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Relation Between Parent Symptomatology and Youth Problems: Multiple Mediation Through Family Income and Parent–Youth Stress

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Abstract This study tested whether family income and stress in the parent–youth relationship might mediate links between parent symptoms and youth problems, and whether the process might differ for youth externalizing versus internalizing problems. We used a multiple mediation technique to test pathways by which family income and stress in the parent–child relationship might relate to parent–youth symptom associations in a sample of clinically-referred 7–13 year-olds (32 % female; M age = 10.16 years). Family income and stress jointly mediated the relation between parent symptoms and youth externalizing problems but not between parent symptoms and youth internalizing problems. Future longitudinal research should investigate whether low income and parent–youth stress may deplete the parental resources needed to manage youth externalizing behavior. This study extends existing literature by suggesting a specific pattern by which two identified risk factors for youth problems may operate jointly, and by showing specificity to externalizing problems.

Keywords Parent symptoms · Youth externalizing · Mediation · Parenting stress · Family income

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Introduction

Elevated psychiatric symptoms in parents have been linked to increased youth problems across a wide range of mental disorders [1, 2]. However, not all youths whose parents have symptoms develop problems themselves. Thus, mechanisms underlying links between parent and youth symptomatology merit careful investigation [3]. Two possible mechanisms suggested in recent research are family income [4] and stress in the parent–youth relationship (henceforth "parent–youth stress") [5, 6]. Among youths with mothers experiencing mental illness, those in low-income households are more likely to develop internalizing and externalizing problems than those in higher-income households [4]. Separately, parental symptomatology has shown links to stressful parent–child relationships [7], which, in turn, have been shown to predict risk for psychological problems in youths [8]. Although both family income and parent–youth stress are associated, individually, with intergenerational symptom associations, they may also be related with one another, and there appears to have been no investigation of their independent, additive, or interactive effects on links between parent symptoms and youth problems. By testing different ways in which these variables might relate, research could help to clarify when youths are at greatest risk for developing significant problems, and this could in turn inform development of prevention and treatment programs.

Parent Symptoms, Family Income, and Youth Problems

Family income has been linked to both parent symptomatology and youth problems [9–11]. In adult populations, one longitudinal study suggested that self-reported psychological distress, including anxiety and self-deprecation, predicted

significantly lower income over a twenty-year period [12]. Importantly, lower income also predicted psychological distress, suggesting a reciprocal relationship between income and psychological health. Other studies have found a unidirectional link. For example, Whooley et al. [13] found that depressive symptoms were associated with a 90 % likelihood of decreased family income over 5 years among employed adults. Further, cross-sectional and prospective studies have demonstrated that psychiatric symptoms predict reduced labor force participation, reduced work hours, and lower earnings, possibly due to symptom-related impairment [14–17]. Thus, there is strong evidence suggesting relations between psychiatric symptoms and family income.

Research has also demonstrated associations between family income and psychological development in youths [18–21]. Youths living in low-income households are significantly more likely to develop social–emotional problems than are their peers from less disadvantaged backgrounds, with this risk increasing with prolonged exposure to impoverished conditions [22, 23]. While several risk factors related to low-income, such as parental education, maternal birth age, and number of siblings, have also shown links to youth psychiatric problems, low family income has predicted youth problems even after accounting for these possible confounds [24]. Family income has shown strong, prospective relations with both internalizing and externalizing problems in youths; levels of behavioral problems, anxiety, and depression tend to be higher among youths living in low-income homes [25].

Income has also been shown to partially explain the association between parent symptoms and youth problems. For example, Conger and colleagues found that economic conditions—such as per capita income and unstable work—predict parental depression, parenting practices, and adolescent adjustment [26]. Further, a meta-analysis by Goodman and colleagues [4] of 134 studies addressing links between maternal and youth psychopathology identified income as a significant moderator of symptom transmission. That is, children with depressed mothers were significantly more likely to develop psychiatric symptoms when living in a low-income (vs middle- or high-income) household. Another longitudinal study found that low family income accounted for a significant portion of the association between depressive symptoms in mothers and youths [27]. Thus, family income seems to be an important factor in relations between parent symptoms and youth problems, although further research is needed to help clarify its precise role.

