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Christine Hannah Wang 04/15/2011

Maternal Depression, Marital Satisfaction, and Internalizing Behaviors at Age 20

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Abstract

This study examined the separate and combined effects of maternal depression and low marital satisfaction on young adult's internalizing problems. We also examined whether youth social functioning, attachment style, parent-child relationship, and self-esteem measured during adolescence would serve as potential mediators of these effects. The sample included 749 Australian mothers and their children who had been followed since pregnancy. The sample was predominantly white and lower/middle SES. Results indicated that maternal depression and marital satisfaction had both separate and combined effects on youth internalizing behaviors. Importantly maternal depression was more strongly associated with internalizing behavior outcomes in those youth whose parents also reported low levels of marital satisfaction. While maternal depression was related to mother psychological control, secure attachment, fearful attachment, and self-esteem and low marital satisfaction was related to father psychological control, none of these factors explained the effects of maternal depression and low marital satisfaction on young adult outcomes. The findings are discussed in relation to developmental theory and as they might pertain to preventative interventions with high risk youth.

Keywords: maternal depression, marital relationships, internalizing behaviors, young adulthood, causal mechanisms

Maternal Depression, Marital Satisfaction, and Internalizing Behaviors at Age 20

Many studies have found that children exposed to maternal depression evidence more internalizing behaviors than children who were never exposed (Downey & Coyne, 1990). A separate literature also finds associations between marital conflict and child internalizing problems (Cummings & Davies, 1994). Because research consistently notes that mothers who are depressed also experience more conflict in their marriages (Goodman, 2007), it is important to examine the separate and combined effects of maternal depression and marital conflict on internalizing outcomes in offspring. Much of the previous research examining negative aspects of the marital relationship as a mediator and moderator between maternal depression and behavioral outcomes has examined children prior to adolescence (Cummings, Keller, & Davies, 2005; Du Rocher Schudlich & Cummings, 2003; Murray, Sinclair, Cooper, Ducournau, & Turner, 1999; Papp, Goeke-Morey, & Cummings, 2004; Trapolini, McMahon, & Ungerer, 2007). The current study extends the previous work in the field by examining internalizing behavior outcomes in young adulthood that are associated with exposure to maternal depression and marital dissatisfaction earlier in development.

Maternal Depression, Marital Relationships, and Child Outcomes

Some researchers have suggested that marital conflict acts as a mediator between maternal depression and child internalizing behaviors (Downey & Coyne, 1990; Goodman & Gotlib, 1999). Most investigators, however, have found that the relationship between maternal depression and child internalizing symptoms becomes slightly attenuated, but is still significant when marital conflict is controlled (Cummings et al., 2005; Davies & Windle 1997; Du Rocher Schudlich & Cummings, 2003; Spence, Najman, Bor, O'Callaghan & Williams, 2002). The lack of a full mediation effect indicates that there must be other mechanisms at play that explain the relationship between maternal depression and youth internalizing behaviors.

In a sample of 4 to 10 year olds, Papp and colleagues (2004) found that the relation between maternal depression and child internalizing behaviors was stronger in cases of poor marital adjustment. In contrast, most studies have failed to find a significant interaction between maternal depression and negative aspects of the marital relationship in predicting child internalizing behaviors (Essex, Klein, Cho, & Kraemer, 2003; Murray et al., 1999; Kouros, Merrilees, & Cummings, 2008; Trapolini et al., 2007). However, such studies were limited to outcomes in early childhood. Goodman, Brogan, Lynch and Fielding (1993) found that older children in middle childhood appeared to be more vulnerable than younger children to multiple risk factors associated with parental depression. Moreover, older children have likely been exposed to maternal depression and marital conflict for a longer time span. Rates of internalizing disorders also increase substantially during adolescence (Petersen, Compas, Brooks-Gunn, Stemmler, & Grant, 1993). Therefore, research on outcomes in late adolescence or early adulthood may yield different results.

Additionally, there are several reasons why marital dissatisfaction may further contribute to the development of internalizing symptoms in young adults exposed to maternal depression. Poor parenting is one mechanism by which maternal depression and negative marital interactions have both been found to be linked to internalizing symptoms in offspring (Elgar, Mills, McGrath, Waschbusch, & Brownridge, 2007; Katz & Gottman, 1996). Therefore, negative marital interactions may increase the negative effects of maternal depression on children by further exacerbating a depressed mother's parenting abilities. Moreover, negative marital interactions may consume a majority of the depressed mother's psychological resources such that her parenting becomes negligent and negative.

Social Functioning

Adolescence is a critical point in social development. Proper social functioning is important for establishing close friendships, which become primary sources of social support during adolescence (LaGreca & Harrisson, 2005). Also, feeling socially accepted during early adolescence may set the stage for successful social functioning throughout the course of further development (McElhaney, Antonishak, & Allen, 2008). Poor social competence at a broad range of ages has been shown to predict internalizing behaviors (Bornstein, Hahn, & Haynes, 2010; Cole, Martin, Powers, & Truglio, 1996; Mesman, Bongers, & Koot, 2001; Obradovic, Burt, & Masten, 2010). For example, Bornstein and colleagues (2010) found that poor social competence at age 4 predicted internalizing behaviors at age 10 and 14. Moreover, Obradovic and colleagues (2010) found that social competence showed stability over a 20 year period such that childhood social competence predicted adolescent internalizing problems and adolescent social competence predicted internalizing symptoms in emerging adulthood.

