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Abstract

The current study investigated the longitudinal transactional association among paternal and maternal depressive symptoms and child internalizing and externalizing difficulties. Data were collected on preschool- to adolescent-age youth via a total of six assessments. The sample (National Institute of Child Health and Human Development [NICHD] Study of Early Child Care) consisted of 1,098 biological mothers and 770 biological fathers. The findings suggest that boys were at lower risk for exhibiting internalizing problems across time and girls were less likely to exhibit externalizing problems. Compared with fathers, mothers reported higher levels of depressive symptoms. The Autoregressive Latent Trajectory models provided evidence for parental and child effects across time, which emphasizes the dynamic association among parental and child psychological symptoms. Differences in the timing of effects were also identified. Transactional associations among maternal and paternal depressive symptoms and child problem behaviors and emotions were identified during the transition from toddlerhood to school age and during adolescence. Finally, gender differences were evident in the transactional associations between parental and child psychological symptoms.

Keywords

internalizing, externalizing, maternal depressive symptoms, paternal depressive symptoms, transactional model

The impact of maternal depression on children's psychological problems is well established in the clinical literature and suggests that maternal depression may be one of the most important risk factors leading to child maladjustment (Cummings & Davies, 1994; Gelfand & Teti, 1990). Moreover, maternal and paternal depression influence children's internalizing (withdrawal, anxiety, and depression) and externalizing (hyperactivity, aggression, defiance, and destructive behavior) problems (Carro, Grant, Gotlib, & Compas, 1993; Connell & Goodman, 2002; Kane & Garber, 2004). In research with community samples, it has been indicated that even mild levels of depressive symptoms in the parents can be predictive of child psychological distress (Cummings, Schermerhorn, Keller, & Davies, 2008; Fanti & Henrich, 2010; Franck & Buehler, 2007; West & Newman, 2003).

Substantial evidence has also been accruing over the last several years that the effects of the interactions between parents and children are bidirectional. Bell (1968) pointed out that the association or correlation among child and parental behaviors may be explained by the child's actions or characteristics, reinterpreting prior explanations that parents affect the development of children over time. Thus,

while the parenting environment has been found to have a significant influence on child maladjustment, the child helps to form his or her own environment by provoking certain parental behaviors such as overprotection in the case of internalizing and harsh discipline in the case of externalizing problems through his or her fearfulness or defiance, respectively (LaFrenière & Dumas, 1992). Furthermore, parent-child interaction at one point in time influences how each behaves in a future interaction (Patterson, 1982), indicating that such reciprocal effects are not time locked but need to be examined throughout the path of development. Sameroff and colleagues proposed a transactional model of development, which can be conceptualized as the continuous bidirectional or reciprocal influence between the child and the child's context (Sameroff & Chandler, 1975;

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Sameroff & MacKenzie, 2003). Based on the transactional model, the development and/or maintenance of the child's internalizing and externalizing problems can be attributed to the continuous reciprocal influence between the child's and his or her parent's psychological symptoms.

Previous transactionally oriented studies have found reciprocal associations among maternal depressive symptoms and externalizing and internalizing problems during childhood and adolescence (Elgar, Curtis, McGrath, Waschbusch, & Steward, 2003; Gross, Shaw, & Moilanen, 2008). For example, Gross et al. (2008) investigated the transactional association between boys' externalizing problems and maternal depressive symptoms from age 5 to age 15. The findings suggested transactional associations between maternal depression and child externalizing problems during the transitions to elementary school and adolescence. Elgar et al. (2003) in addition to investigating a reciprocal model between the child's externalizing problems and maternal depressive symptoms, also looked at the association between the child's internalizing problems and maternal depression across a 4-year developmental period. This study reported bidirectional relationships in both models, suggesting that the development of child externalizing and internalizing problems might indeed be a product of the continuous reciprocal influence between the child and his or her mother's symptomatology.

The transactional association among paternal depression and child internalizing and externalizing problems is less studied in comparison with the transactional association among maternal depression and child problem behaviors and emotions. One previous study investigated the transactional association among paternal depressive symptoms, the child's noncompliance measured at age 2, and child internalizing and externalizing symptoms measured at age 4 (Gross, Shaw, Moilanen, Dishion, & Wilson, 2008). An identical model was also examined for maternal depressive symptoms. The investigation provided evidence for reciprocal associations among child behavior and paternal and maternal depression, although differences between the two models were also evident. For example, maternal depressive symptoms influenced child internalizing and externalizing problems, although paternal depressive symptoms influenced only the child's internalizing problems. The child's noncompliance was more strongly associated with maternal depressive symptoms than with paternal depressive symptoms, suggesting that fathers may be less affected by their child's behavioral problems.

Current Study: Aims and Hypotheses

The present study investigates the longitudinal transactional association among child and parental psychological symptoms from preschool to adolescence. The study is based

on a large community sample, allowing the examination of the wide range of symptom severity present in the general population. Studies with clinical populations can more clearly demonstrate the relationship between parental disorders and child psychological problems, but those findings may not generalize to milder emotional and behavioral difficulties. Examining the extent to which associations hold in subclinical and normal populations may provide findings that are more likely to generalize to the overall population. Because the present study was conducted with a community sample, the terms *depressive symptoms* and *externalizing and internalizing difficulties or problems* will be used throughout to account for the subclinical level of symptomatology.

The current study is based on the premise that, to understand the transactional association among the variables under investigation, it is critical to investigate the development of these concepts and the interrelation among them across time. The findings may suggest horizontal (i.e., each construct under investigation will be mostly related to itself across time) or transactional associations across time. Transactional associations might be specific to certain developmental periods, such as the transition to elementary school or the transition to middle school, or transactional associations might be evident across the whole period under investigation. More importantly, it is expected that testing the interrelations among the variables across time will provide evidence as to the direction of the association among child and parental symptomatology.

One of the unique contributions of the present investigation is that it takes into account the co-occurrence between internalizing and externalizing problems by including both constructs within the same structural equation model. Internalizing and externalizing problems tend to appear together at different ages in development (Fanti & Henrich, 2010; Gilliom & Shaw, 2004). Inclusion of both in the same model can clarify the unique longitudinal transactional effects among internalizing and externalizing difficulties and contextual variables (Fanti, Henrich, Brookmeyer, & Kuperminc, 2008), such as parental depressive symptoms. In addition, it is possible that one type of behavioral problem increases the risk for the other, providing evidence for a cycle of reciprocal causation between internalizing and externalizing problems (Lilienfeld, 2003). For example, externalizing problems might result in social failures, such as peer rejection, which might result in increased internalizing problems (Frick, Lilienfeld, Ellis, Loney, & Silverthorn, 1999; Keiley, Lofthouse, Bates, Dodge, & Pettit, 2003). Feelings of personal distress that are related to internalizing problems may be expressed as externalizing behaviors (Lemerise & Arsenio, 2000).

The development of the association among the variables under investigation might also be different for fathers than mothers and boys than girls. Prior work has shown differential

effects of paternal depressive symptoms compared with maternal depressive symptoms on children's externalizing and internalizing problems (e.g., Gross Shaw, Moilanen, Dishion, & Wilson, 2008), although longitudinal transactional evidence is limited. It also seems reasonable to suggest that maternal depressive symptoms might have a stronger and a longer lasting impact on children's behavioral and emotional problems than paternal depressive symptoms because (a) mothers tend to score higher on depressive symptoms compared with fathers (Bland, 1997) and (b) they tend to engage in more frequent interactions with their children than fathers (Baumrind, 1991; Lewis & Lamb, 2003). By examining two separate transactional models based on mother and father longitudinal reports, the current study may provide important information as to the interrelations among parental depressive symptoms and the child's internalizing and externalizing difficulties, and whether these interrelations are similar or different for mothers than fathers.

In addition, girls score lower on externalizing problems than boys, but higher on internalizing problems, and they may differ on the development of these problems as well (Burt, McGue, Krueger, & Iacono, 2005; Fanti & Henrich, 2010; Leadbeater, Kuperminc, Blatt, & Hertzog, 1999). Previous studies provided inconsistent evidence as to the association among parental depressive symptoms and boys' and girls' externalizing and internalizing problems (Davies & Windle, 1997; Fergusson, Horwood, & Lynskey, 1995; Gross, Conrad, Fogg, Willis, & Garvey, 1995). Investigating for gender moderation in the longitudinal transactional association among maternal and paternal depressive symptoms and child internalizing and externalizing difficulties, in the context of a large community study, might clarify previous contradicting evidence.

