohort of 593 families over a 10-year period (Johnson et al. 2001). Maternal psychopathology was prospectively related to maladaptive parenting and to childhood disorders and the association between maternal and child symptoms were no longer significant after controlling for maladaptive parenting. A dichotomization of maladaptive parenting and the exclusion of fathers from the study precluded a sensitive test of mediation by maternal and paternal parental behavior. A second study

followed 276 high-risk families from the inner city London area over a period of 10 years (Bifulco et al. 2002). Researchers measured psychiatric disorders in mothers and children and various parental behaviors including antipathy, control, neglect, and abuse. While this study also excluded fathers it did find that a maternal history of depression increased the risk of child depression by 78% and that this risk was largely mediated by a composite measure of maternal neglect and abuse. A third mediation study was a 13-year investigation of 184 high-risk families in the Minnesota Longitudinal Study of Parents and Children (Burt et al. 2005). Maternal depression was prospectively linked to child adjustment problems and this link was partly mediated by family environment and parental behavior. Unfortunately, because the data analysis in this study also involved a composite measure of parenting, the findings did not reveal which parenting domain carried the most influence of parent psychopathology on child outcomes.

The available evidence indicates that parental rejection and poor monitoring are associated with maternal distress and depression and mediate, at least in part, a link between maternal depressive symptoms and child maladjustment (Bifulco et al. 2002; Burt et al. 2005; Johnson et al. 2001). Questions about the nature of this mediation remain unanswered. First, much of the research into parental depression has excluded fathers (Kaslow et al. 1994; Phares et al. 2002). The scarcity of data on paternal depression could be the result of greater prevalence of major depression in women than in men, difficulty in recruiting fathers into research, greater interest in parenting by mothers than in parenting by fathers, or the assumption of the central role of mothers in child development (Phares et al. 2002). We aimed to include mothers and fathers in an investigation of parental behavior as a mediating factor in links between parental depressive symptoms and child maladjustment. Second, few data are available on the degree of mediation by both positive and negative forms of parenting practices involving a consistent set of child outcomes. Previous mediation studies were focused on negative parental behavior (e.g., rejection, hostility, and abuse) so it is unclear whether disruptions in positive domains of parental behavior, such as nurturance and monitoring, might also mediate links between parental depressive symptoms and child outcomes.

Building on the findings of previous research, the present study used data from the Canadian National Longitudinal Survey of Children and Youth (NLSCY; Statistics Canada 1996) to examine links between parental depressive symptoms and child maladjustment. The sample and design of NLSCY offered a unique opportunity to carry out a longitudinal investigation of mediation by low nurturance, high rejection, and poor monitoring in the links between self-rated depressive symptoms in mothers and

fathers and self-rated adjustment problems in 10- to 15-year-olds. Child functioning was assessed in three domains: internalizing problems, externalizing problems, and prosocial behavior. The central hypotheses of the study were: (1) that depressive symptoms in parents, parental nurturance, rejection, and monitoring and each domain of child maladjustment would be interrelated, and (2) that parenting practices would mediate links between parental depressive symptoms and child outcomes. The study also set out to explore the effects of age and gender of the parents and children on links between parental and child functioning. The aim of these analyses was to identify which demographic characteristics were associated with a transmission of maladjustment from parents to children.

## Materials and Methods

*Participants* Data were utilized from the 1998 and 2000 cycles of the National Longitudinal Survey of Children and Youth (NLSCY), a study administered by the Government of Canada to investigate child development and health from infancy to adulthood (Statistics Canada 1996). The sampling procedure that was used in the initial data cycle in 1994 identified households in all Canadian provinces with children up to the age of 14. Sampling frames were adopted from the Labour Force Survey (Statistics Canada 2002) and National Population Health Survey (Statistics Canada 1999) to ensure a stratified representation of all regions and socioeconomic conditions in Canada. Parents of eligible children were randomly selected from each frame and 86.3% of those contacted agreed to participate. The families determined which parent participated and in most cases it was the mother who responded to an initial telephone interview, resulting in under-representation of fathers in the sample. Parent data were collected in telephone interviews conducted by Statistics Canada interviewers in 1998 (Time 1) and 2000 (Time 2). Child data were collected at Time 2 using questionnaires at schools. This questionnaire was administered using standardized teacher instructions only to those children who were recruited into the NLSCY. Additional details on the design and methodology of the NLSCY are available online at: <http://www.statcan.ca/english/rdc>.

Inclusion criteria for the present study were that the adult surveyed at Times 1 and 2 was the same parent (birth, step, adoptive or foster) and lived with the child participant and that the child surveyed at Time 2 provided data on their adjustment problems and their parents' nurturance, rejection and monitoring. These criteria provided a maximum number of data points from the school questionnaire that was administered to children who were recruited to the NLSCY between 10 and 15 years of age. Eligible siblings

**Table 1** Parent characteristics

	Mothers (N=3,854)		Fathers (N=330)	
	M (SD)	Range	M (SD)	Range
Age	38.63 (5.45)	22–57	41.33 (6.18)	26–67
Household size	14.33 (1.21)	2–13	4.04 (1.15)	2–8
Education (years)	12.76 (2.13)	3–20	12.96 (2.58)	3–20
Income adequacy	3.73 (0.99)	1–5	3.85 (0.86)	1–5
Depressive symptoms (Time 1)	16.69 (5.55)	12–46	16.25 (5.47)	12–38
Depressive symptoms (Time 2)	16.62 (5.81)	12–48	16.43 (5.95)	12–46

of the sampled child were also included, thus resulting in a cluster sample consisting of more children than parents. Data were available on 4,184 families, including 3,854 mothers and 330 fathers of 6,048 children. Of these children, 3,125 (51.7%) were male and 2,923 (48.3%) were female. A large majority of the parents were biological parents (97.8% of mothers and 95.4% of fathers) and the remainder was stepparents, adoptive parents, and foster parents. When asked to report ethnic ancestry, 51.9% of the parents reported Canadian, 35.3% British, 27.4% French, 25.1% European, 4.3% North American Indian, Métis, or Inuit, 3.2% Chinese or South Asian, 1.4% Black or African.<sup>1</sup> The demographic characteristics of the parents at Time 1 are summarized in Table 1. Child age and number of siblings at Time 2 are shown in Table 2

