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FAMILY PROCESS

ORIGINAL ARTICLE

Is it me or my child? The association between maternal depression and children's behavior problems in mothers and their children with or without autism

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Abstract

Bidirectional associations between maternal depression and child behavior problems have been reported in prior research, however, few studies examine these relations across varied family contexts. This study examined parenting stress and child diagnosis of autism spectrum disorder (ASD) as moderators of bidirectional associations between maternal depression and child behavior problems over time. Our sample included 86 mother–child dyads who reported maternal depressive symptoms, child behavior problems, and parenting stress at three time points over more than 1 year. Approximately half were mothers of children with ASD (n = 41) and half were mothers of neurotypical children (n = 45). We tested the bidirectional associations between maternal depressive symptoms and children's behavior problems and the potential moderating role of parental stress or child ASD diagnosis on these bidirectional associations using aggregated, lagged, and linear mixed models. Even after controlling for lagged maternal depressive symptoms, child behavior problems were associated with greater subsequent maternal depression at the between-person level, but not at the within-person level. The converse relation of prior maternal depressive symptoms on subsequent child behavior problems was not significant. Neither parenting stress nor child ASD diagnosis moderated bidirectional associations between maternal depressive symptoms and children's behavior problems. Child behavior predicted maternal depression,

but the converse was not true, regardless of parenting stress levels or child's ASD diagnosis. For mothers experiencing elevated parenting stress and those with children with ASD, this may help alleviate elevated feelings of guilt related to their children's behavior problems.

KEYWORDS
autism, bidirectional, child behavior, maternal depression, parenting stress

Approximately 1 in 10 women experience depression during their childbearing years (Guo et al., 2018) and prevalence rates may be even higher in women with young children (McCue Horwitz et al., 2007). When depression occurs among women with children, there is a risk that symptomatology may be *intergenerationally transmitted* from mother to offspring. Prior empirical studies observe that children of mothers with depression are 3–6 times more likely to develop socioemotional problems than their non-exposed peers (Gotlib et al., 2020). Although maternal depression is often described as exerting a *unidirectional* influence on offspring outcomes, it is actually the case that maternal and child mental health influence each other in a *bidirectional* manner (Paschall & Mastergeorge, 2016). From a theoretical perspective, Belsky's model of the determinants of parenting posits that child characteristics influence parents, with downstream consequences on children's developmental outcomes (Belsky, 1984). Empirically, bidirectional associations between maternal depression and children's behavior problems may emerge as early as the toddler and preschool years (Roubinov et al., 2022) and have also been observed during childhood (Choe et al., 2014), adolescence (Allen et al., 2010), and early adulthood (Tyrell et al., 2019).

Bidirectional associations between maternal depression and child behavior may not operate uniformly across families. Yet, few studies have examined specific familial characteristics or contexts that may shape the nature of bidirectional relations. Thus, a key objective of this study was to examine potential differences in bidirectional relations across levels of parenting stress. Families recruited based on the presence (or absence) of an autism spectrum disorder (ASD) diagnosis are ideal for this study because research indicates that parenting stress is consistently higher among parents of children with ASD compared to both parents of children with other developmental disabilities and parents of children with no diagnoses (McStay et al., 2014). Parenting stress has also been cited as the most common construct to describe the experience of families with a child with ASD (Hayes & Watson, 2013).

While evidence of reciprocal relations between maternal depression and child behavior problems has been found in families with elevated levels of stress or those recruited on the basis of heightened risk, such studies did not include lower stress or low-risk comparison sample (and moreover, we are not aware of any specific studies that have examined moderation by parenting stress). For example, in a sample of adolescent mothers, robust contingent relations were observed such that as the severity of maternal depressive symptoms increased (or decreased), children's behavior problems followed in a reciprocal manner (Nicholson et al., 2011). Bidirectional relations between parental depressive symptoms and child behavior problems have also been observed among families in which children were at risk for conduct problems (Gross et al., 2008).

It is possible that heightened levels of parenting stress (such as those that can accompany an ASD diagnosis) may exacerbate bidirectional relations between maternal depression and child behavior. In general, the *spillover hypothesis* refers to "the transfer of mood, affect, or behavior from one setting to the next" (Almeida et al., 1999, p. 49). Although extant literature typically applies spillover to explain the processes through which marital conflict compromises