Parent Symptoms, Parent–Youth Stress, and Youth Problems

Parent–youth stress—originally defined by Abidin [28, p. 56] as "difficulties in interacting with the [youth]…due to parents' feeling rejected, abused, or disappointed in the child,"—has shown associations with youth problems and symptoms in their parents. Specifically, psychiatric symptoms in parents have correlated highly with parent-reported parent–youth stress [7, 8] Further, prospective studies have shown that parent–youth conflict and relational stress, measured via parental self-report, increases youths' risk for developing ADHD, conduct problems, and depression [2, 29].

Given these documented relations, several researchers have suggested that intergenerational transmission of psychopathology might be mediated, in part, by parent–youth stress. For instance, mothers experiencing psychiatric symptoms have reported greater difficulty in parenting than their peers without psychiatric difficulties [8]. Observational studies support this finding, documenting several parenting difficulties among parents experiencing psychiatric illness, including increased hostility and higher rates of negative interactions [30–32]. Cross-sectional observational and self-report research suggests that parents experiencing psychopathology tend to communicate less effectively with their youths; report hostility, resentment, and diminished emotional involvement with their youths; and report fewer positive interactions with their youths [30, 33–35]. Thus, parental psychopathology—which studies have linked to maladaptive parenting practices—may exacerbate parent–youth stress. In turn, this stress might increase risk for psychopathology in youths [2, 29].

Income and Stress in the Parent–Youth Relationship

In addition to their individual links to intergenerational symptom transmission, income and parent–youth stress have also shown associations with each other. Research suggests that lower income both correlates with and prospectively predicts higher parent-reported stress in parent–youth interactions [36]. Further, in a study by Reitman et al. [7], family income accounted for a significant proportion of variance in the stress mothers reported in their relationships with their children, consistent with studies indicating that parents' financial resources predict observed and self-reported parenting difficulties [37–39]. These findings suggest that income and parent–youth stress may additively or interactively confer risk for symptom transmission from parents to youths. Additional research is needed to better understand whether, and if so how, income and stress relate to one another in their effects and impact.

Present Study

While the studies reviewed here provide ample evidence that psychiatric symptoms in parents are associated with youth problems, pathways underlying this relationship

warrant further investigation. As noted, family income and parent–youth stress appear to individually affect each other in addition to the relations between parent symptoms and youth problems. However, to our knowledge, the concurrent association between family income and parent–youth stress has not been explored within the same sample. Such research could help clarify whether these factors operate in an additive or interactive fashion in their relation to the association between parent symptoms and youth problems, and could generate hypotheses for future longitudinal research.

The present study was designed to address this gap in knowledge, by testing two alternative pathways by which income and parent–youth stress might influence the parent symptom-youth problem association. One possible pattern suggested by the findings reviewed previously is a moderated mediation model in which (a) stress in the parent–youth relationship mediates links between parent symptoms and youth problems, and (b) income moderates the extent to which stress plays that mediating role. This model would apply, for example, if parent symptoms boost youth problems to the extent that higher parent symptoms create more parent–youth stress, and this pathway applies more strongly to lower-income than higher-income families. Such a model might suggest that parent symptoms show stronger links to parent–youth stress when the family lacks resources required to support basic physical and mental health needs, or that low income exacerbates stress in parent–youth relationships. In a second plausible model, suggested by the evidence to date, family income and parent–youth stress serially mediate links between parent symptoms and youth problems. Within such a model, symptomatic parents might suffer reduced earnings as a result of symptom-related impairment. The reduced income might lead to increased parental stress in general and reduced access to caretaking resources and supports in particular, which could increase parent–youth stress, resulting in increased youth problems over time. The present study tested these two candidate models for relations among parent symptoms, family income, parent–youth stress, and youth problems. The study reflects a two-stage research strategy with cost-effective, cross-sectional testing used initially to identify plausible models, which can be tested more definitively in subsequent longitudinal research.