In summary, the codevelopment between parental and child psychological symptoms from preschool to adolescence will be investigated in the current study. It is hypothesized that parental depressive symptoms and child behavioral and emotional difficulties can best be described by a transactional model of associations. Children's behavioral and emotional problems might exacerbate their parents' depressive symptoms, and reciprocally, the parents' depressive symptoms may be predictive of internalizing and externalizing difficulties in the child. These transactional effects are expected to occur over time throughout childhood and adolescence, although transactional effects might be exacerbated during stressful transitional periods, such as the transition to elementary school or early adolescence. We also hypothesize that maternal depressive symptoms will have a stronger and longer lasting effect on child psychological symptoms than paternal depressive symptoms. In terms of gender differences, girls are expected to score lower on externalizing problems but higher on internalizing problems compared with boys. Similarly, mothers are

expected to score higher on depressive symptoms compared with fathers. Finally, we hypothesize that externalizing and internalizing problems codevelop from early childhood to adolescence.

Method

Participants

The present study used data from the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care. This study was conducted by the NICHD Early Child Care Research Network (ECCRN) supported by NICHD through a cooperative agreement that calls for scientific collaboration between the grantees and the NICHD staff. Participants were recruited from different hospitals across 10 locations in the United States (Little Rock, Arkansas; Irvine, California; Lawrence, Kansas; Boston, Massachusetts; Philadelphia, Pennsylvania; Pittsburgh, Pennsylvania; Charlottesville, Virginia; Morganton, North Carolina; Seattle, Washington; and Madison, Wisconsin). A total of 8,986 women gave birth during the sampling period (January of 1991 and November of 1991) across the different locations, and 60% (5,416) of those women agreed to be contacted for a telephone interview. Of the women who agreed to participate, 56% were selected based on conditional random sampling to assure that the sample was representative of single mothers, poverty status, ethnic minority, and low maternal education. From this sample, participants were excluded if (a) mothers were younger than 18 at the time of the child's birth, (b) families were planning to move before the completion of the study, (c) children were born with disabilities or remained in the hospital more than 7 days postpartum, and (d) mothers could not communicate sufficiently in English. A total of 1,525 families were selected as eligible, but only 1,364 completed the home interview when the infant was 1 month old, and these families comprised the final sample of the study. Of the final sample, 53% of the children were boys, 24% were of minority status, 11% of the mothers had not completed high school, 24.3% scored below the poverty line, and 14% were single (see <http://secc.rti.org> for additional recruiting or participant information).

For the purposes of the current study, two different samples were used based on mother and father reports. In accordance with prior research that used the same data set, mothers or fathers who completed the measures under investigation at least 2 times out of 6 were included in the analyses (Fanti & Henrich, 2010; NICHD ECCRN, 2004). The final analytic samples were composed of 1,098 biological mothers and 770 biological fathers. There was a 100% overlap in the father and mother reports, indicating that all the families in the father data set were also present in the mother data set. According to the demographic information

that was collected when the child was 1 month old, 16% of the mothers in the final sample ($n = 1,098$) were of minority status, 8.1% had not completed high school, 12.8% were single, and 19.3% scored below the poverty line. Approximately one tenth (10.3%) of the fathers in the final sample ($n = 770$) were of minority status, 4.2% had not completed high school, and 12.7% scored below the poverty line. Based on the mother-reported data set, 18.4% of the children were of minority status and 50.5% were boys. According to the father-reported data set, 11.3% of the children were of minority status and 49.9% were boys.

Attrition analysis using binary logistic regression was conducted to compare participants excluded from analyses to those included on demographic characteristics. Two separate binary logistic regression analyses were estimated based on mother and father reports. The analysis comparing the analytic sample to the eliminated sample based on mother reports with the use of binary logistic regression was significant, $\chi^2(6, N = 1364) = 49.53, p < .001$. Compared with the excluded sample ($n = 266$), mothers in the included ($n = 1,098$) sample were less likely to be poor ($B = .78, SE = .19, p < .001$) and likely to be more educated ($B = -.70, SE = .23, p < .01$). Children were more likely to be female ($B = -.29, SE = .15, p < .05$). The excluded sample and included sample were not different in terms of maternal marital status ($B = -.05, SE = .25, p = .82$) and the child's ($B = -.35, SE = .40, p = .38$) or mother's ($B = .50, SE = .41, p = .22$) minority status. The analysis comparing the included sample ($n = 770$) with the excluded sample ($n = 594$) based on father reports was also significant, $\chi^2(6, N = 1364) = 123.96, p < .001$. Participants in the included sample were less likely to be poor ($B = -.89, SE = .16, p < .001$) and likely to be more educated ($B = 1.19, SE = .25, p < .001$) than the excluded sample. Children were more likely to be girls ($B = .26, SE = .13, p < .05$). The excluded sample and included sample did not differ for the child's ($B = -.50, SE = .37, p = .17$) or father's ($B = -.24, SE = .38, p = .53$) minority status. The demographic differences identified in the current study between the included and excluded samples are similar to the demographic differences reported by prior work that used the same data set (Roisman et al., 2010).

Measures

Externalizing and internalizing problems. Mothers and fathers rated their children's externalizing and internalizing problems at 4.5, 7, 9, 11, 12, and 15 years of age with the *Child Behavior Checklist* (CBCL; Achenbach, 1991). The school-age version of the CBCL includes 113 items and can be administered to parents of children between ages of 4 and 18 years. These items provide information on two broad domains of symptomatology, internalizing and externalizing problems. The internalizing problems domain consists of withdrawn, somatic complaints and anxious/depressed

syndromes, and the externalizing behaviors domain consists of delinquent and aggressive behavior. "Unhappy, sad, or depressed," is an example of an item indicating internalizing problems, and "Gets in many fights," is an example of an item indicating externalizing problems. Parents rated how descriptive each item was of the child's usual behavior now or within the past 6 months on a 3-point scale (0 = *not true*, 1 = *somewhat or sometimes true*, 2 = *very true or often true*). The syndrome scores for externalizing and internalizing problems were generated with the Cross-Informant Computer Program for the CBCL/4–18. This software allows users to enter and edit data, scores data from the checklists creating raw scores and in case of missing items, no scores are calculated by the software. The Cronbach's alphas for externalizing problems ranged from .86 to .94 and for internalizing problems from .82 to .92. According to the cutoff score used for the CBCL (*T*-score of 70 or higher), 10% to 13% of the sample (depending on the time point of measurement) exhibited clinical levels of internalizing problems and 10% to 14% of the sample exhibited clinical levels of externalizing problems.

Parental depressive symptoms. During the child ages of 4.5, 7, 9, 11, 12, and 15 years mothers and fathers filled out the *Center for Epidemiological Studies Depression Scale* (CES-D; Radloff, 1997), which measures symptoms of depression in nonclinical populations. Respondents rate the frequency of 20 symptoms during the past week. Response categories are "rarely or none of the time (less than 1 day)," "some or a little of the time (1–2 days)," "occasionally or a moderate amount of time (3–4 days)," and "most or all of the time (5–7 days)." The items were summed to create the total depression scores across time, and in case of missing items no scores were calculated. For this study's sample, the items had high internal reliability (.85–.91). The CES-D evidenced high correlations with other measures of depressive symptoms, and adequate discriminative validity between psychiatric inpatients and general population adults (Radloff, 1997). The standard scoring has scores ranging from 0 to 60, and a score of 16 or higher is considered to have clinical significance. For this study's sample, 16% to 19% of mothers (depending on time point of measurement) and 9% to 13% of fathers met screening criteria for depression based on the CES-D cutoff score of 16.

Plan of Analysis

The current study aimed to investigate the time-specific and the longitudinal transactional associations between parental depressive symptoms and child externalizing and internalizing difficulties. The time-specific cross-lag associations are usually tested with the autoregressive model, whereas the associations among growth trajectories are tested with the Latent Growth Curve (LGC) model (Bollen & Curran, 2004, 2006). The cross-lag associations tested with the