## Measures and Procedure

**Sociodemographic Characteristics** Parents gave information on the number of persons living in the household, number of siblings of the child, parental age and education (in years), and the age and sex of each child during a telephone interview. A five-point measure of income adequacy ranging from 1 (lowest) to 5 (highest) was used to reflect annual gross household income (in 1998 Canadian dollars) adjusted for household size.<sup>2</sup>

<sup>1</sup> Figures include parents who reported more than one ethnic origin, which is why the percentages add to more than 100%. Aboriginal children were underrepresented because the NLSCY did not survey children living on reserves and in the Yukon and Northwest Territories.

<sup>2</sup> Income adequacy scores were: 1 (less than \$10,000 for 1–4 persons or less than \$15,000 for five or more persons); 2 (\$10,000 to \$14,999 for one or two persons, \$10,000 to \$19,999 for three or four persons, or \$15,000 to \$29,999 for five or more persons); 3 (\$15,000 to \$29,999 for one or two persons, \$20,000 to \$39,999 for three or four persons, or \$30,000 to \$59,999 for five or more persons); 4 (\$30,000 to \$59,999 for one or two persons, \$40,000 to \$79,999 for three or four persons, or \$60,000 to \$79,999 for five or more persons); and 5 (more than \$60,000 for one or two persons or more than \$80,000 for three or more persons).

**Depressive Symptoms** Parents reported depressive symptoms at Times 1 and 2 using a 12-item version of Radloff's (1977) Centre for Epidemiological Studies–Depression Scale (CES-D-12). This short scale has adequate cross-validity with the original version of the scale (Poulin et al. 2005) and has been used in previous studies of parental depression (e.g., Elgar et al. 2003; Lipman et al. 2002). Parents indicated how well 12 statements described their mood over the previous 2 weeks (e.g., “I did not feel like eating or my appetite was poor” and “I felt that I could not shake off the blues even with help from my family or friends”). A complete list of items is shown in the Appendix. Possible responses were “rarely or none of the time” (1), “some or a little of the time” (2), “occasionally or a moderate amount of time” (3), or “most or all of the time” (4). Three positive items were reverse-scored and scores ranged from 12 to 46 in mothers and from 12 to 38 in fathers with higher scores reflecting greater distress. The CES-D-12 showed adequate internal consistency in mothers ( $\alpha=0.86$  at Time 1;  $\alpha=0.87$  at Time 2) and fathers ( $\alpha=0.80$  at Time 1;  $\alpha=0.81$  at Time 2).

**Parental Behavior** Children's perceptions of their relationships with their parents and parental supervision were assessed using a 23-item scale developed by Lempers et al. (1989). The scale was part of the NLSCY school questionnaire that was administered by teachers in classroom settings. Only children who were recruited to the NLSCY completed this questionnaire. Seven items measured parental nurturance (e.g., “My parents listen to my ideas and opinions”), seven items measured parental rejection (e.g., “My parents seem too busy to spend as much time with me as I'd like”), and five items measured parental monitoring (e.g., “My parents want to know exactly where I am and what I am doing;” see Appendix). Items used a five-point rating scale ranging from “never” (0) to “always” (4). Scores ranged from 0 to 28 for nurturance and rejection scales and from 0 to 20 for the monitoring scale. Internal consistency in these scales was high to moderate for nurturance ( $\alpha=0.88$ ) and rejection ( $\alpha=0.73$ ) but somewhat low for monitoring ( $\alpha=0.57$ ).

**Table 2** Child characteristics and parental behavior as rated by boys and girls at time 2

	Boys (N=3,125)		Girls (N=2,923)	
	M (SD)	Range	M (SD)	Range
Age (years)	12.59 (1.69)	10–15	12.58 (1.71)	10–15
Number of siblings	1.16 (0.93)	0–7	1.20 (0.98)	0–7
Internalizing problems	2.91 (2.56)	0–16	3.89 (2.84)	0–14
Externalizing problems	3.91 (4.05)	0–34	3.01 (3.49)	0–30
Prosocial behavior	14.10 (3.49)	0–20	11.73 (4.00)	0–20
Nurturance	20.68 (5.58)	0–28	21.09 (5.39)	0–28
Rejection	9.86 (4.96)	0–28	9.45 (4.78)	0–28
Monitoring	14.63 (3.25)	0–20	15.22 (3.10)	0–20