To maximize clinical relevance and ensure the variability in youth problem levels needed for a fair test, we focused on a sample of clinically-referred youths. Also, we tested the models separately for youth internalizing and externalizing problems, because there is reason to expect that family income and parent–youth stress may relate differently to these two forms of dysfunction. Compared to managing internalizing problems, managing youth externalizing problems may require greater parental energy, attentiveness, monitoring, psychological resources, and parenting support. Indeed, the most prominent and numerous forms of evidence-based treatment for youth externalizing problems involve training parents to perform the demanding tasks associated with youth behavior management [40]; by contrast, virtually all evidence-based treatments for youth internalizing problems are youth therapies, not parent-focused interventions [41]. Thus, higher parental symptoms, family income, and parent–perceived relational stress might have especially strong links to externalizing difficulties in youths.

Methods

Procedure

Data were drawn from the baseline assessment for a randomized effectiveness trial of an integrative, modular intervention for internalizing and externalizing youth mental health problems [42]. This sample comprised youths who had been referred for outpatient care. Research procedures for this trial were approved by the institutional review boards of Judge Baker Children's Center (affiliated with Harvard Medical School) in Boston, MA and the University of Hawaii at Manoa, HI. Participating families were recruited from sites in both locations.

The sample included 157 clinic-referred youths aged 7–13 (mean age = 10.16 years; SD = 1.70 years). Based on a structured diagnostic interview, 35.5 % of these youths were diagnosed with a primary anxiety disorder; 44.5 %, with a primary conduct disorder; and 20.0 %, with a primary depressive disorder, and 79.4 % of were diagnosed with multiple (i.e., two or more) disorders. Of these youths, 68 % were boys, 45.2 % Caucasian, 31.2 % multiethnic, 8.3 % African American, 7.0 % Latino or Latina, 3.2 % Asian-American, and 3.8 % identified as "other." There were significantly more Caucasian, African American, and Latino or Latina youths at Boston versus Hawaii sites, and there were significantly more Asian and Mixed youths at Hawaii versus Boston sites, all $p < .05$. There were significantly more boys at Hawaii versus Boston sites, $t(155) = -2.71$, $p = .01$. Most youths were diagnosed Annual family income was less than $19,000 for 21 % of the sample; $20,000 to $39,000 for 31.8 %; $40,000 to $59,000 for 9.6 %; $60,000 to $79,000 for 12.1 %; and above $80,000 for 15.7 % of the sample. There were no significant differences in family income by youth ethnicity, gender, age, or site location (Hawaii vs Boston).

One parent of each youth participant completed the baseline assessment. Of these parents, 92.4 % were female. Among female caregivers, 77.7 % were biological mothers; 6.1 % grandmothers; 5.4 % adoptive mothers; 4.1 %

stepmothers; and 2.7 % "other" female caretakers. Among male parents, 88.9 % were biological fathers and 11.1 % were grandfathers. Gender and types of caregivers did not differ by site location.

Across parent informants, 54.1 % shared parenting responsibilities with another adult, and 45.9 % were single parents. In dual-parent households, the "non-primary" adult caregivers were 72.9 % biological parents, 7.1 % grandparents, 11.8 % stepparents, 2.4 % adoptive parents, and 5.9 % "other" (which included the primary parents' partners, cousins, uncles, and aunts). Independent-samples t tests showed no significant differences in family structure or family income by parent gender, youth gender, site location, or youth ethnicity. However, parents in single-parent families reported significantly lower incomes than parents in dual-parent families ($t = 3.39$, $p = .001$).