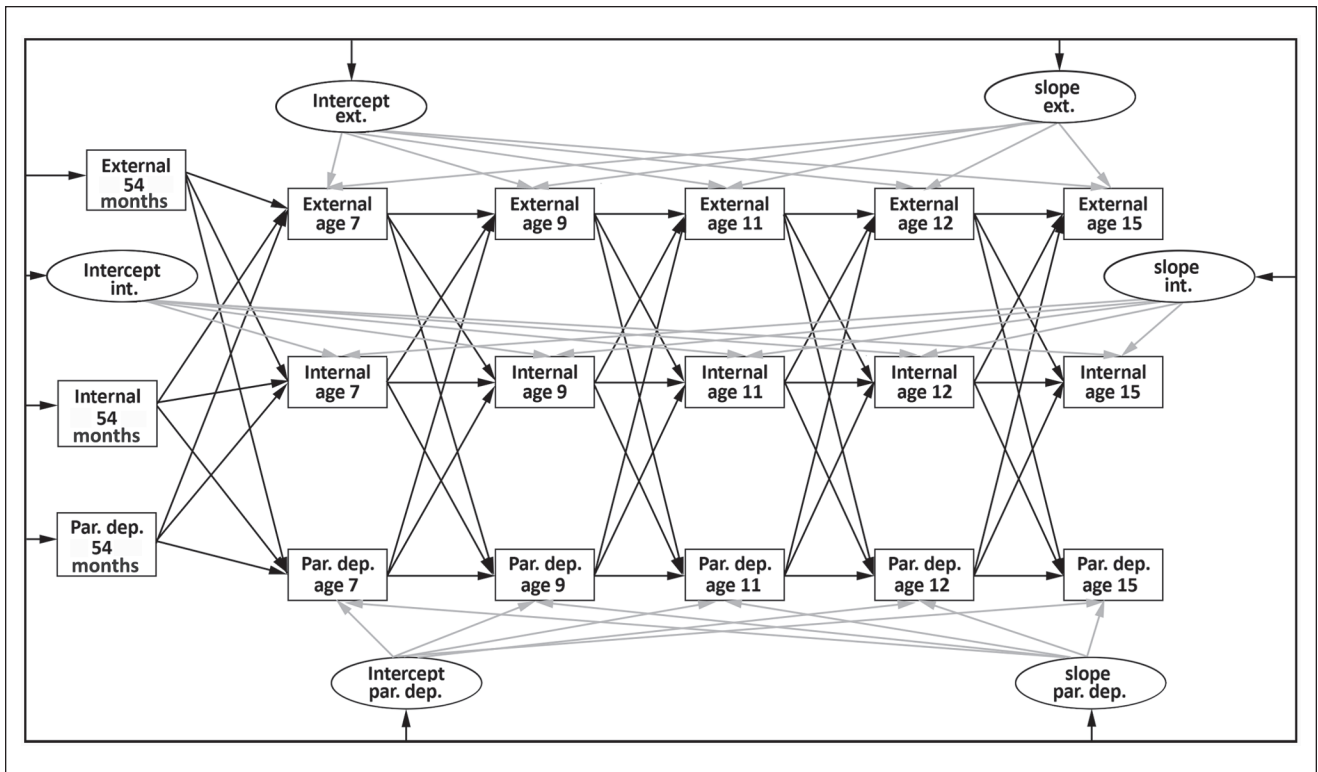


Figure 1. Autoregressive latent trajectory model

Note: Ext. = externalizing; int. = internalizing; par. dep. = paternal depression. The correlations between the variables at each time point are not shown in the figure.

autoregressive model represent the longitudinal association among distinct variables above and beyond the autoregressive effects of these variables from themselves. The LGC model estimates latent trajectories for each variable under investigation and allows for testing the association between the intercepts and slopes derived from each trajectory. Bollen and Curran (2004, 2006) suggested that investigating the association between growth terms alone or just time-specific associations may result in contradicting findings, and they proposed the Autoregressive Latent Trajectory (ALT) model as an alternative method. The ALT model is a flexible hybrid model that combines features of the autoregressive and the LGC model, and allows for the simultaneous estimation of (a) autoregressive effects between the same variables across time, (b) time-specific cross-lag effects going from each variable to the other, (c) the estimation of latent trajectories (intercept and slope), and (d) the longitudinal associations among the growth terms of different variables.

In the ALT model, the growth terms are net the time-specific autoregressive effects, and the autoregressive effects are net the growth terms. As a result, the autoregressive effects do not represent intraindividual stability as in the autoregressive model. This model is depicted in Figure 1. As shown in Figure 1, the first measurement point (age 4.5)

is treated as predetermined or as an exogenous variable (similar to the autoregressive model) and is allowed to be correlated with the intercept and slope parameters. Moreover, the intercept is the level of each variable at age 7, after taking into account the association among the first measurement point and the intercept (Morin, Maiano, Marsh, Janosz, & Nagengast, 2011). The slope is the rate of change from age 7 to age 15. For clarity, the correlations between the variables at each point of measurement are not shown in the figure.

The analyses were run in Mplus 6.1 (Muthén & Muthén, 2010). Following Bollen and Curran's (2004, 2006) suggestions, autoregressive, LGC, and ALT models were estimated for each of the variables under investigation using mother and father reports. These models were compared to determine which model better fit the data. The ALT model was also compared with simpler nested models to determine which model provided the most parsimonious representation of the data. More specifically, the ALT model was compared with models that (a) fixed the slope variances to zero, (b) excluded the slope factor, (c) excluded the time-specific correlations, (d) constrained the time-specific correlations to be equal, (e) constrained the autoregressive parameters to be equal across time, and (f) constrained the cross-lag parameters to be equal. Following Bollen and

Curran's (2004, 2006) recommendation, these constraints were added progressively, and each model was compared with prior more complex models. These model comparisons provide information as to whether the complexity of the ALT model better represents the data. Models were compared with the use of the chi-square difference test (Bollen, 1989).

Finally, multiple group models were computed to investigate potential moderating effects for gender following Little's (1997) statistical guidelines. First, with the use of the chi-square difference test, equality of the latent average growth terms for each variable was examined by comparing a model in which latent means were constrained to be equal across groups with a model in which the latent means were freely estimated in all groups. If the chi-square change test was significant, it was concluded that there were cross-group differences in the latent means. Second, to examine moderation of the associations between the growth terms, a measurement model that constrained the growth associations to be invariant was compared with a structural model that freely estimated the growth associations. Similarly, to examine moderation of the structural paths, a structural model that constrained the cross-lag paths to be invariant was compared with a structural model that freely estimated the structural paths.

For all the analyses, four standard fit indexes were used in addition to the chi-square statistic to evaluate model fit: the root mean square error of approximation (RMSEA), standardized root mean residual (SRMR), the Tucker-Lewis index (TLI), and the comparative fit index (CFI). Cutoff values below .06 for RMSEA, below .08 for SRMR, and above .95 for TLI and CFI are considered a good fit (Bollen, 1989; Hu & Bentler, 1999). The Full Information Maximum Likelihood Estimator in Mplus 6.1 was utilized for all the analyses. This type of estimation accommodates even large proportions of missing data by estimating the full model using all the available information from all participants.

Results

Descriptive Statistics

The means and standard deviations for externalizing and internalizing problems from age 4.5 to age 15 separately for mother and father reports are displayed in Table 1. The scores for internalizing and externalizing problems reported in the table are similar to the average scores reported by Rescorla et al. (2007), who calculated the average CBCL scores using data from 31 countries. Rescorla et al. also found that externalizing problems tended to decrease with age. Compared with fathers, mothers reported higher levels of externalizing problems in their children at age 7, $t(663) = 2.06, p < .05$, and higher levels of internalizing problems at age 11, $t(627) = 2.65, p < .01$. Furthermore,

Table 1. Child Externalizing and Internalizing Problems and Parental Depressive Symptoms as Reported by Parents

Problem/symptom	Mother report			Father report		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Externalizing						
Age 4.5	1,015	10.02	6.71	659	9.37	6.36
Age 7	1,008	8.16	6.60	651	7.93	6.17
Age 9	1,003	7.33	6.32	634	6.55	5.26
Age 11	991	6.52	6.32	625	5.52	6.09
Age 12	986	6.19	6.18	607	6.12	6.48
Age 15	929	5.35	6.51	568	4.68	5.92
Internalizing						
Age 4.5	1,015	4.43	4.20	659	4.14	4.58
Age 7	1,008	4.87	4.41	651	4.46	4.47
Age 9	1,003	5.14	5.13	634	4.54	4.60
Age 11	991	5.27	5.15	625	4.45	5.12
Age 12	986	5.15	5.38	607	4.75	5.35
Age 15	929	5.12	5.25	568	4.76	5.70
Depressive symptoms						
Age 4.5	1,035	9.83	8.70	662	7.75	6.76
Age 7	999	8.37	8.47	647	7.27	6.78
Age 9	1,002	9.06	8.86	634	8.05	7.70
Age 11	991	8.77	8.67	624	7.63	7.22
Age 12	987	8.99	8.86	591	7.38	7.84
Age 15	929	10.34	9.74	567	8.24	7.46

Note: *n* = number of participants at each time point.

mothers scored higher on their own depressive symptoms at child's age 4.5, $t(718) = 2.31, p < .05$, and age 15, $t(552) = 2.01, p < .05$, compared with fathers.

ALT Model Based on Mother Reports

The results from the different models under investigation based on maternal reports are displayed in Table 2. Neither the LGC (Model 1) nor the autoregressive (Model 2) models provided a satisfactory fit for the model under investigation. The full ALT model (Model 3), as described by Bollen and Curran (2004, 2006), adequately fit the data based on all of the fit indexes. The nested models were compared with the chi-square difference test. A significant change in chi-square indicates an improvement in model fit over the previous model. The retained final ALT model (Model 21)—which excluded all the parameters that did not improve the model fit—fit the data well. The discussion that follows is based on the final ALT model. Findings are discussed in relation to both the parameters which improved and the parameters that did not improve the model fit.