*Child Adjustment Problems* Internalizing problems, externalizing problems, and prosocial behavior were also assessed in the NLSCY school questionnaire using items that were developed for the Montreal Longitudinal Survey and Ontario Child Health Study (Statistics Canada 1996; see Appendix). Possible responses to these items were “never” (0), “sometimes or somewhat true” (1), and “often or very true” (2). Internalizing problems were measured using seven items that described symptoms of depression and anxiety (e.g., “I am unhappy or sad,” and “I am too fearful or nervous”). Total scores ranged from 0 to 14 with higher scores reflecting more internalizing problems. The internal consistency of the internalizing problems scale was moderate ( $\alpha=0.74$  in boys and  $\alpha=0.72$  in girls). Externalizing problems were measured using 17 items that describe physical and indirect aggression and property offenses.<sup>3</sup> Six items measured physical aggression (e.g., “I get into many fights”), five items measured indirect aggression (e.g., “When I am mad at someone, I try to get others to dislike him/her”), and six items measured property offences (e.g., “I destroy my own things”). Total scores ranged from 0 to 34 with higher scores reflecting more externalizing problems. The internal consistency of the externalizing problems scale was high ( $\alpha=0.99$  in boys and  $\alpha=0.94$  in girls). Prosocial behavior was measured using ten items (e.g., “I show sympathy for a child who has made a mistake,” and “I try to help someone who has been hurt”). Scores ranged from 0 to 20 with high scores indicating frequent prosocial behaviors. The internal consistency of the prosocial behavior scale was also adequate ( $\alpha=0.76$  in boys and girls).

<sup>3</sup> Although data on hyperactivity symptoms were also available and tend to correlate highly with aggressive conduct problems in children (Waschbusch 2002), these data were excluded from this study because the behaviors were measured using self-reports. Past research supports the reliability and validity of children’s self-reports of aggressive conduct problems but has found limited value in children’s self-reports of hyperactivity (Jensen et al. 1999; Loeber et al. 1989).

## Data Analysis

Data were analyzed using Stata 9 (StataCorp LP, College Station, TX). This package computes appropriate standard errors for estimates obtained from complex survey designs and takes account of the effects of stratification and clustering on the precision of survey estimates. The NLSCY provides population weights for the measures described in this study and these were used in all analyses. Relations between variables were first analyzed using correlations involving one randomly chosen child per parent. Hierarchical linear modeling (HLM) was then used to better utilize all the data available while adjusting for shared variance (clustering) among siblings. Associations between parental depressive symptoms, parental behavior, and child outcomes were tested using linear regressions with parental education, household size, and income adequacy controlled as covariates. These variables were chosen to account for known income gradients in parenting difficulties (Lempers et al. 1989), depressive symptoms in parents (Brown and Harris 1978) and adjustment problems in children (Lipman et al. 1995). Parental age and gender, child age and gender, and interactions of parent gender and child gender were also included in HLM models to study their relations with parental depressive symptoms, parental behavior, and child maladjustment. Parental depressive symptoms at Time 1 were also included as a covariate to study the influence of change in parental depressive symptoms on parental behavior and child maladjustment.

Baron and Kenny’s (1986) criteria for mediation were tested to establish whether parental behavior helped to explain associations between parental depressive symptoms and child outcomes. The criteria were: (1) parental depressive symptoms must be shown to relate to parental behavior, (2) parenting practices must be shown to relate to child adjustment problems, (3) parental depressive symptoms must be shown to relate to child adjustment problems, and (4) statistically controlling for shared associations with parental behavior must attenuate the association between

parental depressive symptoms and child adjustment problems. This fourth criterion was tested by comparing the results of mediated and unmediated models and using Sobel (1982) tests to compare the viability of an indirect, mediated effect of depressive symptoms on child maladjustment to the null hypothesis that it equals zero (Holmbeck 2002; Preacher and Hayes 2004).

## Results

Differences were found between the mothers and fathers in the sample. As shown in Table 1, mothers tended to be younger,  $t(4,823)=8.43$ ,  $p<0.01$ , and in larger families,  $t(4,823)=4.17$ ,  $p<0.01$ , than fathers. Mothers also reported lower income adequacy than fathers,  $t(4,823)=1.99$ ,  $p<0.05$ . However, there were no significant differences between mothers and fathers in the number of depressive symptoms reported at either Time 1 or Time 2.

Compared to boys, girls reported more internalizing problems,  $t(4,515)=12.15$ ,  $p<0.01$ , less prosocial behavior,  $t(4,543)=10.11$ ,  $p<0.01$ , and fewer externalizing problems,  $t(4,655)=8.05$ ,  $p<0.01$  (see Table 2). Girls and boys also differed slightly in their reports of parenting behavior, with girls reporting more nurturance,  $t(4,304)=2.45$ ,  $p<0.05$ , more monitoring,  $t(4,502)=6.28$ ,  $p<0.01$ , and less parental rejection,  $t(4,282)=-2.71$ ,  $p<0.01$ .

Table 3 shows matrices of correlations between mothers' and fathers' depressive symptoms at Times 1 and 2 and parenting practices and child adjustment problems at Time 2. These correlations involved one randomly selected child

per parent and were not adjusted for associations with the sociodemographic variables shown in Table 1. The results indicated that depressive symptoms in mothers and in fathers were positively related to child internalizing and externalizing problems. A negative correlation between parental depressive symptoms and child prosocial behavior was only found among fathers and sons. Parental depressive symptoms were also correlated with less nurturance and monitoring and more rejection, particularly among the fathers. Correlations between parental behavior and child outcomes were also statistically significant and in the expected directions. That is, parental nurturance and monitoring were negatively correlated with child internalizing and externalizing problems and positively correlated with prosocial behavior. Parental rejection had the opposite correlations with these child outcomes.