Measures

Parent Symptoms

Parents completed the Brief Symptom Inventory (BSI) [43], a 53-item self-report measure of parent symptomatology. Items are measured on a 5-point Likert scale, with responses ranging from 0 ("not at all") to 4 ("extremely"), and scale scores are calculated by taking the mean item rating. Scores are obtained on the following nine scales: Somatization, Obsessive–Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. The BSI's General Severity Index (GSI) is a weighted frequency score based on the sum of the ratings the subject has assigned to each symptom. Due to significant intercorrelations among BSI symptom subscales, research has suggested that the measure may be best used as a general indicator of symptomatology [55]. Thus, in the present study, the GSI was used to assess overall/general/global parental symptomatology. Derogatis and Melisaratos [44] have reported adequate test–retest (.68 to .91) and internal consistency reliabilities (alphas ranging from .71 to .85). In the present study, alpha was .97 for the GSI.

Youth Problems

Parents completed the Child Behavior Checklist (CBCL) [45]. This widely-used, standardized parent-report measure of youth emotional and behavioral problems has 118 items. Using a 3-point Likert scale, parents report the extent to which their child has displayed certain feelings and behaviors within the past 6 months. In this study, the CBCL's two broadband scales were used to measure overall Internalizing and Externalizing problems. The CBCL Total Problems score (a sum of all items),

broadband Internalizing scale (a sum of the Withdrawn, Somatic Complaints, and Anxious/Depressed subscales), and broadband Externalizing scale (comprised of the Delinquent Behavior and Aggressive Behavior subscales) have each demonstrated high test–retest reliability, content validity, and adequate inter-rater agreement, for youths ranging in age from 4 to 18 [46]. In the present study, alpha was .97 for internalizing and .97 for externalizing.

Parent–Youth Stress

Parents completed the Parenting Stress Index short form (PSI-SF) [28] which is a 36-item questionnaire with items rated on a 5-point scale ranging from "strongly agree" to "strongly disagree." It consists of three subscales: Parental Distress (12 items), Difficult Child (12 items), and Parent–Child Dysfunctional Interactions (12 items). The Parent–Child Dysfunctional Interactions subscale measures the construct of interest in this study—i.e., as "difficulties in interacting with the [youth]…due to parents' feeling rejected, abused, or disappointed in the child" [28, p. 56]. Specifically, the subscale measures whether children meet the expectations of their parents, and whether interactions between parents and their children are reinforcing (e.g., "When I do things for my child I get the feeling that my efforts are not appreciated very much").[1] For this subscale, test–retest reliability has ranged from .7 to .8, and internal consistency alphas from .80 to .91 [28]. In this study, alpha was .96 for the Parent–Child Dysfunctional Interaction subscale.

Results

Descriptives and Correlations

Means and standard deviations for parent symptoms, youth internalizing problems, youth externalizing problems, parent–youth stress, and income are presented for the total sample in Table 1. For parent symptom youth problem scales, means for both raw and T-scores are included; however, raw scores were used in all analyses. Income was coded into 8 brackets, such that annual incomes of $0–$19,000 were coded as 0, $20,000–$39,000 as 1, $40,000–$59,000 as 2, $60,000–$79,000 as 3, $80,000–$99,000 as

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[1] The other two PSI subscales are interesting but not a good fit to the goals of the present study, for both conceptual and methodological reasons. The Difficult Child subscale focuses specifically on the youth's behavioral problems, from the parent's perspective, and it has shown specific associations with youth externalizing problems only [28]. The Parental Distress subscale has raised concern on the part of researchers that it may not measure a concept distinctly different from parental psychiatric symptoms [47].