A comparison of the nested models suggested that the slope variance of maternal depressive symptoms can be fixed to zero (Model 8) without changing the overall fit of the model (see Table 2). The remaining variances of all the Time 1 variables, the intercepts, and the slopes for child

Table 2. Results From the Structural Equation Models Based on Maternal Reports

Model	$\chi^2(df)$	CM	$\Delta\chi^2(df)$	CFI	TLI	RMSEA	SRMR
1. LGC full model	1,619.67(144)**			.87	.86	.10	.05
2. Autoregressive full model	1,126.91(102)**			.90	.86	.10	.11
3. ALT full model	66.02(60)			.99	.99	.01	.01
4. ALT, no slope variance on EXT	93.32(69)**	3	27.30(9)**	.99	.99	.02	.01
5. ALT, no slope on EXT	112.93(70)**	3	46.91(10)**	.99	.99	.02	.02
6. ALT 5 + no slope variance on INT	151.78(78)**	5	38.85(8)**	.99	.99	.03	.02
7. ALT 6 + no slope on INT	155.32(79)**	5	42.39(9)**	.99	.99	.03	.02
8. ALT 7 + no slope variance on DS	167.60(86)**	7	16.28(7)	.99	.99	.03	.02
9. ALT 7 + no slope on DS	189.81(87)**	7	39.30(8)**	.99	.99	.02	.02
10. ALT 9 + no time-specific correlations	495.79(102)**	9	305.98(15)**	.96	.95	.06	.04
11. ALT 9 + fixed time-specific correlations	505.46(104)**	9	315.65(17)**	.96	.95	.06	.08
12. ALT 11 + fixed autoregressions for EXT	534.68(108)**	11	29.22(4)**	.96	.95	.06	.08
13. ALT 12 + fixed autoregressions for INT	559.15(112)**	12	24.47(4)**	.96	.95	.06	.08
14. ALT 13 + fixed autoregressions for DS	560.26(116)**	13	1.15(4)	.96	.95	.06	.08
15. ALT 14 + fixed EXT → INT regressions	569.39(120)**	14	9.13(4)	.96	.95	.06	.08
16. ALT 15 + fixed EXT → DS regressions	573.68(124)**	15	4.29(4)	.96	.95	.06	.08
17. ALT 16 + fixed INT → EXT regressions	586.00(128)**	16	12.32(4)*	.96	.95	.06	.08
18. ALT 17 + fixed INT → DS regressions	615.46(132)**	17	10.66(4)*	.95	.94	.06	.08
19. ALT 18 + fixed DS → INT regressions	626.12(136)**	18	24.94(4)**	.95	.94	.06	.08
20. ALT 19 + fixed DS → EXT regressions	683.93(140)**	19	57.81(4)**	.95	.94	.06	.08
21. Final ALT model	99.11(81)			.99	.99	.01	.02

Note: CM = comparison model; $\Delta\chi^2$ = change in chi-square; CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; LGC = latent growth curve; ALT = autoregressive latent trajectory; EXT = externalizing problems; INT = internalizing problems; DS = depressive symptoms.

* $p < .05$. ** $p < .01$.

internalizing and externalizing problems were significant at the $p < .01$ level indicating interindividual variability in these parameters. In addition, the findings suggested that it is important to model the average levels of all three slope factors (Models 5, 7, and 9). Table 3 reports the estimates of the growth terms of the different variables under investigation based on the final ALT model. According to Morin et al. (2011), in ALT models the difference between the first measurement point and the intercept represents the portion of the variable measured at Time 2, in that case at age 7, that remained unexplained by the variable measured at Time 1 (age 4.5); that is, after taking into account the association between the Time 1 variable and the intercept. This explains the difference between the average scores of the first measurement points and the estimated intercepts shown in Table 3. Findings suggested that maternal depressive symptoms and child internalizing problems increased across time, although externalizing problems decreased from early childhood to adolescence. Because the slope variance of maternal depressive symptoms did not add significantly to the model fit, it can be concluded that the increase in maternal depression is common for all participants (see Tables 2 and 3).

The correlations among the latent growth terms and the Time 1 variables are displayed in Table 3. The slope for maternal depressive symptoms was not allowed to be

correlated with other growth terms because it did not show significant interindividual variability. The correlations between the first measurement point variables and the intercept terms of all the variables under investigation suggested overtime associations among child behavioral and emotional problems and maternal depressive symptoms. Moreover, the Time 1 measure and the intercept of maternal depressive symptoms were positively associated with initial levels and change over time in child internalizing problems, suggesting that mothers who reported more depressive symptoms at baseline were more likely to report higher child internalizing scores at the same assessment point and across time. Furthermore, the slope of child externalizing problems was positively associated with the slope of child internalizing problems, suggesting a strong association between externalizing and internalizing problem trajectories.

The time-specific correlations among all the variables also added significantly to the model fit (see Table 2). The correlations between externalizing and internalizing problems within each measurement point were stronger compared with the correlations among maternal depressive symptoms and child problem behaviors and emotions (see Table 4). In addition, the time-specific correlations among maternal depressive symptoms and the child's difficulties were stronger during early childhood and adolescence

Table 3. Correlations Between Time 1 Variables and Growth Terms

	Time 1 DS	Intercept DS	Slope DS	Time 1 INT	Intercept INT	Slope INT	Time 1 EXT	Intercept EXT	Slope EXT
Intercept MDS	.65**								
Time 1 internalizing	.24**	.36**							
Intercept internalizing	.19**	.38**		.68**					
Slope internalizing	.15*	.25**		-.09	-.19				
Time 1 externalizing	.24**	.40**		.58**	.51**	.06			
Intercept externalizing	.23**	.36**		.42**	.63**	-.03	.73**		
Slope externalizing	.01	.16		-.14	-.28	.72**	-.15	-.30	
Estimated growth terms	9.74**	6.84**	.38**	4.46**	4.19**	.25*	10.05**	6.32**	-.32*
Males				4.24**	3.66**	.24	10.44**	6.58**	-.17
Females				4.70**	4.49**	.32*	9.66**	5.96**	-.32*
Intercept FDS	.67**								
Time 1 internalizing	.21**	.21**							
Intercept internalizing	.29*	.50**		.21**					
Time 1 externalizing	.22**	.29*		.60**	.45**				
Intercept externalizing	.24**	.43**		.27**	.67**		.60**		
Estimated growth terms	7.46**	6.33**	.11	4.16**	3.08**		9.37**	4.98**	-.31**
Males				3.92**	2.89**		9.92**	5.20**	-.20
Females				4.54**	3.13**		8.77**	4.12**	-.32**

Note. EXT = externalizing problems; INT = internalizing problems; DS = depressive symptoms; MDS = mother depressive symptoms; FDS = father depressive symptoms.

* $p < .05$. ** $p < .01$.

compared with middle childhood. The nested model comparisons further suggested that the maternal depressive symptom autoregressions (Model 14), the cross-lag regressions from externalizing problems to maternal depressive symptoms (Model 16), and the cross-lag regressions from externalizing to internalizing problems (Model 15) can be constrained to be equal across time without significantly changing the overall fit of the model (see Table 2). The ability of maternal depressive symptoms to predict later levels of maternal depressive symptoms is stable and significant (see Figure 2). The ability of child externalizing problems to predict later levels of child internalizing problems and maternal depressive symptoms is nonsignificant at all time points.

As shown in models 12, 13, 17, 18, 19, and 20, a number of autoregressions and cross-lag associations between the variables under investigation were not constrained to be equal, see Figure 2 and Table 2. Child behavioral (β range = .15–.28, $p < .01$) and emotional problems (β range = .08–.13, $p < .05$) showed some stability across time, after taking the variables' latent growth into account. Child internalizing problems were not significantly related to maternal depressive symptoms across time, although maternal depressive symptoms predicted child internalizing problems from ages 7 to 9 and ages 12 to 15. Maternal depressive symptoms also predicted child externalizing problems from ages 4.5 to 7, ages 7 to 9, and ages 12 to 15.

Internalizing problems at age 7 were positively associated with externalizing problems at age 9. As suggested by the time-specific correlations and the overtime associations among the first measurement point and the intercepts, maternal depressive symptoms and child problem behaviors and emotions are interrelated. The cross-lag associations suggested that the temporal associations of these effects went from maternal depressive symptoms to child externalizing and internalizing problems. The overall change in internalizing problems from childhood to adolescence can also be explained by childhood levels of maternal depressive symptoms, and changes in externalizing problems. Similarly, the growth in externalizing problems can be explained by the change in internalizing problems.