Next, HLM was used to control for sample clustering and shared associations with sociodemographic factors that might have inflated the strength of the correlations between parent and child variables. These analyses also accounted for covariation among the three parenting domains and among the child outcomes as shown in Table 3. The first criterion of mediation was tested by regressing maternal and paternal depressive symptoms at Time 1 on each domain of parental behavior (Table 4). Two models were used to contrast the strength of these associations before and after adjusting for depressive symptoms at Time 2. In Model 1, significant relations were found between parental depressive symptoms at Time 1 and all three parenting domains at Time 2. Model 2 indicates that a change in parental depressive symptoms from Time 1 to Time 2 was

**Table 3** Correlations between parental depressive symptoms (Times 1 and 2), parenting practices, and child maladjustment

Variable	1.	2.	3.	4.	5.	6.	7.	8.
<b>Mothers</b>								
1. Depressive symptoms (1)	–	0.48**	–0.10**	0.24**	–0.14**	0.15**	0.22**	–0.02
2. Depressive symptoms (2)	0.47**	–	–0.10**	0.14**	–0.02	0.08**	0.09**	–0.10**
3. Parental nurturance	–0.07**	–0.14**	–	–0.14**	0.47**	0.03	–0.13**	0.39**
4. Parental rejection	0.22**	0.13**	–0.24**	–	–0.07**	0.35**	0.40**	–0.31**
5. Parental monitoring	–0.14*	–0.04	0.43**	–0.06*	–	–0.22**	–0.05	0.31**
6. Internalizing problems	0.24**	0.19**	–0.08**	0.34**	–0.08*	–	–0.47**	–0.02
7. Externalizing problems	0.22**	0.19**	–0.12**	0.40**	–0.13**	0.45**	–	0.29**
8. Prosocial behavior	0.01	–0.06*	0.43**	–0.20**	0.27**	–0.05*	–0.22**	–
<b>Fathers</b>								
1. Depressive symptoms (1)	–	0.31**	–0.46**	0.49**	–0.47**	0.42**	0.47**	–0.40**
2. Depressive symptoms (2)	0.33**	–	–0.03	0.08	–0.30**	0.13	0.15*	–0.19**
3. Parental nurturance	–0.46**	–0.08	–	–0.43**	0.63**	–0.40**	–0.48**	0.29**
4. Parental rejection	0.49**	0.26**	–0.35**	–	–0.67**	0.58**	0.52**	0.09
5. Parental monitoring	–0.43**	–0.14	0.77**	–0.45**	–	–0.55**	–0.67**	0.22**
6. Internalizing problems	0.33**	0.32**	–0.37**	0.41**	–0.52**	–	0.66**	0.01
7. Externalizing problems	0.46**	0.16**	–0.43**	0.56**	–0.50**	0.43**	–	0.30**
8. Prosocial behavior	–0.06	0.12	0.26**	–0.04	0.32**	0.06	–0.37**	–

Boys are shown above the diagonal; girls below

\* $p<0.05$ , \*\* $p<0.01$

also related to parental behavior. Both models indicated that depressive symptoms were predictive of low nurturance, high rejection, and low monitoring. Analyses of the cases included in Model 1 but missing from Model 2 (2.33–2.40% of the sample) showed no systematic loss of data owing to depressive symptoms at Time 1 or to any of the sociodemographic variables studied.

Table 4 also shows parent and child characteristics that were related to parental behavior. Specifically, parental age, education, income adequacy, parental female gender, and child female gender each predicted more parental nurtur-

ance and monitoring. Child age was related to less nurturance, more rejection, and more monitoring and parental age was related to less rejection. As well, interactions of parent female gender and child female gender were negatively related to nurturance and monitoring. These interactions were indicative of a moderating role of child gender on links between parent gender and these domains of parental behavior.

The second and third criteria of mediation were tested using regressions of child adjustment problems by parental depressive symptoms and parenting practices (Table 5).

**Table 4** Linear regression of parental nurturance, rejection, and monitoring by parental depressive symptoms

	Model 1		Model 2	
	B (SE)	<i>t</i>	B (SE)	<i>t</i>
<b>1. Nurturance</b>				
Parent age	0.12(0.03)	3.53**	0.11(0.04)	3.20**
Parent education	0.53(0.08)	6.93**	0.52(0.08)	6.61**
Parent gender (female)	4.29(0.93)	4.62**	4.08(0.93)	4.36**
Income adequacy	0.93(0.21)	4.54**	0.94(0.21)	4.50**
Child age	-0.08(0.07)	-1.10**	-0.12(0.08)	-1.62**
Child gender (female)	3.52(0.74)	4.74**	3.55(0.75)	4.75**
Parent X child gender	-2.32(0.68)	-3.42**	-2.34(0.69)	-3.41**
Depressive symptoms (Time 1)	-0.06(0.03)	2.15*	0.01(0.03)	-0.27
Depressive symptoms (Time 2)			0.09(0.03)	3.38**
<i>N</i> (children)	3,805		3,716	
<i>N</i> (parents)	3,153		3,080	
<i>R</i> <sup>2</sup>	0.93		0.93	
<b>2. Rejection</b>				
Parent age	-0.04(0.02)	-1.98*	-0.05(0.02)	-2.12*
Parent education	-0.11(0.06)	-1.79	-0.09(0.06)	-1.50
Parent gender (female)	0.36(0.56)	0.64	0.07(0.57)	0.12
Income adequacy	-0.19(0.17)	-1.18	-0.16(0.17)	-0.93
Child age	0.77(0.07)	11.73**	0.71(0.07)	10.59**
Child gender (female)	0.18(0.47)	0.71	0.06(0.50)	-0.12
Parent X child gender	0.16(0.38)	0.68	0.33(0.41)	0.82
Depressive symptoms (Time 1)	0.07(0.03)	2.79**	0.04(0.03)	1.31
Depressive symptoms (Time 2)			0.08(0.02)	3.33
<i>N</i> (children)	3,752		3,662	
<i>N</i> (parents)	3,111		3,041	
<i>R</i> <sup>2</sup>	0.81		0.81	
<b>3. Monitoring</b>				
Parent age	0.10(0.02)	5.08**	0.09(0.02)	4.71**
Parent education	0.22(0.05)	6.46**	0.33(0.05)	6.77**
Parent gender (female)	2.29(0.45)	5.15**	2.05(0.46)	4.50**
Income adequacy	0.35(0.11)	3.28**	0.35(0.11)	3.32**
Child age	0.15(0.05)	3.11**	0.11(0.05)	2.26*
Child gender (female)	1.39(0.29)	4.77**	1.36(0.31)	4.33**
Parent X child gender	-0.99(0.22)	-4.35**	-0.97(0.25)	-3.89**
Depressive symptoms (Time 1)	0.07(0.01)	4.86**	0.03(0.02)	1.64
Depressive symptoms (Time 2)			0.08(0.02)	4.24**
<i>N</i> (children)	3,968		3,873	
<i>N</i> (parents)	3,261		3,187	
<i>R</i> <sup>2</sup>	0.95		0.95	