parenting behaviors (Guo et al., 2018), when considered for broader family contexts (i.e., maternal mental health, parenting stress, and child behavior), this framework may be relevant for the present study. Prior studies also suggest spillover effects may be heightened in the context of stress. For example, studies of romantic couples suggest that individuals are more strongly negatively influenced by a partner's low mood in the context of elevated stress levels (Neff & Karney, 2004) and more family conflict has been shown to lead to greater reciprocation of negative behavior between couples (Sears et al., 2016). It has been suggested that risk within the family environment enhances bidirectional processes related to children's development (Crnic & Greenberg, 1987). Elevated levels of parenting stress may reflect coping mechanisms that are maladaptive or insufficient to meet the demands of parenting (Folkman & Lazarus, 1985). Such heightened levels of parenting stress may indicate impairments in a caregiver's ability to engage in parenting behaviors that are adaptive for children, compounding the negative sequelae of maternal depressive symptoms on children's behavior. Similarly, heightened parenting stress may lead caregivers to feel especially ineffective in their parenting, which could exacerbate the consequences of child behavior problems on maternal depressive symptoms. Thus, a stronger "coupling" of maternal-child symptoms could emerge when parenting stress is high, such that elevated maternal depressive symptoms are associated with greater behavior problems (and vice versa). Conversely, lower levels of parenting stress may render parent–child dyads less vulnerable to the distress or negative behavior of other members in the family system.

To address gaps in the extant literature, the present study examined bidirectional associations between maternal depressive symptoms and children's behavior problems and the potential moderating impact of parenting stress within a sample of mothers of a child with ASD and age-matched mothers of a child without ASD. Based on prior literature, we hypothesized that the bidirectional associations between maternal and child symptoms would be stronger in family contexts characterized by higher levels of parenting stress. Although we were primarily interested in parenting stress given the extent to which it captures the unique experience of families with a child with ASD (Hayes & Watson, 2013), we acknowledge that it is not the only distinguishing characteristic of these families, nor are parenting stress and child ASD diagnosis interchangeable constructs. Thus secondarily, we also examine whether bidirectional associations between maternal depressive symptoms and child behavior problems are moderated by a child's ASD diagnosis. Mothers of children with ASD may experience self-blame and despair related to their child's diagnosis (Da Paz et al., 2018); behavior problems that occur in the context of ASD may thus carry more stigma and be more strongly linked to maternal depression than behavior problems in neurotypical children. Families with children with ASD may also be especially vulnerable to experiencing other difficulties within the family system, including marital strain (Chan & Leung, 2020) and economic hardship (Trentacosta et al., 2018), which could exacerbate the impact of maternal depressive symptoms on children's behavior.

METHOD

Participants

Participants were drawn from a larger longitudinal study of chronic caregiving stress and aging, the Stress, Aging, and Emotions (SAGE) study. Recruitment sources included schools, child development centers, and a local university autism treatment center in the San Francisco Bay Area. A total of 183 women were recruited into the larger study on the basis of (1) raising a child with an ASD ($n = 92$) or (2) raising a neurotypical child ($n = 91$). Additional eligibility criteria included: non-smokers, between the ages of 20 and 50 years old, and at least one child between 2 and 16 years. Women were excluded if they reported a major medical disorder or

TABLE 1 Sample demographics

Maternal age; range, *M* (SD)	32–51, 43.2 (4.9)
Child age; range, *M* (SD)	2–15, 7.7 (3.1)
Child sex; *N* (%)	
Female	32 (37.2%)
Male	54 (62.8%)
Marital status; *N* (%)	
Married	74 (86.0%)
Not married	12 (14.0%)
Education; *N* (%)	
High school graduate	1 (1.2%)
Some college or technical school	4 (4.7%)
Associate degree	3 (3.5%)
Bachelor's degree	31 (36.0%)
Master's degree	26 (30.2%)
Doctoral degree or equivalent	19 (22.1%)
Did not answer	2 (2.3%)
Race *N* (%)	
White	86 (100%)
Annual family income; *N* (%)	
≤$39,999	1 (1.2%)
$40,000–$79,999	9 (10.4%)
$80,000–$99,999	6 (7.0%)
$100,000–$149,999	26 (30.2%)
$150,000–$200,000	19 (22.1%)
≥$200,000	25 (29.1%)
Child ASD diagnosis; *N* (%)	
Mother of a child with ASD	41 (47.7%)
Mother of a child without ASD	45 (52.3%)

psychiatric condition, including bipolar disorder, post-traumatic stress disorder, or eating disorder. The sample for the current study was comprised of 86 women who had at least one complete lag of data (see Missing Data section below). The analytic sample included 45 mothers of neurotypical children (hereafter referred to as *control mothers*) and 41 mothers of children with ASD. As expected, mothers of children with ASD reported significantly higher levels of parenting stress than control mothers at baseline ($t[82] = 6.19$, $p < 0.001$; $d = 1.34$), 18 months ($t[84] = 5.37$, $p < 0.001$; $d = 1.15$), and 24 months ($t[77] = 4.80$, $p < 0.001$; $d = 1.08$). See Table 1 for sample demographics.

Procedure

The SAGE study was approved by the Institutional Review Board at the University of California, San Francisco. All participants provided written informed consent prior to engaging in any study activity. Mothers completed questionnaires upon entry into the study and at

follow-up assessments at 9, 18, and 24 months. Sociodemographic questions included maternal age, child age, child gender, self-identified race/ethnicity, marital status, the highest level of education, and household income. Psychological questionnaires assessed maternal depression, child behavior problems, and parental stress. Between 18 and 24 months, a brief intervention was offered to all participants. A subset of mothers ($N = 43$; 21 mothers of neurotypical children and 22 mothers of children with ASD) chose to participate (women were not randomly assigned). There was no significant change in parenting stress between 18 and 24 months among mothers who opted to complete the program ($p = 0.12$). As the focus of the current study was not on evaluating intervention effects, intervention status was only included as a covariate in models.