ALT Model Based on Father Reports

Compared with the LGC (Model 1) and autoregressive (Model 2) models, the full ALT model (Model 3) better represented the data (see Table 5). The final ALT model (Model 21) also fit the data well. As with prior analysis, a number of constraints were imposed on the initial ALT model (Model 3) to identify the more parsimonious model. The chi-square difference test suggested that the slope variance of externalizing problems (Model 4), the slope of internalizing problems (Model 7), and the slope variance of paternal depressive symptoms (Model 8) can be removed without significantly

Table 4. Time-Specific Correlations

Child problem	Mother reports		Father reports	
	Depressive symptoms	Internalizing problems	Depressive symptoms	Internalizing problems
Internalizing (age 4.5)	.24**		.21**	
Externalizing (age 4.5)	.24**	.57**	.22**	.60**
Internalizing (age 7)	.11*		.12**	
Externalizing (age 7)	.15**	.41**	.04	.48**
Internalizing (age 9)	.08*		.14**	
Externalizing (age 9)	.12**	.52**	.03	.48**
Internalizing (age 11)	.03		.21**	
Externalizing (age 11)	.11**	.48**	.16**	.61**
Internalizing (age 12)	.15**		.22**	
Externalizing (age 12)	.15**	.41**	.19**	.52**
Internalizing (age 15)	.16**		.13*	
Externalizing (age 15)	.20**	.55**	.18**	.69**

* $p < .05$. ** $p < .01$.

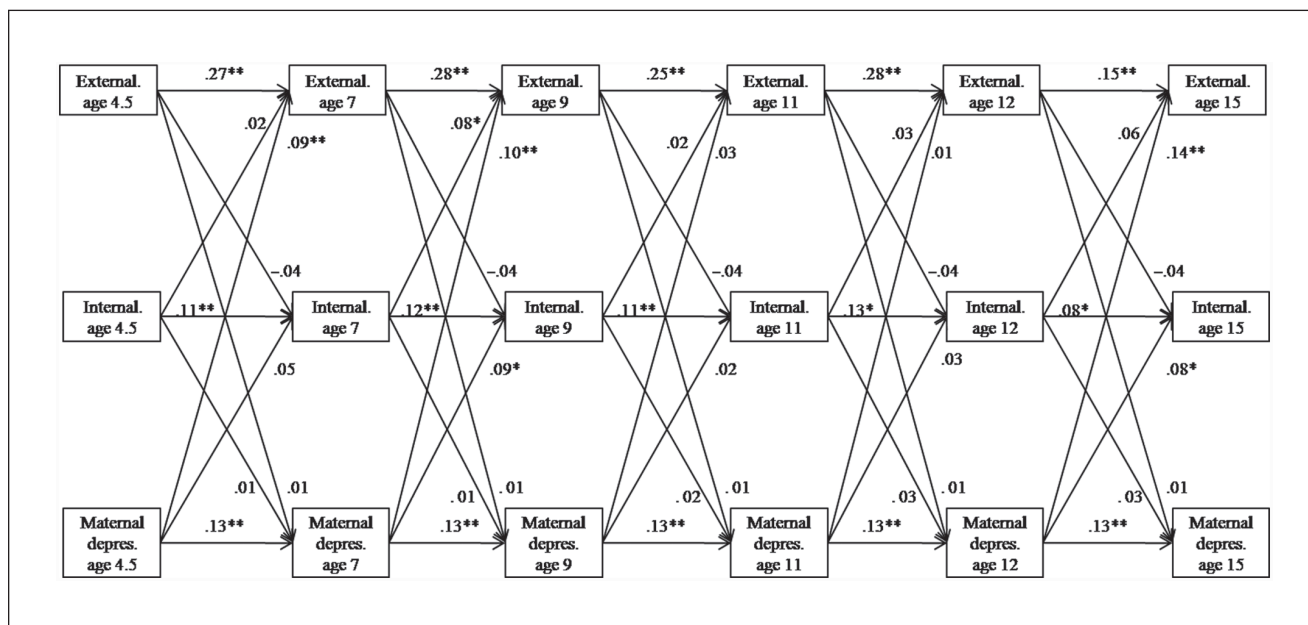


Figure 2. The autoregressive part of the ALT model based on mother reports

Note: depress. = depression. The correlations between the variables at each time point and the intercepts and slopes are not shown in the figure.

* $p < .05$. ** $p < .01$.

changing the overall fit of the model (see Table 5). Thus, the slight increase over time in paternal depressive symptoms and the decrease across time in child externalizing problems is common to all participants (see Table 3). The findings also suggest intraindividual stability over time in the levels of internalizing problems children exhibit, as the slope term did not add significantly to the model fit (Table 5, Model 7). The variances of the remaining estimated parameters were significant at the $p < .01$ level, suggesting significant interindividual variability for initial levels (ages 4.5 and 7) of the variables under investigation.

The correlations demonstrate significant associations between all variables measured at Time 1 and the intercept terms, suggesting overtime associations among these variables from age 4.5 to 7 (see Table 3). None of the slopes were allowed to correlate with the Time 1 variables and the intercepts because the slopes' variability did not add significantly to the model fit (see Table 5, Models 4, 6, and 8). The findings suggested stronger correlations among child externalizing and internalizing problems than among paternal depressive symptoms and child externalizing and internalizing problems across time and, in accordance with the

Table 5. Results From the Structural Equation Models Based on Paternal Reports

Model	$\chi^2(df)$	CM	$\Delta\chi^2(df)$	CFI	TLI	RMSEA	SRMR
1. LGC full model	1,281.84(144)**			.83	.82	.10	.06
2. Autoregressive full model	683.45(102)**			.91	.87	.09	.11
3. ALT full model	131.34(60)**			.99	.97	.04	.03
4. ALT, no slope variance on EXT	146.88(69)**	3	15.54(9)	.99	.97	.04	.03
5. ALT, no slope on EXT	172.33(70)**	3	40.99(10)**	.98	.97	.04	.04
6. ALT 5 + no slope variance on INT	185.88(78)**	5	13.55(8)	.98	.97	.04	.4
7. ALT 6 + no slope on INT	186.99(79)**	5	14.66(9)	.98	.97	.04	.04
8. ALT 7 + no slope variance on DS	199.63(86)**	7	12.64(7)	.98	.96	.04	.04
9. ALT 7 + no slope on DS	219.71(87)**	7	32.72(8)**	.98	.96	.04	.04
10. ALT 9 + no time-specific correlations	457.26(102)**	9	237.55(15)**	.95	.92	.07	.06
11. ALT 9 + fixed time-specific correlations	552.43(104)**	9	332.71(17)**	.93	.90	.07	.08
12. ALT 11 + fixed autoregressions for EXT	600.75(108)**	11	48.32(4)**	.93	.90	.07	.08
13. ALT 12 + fixed autoregressions for INT	611.74(112)**	12	10.99(4)*	.93	.90	.07	.08
14. ALT 13 + fixed autoregressions for DS	627.31(116)**	13	15.57(4)**	.92	.90	.08	.08
15. ALT 14 + fixed EXT → INT regressions	636.67(120)**	14	9.36(4)	.92	.90	.07	.08
16. ALT 15 + fixed EXT → DS regressions	647.31(124)**	15	10.67(4)*	.92	.90	.07	.08
17. ALT 16 + fixed INT → EXT regressions	653.85(128)**	16	6.54(4)	.92	.90	.07	.08
18. ALT 17 + fixed INT → DS regressions	667.74(132)**	17	13.89(4)**	.92	.90	.07	.08
19. ALT 18 + fixed DS → INT regressions	675.97(136)**	18	8.84(4)	.91	.90	.07	.08
20. ALT 19 + fixed DS → EXT regressions	730.34(140)**	19	54.37(4)**	.91	.90	.07	.08
21. Final ALT model	229.98(97)**			.98	.97	.04	.04

Note: CM = comparison model; $\Delta\chi^2$ = change in chi-square; CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; LGC = latent growth curve; ALT = autoregressive latent trajectory; EXT = externalizing problems; INT = internalizing problems; DS = depressive symptoms.

* $p < .05$. ** $p < .01$.

time-specific correlations, within each wave of measurement (see Tables 3 and 4). The time-specific correlations between paternal depressive symptoms and externalizing problems at age 7 and age 9 were not significant (see Table 4).

The cross-lag effects from child externalizing to internalizing problems (Model 15), from internalizing problems to externalizing problems (Model 17), and from paternal depressive symptoms to internalizing problems (Model 19) were fixed to be equal (see Table 5). Child internalizing problems were positively associated with externalizing problems, and paternal depressive symptoms positively influenced the child's internalizing problems across time (see Figure 3). As indicated by the autoregressive paths, child internalizing problems showed significant stability across time (β range = .25–.34, $p < .01$). Child externalizing problems showed stronger stability from age 4.5 to age 12 (β range = .23–.29, $p < .01$), although this stability was lower from age 12 to age 15 ($\beta = .11$, $p < .01$). Paternal depressive symptoms showed some stability from age 7 to 15 (β range = .17–.20, $p < .01$), and no stability from age 4.5 to 7 ($\beta = .05$, $p = n.s.$). According to the cross-lag findings, paternal depressive symptoms influenced the child's externalizing problems from ages 4.5 to 7 and from ages 12 to 15. Finally, child externalizing and internalizing problems measured at age 11 influenced paternal depressive symptoms at age 12. These findings provide support for a

bidirectional association between paternal depressive symptoms and child internalizing problems during early adolescence.