\**p*<0.05, \*\**p*<0.01

**Table 5** Linear regression of child maladjustment by parental depressive symptoms and parenting behavior

	Model 1		Model 2		Model 3		Model 4	
	B(SE)	<i>t</i>	B(SE)	<i>t</i>	B(SE)	<i>t</i>	B(SE)	<i>t</i>
<b>1. Internalizing problems</b>								
Parent age	0.05(0.01)	4.36**	0.05(0.01)	4.11**	0.05(0.01)	3.61**	0.05(0.01)	3.52**
Parent education	-0.02(0.03)	-0.72	-0.02(0.03)	-0.71	-0.04(0.04)	-1.24	-0.04(0.04)	-0.91
Parent gender (female)	1.17(0.34)	3.50**	1.05(0.32)	3.18**	1.25(0.37)	3.38**	1.21(0.37)	3.28**
Income adequacy	-0.09(0.08)	-1.16	-0.08(0.08)	-1.04	-0.02(0.08)	-0.19	0.01(0.08)	0.16
Child age	0.13(0.04)	3.59**	0.10(0.08)	2.61**	0.02(0.04)	0.56	-0.02(0.04)	-0.56
Child gender (female)	0.50(0.24)	2.12*	0.57(0.04)	2.35**	0.31(0.30)	1.06	0.31(0.31)	1.03
Parent X child gender	-0.28(0.18)	-1.50	-0.22(0.25)	-1.17	-0.46(0.26)	-1.81	-0.47(0.26)	-1.77
Dep. Symptoms (Time 1)	0.05(0.01)	4.77**	0.03(0.01)	2.30*			0.02(0.01)	1.57
Dep. Symptoms (Time 2)			0.04(0.02)	2.51*			0.03(0.02)	1.74
Nurturance					-0.07(0.02)	-3.80**	-0.07(0.02)	-3.92**
Rejection					0.14(0.02)	8.52**	0.14(0.02)	8.30**
Monitoring					-0.11(0.03)	-4.19**	-0.10(0.03)	-3.79*
<i>N</i> (children)		3,985		3,893		3,385		3,235
<i>N</i> (parents)		3,287		3,217		2,848		2,731
<i>R</i> <sup>2</sup>		0.62		0.62		0.65		0.66
<b>2. Externalizing problems</b>								
Parent age	-0.01(0.02)	-0.66	-0.01(0.02)	-0.80	0.01(0.02)	0.66	0.01(0.02)	0.52
Parent education	-0.02(0.04)	-0.37	-0.02(0.04)	-0.48	-0.01(0.05)	-0.19	0.00(0.05)	-0.01
Parent gender (female)	0.50(0.35)	1.40	0.33(0.36)	0.92	0.81(0.39)	2.05*	0.60(0.41)	1.47
Income adequacy	-0.23(0.11)	-2.17*	-0.21(0.11)	-1.90	-0.13(0.11)	-1.18	-0.08(0.11)	-0.75
Child age	0.21(0.05)	4.50**	0.19(0.05)	4.06**	0.02(0.05)	0.35	0.00(0.05)	-0.06
Child gender (female)	-1.24(0.27)	-4.57**	-1.13(0.28)	-3.98**	-1.73(0.33)	-5.23**	-1.65(0.35)	-4.68**
Parent X child gender	-0.18(0.21)	-0.87	-0.10(0.22)	-0.46	-0.58(0.28)	-2.11*	-0.52(0.30)	-1.75
Dep. Symptoms (Time 1)	0.05(0.02)	2.98**	0.04(0.02)	1.93			0.02(0.02)	1.35
Dep. Symptoms (Time 2)			0.03(0.02)	2.01*			0.02(0.02)	1.25
Nurturance					-0.11(0.02)	-4.63**	-0.11(0.02)	-4.67**
Rejection					0.24(0.02)	11.04**	0.23(0.02)	10.48**
Monitoring					0.04(0.03)	1.38	0.04(0.03)	1.33
<i>N</i> (children)		4,127		4,031		3,474		3,319
<i>N</i> (parents)		3,383		3,309		2,913		2,792
<i>R</i> <sup>2</sup>		0.47		0.47		0.54		0.54
<b>3. Prosocial behavior</b>								
Parent age	0.14(0.02)	7.75**	0.14(0.02)	7.40**	0.09(0.02)	4.94**	0.09(0.02)	4.86**
Parent education	0.36(0.05)	6.87**	0.35(0.05)	6.70**	0.12(0.04)	2.76**	0.13(0.04)	2.85**
Parent gender (female)	2.76(0.48)	5.74**	2.66(0.50)	5.35**	1.25(0.39)	3.17**	1.16(0.42)	2.79**
Income adequacy	-0.29(0.11)	2.58*	0.30(0.11)	2.62**	-0.06(0.11)	-0.51	-0.03(0.12)	-0.27
Child age	0.02(0.05)	0.35	-0.01(0.05)	-0.28	-0.01(0.05)	-0.26	-0.04(0.05)	-0.68
Child gender (female)	0.49(0.33)	1.49	0.54(0.34)	1.59	1.57(0.31)	5.07**	1.69(0.33)	5.16**
Parent X child gender	-0.86(0.26)	-3.36**	-0.83(0.27)	-3.11	-0.16(0.22)	-0.75	-0.09(0.24)	-0.36
Dep. Symptoms (Time 1)	-0.07(0.02)	-3.86**	-0.03(0.02)	-1.71**			-0.03(0.02)	-1.51
Dep. Symptoms (Time 2)			-0.06(0.02)	-3.20**			-0.02(0.02)	-0.97