Table 1 Descriptive statistics and zero-order correlations of parent and youth symptom variables, parent–youth stress (PYS), and income

T-score information included where applicable

* $p < .05$; ** $p < .001$

	M (Raw score)	SD (Raw score)	M (T score)	(1)	(2)	(3)	(4)	(5)
Parent symptoms	33.04	30.88	56.67	–	.33**	.32**	.33**	−.22**
CBCL externalizing	16.44	10.50	63.39	–	–	.39**	.51**	−.11*
CBCL internalizing	17.72	9.72	66.57	–	–	–	.147	.025
PYS	23.28	7.73	–	–	–	–	–	−.19*
Income	1.83	1.80	–	–	–	–	–	–

4, $100,000–$119,000 as 5, $120,000–$139,000 as 6, and $140,000 or above as 7. As shown, youth internalizing problems showed significant positive relations with parent symptoms and parent–youth stress, but no significant association with income. Youth externalizing problems showed significant negative relations with income and significant positive relations with parent symptoms and parent–youth stress. Parent symptoms correlated negatively with income and positively with parent–youth stress. Based on T scores, mean youth externalizing problems were in the "at risk" range, and mean internalizing problems, in the clinical range [45]. Parents' self-reported symptoms were elevated as compared to normative samples, but below the clinical cutoff of T = 63, as expected (i.e., this is a child-referred clinical sample, not a parent clinical sample) [43]. Among all parents, 28 % reported clinically significant symptoms, based on the GSI. For correlations and all subsequent analyses, the full available sample (N = 157) was used.

Model 1: Single-Step Mediation and Moderated Mediation

The first model proposed a moderated meditational pathway, in which (1) stress in the parent–child relationship mediates links between parent symptoms and youth internalizing or externalizing problems, and (2) income moderates the extent to which stress in the parent–child relationship plays that mediating role. To determine whether testing moderated mediation was justified, we first tested the effect of the meditational pathway alone. We tested this pathway separately for youth internalizing and externalizing problems. Mediation occurs when an independent variable (X) affects a dependent variable (Y) via an intervening variable, or mediator (M_e). The total effect of X on Y is decomposed into the direct effect (X → Y) and indirect effect (X → M_e → Y). Complete mediation occurs when X no longer has an effect on Y after controlling for M_e, whereas in partial mediation, the effect of X on Y is diminished but remains significant after controlling for M_e. Preacher and Hayes [48] also recommend testing mediation using bootstrapped confidence intervals, with mediation occurring when the indirect effect is
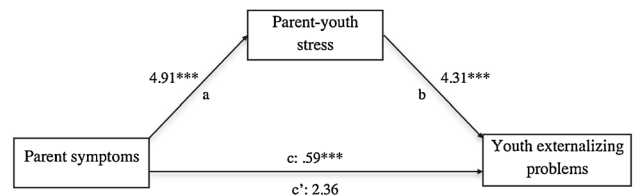

Fig. 1 Single-step mediator model with unstandardized regressions coefficients. *$p < .05$; **$p < .01$; ***$p < .001$

significant *and* the 95 % confidence intervals do not contain zero (i.e., indicating that the indirect effect is significantly different from zero); if the confidence interval contains zero, neither full nor partial mediation exists. Using bootstrapped confidence intervals (CIs) reduces power problems introduced by asymmetric and other non-normal sampling distributions of an indirect effect [49].

Figure 1 shows the mediation model, including unstandardized path coefficients, for youth externalizing problems.[2] Based on unstandardized regression coefficients, parental symptomatology was significantly related to youth externalizing problems, without accounting for parent–youth stress (c path), as well as to parent–youth stress (a path). Further, parent–youth stress was related to youth externalizing problems (b path). Support for mediation was found, as the indirect effect through the mediator was significant (t = 2.55, $p < .001$) and the bootstrapped confidence interval did not contain zero, 95 % CI [1.13, 3.96]. The main effect of parent symptoms on youth symptoms

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[2] To address potentially confounding effects of youth ethnicity and family structure (single versus dual-parent households) on models involving family income, as well as the effect of youth and parent gender on relations between variables, we also tested all models including these four factors as covariates. Youth ethnicity was coded into seven separate variables, each representing one ethnic category. Family structure was coded into one variable with 0 representing single-parent families, and 1, dual-parent families. Youth and parent gender were both coded into two separate variables, with 0 representing males and 1 representing females. Findings for all significant models in this study remained significant even after including youth ethnicity, family structure, youth gender, and parent gender as covariates. Thus, models are reported without these covariates included.

became non-significant after accounting for the mediator (t = 1.94, p = .053; c' path), suggesting full mediation.