Moderation by Gender Based on Mother Reports

Multigroup analysis was used to investigate whether the average growth terms, the correlations among the growth parameters, and the structural regression paths differed across gender. These findings are not graphically displayed but are statistically explained. At the first stage of the analysis, we conducted a multigroup model based on the final ALT model (Model 21) with no equality constraints across gender, $\chi^2(165, N = 1098) = 221.30$, $p < .05$, RMSEA = .02, SRMR = .03, CFI = .99, TLI = .99. This model was compared with models that imposed different equality constraints across gender with the use of the chi-square difference test. Initially, we compared the freely estimated model with a model that imposed equality constraints to the latent average growth terms. The chi-square difference test was significant, $\Delta\chi^2(3, N = 1098) = 8.73$, $p < .05$, indicating cross-group (across gender) differences in the latent means (Little, 1997). After testing the growth parameters for each of the variables under investigation, mean differences in the growth terms for externalizing, $\Delta\chi^2(1, N = 1098) = 5.43$,

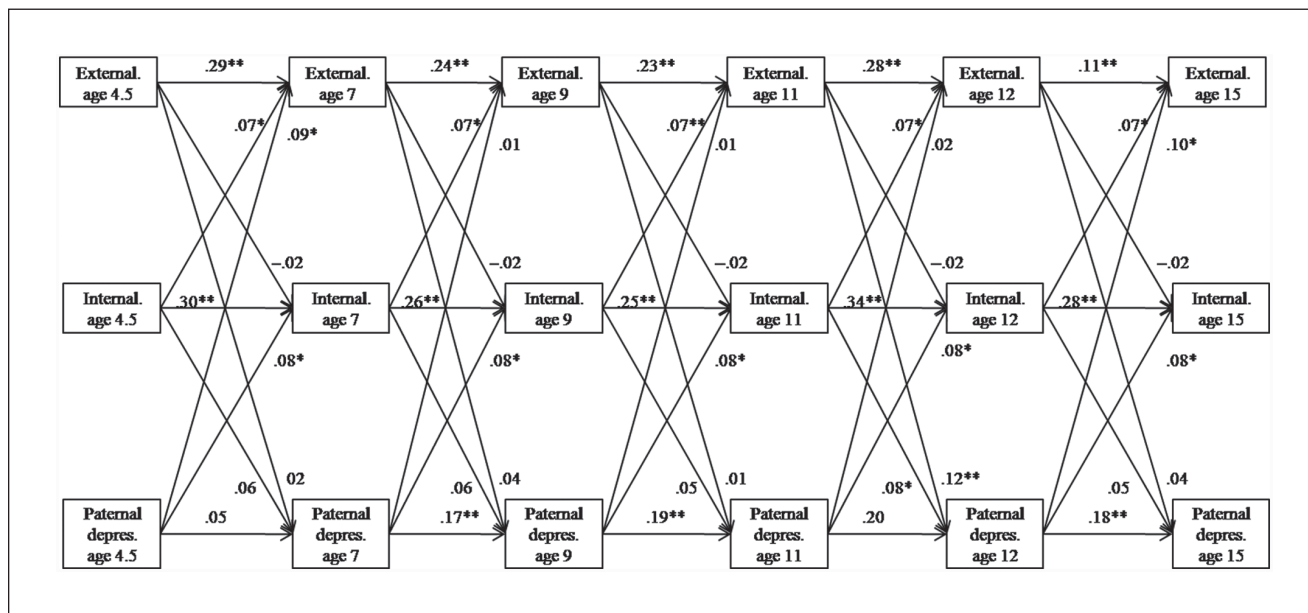


Figure 3. The autoregressive part of the ALT model based on father reports

Note: depress. = depression. The correlations between the variables at each time point and the intercepts and slopes are not shown in the figure. * $p < .05$. ** $p < .01$.

$p < .001$, and internalizing, $\Delta\chi^2(1, N = 1098) = 4.68, p < .001$, problems were identified with the use of the chi-square difference test. As shown in Table 3, girls' initial scores on internalizing problems were higher compared with boys. In addition, girls were more likely to demonstrate increases in internalizing problems although boys exhibited stable levels of internalizing problems. Compared with boys, girls were at lower risk for early childhood externalizing problems and more likely to exhibit decreases in these problems over time.

The next comparison model imposed equality constraints to the correlations between the growth parameters. The chi-square difference test was significant, $\Delta\chi^2(25, N = 1098) = 49.03, p < .01$. The difference in models was accounted by one correlation between Time 1 child internalizing problems and the intercept in child externalizing problems, $\Delta\chi^2(1, N = 1098) = 6.82, p < .01$. The correlations for boys was not as strong ($r = .31, p < .001$) as the correlation for girls ($r = .47, p < .001$). Finally, a model in which structural paths were equated across gender was estimated. The chi-square difference test indicated that there were gender differences in the cross-lag paths as well, $\Delta\chi^2(22, N = 1098) = 40.24, p = .01$. Individual paths were examined to determine which contributed to the gender differences in the cross-lag model. The difference in models was accounted for by a gender difference in the cross-lag paths from child externalizing problems to maternal depressive symptoms: Externalizing problems were positively associated with maternal depressive symptoms across time

for girls ($\beta = .11, SE = .04, p < .05$) but not for boys ($\beta = -.04, SE = .03, p = .17$), $\Delta\chi^2(1, N = 1098) = 4.97, p < .05$.

Moderation by Gender Based on Father Reports

As with prior analysis, we first run a multigroup model with no equality constraints across gender, $\chi^2(200, N = 770) = 390.76, p < .001, RMSEA = .05, SRMR = .04, CFI = .97, TLI = .96$. This model was first compared with a model that imposed equality constraints to the latent average growth terms, providing evidence for gender differences in the latent means, $\Delta\chi^2(3, N = 770) = 8.73, p < .05$. After testing the growth parameters for each of the variables under investigation, mean differences in the growth terms for externalizing, $\Delta\chi^2(1, N = 770) = 8.94, p < .001$, and internalizing, $\Delta\chi^2(1, N = 770) = 4.53, p < .001$, problems were identified with the use of the chi-square difference test. As shown in Table 3, compared with boys, girls' initial scores on internalizing problems were higher and their initial scores on externalizing problems were lower. Also, girls exhibited decreases in externalizing problems over time, although boys exhibited stable levels of externalizing problems.

The next step of the analysis, suggested that the model in which the associations among the growth terms were freely estimated, fit the data significantly better than the model in which the correlations among the growth terms were equated across gender, $\Delta\chi^2(12, N = 770) = 30.79, p < .01$. The correlation between paternal depressive symptoms at

Time 1 and the child internalizing problems intercept, $\Delta\chi^2(1, N = 770) = 5.74, p < .05$, was not as strong for boys ($r = .19, p < .01$) compared with girls ($r = .36, p < .001$). The correlation between paternal depressive symptoms at Time 1 and the child externalizing problems intercept, $\Delta\chi^2(1, N = 770) = 11.24, p < .001$, was stronger for boys ($r = .33, p < .001$) compared with girls ($r = .15, p < .05$). The correlation between the child internalizing problems intercept and the externalizing problems intercept, $\Delta\chi^2(1, N = 770) = 5.69, p < .05$, was stronger for girls ($r = .73, p < .001$) compared with boys ($r = .59, p < .001$).

In addition, a two-group model in which cross-lag paths were freely estimated fit the data significantly better than did a model in which cross-lag paths were equated across gender, $\Delta\chi^2(15, N = 770) = 30.40, p = .01$. The findings suggested that paternal depressive symptoms at age 4.5 predicted girls' externalizing problems at age 7 ($\beta = .13, SE = .04, p < .001$) but not boys' ($\beta = .01, SE = .04, p = .81$), $\Delta\chi^2(1, N = 770) = 5.23, p < .05$. Furthermore, girls' internalizing problems measured at age 12 predicted paternal depressive symptoms measured at age 15 ($\beta = .15, SE = .07, p < .05$), but this effect was not found for boys ($\beta = -.02, SE = .06, p = .12$), $\Delta\chi^2(1, N = 770) = 5.17, p < .05$. Paternal depressive symptoms at age 12 predicted girls' externalizing problems at age 15 ($\beta = .15, SE = .04, p < .001$) but not boys' ($\beta = -.03, SE = .04, p = .56$), $\Delta\chi^2(1, N = 770) = 11.21, p < .001$.