**Table 5** (continued)

	Model 1		Model 2		Model 3		Model 4	
	B(SE)	<i>t</i>	B(SE)	<i>t</i>	B(SE)	<i>t</i>	B(SE)	<i>t</i>
Nurturance					0.24(0.02)	11.79**	0.25(0.02)	11.45**
Rejection					0.01(0.02)	.37	0.01(0.03)	0.25
Monitoring					0.28(0.03)	8.70**	0.27(0.03)	8.08**
<i>N</i> (children)		3,929		3,838		3,750		3,205
<i>N</i> (parents)		3,258		3,188		2,829		2,714
<i>R</i> <sup>2</sup>		0.91		0.91		0.93		0.94

\**p*<0.05, \*\**p*<0.01

Again, sets of variables were added sequentially to regression models in order to compare their contributions to each child outcome. The results showed significant contributions of parental depressive symptoms at Time 1 (Model 1) and change in parental depressive symptoms from Time 1 to Time 2 (Model 2) to more internalizing and externalizing problems and less prosocial behavior. Consistent with the correlations shown in Table 3, parental nurturance and monitoring predicted fewer internalizing and externalizing problems and more prosocial behavior whereas parental rejection predicted more internalizing and externalizing problems and less prosocial behavior (Model 3).

Table 5 also shows contributions of parental age and parental female gender to more internalizing problems, contributions of child female gender to fewer externalizing problems, and contributions of parental age, parental education, parental female gender, and child female gender to more prosocial behavior. Child age was positively related to parental rejection and monitoring but negatively related to parental nurturance. Child age did not appear to predict adjustment problems after parental depressive symptoms and parental behaviors were accounted for. A substantial change in sample size between Models 1 and 4 was observed but, again, analyses of the cases included in Model 1 but missing from Model 4 (18.43–19.58% of the sample) showed no systematic loss of data owing to depressive symptoms at Time 1 or to any of the socio-demographic variables studied.

Finally, the fourth criterion of mediation was tested by comparing the fit of direct, unmediated models of parental depressive symptoms and child maladjustment (Model 2, Table 5) to indirect, mediated models that included parental behavior (Model 4, Table 5). The addition of parental behavior to the regression model appeared to attenuate the relation between parental depressive symptoms and all three of the child maladjustment outcomes. These attenuated effects are consistent with mediation but do not, in themselves, show the degree of the mediation (Holmbeck 2002). Indeed, the addition of parental behavior variables to the models resulted in only small differences in the

percentage of explained variance (*R*<sup>2</sup>). Therefore, Sobel tests were used to test the viability of indirect, mediated associations between parental depressive symptoms and child maladjustment, through parental behavior. As shown in Table 6, the results of these analyses supported a mediating role of parental nurturance in links between parental depressive symptoms and externalizing problems (low nurturance) and prosocial behavior (high nurturance), a mediating role of parental rejection in links between parental depressive symptoms and child internalizing and externalizing problems, and a mediating role of parental low monitoring in links between parental depressive symptoms and more child internalizing problems and less prosocial behavior in the child.

**Discussion**

The aim of this study was to test mediation by parenting practices in the links between parental depressive symptoms and maladjustment in children. Using self-report measures of parental depressive symptoms and child adjustment problems, evidence of mediation was found for (1) parental nurturance in links between parental depressive symptoms and children’s externalizing problems and prosocial behavior; (2) parental rejection in links between parental depressive symptoms and children’s

**Table 6** Sobel tests of mediation

	Internalizing problems	Externalizing problems	Prosocial behavior
Nurturance	2.59	2.74*	3.24*
Rejection	3.09*	3.17*	0.25
Monitoring	2.83*	1.27	3.75*

Sobel’s (1982) test was computed using the formula,  $Z = \frac{a \times b}{\sqrt{b^2 \times s_a^2 + a^2 \times s_b^2 + s_a^2 \times s_b^2}}$  where *a* is the unstandardized regression coefficient for the association between parental depression and parental behavior, *b* is the unstandardized coefficient for the association between parental behavior and child adjustment problems, and *s<sub>a</sub>* and *s<sub>b</sub>* are standard errors of *a* and *b*, respectively  
\**p*<0.01

internalizing and externalizing problems; and (3) parental monitoring in links between parental depressive symptoms and child internalizing problems and prosocial behavior. The findings build upon previous research and address gaps in our understanding of how maternal and paternal depressive symptoms influence these child outcomes.