We also tested this meditational path with youth internalizing problems as the outcome variable. No support for mediation was found for this model, as the indirect effect was non-significant, and the bootstrapped confidence interval included zero.

Because we found a significant mediation effect for youth externalizing problems, we proceeded to test the hypothesized moderated mediation pathway with youth externalizing problems as the outcome variable. Moderated mediation occurs when the strength of an indirect effect depends on the level of a variable. Preacher and colleagues [49] note that moderation may be demonstrated when X and M_e and moderator significantly interact *and* the bootstrapped confidence intervals for the model's indirect effect do not contain zero. In the present model, we tested whether moderation would occur such that the effect of parent symptoms on stress in the parent–youth relationship would be more pronounced for lower-income families than for higher-income families. Assuming significant moderation, we tested whether the strength of the hypothesized indirect (mediated) effect was contingent on the value of the proposed moderator (income). To accomplish this, we utilized an SPSS macro (MODMED) designed by Preacher et al. [50]. This macro facilitates estimation of the indirect effect, both with a normal theory approach (i.e., the Sobel test) [51] and with a bootstrap approach to obtain bias-corrected confidence intervals.

Results of the moderated mediation analyses found no evidence for moderation of the path between parent symptoms and stress in the parent–youth relationship by income (p > .1). Thus, analyses did not support moderation of the mediational pathway. However, income did significantly predict the mediator, stress in the parent–youth relationship (t = −2.09, p = .04). This finding suggests that income, while not a moderator of the X to M_e relationship, might relate to the model's variables in some other manner.

Model 2: Multiple-Step Mediation

Next, we tested the proposed multiple-step, multiple mediator model, positing that the effect of parent symptoms on youth problems would be associated with income and subsequently show associations with parent–youth stress. Multiple-step, multiple mediator models test relationships between a predictor, X, and two mediators, M_{e1} and M_{e2}. These variables are evaluated in terms of their sequential effects on the dependent variable as well as the causal relationship, if any, between the mediators. In accordance with Preacher and Hayes [47] and Hayes et al. [52], to provide support for multiple-step, multiple
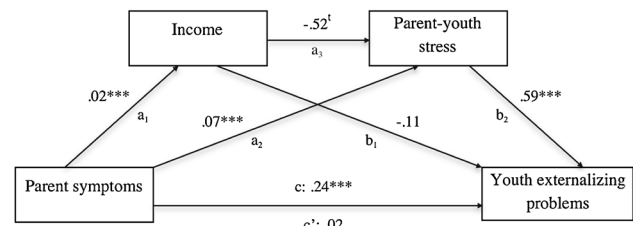

Fig. 2 Multiple step multiple mediator model with unstandardized regressions coefficients, predicting youth externalizing problems. $^{t}p < .1$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

mediator models, the bias-corrected confidence interval for the indirect effect (path $a_1a_3b_2$) must not include zero. To test the proposed model, a multiple-step, multiple mediator regression analysis was conducted using the MEDTHREE macro for SPSS [52]. In the first model, we entered youth externalizing problems as the outcome variable, and in the second, youth internalizing problems.