Measures

Maternal depressive symptoms

Mothers completed the Inventory of Depressive Symptoms (IDS; Rush et al., 1996), a 30-item self-report of depressive symptoms at 9, 18, and 24 months following enrollment in the study. Symptoms were evaluated on a 0–3-point response scale. Higher scores indicated greater depressive symptoms. Rates of clinically significant symptoms (IDS ≥ 18) were as follows: 50% of mothers of children with ASD and 5.9% of control mothers at 9 months, 50% of mothers of children with ASD and 13.6% of control mothers at 18 months, and 50% of mothers of children with ASD and 9.5% of control mothers at 24 months. Internal consistency was good at all waves of data collection (9-months $\alpha = 0.82$; 18-months $\alpha = 0.87$; and 24-months $\alpha = 0.88$).

Child behavior problems

Child behavior problems were evaluated by the maternal report on the Child's Challenging Behavior Scale (Bourke-Taylor et al., 2010) at 9, 18, and 24 months. This 11-item questionnaire measures common behavior problems and positive behaviors among children. The scale of the CCBS ranges from 1 (Strongly Agree) to 5 (Strongly Disagree). Negative behavior items (e.g., aggravates others, stubborn, and uncooperative) were reverse scored such that higher scores indicate more behavior problems. The measure of children's behavior problems was developed and validated on a sample of children between 5 and 18 years old (Bourke-Taylor et al., 2010), indicating its appropriateness for young children and adolescents. The scale demonstrated good internal consistency at all three waves of data collection (9-months $\alpha = 0.86$; 18-months $\alpha = 0.89$; and 24-months $\alpha = 0.88$).

Parenting stress

Parenting stress was evaluated by maternal self-report on the Parental Stress Scale at baseline, 18 months, and 24 months (Berry & Jones, 1995). This 18-item questionnaire measures positive and negative aspects of parenthood: emotional benefits, self-enrichment, personal development, demands on resources, and opportunity costs and restrictions. Positive items are reverse coded such that higher scores indicate greater parenting stress, and internal consistency was good at all waves of data collection (baseline $\alpha = 0.87$; 18-months $\alpha = 0.89$; and 24-months $\alpha = 0.87$).

Covariates

Based on theory and empirical associations with key study variables, child ASD diagnosis (Daniels et al., 2008), child age and sex (Goodman, 2020), and family income (Ertel et al., 2011) were included as covariates. Dichotomous variables indicated whether a participating mother was raising a child with ASD or was not raising a child with ASD and reflected child sex. Child age was included as calculated from children's date of birth. Mothers reported family income based on total annual household income, ranging from $12,000 to $199,000. Marital status (1 = married, 0 = not married) was also considered for inclusion as a covariate but was uncorrelated with maternal depression, child behavior problems, and parenting stress (all $ps > 0.10$).

Missing data

To be included in the analyses, participants needed to have one complete lag of data (i.e., participants needed to have complete data at *both* 9 and 18 months, or 18 and 24 months). At the 9-month wave of data collection, 138 participants had complete data on depression, and 136 participants had complete data on child behavior. At 18 months, 126 had complete data on depression, and 124 had complete data on child behavior. At 24 months, 121 had complete data on both maternal depression and child behavior. We conducted analyses to examine whether income, child age, or child ASD diagnosis were associated with missing data at any of the time points. Participants who reported lower income were more likely to have missing data at the 18-month wave of data collection ($r = -0.18$, $p = 0.04$). Additionally, mothers with a child with ASD were more likely to have missing data at the 18-month ($r = 0.21$, $p = 0.008$) and 24-month ($r = 0.18$, $p = 0.02$) waves of data collection. All other variables were not associated with missingness. Additionally, we examined whether baseline maternal depression and childhood behavior problems were associated with a greater likelihood of attrition on these same variables at 18 and 24 months. Results demonstrated that baseline depression and childhood behavior problems were not associated with attrition on these variables at subsequent time points. Based on the number of individuals who had at least one complete lag of data, the final sample for the purpose of analyses included 160 lags in 86 people (many participants had two complete lags).