Discussion

The present study makes a unique contribution by investigating the transactional association among parental depressive symptoms and child internalizing and externalizing problems longitudinally in a community sample. Two separate transactional models were investigated based on maternal and paternal reports of their own and their child's symptoms. Additional goals were to examine (a) the developmental trajectories of parental depressive symptoms and child behavioral and emotional problems, (b) the role of the child's gender in the association between parent and child symptomatology, and (c) the bidirectional association between child externalizing and internalizing problems over time. Evidence was found for both parental and child effects across time, which emphasizes the dynamic association between parental and child psychological symptoms. A number of similarities and differences were also evident for the effects of maternal and paternal depressive symptoms on child behavioral and emotional difficulties. The differences between the two models may be attributed to how mothers compared with fathers perceive their child's difficulties.

Developmental Trajectories

On average, based on maternal reports, child externalizing difficulties decreased and internalizing difficulties increased

over time. This inverse growth relationship is consistent with previous research investigating the average development of internalizing and externalizing problems (Gilliom & Shaw, 2004). Externalizing behaviors, such as aggression and destructive behaviors are often used by typically developing toddlers to solve conflicts with peers or playmates, and with the development of cognitive abilities and skills to regulate emotions, externalizing problems decrease and diminish over the preschool- and school-age period (Coie & Dodge, 1998). Increases in internalizing problems might be the result of cognitive maturation as well (Kovacs & Devline, 1998), as improvements in cognitive abilities enable the child to self-reflect, remember, and anticipate negative or depressive events. According to paternal reports, externalizing problems decreased across time whereas internalizing problems remained stable across time. This difference in parental perceptions may be tentatively attributed to the fact that fathers, perhaps due to less direct contact and fewer opportunities to observe their children, compared with mothers, do not observe changes in their children's emotional difficulties, which are harder to detect than behavioral problems. It is also possible that the self-reported increasing depression of mothers makes them perceive their child's depression/internalizing problems as increasing over time as well (Tretler & Epkins, 2003).

In terms of gender differences, girls exhibited lower mean levels of externalizing problems during early childhood compared with boys and were more likely to demonstrate decreases in these problems across time. However, boys were at lower risk to exhibit internalizing problems across time compared with girls. These findings are in accordance with previous work showing that boys are at higher risk to develop externalizing problems and girls are at higher risk to develop internalizing problems (Burt et al., 2005; Fanti et al., 2008; Leadbeater et al., 1999; Rescorla et al., 2007). The gender difference regarding internalizing problems is also evident during adulthood, because mothers scored continually higher on depressive symptoms compared with fathers. Furthermore, maternal depressive symptoms increased over time, although paternal depressive symptoms did not demonstrate significant changes. Prior epidemiological work has documented almost double prevalence rates of depressive symptoms in women than men (Bland, 1997), and the current findings substantiate the notion that this gender difference persists longitudinally across a 10-year period.

Longitudinal Association Between Externalizing and Internalizing Problems

The time-specific associations among the child's behavioral and emotional problems were of moderate strength and actually much stronger when compared with the associations among child problems and parental depressive symptoms. The longitudinal evidence based on mother

reports suggested that internalizing problems codevelop with externalizing problems. These findings in combination provide evidence in terms of the co-occurrence among externalizing and internalizing problems, as suggested by prior work (e.g., Fanti & Henrich, 2010), and attests to the possibility that a large proportion of variance in the development of psychopathological symptoms is explained by characteristics or behaviors of the child. Findings from the father data set suggested that internalizing problems might be a risk factor for later externalizing problems, but the reciprocal association was not found. The presence of internalizing difficulties may result in negative social consequences such as teasing, shunning, or bullying, which in turn may result in frustration and anger in the child with internalizing difficulties. This frustration may be expressed through symptoms of irritability and aggression rather than sadness among children (American Psychiatric Association, 1994).

Timing of Transactional Effects

The models investigating the association among parental depressive symptoms and child maladjustment used in the current study take the co-occurrence between behavioral and emotional problems into account. Thus, all the associations among parental and child symptomatology reported in the current study are net the associations between the child's behavioral and emotional problems. Moreover, the longitudinal associations are net the time-specific associations. A number of transactional associations were found above and beyond the association among externalizing and internalizing problems and the cross-sectional associations among the variables under study.

The cross-sectional associations between parental depressive symptoms and child behavioral and emotional problems indicate that the three variables are interrelated. This interrelation was also shown with the significant correlations among the intercepts and the first measurement points of parental depressive symptoms, externalizing and internalizing problems, providing evidence for overtime associations among the variables. The overtime associations among the child's internalizing difficulties and maternal and paternal depressive symptoms during early childhood may suggest that parents may react to their child's emotional difficulties in addition to influencing them by their own emotional problems. Perhaps, the child's internalizing difficulties may help verify the parents' depressogenic cognitions of failure and incompetence. Parental depressive symptoms may also contribute to intrusive or withdrawn parenting that initiates further disruptive, externalizing behaviors in the child (Elgar, Waschbusch, McGrath, Stewart, & Curtis, 2004). In addition, the depressed parent may find it difficult to manage the child's externalizing behaviors and may experience feelings of failure as a parent, resulting in increased depressive symptoms.

The growth findings suggested that maternal depressive symptoms during early childhood were associated with increases in child internalizing problems across time. The cross-lag findings also suggested that maternal depressive symptoms were associated with the child's internalizing problems from ages 7 through 9 and 12 through 15. Paternal depressive symptoms were positively associated with the child's internalizing problems across time as well, in accordance with the cross-lag findings. Previous studies suggest that the intrusive or controlling parenting behaviors of depressed parents is associated with the internalizing spectrum of symptomatology through creating a sense of constant potential threat, lower personal control, and negative affect in the child (Ballash, Leyfer, Buckley, & Woodruff-Borden, 2006). Perhaps through this mechanism, maternal and paternal depressive symptoms contribute to the continuity of internalizing symptoms by the child.

During early adolescence (ages 11–12), a bidirectional association between paternal depressive symptoms and internalizing problems was found. Early adolescence is marked by increases in the prevalence of internalizing problems in boys and girls (Roberts, Andrews, Lewinsohn, & Hops, 1990), indicating that this is a particularly stressful developmental period. A depressed or withdrawn father may be perceived as being less able to provide support and safety during this challenging period for children, increasing their sense of uncontrollability. With regards to child effects on fathers, adolescence may overlap with an equally difficult period for parents, particularly fathers, who, as they enter middle age, may be faced with fewer opportunities for growth and achievement and may have settled into a period of stability/stagnation at work and home. The added challenge of a child with internalizing difficulties may increase feelings of helplessness, hopelessness, and poor self-efficacy. This bidirectional association was also identified during middle adolescence (ages 12–15), although it was specific to girls, which might be due to the increased vulnerability of girls to internalizing problems during adolescence (Fanti et al., 2008). No transactional associations were found among maternal depressive symptoms and child internalizing problems during adolescence, indicating that maternal depressive symptoms mainly affect the child's emotional problems, but not the other way around, during this developmental period.

Cross-lag associations further indicated that girls', but not boys', externalizing problems positively predicted maternal depressive symptoms continually from early childhood to middle adolescence. It is well documented that mothers and daughters are more likely to engage in high conflict and disagreement in comparison with mothers and sons (e.g., Hay, Vespo, & Zahn-Waxler, 1998; Laursen, 2005), which might explain this gender-specific association. The early childhood cross-lag associations also suggested transactional associations among maternal depressive

symptoms and girls' externalizing problems. In terms of paternal depression, no gender differences were identified on the effect from externalizing problems to paternal depressive symptoms. However, the reciprocal effect from paternal depression to externalizing problems was only found for girls. In addition, there was a transactional association among girls' externalizing problems and maternal and paternal depressive symptoms during adolescence, although the effect from maternal depressive symptoms to boys' externalizing problems was unidirectional. Why are these transactional associations specific for girls? According to Keenan and Shaw (1997), externalizing problems are not considered acceptable behaviors for females by societal standards, which might mean that their symptoms are seen as more salient. Girls may also spend more time at home than boys, displaying their problems in a way that is more apparent to their parents, whereas boys may act disruptively mostly in peer social groups outside home.