For the model predicting youth externalizing problems (Fig. 2), there was a significant total effect of parent symptoms on youth externalizing problems. However, controlling for combined effects of both mediators, the path (path c') became nonsignificant. Based on unstandardized regression coefficients, there was a significant effect of parent symptoms on income, a marginally significant effect of income on stress in the parent–youth relationship, and a significant effect of stress in the parent–youth relationship on youth externalizing problems. Further, the indirect effect of the parent symptoms on youth externalizing problems through both mediators had a bias-corrected, 95 % confidence interval between .001 and .012, suggesting a significant mediated effect. The a_1b_1 and a_2b_2 paths, respectively, had 95 % confidence intervals of (−.008, .013) and (.014, .073). Thus, the a_1b_1 path effect was nonsignificant, while a_2b_2 path effect was significant. Because the overall indirect effect for the model was significant, results supported a multiple-step mediation model, such that the relation of parent symptoms on child symptoms was fully mediated through income and parent–youth stress, sequentially.

Because this model relied on cross-sectional data, and because other relations between the examined variables are theoretically plausible, we tested two alternate models to assess the specificity of the predicted configuration of variables. First, given documented, reciprocal relations between parent symptoms and youth problems, we tested a model specifying youth externalizing problems as the IV, parent symptoms as the DV, income as the first mediator, and parent–youth stress as the second mediator. For this model, the indirect effect of youth problems on parent symptoms through both mediators (.011) had a 95 %

confidence interval that included zero (−.0004, .0615), indicating a nonsignificant mediated effect. Second, to test the hypothesized mediator sequence, we ran a model specifying parent symptoms as the IV, youth externalizing problems as the DV, parent–youth stress as the first mediator, and income as the second mediator. For this model, the indirect effect of youth problems on parent symptoms through both mediators (.0004) had a 95 % confidence interval that included zero (−.0013, .0047), indicating a nonsignificant indirect effect. Thus, the relation between parent symptoms and youth problems seemed uniquely, sequentially mediated by income and parent–youth stress, in that order.

For the model predicting youth internalizing problems, the indirect effect of parent symptoms on youth internalizing problems through both mediators had a confidence interval that included zero (−.0001, .0004). Thus, results did not support the model's applicability to youth internalizing problems.

Discussion

This study tested two pathways by which family income and parent–youth stress might jointly influence associations between symptoms in parents and problems in clinically-referred youths. Evidence emerged for a multiple mediation model, whereby relations between parent symptoms and youth externalizing (but not internalizing) problems were jointly mediated by family income and parent–youth stress. Results did not support (for externalizing or internalizing) the moderated mediation model whereby income might moderate the extent to which parent–youth stress mediates between parent symptoms and youth problems.

In the proposed multiple mediation model, we hypothesized that family income and parent–youth stress would mediate relations between parent symptoms and youth problems—specifically, that parents with higher symptom levels might have decreased earnings, exacerbating parent–youth stress, which might in turn be associated with increased youth problems. We also suggested that this model might apply to youth externalizing problems more than internalizing problems, since externalizing problems may require more parental monitoring and psychological resources. In support of these hypotheses, we found that parents with higher symptom levels reported lower family incomes, and these lower incomes were associated with greater parent–youth stress and, finally, greater youth externalizing problems. These findings consistent with our hypothesized model suggest that the model now warrants testing within a longitudinal design.

The predicted multiple mediation model was significant for youth externalizing problems only, and other configurations of the relevant variables yielded non-significant indirect paths. That is, mediation occurred for the predicted ordering of variables only: *parent symptoms → family income → parent-youth stress → youth externalizing problems*, not for alternative orderings that had some support in prior literature (e.g., *parent symptoms → parent-youth stress → family income → youth externalizing problems*). These findings may have heuristic value, suggestions a plausible model for the well-documented association between parent symptoms and youth problems. While research has identified broad links between parent and youth mental health [1, 2], the model supported in this study points to a particular process through which parent symptoms may exacerbate youth externalizing problems through (a) reduced family income, and (b) increased parent–youth stress. While studies have demonstrated bidirectional relations between parent symptoms and youth problems, the present model was non-significant when youth problems were identified as the predictor and parent symptoms as the outcome. Thus, this model may be uniquely relevant to transmission of symptoms from parents to youths.