Analysis plan

We conducted aggregated, lagged, linear mixed models in SPSS (using REML estimation) in two steps (Heck et al., 2013; West et al., 2014). We first aimed to replicate prior research testing the bidirectional link between maternal depression and child behavior problems by examining whether lagged maternal depression (9- and 18-month assessments) predicted child behavior problems at each subsequent wave (18- and 24-month assessments), and whether lagged child behavior problems predicted maternal depression at each subsequent wave. In each model (one for maternal depression as an outcome and one for child behavior as an outcome), we controlled for lagged levels of the outcome variable to isolate the unique, prospective effects of the predictor of interest on the subsequent outcome variable. Because we did not hypothesize any differences at the different time periods, each model was specified to provide an *aggregated* estimate of the association of interest across the different time lags. This aggregated approach means that rather than providing two different estimates of the association between maternal depression and subsequent child behavior problems for each time lag (i.e., 9-month maternal depression predicting 18-month child behavior problems and 18-month maternal depression predicting 24-month child behavior problems), the

analysis provides one, the overall estimate of the association between prior maternal depression and subsequent child behavior problems.[1] As recommended for longitudinal, multilevel data (Bolger & Laurenceau, 2013; Hoffman, 2015), we partitioned the variability in the predictor variables into between-person and within-person components. The between-person variable represents the individual's overall mean across their lagged time points in the study, and the within-person variable represents the individual's deviation from their own person mean at a particular time point. This allows for assessing whether it is most important to have generally high or low levels of lagged maternal depression or child behavior problems as compared to others in the study (i.e., at the between-person level), or whether deviations from one's own typical level of lagged depression or child behavior problems are especially predictive of subsequent outcomes (i.e., within-person effects).[2] Effect sizes (r values) were calculated according to the method used by Kashdan and Steger (2006): $r = \sqrt{(t^2/t^2 + df)}$.[3]

After testing these initial bidirectional models, we examined our primary analyses of moderation by parental stress. In the model in which we examined whether lagged child behavior problems predicted subsequent wave maternal depression, we examined the prior, most proximal wave parenting stress as a moderator of the association between lagged child behavior problems and subsequent wave maternal depression (controlling for children's diagnosis of ASD). We did the same for the opposing model in which lagged depression served as a predictor of subsequent wave child behavior problems. In the case that any interactions with lagged parenting stress were significant, we planned to probe simple slopes one standard deviation above and below the mean of parenting stress (Aiken et al., 1991). Parenting stress was not measured at the 9-month assessment, so we used the assessment of parenting stress at baseline as the moderator of either child behavior or maternal depression at 9 months. Parenting stress was measured at 18 months and this variable was included as the moderator of 18-month child behavior or maternal depression on 24-month outcomes. Although we assessed parenting stress at 24 months, it was a moderator of the predictor variables and not an outcome variable, and thus, was not included in our primary models. However, we have presented it in the correlation tables to provide perspective on the stability of this variable across the course of the study. All models controlled for caregiver status (mother of a child with ASD or control mother), household income, child age, and intervention status. Additionally, we repeated the aforementioned analyses with the specification of child ASD diagnosis as a moderator of the bidirectional relationship between maternal depression and child behavior problems (controlling for parenting stress).

[1]We accounted for the nesting of the data using the repeated subcommand of the MIXED procedure in SPSS (Heck et al., 2013; West et al., 2014). Although our original goal was to also specify these models with random intercepts, the models failed to converge with random intercepts. As such, we accounted for the nesting of the data using the repeated command only, and the models are specified using fixed intercepts and slopes.

[2]We note here that because the between-person variable is calculated based on the 9- and 18-month data points, and is used to predict the 18- and 24-month outcomes, in the case of the between-person variable predicting the 18-month outcome, the analysis is only partially longitudinal (i.e., with respect to the two data points included in the between-person variable, only the 9-month timepoint precedes the outcome). So, while this analysis can generally be interpreted as an aggregated examination of the between-person lagged, association between maternal depression and child behavior problems across time, it is not fully longitudinal, which should be taken into consideration when interpreting results.

[3]To ensure any findings were not dependent on the timing of the assessments, we also examined whether the wave of data collection moderated the association between prior levels of the predictor and subsequent levels of the outcome. Because our theoretical and analysis approach assumed the associations would be relatively similar regardless of when they occurred during the study, we expected the moderation analyses would be non-significant (thus, providing support for the aggregated approach). These results were not significant (Tables S1 and S2).

RESULTS

Table 2 presents descriptive statistics and correlations for our study variables. Results of mixed models examining the aggregated, prospective association between lagged child behavior problems and subsequent maternal depression (while controlling for lagged maternal depression) are presented in Table 3. Even after controlling for lagged maternal depression (as well as numerous other covariates), lagged child behavior problems were associated with maternal depression at the between-person level ($B = 0.21$, $r = 0.42$), but not at the within-person level ($B = -0.13$, $r = -0.13$), suggesting that when mothers reported generally higher levels of lagged child behavior problems as compared to other mothers in the study, this was the primary predictor of their subsequent wave depression. The bottom section of Table 3 presents the results of analyses examining whether parenting stress moderated the association between lagged (between and within-person) child behavior problems and subsequent wave maternal depression. Results demonstrated that prior parenting stress did not significantly moderate the association between lagged child behavior problems and subsequent wave maternal depression, and this was true at the between- and within-person levels.