Three domains of parental behavior, nurturance, rejection, and monitoring, were found to mediate links between a change in parental depressive symptoms over time and two of the three child outcomes that were measured. Evidence of a mediating role of parental behavior is consistent with studies that have shown similar mediation by negative or ineffectual parenting practices (Burt et al. 2005; Johnson et al. 2001) and it fits a wider body of research that describes mothers and fathers who exhibit symptoms of depression as more intrusive, hostile, and neglectful and less involved and warm towards their children than non-depressed parents (Cummings et al. 2005; Kane and Garber 2004; Lovejoy et al. 2000). Unique to this study was evidence of mediation by both *positive* and *negative* domains of parental behavior; reductions in parental nurturance and monitoring and increases in parental rejection each carried a significant amount of influence of parental depressive symptoms on child functioning. Symptoms of maternal and paternal depression were negatively related to behaviors that are indicative of an “authoritative” style of parenting (Baumrind 1967) and were positively related to coercive family interactions, which have been described elsewhere in the literature to contribute to undersocialized, externalizing behavioral problems in children (Dodge and Pettit 2003; Patterson et al. 1989).

A practical implication of this evidence of mediation is that helping parents who experience symptoms of depression to optimize their children’s rearing environment—to be actively involved and nurturing as a parent, to minimize hostility and rejection towards the child, and to monitor the child’s activities—might mitigate some of the environmentally mediated risk to their children. Based on these results, it was difficult to determine which parental behavior domains might have carried the most influence from parental depressive symptoms to child adjustment problems and therefore which behaviors would be most important for intervention. Contrasting the relative influences of parental behaviors in this way would have required parenting measures that were highly and equally sensitive and reliable. Our measures of parenting were only moderately reliable. Still, the findings support our hypothesis that disruptions in parenting is one of the mechanisms involved in transmitting the risk of adjustment problems to children of depressed mothers (Elgar et al. 2004; Goodman and Gotlib 1999). Previous studies indicated that parents who exhibit depressive symptoms may continue to exhibit less

than optimum parenting even after their mood has lifted (Brown and Harris 1978) so if a reduction in parental depressive symptoms is accompanied by a continuation of inadequate parenting then specific interventions to teach appropriate parenting might be needed in addition to any specific intervention for depression.

Although not a focus of this investigation, several effects were found owing to demographic characteristics of the sample. With respect to parental behaviors, income adequacy was related to less parental monitoring and nurturance, which is consistent with other research that has found greater difficulties in parenting among low income families as compared to more affluent families (e.g., Lempers et al. 1989). Parents’ age was related to more nurturance and monitoring and less rejection, possibly related to older parents’ greater ability to focus on their child’s needs (Dix 1992; Dix et al. 2004) while child age was negatively related to parental nurturance and positively related to parental rejection and monitoring, trends indicative of changes in parental attributions about children (or children’s perceptions of parental behaviors) during the transition from childhood to adolescence (e.g., Dix 1993; Dix et al. 1989). In line with other findings, parental female gender and child female gender both predicted more parental nurturance and monitoring and their combination was additionally predictive of these parental behaviors (Leaper 2002). With respect to child outcomes, child age did not predict a significant amount of variance in adjustment outcomes, possibly due to the constrained age range of the sample. Child gender, on the other hand, differentially predicted internalizing and externalizing problems, consistent with previous investigations (Offord et al. 1987; Zahn-Waxler et al. 2000)). Parents’ age also related to more internalizing problems and more prosocial behavior in children. We expected but did not find a higher rate of depressive symptoms among mothers than among fathers (Kessler et al. 1993). Other research suggests that there could be differences in mothers’ and fathers’ parenting styles and their contributions to child functioning, with mother–child interactions being more influential of children’s self-esteem and emotional well-being and father–child interactions being more influential of children’s social competencies (e.g., Conger et al. 1995; Kaisa and Jari-Erik 2005). Indeed, a negative correlation between parental depressive symptoms at Time 1 and child prosocial behavior at Time 2 was particularly strong for fathers and sons ( $r=-0.40$ ). Taken together, these findings point to important variations in the contribution of depressive symptoms to child outcomes owing to parent and child characteristics.

Given the independence of parent and child reports, the evidence of mediation shown here cannot be explained away as shared method variance. Parents’ emotional

functioning influences the quality of their children's rearing environments in ways that can have measurable consequences for children's behavioral, emotional, and social functioning (Weissman et al. 2006). Moreover, this mediated effect of parental depressive symptoms on child functioning was found in a representative community sample of families and does not appear to be specific to clinical populations of depressed parents nor to high-risk families that exhibit negligent or abusive parental behaviors. Deleterious effects of parental distress and parenting inadequacies can be found in the general population.

Strengths of the study include a large sample size, the inclusion of both mothers and fathers, and independent ratings of parental and child functioning. The inclusion of fathers in the study lends new evidence that links between maternal and paternal depressive symptoms and child maladjustment are mediated, at least in part, by parental behaviors. The independence of parent and child data is important because previous investigations have tended to rely on single informants (typically mothers) when collecting data on symptoms or disorders in parents and children. This is a potential methodological limitation given that parents with low mood are more likely to exaggerate the severity of child problems than parents with normal mood (Najman et al. 2000). Burt et al. (2005) reported informant effects in their tests of mediation, showing significant mediation in data that were collected from single informants but no mediation in data that were collected from independent informants. These informant effects called into question whether the supposed mediation by parental behavior was a statistical artifact of shared method variance. The present study shows that such mediation is not a statistical artifact of shared method variance.