Because our data were collected at a single time-point, directionality of effects cannot be confirmed. However, cross-sectional research of this kind can be a useful step in an efficient strategy for identifying causal mechanisms. Because longitudinal studies are time-consuming and costly, it is important to plan them in the best-informed way possible, with a strong empirical basis for selecting candidate models. One way to identify such models is through cross-sectional analyses like those carried out here, testing the plausibility of alternative pathways and thus identifying particularly promising candidate models. In this way, as the first step in a two-step strategy, cross-sectional studies may inform the development and enhance the productivity of longitudinal research. Our findings, for example, point to a specific candidate model for relations among parent symptoms, income, parent–youth stress, and youth problems that may warrant testing within a longitudinal design.

Our study has certain limitations that warrant attention, and may suggest directions for future research. First, family income may not fully explain a given family's SES. It remains possible that any effects of income might be accounted for in part by other, related factors—including number of children in the home, number of adults sharing caretaking responsibilities, parental education, and whether the family is recently or chronically low-income.

Second, given that we relied on parent-informant measures, our findings could have been influenced by the biases inherent in all informant-report instruments. In the future, it will be useful to supplement self-report data with observational and multi-informant data to enhance our

measurement of parent symptoms, youth problems, and familial processes. Another limitation, common in research with parents, is that the great majority of our parent participants (about 90 %) were female. Thus, we did not have sufficient statistical power to explore potential effects of parent gender on the tested models. Paternal participation is an ongoing issue in clinical research with youths and families [53, 54]. Future studies with ample representation of both mothers and fathers could help clarify whether different models are needed to account for links among mothers' and fathers' symptoms, parent–youth stress, family income, and youth mental health.

Finally, because the BSI has been shown to be most useful as a measure of global adult symptomatology [55], we did not assess relations of specific parent symptom clusters (e.g., depression, psychoticism) to symptoms in offspring. Future studies might employ more comprehensive measures of parent symptomatology to analyze specific factors underlying the parent symptom-youth problem association.

In addition to these limitations, the present study has significant strengths. First, although existing literature demonstrates *separate* impacts of family income and parent–youth stress on links between parent and youth psychiatric symptoms, our study is the first, to our knowledge, to explore the interactive effects of these two variables on intergenerational symptom associations. Second, few studies on links between parent symptoms and youth problems have employed multiple mediation techniques to assess how risk factors might interact to effect symptom-problem associations. Relations between parent symptoms and youth problems are likely to involve the interplay of multiple factors; our findings suggest that multiple mediation and moderated mediation analyses may be useful tools in identifying these factors and the processes that link them to one another. Third, our use of a clinically-referred youth sample renders the findings especially germane to high-risk youth populations. Future research will be needed to assess the strength of our findings across sample variations, and to test suggested causal mechanisms using longitudinal data. Ultimately, such work may help inform interventions for clinically referred youths living in challenging socioeconomic conditions, especially those whose parents are experiencing psychiatric dysfunction and relational stress.

Summary

Using a clinically-referred sample of youths and their parents, this study tested whether family income and stress in the parent–youth relationship mediated links between parent symptoms and youth problems. It also examined whether these relations might differ for youth externalizing versus internalizing problems. A multiple mediation technique was employed to test family income and stress in the parent–child relationship as mediators between parent symptoms and youth problems. Family income and parent–youth stress simultaneously mediated links between parent symptoms and youth externalizing problems. However, no mediation emerged for links between parent symptoms and youth internalizing problems. These findings suggest a specific pattern by which two identified familial stressors may jointly affect externalizing problems in youths. Future studies should assess whether low income, parent–youth stress, and related familial challenges may deplete parents' capacity to manage youth externalizing behavior over time.

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