Although the present investigation does not include variables that might help explain the mechanisms that underlie either the cross-lag effects among parents and children over time or the time-specific associations among parent and child psychological difficulties, the literature on caregiver strain may provide some relevant hypotheses: It is well documented that caregivers, both of the elderly and of children with emotional and behavioral problems, suffer from increased strain, especially when they lack appropriate coping skills, are burdened by sociodemographic adversities, or do not have a network of social and instrumental support (Brannan, Heflinger, & Bickman, 1997; Bussing et al., 2003). This may be particularly true of women (Doress-Worters, 1994) whose multiple roles have been found to partly explain the higher depression rates associated with female gender. Caregivers (the parents in this case) may suffer from isolation, stress, and burnout (Lim & Zebrack, 2004) as well as increased anxiety and depression. Not only does this burden lead to poor quality of life among caregivers but it also affects the care and support they can offer to the ill or emotionally disturbed member of the family, initiating a vicious cycle of increased family distress. In the present investigation, it can be postulated that having a child with emotional and behavioral difficulties increases parental caregiver strain at any one time point, which in turn may affect child well-being at a later time. Indeed, children with emotional difficulties and particularly oppositional behaviors increase strain among the parents (Bussing et al., 2003), and it has also been found that later parent-targeted aggression among children may be a reaction and adaptation to family strain (Brezina, 1999). Thus, caregiver and family strain may represent mediating variables in the associations between parent and child psychological difficulties that need to be explored in future transactional research.

In conclusion, consistent with evidence provided by Gross, Shaw, & Moilanen (2008), transactional associations

were more evident during the early childhood and adolescence period, which are associated with social, individual, and academic changes. During early childhood, children meet with a variety of demands represented by key developmental tasks such as making friends and learning the obedience and self-control skills required by the school setting (Mesman, Bongers, & Koot, 2001). Adolescence comes not only with a number of social changes, in the family, school, and peer context, but also with changes in the individual, such as increases in behavioral and emotional problems (Eccles et al., 1993; Fanti et al., 2008; Steinberg & Morris, 2001). For example, parents might find it very difficult to deal with adolescents' behavioral and emotional changes, which might then lead to cycles of coercive processes (Patterson, 1982). Gross, Shaw, & Moilanen (2008) provided evidence that during the transition from toddlerhood to school age and from late childhood to adolescence, the child and parent effects are more prevalent, due to changes in physical maturation and the social environment. These social and individual changes might increase the strength of the bidirectional effects between children, adolescents, and their parents. However, no transactional associations were found during middle childhood, ages 9 to 11, between parental and child symptomatology. During middle and late childhood, children are well adjusted into school, where they receive socialization experiences and also spend a substantial portion of their time, and as a result, the impact of their emotional and behavioral problems in the home environment may decline. This may further coincide with parental maturation and increased ability for parents' own emotional regulation and hardiness, along with better family, employment, and financial stability, which may make them less reactive to their children's difficulties. All the postulated mechanisms to explain cross-lag transactional effects here are hypothetical as no mediating and moderating variables were examined. Because of the correlational nature of the study and the absence of such variables in the current investigation, it is indeed impossible to speak of any causal effects between parent and child difficulties. It is possible that parent and children influence each other transactionally through mechanisms similar perhaps to those postulated by Patterson (1982) and by the caregiver and family strain literatures, and these interactions later produce other longitudinal transactions.

Strengths and Limitations

Strengths of this investigation included a large community sample, which enabled the investigation of the timing of effects between parent and child psychological symptoms within the ALT model. The large sample of the current study enabled the use of sophisticated structural equation techniques that tested multiple relationships simultaneously. Another strength of this study is the investigation of mother

and father transactional models, and the inclusion of internalizing and externalizing difficulties in the same model. However, the differences identified in the current study between mother- and father-reported data may not be due to differences in relationships but due to the fact that these associations were investigated in two different samples.

What may be considered a limitation of the study is the fact that the levels of symptomatology in this community sample were expectedly low (though a substantial proportion evidenced higher than cutoff levels of depression), which might explain the small magnitude of the weights in the prediction models. Certainly, this means that results are difficult to generalize to families with truly depressed parents (i.e., who have to cope with the presence of severe mental illness) and children with internalizing and externalizing psychopathology. However, when the symptoms are looked at as behaviors that express themselves on a continuum of severity in the general population, it can be argued that the associations proposed in the current theoretical model are indeed robust. It should be stressed that the patterns of associations found here are not substantially different from those uncovered by clinical studies, demonstrating the continuity of these phenomena along the severity spectrum of the examined symptom patterns. Simultaneously, this article does not claim to inform the literature on how parental depression affects child psychopathology. The sample is a community one; levels of symptomatology were low and only a small proportion of participants met clinical cutoffs for either depression or child behavior and emotional problems. The present findings pertain mostly to typical populations. However, having acknowledged this as a potential limitation, it is important to reiterate the fact that finding that even such mild levels of emotional distress may have a significant impact on other family members, both at the same time and across development, should provide an impetus for further research into the transactional effects between parent and child psychopathology where these effects can be anticipated to be particularly potent.

A methodological limitation is that only parental reports were used for parental and child symptoms, which may have led to response bias and inflation of observed associations; the inclusion of reports from other agents might have enhanced the validity of our findings. However, parents are considered to be a critical source for reporting on their child's behavior (Shaw, Gilliom, Ingoldsby, & Nagin, 2003), and they may be more observant of the children's internalizing symptoms compared with teachers or other informants (Keiley, Bates, Dodge, & Pettit, 2000). An additional potential shortcoming of the study is that it has not examined for transactional effects between parental and child symptoms during the first years of a child's life, which might limit conclusions in terms of possible transactional associations during the preschool period. Similarly, the directions of effects during the first time points under investigation are difficult to discern because a correlational

analysis was employed during these early time points. Also, generalizability may be limited due to the racial composition of the present sample, which was about 78% White. Finally, the demographic differences between the included and excluded samples, such as socioeconomic status (SES) and educational level, might have influenced the findings reported in the current study. This means that findings most readily apply to White middle-class families and further research is needed to demonstrate potential applicability to families of other racial backgrounds or SES.

Implications

Understanding the longitudinal association among parental depression and the child's emotional and behavioral problems is fundamental for the establishment of effective, developmentally sensitive interventions. According to Dodge and Pettit (2003), it is important to carry interventions early in life before antisocial outcomes or other types of psychological problems become inevitable, especially because early onset child difficulties have a poorer prognosis. It is well documented that attempting to alter oppositional and antisocial behaviors in adolescence is a challenging effort, especially given that parents have much less control over their children and managing contingencies during this developmental period (Anastopoulos & Farley, 2003). Also, early child maladjustment (e.g., in the form of misbehavior) often is predictive of later more severe forms of pathology such as conduct disorder. Therefore, it is much more efficacious to put early childhood behavior under parental control, for example, through the well-documented parent-child interaction therapy (Brinkmeyer & Eyberg, 2003, or parent training as proposed by Barkley, 1990). However, such intervention programs that rely heavily on the parents being active, persistent, and authoritative may be hindered in their effectiveness by the presence of parental depressive symptoms and its associated negative predictions about the future, low self-esteem, and energy depletion. It may be important to account for these potential obstacles and also to prepare parents for upcoming "rough" developmental periods, such as the transition to school and the transition to adolescence when child symptoms seem to have a greater negative impact on the parents. The possibility that early depressive symptoms among parents may be partly due to the strain exerted by having a child with behavioral difficulties also suggests that in addition to addressing within-person difficulties or the parents during treatment, emphasis needs to be placed on lowering family strain. This may be achieved by improving coping skills, enhancing supportive networks, and resolving practical problems that increase stress, such as financial, employment, and time-management issues. Taking into consideration parental depressive symptoms may also help to address the high attrition rates faced by some treatment

programs, making them more generalizable and effective to a wider spectrum of families.

Therefore, keeping in mind the cyclical interactions between parents and children, it may become a crucial focus of family interventions to empower parents, set small parenting goals that will provide initial experiences of success, and be sensitive and aware in the process of parental tendencies for self-blame, helplessness, and exaggeration of negative family interactions that may affect their own depressive symptoms. Simultaneously, the fact that apparently the two parents have somewhat different perceptions of their children's difficulties and how these progress over time may explain in part the oftentimes inconsistent parenting practices adopted by the two parents. Findings of the current study highlight the need to promote open and documented discussions of the difference in perceptions of the two parents, which may result in better collaboration and support between them.

In summary, the present study has contributed to the literature by developing and testing a transactional model, based on longitudinal data, capable of describing the interrelation between parental emotional and child internalizing and externalizing difficulties. By testing the associations between parental symptoms and child difficulties in a large community sample, this study also provides evidence that the previously reviewed findings deriving from clinical studies generalizes to milder forms of symptomatology as it is distributed in the normal population. Transactional associations were supported between maternal and paternal depressive symptoms and the child's behavioral and emotional difficulties, although evidence suggested that the timing of effects need to be taken into account. The empirical evidence provided contributes to a better understanding of the ongoing dynamics between parents, children, and children behavior across development. Finally, it is particularly important to recognize the critical role that parents and children may play in directing the onset and maintenance of child internalizing and externalizing behaviors.

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