Limitations of the study should be addressed. First, less than 10% of the parents who participated in the NLSCY were fathers and while their numbers provided adequate statistical power, this lopsided distribution in our sample could have resulted in our overstating the significance of relations involving mothers and understating those involving fathers. It was also difficult to determine how families with respondent fathers were similar to those without respondent fathers. For instance, that fathers in the study were in smaller families than mothers and reported similar levels of depressive symptoms suggests that fathers were more likely to have been recently separated or divorced. It would be worthwhile replicating these findings on a larger and more representative sample of fathers. Second, the parenting scale completed at Time 2 did not specify to children on which parent that they should report. The scale simply asked children about parenting in general and so it likely tapped a general impression based on both parents and potentially dominated by maternal behavior. A third limitation pertains to the nature of the child symptom

measures that were used in the NLSCY. These measures were designed for epidemiological surveys and do not correspond directly to psychiatric conditions. The clinical implications of our findings might have been clearer had there been clinical screens or diagnostic assessments carried out on the sample. Fourth, the parental behavior scales were only moderately reliable. We cannot offer a theoretical rationale for why a lower alpha was found in the monitoring scale ( $\alpha=0.57$ ) than in the nurturance ( $\alpha=0.88$ ) and rejection scales ( $\alpha=0.73$ ). Parental monitoring could have been the least unified construct but this reduction in alpha likely reflects the shorter length of the scale rather than increased error variance. With just five items measuring parental monitoring as compared to seven items each measuring nurturance and rejection, alpha coefficients would likely indicate that a large proportion of variance is not part of a "true score" of a single construct and is therefore error (unless each item was essentially a rephrasing of the others). Fifth, due to the narrow age range for which the child questionnaire was administered and the 2-year interval between NLSCY assessments, we were unable to control for parental behavior and child maladjustment at Time 1 in the mediation analyses without incurring a substantial loss of data. These added controls might have led to stronger inferences about the causal relations implied by our mediation models (Cole and Maxwell 2003)

Despite these issues, the present study uniquely demonstrated a mediating role of parental behavior in links between parental depressive symptoms and child maladjustment while using independent and time-lagged ratings of parent and child symptoms, thereby shedding light on how inadequacies in parenting put some children of depressed parents at risk. Consistent with a family systems model of family relationships (Cox and Paley 1997), the study supports the notion that functioning within one part of the family has implications for the functioning of other family sub-systems. Mothers' and fathers' ability to prevent their own emotional distress or symptoms of depression from affecting their role as a parent may be an important source of resilience for these children. The links between parent depressive symptoms and child functioning are worthy of continued research attention because although genetic and biological transmission of risk from parent to child is important to consider, it is the environmental factors, such as parenting, that are amenable to change.

## Appendix

Below are survey items that were used in the NLSCY to measure parental depressive symptoms and child-rated parental behavior and adjustment problems. Items measur-

ing *parental depressive symptoms* in the CES-D-12 were: I did not feel like eating or my appetite was poor; I felt that I could not shake off the blues even with help from my family or friends; I had trouble keeping my mind on what I was doing; I felt depressed; I felt that everything I did was an effort; I felt hopeful about the future; My sleep was restless; I was happy; I felt lonely; I enjoyed life; I had crying spells; I felt that people disliked me.

Items measuring *parental nurturance* were: My parents smile at me; My parents praise me; My parents make sure I know I am appreciated; My parents listen to my ideas and opinions; My parents and I solve a problem together whenever we disagree about something; My parents speak of the good things I do; My parents seem proud of the things I do. Items measuring *parental rejection* were: My parents soon forget a rule they have made; My parents nag me about little things; My parents only keep rules when it suits them; My parents threaten punishment more often than they use it; My parents enforce a rule or do not enforce a rule depending upon their mood; My parents hit me or threaten to do so; My parents get angry and yell at me. Items measuring *parental monitoring* were: My parents want to know exactly where I am and what I am doing; My parents tell me what time to be home when I go out; My parents find out about my misbehaviour; My parents let me go out any evening I want; My parents take an interest in where I am going and who I am with.

Items measuring *internalizing problems* were: I am unhappy or sad; I am not as happy as other children; I am too fearful or nervous; I worry a lot; I cry a lot; I am nervous, high strung or tense; I have trouble enjoying myself. Items measuring *externalizing problems* were: I get into many fights; When another kid accidentally hurts me, I assume that the other kid meant to do it and I respond with anger and fighting; I physically attack people; I threaten people; I bully or am mean to others; I kick or hit other people my age; When I am mad at someone, I try to get others to dislike him/her; When I am mad at someone, I become friends with another as revenge; When I am mad at someone, I say bad things behind the his/her back; When I am mad at someone, I say to others “let’s not be friends with him/her;” When I am mad at someone, I tell that person’s secrets to a third person; I destroy my own things; I steal at home; I destroy things belonging to my family or other young people; I tell lies or cheat; I vandalize; I steal outside my home. Items measuring *prosocial behavior* were: I show sympathy for a child who has made a mistake; I try to help someone who has been hurt; I offer to help clear up a mess someone else has made; If there is an argument, I try to stop it; I offer to help other young people who are having difficulty with a task; I comfort another young person (friend, brother, or sister) who is crying or upset; I help to pick up things that another young person

has dropped; When I am playing with others, I invite bystanders to join in a game; I help other people my age (friends, brother, or sister) who are feeling sick; I encourage other people my age who cannot do things as well as I can.

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