Results of mixed models examining the prospective association between lagged maternal depression and subsequent child behavior problems (while controlling for lagged child behavior problems) are presented in Table 4. After controlling for lagged child behavior problems and the other covariates in the model, lagged between- and within-person maternal depression did not significantly predict subsequent wave child behavior problems. The bottom section of Table 4 presents the results of our primary analyses examining whether prior parenting stress moderated the association between lagged maternal depression and subsequent wave child behavior problems. Once again, contrary to our hypotheses, results demonstrated that prior parenting stress did not significantly moderate the association between lagged between- and within-person maternal depression and subsequent wave child behavior problems.

Additional models tested child ASD diagnosis as a moderator. The pattern of results paralleled that of parenting stress in suggesting that child ASD diagnosis did not significantly moderate the association between lagged between or within-person maternal depression and subsequent wave child behavior problems or vice versa (Tables 5 and 6).

DISCUSSION

It is well-documented that mothers of children with ASD report elevated levels of parenting stress compared to mothers of typically developing children (Enea & Rusu, 2020; Hartley et al., 2018; Postorino et al., 2019). The objective of the current study was to examine if stress associated with the parenting role shaped the longitudinal, bidirectional relations between maternal depressive symptoms and children's behavior problems in a sample of families in which approximately half the mothers were caregivers for a child with ASD and half were control mothers. Secondarily, we also examined child ASD diagnosis as a moderator of these bidirectional associations.

Prior to examining moderation, we first tested the longitudinal, bidirectional associations between maternal and child symptoms. Across a period of approximately 15 months with data collected repeatedly over time, children's behavior problems were associated with greater subsequent maternal depressive symptoms at the between-person level, even after adjusting for prior maternal depressive symptoms. Although we note that our between-person analyses were not fully longitudinal, these results provide evidence that when mothers in our sample reported greater lagged levels of child behavior problems as compared to other mothers, they were more likely to report depression across the course of time. By contrast, within-person fluctuations from one's own person-mean with respect to child behavior problems did not

TABLE 2 Descriptive statistics and correlations

Variable	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Maternal depression (9 months)	14.23 (8.50)	–												
2. Maternal depression (18 months)	14.23 (8.70)	0.715**	–											
3. Maternal depression (24 months)	13.76 (8.94)	0.630**	0.733**	–										
4. Child behavior (9 months)	28.47 (7.44)	0.447**	0.446**	0.418**	–									
5. Child behavior (18 months)	28.58 (8.27)	0.363**	0.429**	0.385**	0.737**	–								
6. Child behavior (24 months)	27.42 (8.11)	0.382**	0.442**	0.441**	0.785**	0.893**	–							
7. Parent stress (baseline)	42.67 (9.44)	0.628**	0.593**	0.478**	0.525**	0.494**	0.467**	–						
8. Parent stress (18 months)	41.39 (9.91)	0.630**	0.626**	0.461**	0.544**	0.560**	0.534**	0.847**	–					
9. Parent stress (24 months)	40.47 (9.23)	0.591**	0.577**	0.522**	0.580**	0.586**	0.592**	0.820**	0.836**	–				
10. Child ASD diagnosis[a]		0.556**	0.502**	0.554**	0.335**	0.336**	0.292*	0.565**	0.505**	0.480**	–			
11. Intervention status[b]		0.345**	0.284**	0.189	0.161	0.249*	0.188	0.288**	0.305**	0.194	0.070	–		
13. Child age	7.63 (3.23)	0.125	−0.090	0.073	0.108	0.114	0.076	0.205	0.121	0.198	0.325**	−0.093	–	
14. Income		−115	−0.223*	−0.252*	−0.018	−0.053	−0.060	0.032	0.009	−0.014	−0.144	−0.169	−0.186	–
15. Child sex[c]		−0.217*	−0.211	−0.194	−0.251*	−0.168	−0.124	−0.215*	−0.197	−0.192	−0.398**	0.096	−0.101	0.047

[a]0 = neurotypical child, 1 = child with ASD.

[b]0 = did not engage in the intervention, 1 = engaged in the intervention.

[c]0 = male, 1 = female.

*$p < 0.05$ **$p < 0.01$.

TABLE 3 Results of aggregated, lagged linear mixed models examining whether child behavior problems prospectively predict maternal depression and moderation by parental stress

Outcome: Maternal depression				95% CI		
Predictor	***B***	**SE**	***p***	**Lower**	**Upper**	***r***
Intercept	11.66	1.93	<0.001	7.79	15.53	0.65
Wave	0.63	0.98	0.52	−1.34	2.60	0.10
Lagged maternal depression	0.55	0.07	<0.001	0.40	0.69	0.61
Lagged child behavior problems—BP	0.21	0.07	0.005	0.06	0.35	0.42
Lagged child behavior problems—WP	−0.13	0.16	0.42	−0.46	0.19	−0.13
Child ASD diagnosis[a]	4.72	1.31	<0.001	2.09	7.36	0.46
Intervention status[b]	−0.81	1.05	0.45	−2.93	1.31	−0.12
Income	−0.64	0.23	0.009	−1.11	−0.17	−0.40
Child age	−0.44	0.17	0.01	−0.78	−0.10	−0.38
Child sex[c]	0.45	1.10	0.68	−1.77	2.67	0.06
Predictor	***B***	**SE**	***p***	**Lower**	**Upper**	***r***
Intercept	12.64	1.95	<0.001	8.78	16.50	0.47
Wave	0.29	0.96	0.77	−1.62	2.19	0.02
Lagged maternal depression	0.51	0.08	<0.001	0.35	0.67	0.46
Lagged child behavior problems—BP	0.20	0.08	0.008	0.06	0.35	0.22
Lagged child behavior problems—WP	−0.13	0.16	0.42	−0.44	0.19	−0.07
Child ASD diagnosis[a]	4.38	1.35	0.001	1.71	7.05	0.26
Intervention status[b]	−0.93	1.07	0.388	−3.05	1.19	−0.07
Income	−0.56	0.24	0.02	−1.03	−0.08	−0.19
Child age	−0.34	0.17	0.049	−0.68	0.00	−0.16
Child sex[c]	−0.09	1.16	0.94	−2.39	2.20	−0.01
Lagged parenting stress (PS)	0.05	0.08	0.51	−0.11	0.21	0.05
Lagged child behavior problems BP×lagged PS	0.01	0.01	0.31	−0.01	0.02	0.08
Lagged child behavior problems WP×lagged PS	0.01	0.02	0.64	−0.03	0.04	0.04

Note: $r = \sqrt{(t^2/t^2 + df)}$. −2 log likelihood (LL) = 1026.44 for the first model, and 1021.88 for the second model ($df = 2$).

Abbreviations: BP, between-person; WP, within-person.

[a]0 = neurotypical child, 1 = child with ASD.

[b]0 = did not engage in the intervention, 1 = engaged in the intervention.

[c]0 = male, 1 = female.

predict subsequent depression. As such, it appears that overall levels of child behavior problems, as compared to others, are especially important to understanding the influence of child behavior problems and maternal depression across time.

These results are consistent with prior studies of "child-directed" effects on parent mental health in general population samples (Baker et al., 2020) and extensive research on ASD and parenting stress. For example, fewer positive and more negative marital interactions have been associated with greater parenting stress among mothers of children with ASD (Hartley et al., 2018) and elevated levels of parenting stress, in turn, have been shown to predict emotional attributes of the relationship between parents and children with ASD (Hickey et al., 2020). In

TABLE 4 Results of aggregated, lagged linear mixed models examining whether maternal depression prospectively predicts child behavior problems and moderation by parental stress

Outcome: Child behavior problems				**95% CI**		
Predictor	***B***	**SE**	***p***	**Lower**	**Upper**	***r***
Intercept	27.86	1.39	<0.001	25.09	30.64	–
Wave	−0.75	0.94	0.43	−2.63	1.13	−0.09
Lagged maternal depression—BP	0.07	0.06	0.22	−0.04	0.19	0.15
Lagged maternal depression—WP	−0.10	0.14	0.50	−0.37	0.18	−0.08
Lagged child behavior problems	0.92	0.05	<0.001	0.82	1.01	0.92
Child ASD diagnosis[a]	−0.27	0.96	0.78	−2.19	1.64	−0.04
Intervention status[b]	−0.26	0.73	0.72	−1.73	1.21	−0.05
Income	0.01	0.16	0.95	−0.31	0.33	0.01
Child age	0.03	0.12	0.79	−0.20	0.26	0.04
Child sex[c]	0.35	0.76	0.65	−1.17	1.88	0.06
Predictor	***B***	**SE**	***p***	**Lower**	**Upper**	***r***
Intercept	28.11	1.45	<0.001	25.22	31.01	–
Wave	−0.62	0.93	0.51	−2.48	1.24	−0.08
Lagged maternal depression—BP	0.04	0.07	0.57	−0.11	0.19	0.07
Lagged maternal depression—WP	−0.11	0.15	0.47	−0.40	0.18	−0.09
Lagged child behavior problems	0.87	0.05	<0.001	0.77	0.98	0.89
Child ASD diagnosis[a]	−0.63	1.02	0.54	−2.67	1.42	−0.08
Intervention status[b]	−0.37	0.77	0.63	−1.92	1.18	−0.07
Income	−0.06	0.17	0.75	−0.40	0.29	−0.04
Child age	0.00	0.12	0.97	−0.25	0.25	0.00
Child sex[c]	0.38	0.81	0.64	−1.24	1.99	0.06
Lagged parenting stress (PS)	0.09	0.06	0.16	−0.04	0.21	0.16
Lagged maternal depression BP×lagged PS	0.00	0.00	0.81	−0.01	0.01	0.03
Lagged maternal depression WP×lagged PS	0.00	0.01	0.80	−0.03	0.03	0.03

Note: $r = \sqrt{(t^2/t^2 + df)}$. −2LL = 952.17 for the first model, and 945.04 for the second model ($df = 2$).

Abbreviations: BP, between-person; WP, within-person.

[a]0 = neurotypical child, 1 = child with ASD.

[b]0 = did not engage in the intervention, 1 = engaged in the intervention.

[c]0 = male, 1 = female.

the present study, we focus on spillover as it relates to the unique dynamic between maternal and child mood and behavior.

Unlike some prior studies, we did not observe prospective associations from prior maternal depression to subsequent children's behavior problems. Although maternal depression has been robustly associated with children's behavior problems (Goodman, 2020), some research suggests transactional relations wane when children are older (Dora & Baydar, 2020). These new findings may be at least partly attributable to the age range of children in the sample, which included older children and teenagers, though post-hoc moderation analyses by child age were not significant ($B = -0.018$, $p = 0.31$). While it appears that there was no prospective

TABLE 5 Results of aggregated, lagged linear mixed models examining whether child ASD diagnosis moderates the prospective effect of child behavior problems on maternal depression

Outcome: Maternal depression				95% CI		
Predictor	***B***	**SE**	***p***	**Lower**	**Upper**	***r***
Intercept	12.28	1.94	<0.001	8.45	16.12	–
Wave	0.37	0.96	0.70	−1.53	2.27	0.03
Lagged maternal depression	0.54	0.08	<0.001	0.38	0.70	0.49
Lagged child behavior problems—BP	0.28	0.11	0.02	0.05	0.50	0.20
Lagged child behavior problems—WP	−0.16	0.19	0.42	−0.53	0.22	−0.07
Child ASD diagnosis[a]	4.66	1.34	<0.001	2.00	7.31	0.28
Intervention status[b]	−1.30	1.07	0.23	−3.42	0.81	−0.10
Income	−0.57	0.24	0.02	−1.05	−0.09	−0.19
Child age	−0.36	0.17	0.04	−0.69	−0.02	−0.17
Child sex[c]	0.50	1.11	0.65	−1.69	2.68	0.04
Lagged parenting stress	0.04	0.08	0.63	−0.12	0.20	0.04
Lagged child behavior—BP × ASD diagnosis	−0.11	0.14	0.44	−0.38	0.16	−0.06
Lagged child behavior—WP × ASD diagnosis	0.02	0.34	0.95	−0.64	0.68	0.00

Note: −2LL = 1021.22 (*df* = 2).

Abbreviations: BP, between-person; WP, within-person.

[a]0 = not a mother of a child with ASD, 1 = mother of a child with ASD.

[b]0 = did not engage in the intervention, 1 = engaged in the intervention.

[c]0 = male, 1 = female.

relation of maternal depression to children's behavior problems in the current study, this could also be due, at least in part, to a limited amount of change in behavior over time: we note that the high degree of stability in children's behavior problems over time (a correlation of 0.92 in the aggregate analyses) may have made it more difficult to detect such small effects after covarying for prior levels of behavior problems and depression.

The present study examined whether parenting stress (or child ASD diagnosis) shaped bidirectionality between maternal and child mental health symptoms. Contrary to our hypothesis, parenting stress (or child ASD diagnosis) did not moderate the association between prior maternal depression and subsequent child behavior problems, nor did it moderate the association between prior child behavior problems and subsequent maternal depression. It is important to note that parenting a child with ASD is a multifaceted experience. While it is often associated with elevated parenting stress, mothers of children with ASD also report high levels of emotional closeness (Hoffman et al., 2009) and as many positive experiences with their offspring as control mothers (Smith et al., 2010). The non-significant results in the present study are important. First, they provide initial evidence that bidirectional associations between maternal and child symptoms do not differ based on parenting stress or between caregivers of neurotypical children and caregivers of children with ASD. Notably, mothers of children with ASD may experience feelings of guilt or blame following their beliefs regarding their role in the etiology of their child's ASD diagnosis and associated behavior problems (Gordillo et al., 2020; McKenna Gulyn & Diaz-Asper, 2018). It may be especially easy for these mothers to blame their parenting for their children's lack of improvement or worsening. In the current study, we

TABLE 6 Results of aggregated, lagged linear mixed models examining whether child ASD diagnosis moderates the prospective effect of maternal depression on child behavior problems

Outcome: Child behavior problems				95% CI		
Predictor	***B***	**SE**	***p***	**Lower**	**Upper**	***r***
Intercept	28.09	1.46	<0.001	25.18	31.01	–
Wave	−0.62	0.93	0.51	−2.48	1.24	−0.08
Lagged maternal depression—BP	0.02	0.11	0.84	−0.19	0.23	0.03
Lagged maternal depression—WP	−0.18	0.27	0.51	−0.72	0.36	−0.08
Lagged child behavior problems	0.88	0.05	<0.001	0.77	0.98	0.89
Child ASD diagnosis[a]	−0.59	1.01	0.56	−2.62	1.44	−0.08
Intervention status[b]	−0.35	0.77	0.65	−1.90	1.19	−0.06
Income	−0.06	0.17	0.75	−0.40	0.29	−0.04
Child age	0.00	0.12	0.99	−0.25	0.25	0.00
Child sex[c]	0.30	0.80	0.71	−1.30	1.91	0.05
Lagged parenting stress	0.09	0.06	0.16	−0.03	0.21	0.16
Lagged child behavior—BP×ASD diagnosis	0.02	0.12	0.87	−0.22	0.26	0.02
Lagged child behavior—WP×ASD diagnosis	0.09	0.31	0.79	−0.54	0.71	0.03

Note: −2LL = 952.06 (*df* = 2).

Abbreviations: BP, between-person; WP, within-person.

[a]0 = not a mother of a child with ASD, 1 = mother of a child with ASD.

[b]0 = did not engage in the intervention, 1 = engaged in the intervention.

[c]0 = male, 1 = female.

did not observe an effect of maternal depression on child behavior problems, nor did we find that parenting stress or child ASD diagnosis exacerbated the relation between maternal and child symptoms. Second, these results may alleviate some of the blame caregivers of children with ASD often ascribe to themselves, which could help to reduce their distress. Finally, although it is never possible to accept the null hypothesis, reporting these results is important for combating social science's "file drawer problem" (Franco et al., 2014) in which non-significant findings often remain unpublished, thus biasing scientific understanding.

The results of the current study have important clinical implications. Findings underscore the need to monitor caregiver mental health in the context of children's behavior problems and consider dyadic relations over time. The siloed nature of most mental health service systems is such that treatment for adults and children are separate: most evidence-based interventions for adults do not recognize their role as parents and programs to reduce children's behavior problems rarely address parent psychopathology (Zalewski et al., 2017). It is imperative to develop theoretically and empirically informed integrated care programs that treat mental health problems at the level of the *family*, particularly when mothers are experiencing depression (Goodman & Garber, 2017) and for families with children with ASD (Karst & Hecke, 2012). Parents who seek support for their children's behavior problems are often referred to programs to improve parenting (and parenting stress), with limited attention to caregivers' own mental health problems. Given the burden of depression, we contend that support for mothers is important even when children are the "target patients." Results of the current study do not obviate the need to address parenting (we note that parenting stress and children's behavior

problems were correlated over time in the present sample) but suggest expanding the focus of treatment for children's behavior problems to additionally address parent mental health.

There are several limitations of the current study that must be considered when interpreting the results. First, the demographic characteristics of the sample may limit generalizability to other populations. The sample included only women with children between the age of 2 and 16 years old and was relatively homogenous in terms of race (White), education, and relationship status (most mothers were married or living with a partner). Reflective of the geographic region from which families were drawn, most women were from middle-to-upper class backgrounds and had a bachelor's or graduate degree. Second, the current study measured children's behavior problems that were predominantly externalizing in nature (e.g., tantrums, aggression, and defiance). However, transactional relations between maternal mental health and children's internalizing problems have also been observed (Roubinov et al., 2022). Third, a single reporter (mothers) provided data on depressive symptoms, parenting stress, and child behavior problems. Prior research suggests that stress and/or depressive symptoms may promote bias in informant reports of child behavior such that a more negative assessment is gathered (De Los Reyes & Kazdin, 2005). Fourth, although a strength of the present study was its longitudinal follow-up, the sample size was small. It may not have been sufficiently powered to detect small effects, especially those related to tests of moderation. Moreover, although we examined within-person effects, our study included a maximum of only two within-person lags. A greater number of longitudinal time points may have captured greater variability in maternal depression and child behavior across the course of time. Finally, the current study focused specifically on testing moderation by parenting stress (and secondarily, child ASD diagnosis). Some studies suggest that parenting behaviors mediate the association between maternal depression and children's behavior problems (Kuckertz et al., 2018), though others find no evidence of mediation (Olino et al., 2016). The potential mediating role of parental stress in the context of bidirectional associations between maternal depression and children's behavior problems is worthy of further study, particularly among families of children with ASD.

In sum, this study examined longitudinal, bidirectional associations between maternal and child mental health in families with a neurotypical child and families with a child with ASD. Although there was no evidence that prior maternal depression increased children's subsequent behavior problems, prior children's behavior problems were associated with greater subsequent maternal depressive symptoms even after adjusting for prior maternal symptoms. Heightened levels of parenting stress and child ASD diagnosis did not moderate these relations; the effects of child behavior on maternal depression operated similarly across these families. Thus, it demonstrates that even in families without elevated parenting stress or a child with a diagnosable disorder, early behavioral problems may affect maternal well-being. Findings underscore the importance of holistic, integrated treatment programs that address both parents' and children's mental health. This may be particularly important for caregivers of children with ASD who internalize feelings of shame or failure in relation to their children's behavior problems.

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