Compared to depressed adolescents of nondepressed women, depressed adolescents of depressed mothers exhibit worse social functioning (Hammen & Brennan, 2001). Moreover, the relationship between maternal depression and negative peer interactions or poor social functioning has been shown in offspring of depressed mothers (Alpern & Lyons-Ruth, 1993; Luoma et al., 2001; Murray et al 1999; Hipwell et al., 2005). Specifically, Hammen (1991) introduced the intergenerational interpersonal stress model of depression, which proposes that maternal depression is related to depression in offspring as a consequence of the effects of stressful family environments on youths' interpersonal functioning. Empirical data have been found to support this model. For example, youth social functioning has been found to mediate the relationship between maternal depression and youth depression at age 15 (Hammen, Shih, & Brennan, 2004) and age 20 (Hammen, Brennan, & Keenan-Miller, 2008).

Marital conflict has also been associated with poor social functioning in children. Mothers who reported higher marital conflict had children whose teachers rated their children to be less socially competent (Emery & O'Leary, 1984; Long, Forehand, Fauber, & Brody, 1987). Moreover, a study of first year college students found that students who reported more marital conflict between their parents also reported less social competence (Kenny & Donaldson, 1991). However, to date, no study has looked at social functioning as a mediator between poor marital quality and internalizing behaviors in young adults.

Attachment

As children develop, early attachment relations serve to form a prototype for later relationships outside the family (Bartholomew & Horowitz, 1991). For example, attachment theorists claim that attachment behavior becomes directed toward non-parental figures during adolescence (Wiess, 1982). Moreover, many investigators point to adolescence as the time point in which a single, overarching attachment style emerges (Allen & Land, 1999). By adolescence, a person can summarize all their experiences with past caregivers to construct a more general stance toward attachment (Main, Kaplan, & Cassidy, 1985). According to Mickelson, Kessler, and Shaver (1997), avoidant attachment in adults is characterized by reluctance to get close with others and difficulties with trust. Anxious attachment is characterized by fearing others do not want to get close and do not really care. Secure attachment is characterized by being able to get close with others and depend on them. Such adult categories correspond with ambivalent/resistant, avoidant, and secure attachment styles in infants.

Certain types of attachment styles have been found to predict later internalizing problems. These include resistant attachment styles (Warren, Huston, Egeland, & Stroufe, 1997), insecure attachment (Bifulco et al., 2006; Sund & Wichstrom, 2002) and preoccupied attachment styles (Allen, Moore, Kuperminc, & Bell, 1998; Kobak, Sudler, & Gamble, 1991). Both resistant

and preoccupied attachment styles in children correspond with anxious attachment in adulthood. Moreover, many studies show that maternal depression has a direct effect on infant attachment security and is associated with more infant insecure attachment (Coyl, Roggman & Newland, 2002). A meta-analysis conducted on studies that used Strange Situation to assess attachment found that infants of depressed mothers were less likely to exhibit secure attachment and more likely to show avoidant and disorganized styles of attachment, with disorganized attachment being the most consistent in magnitude across studies (Martins & Gaffan, 2000). Moreover, Lyons-Ruth, Easterbrooks & Cibelli (1997) found that 18-month old infants who were rated as displaying an organized/avoidant style of attachment were at risk for internalizing behavior problems at age 7 when the mother was depressed at either 18 months or 5 years.

Additionally, parental reports of high marital conflict also predict infant insecure attachment (Owen & Cox, 1997). Parental reports of high marital conflict have also been associated with child reports of less attachment to parents (El-Sheikh & Elmore-Staton, 2004). One widely cited theory regarding marital conflict and child attachment is the emotional security hypothesis proposed by Davies and Cummings (1994), which states that marital conflict directly threatens young children's attachment security by endangering the parent-child relationship and the confidence children derive from such relationships as a secure base (Davies & Cummings, 1994).

Studies have found that parent-child attachment mediates the relationship between marital conflict and child internalizing symptoms (El-Sheikh & Elmore-Staton, 2004). Specifically, many studies looking at emotional security have found it to mediate the link between marital conflict and internalizing symptoms (Cummings, Schermerhorn, Davies, Goeke-Morey, & Cummings, 2006; Davies & Cummings, 1998). However, to date, no study has looked

at attachment style as a mediator between maternal depression and internalizing behaviors in youth.

Parent-Child Relationship

The parent-child relationship undergoes several transformations during adolescence. A meta-analysis examining parent-child conflict during adolescence found more negative affect during middle adolescence (Laursen, Coy & Collins, 1998). Moreover, adolescence is a time when youth begin to distance themselves from their parents, emotionally and physically (Rapp, 1998). However, a positive parent-child relationship is still necessary for proper adolescent functioning since adolescents still rely on their parents for emotional support and advice (Maccoby and Martin, 1983). Not surprisingly, poor parent-child relationships have been shown to predict internalizing behaviors in offspring (Dekovic, Buist, & Reitz, 2004). With time, negative and critical statements of the child may become internalized and therefore, such children may acquire a cognitive vulnerability toward internalizing disorders, such as depression.

Maternal depression has been predictive of disruptive parent-child relationships (Dodge, 1990; Hammen, Burge, & Stansbury, 1990). Research shows that parents with depression tend to make more critical statements of their children, show more negative affect, and exhibit maladaptive parenting styles (Goodman & Gotlib, 1999). A meta-analysis of observational studies revealed that depressed mothers show more negative and disengaged parenting behaviors and lower levels of positive behaviors than that of nondepressed mothers (Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Moreover, studies have found that adolescents feel closer to their mothers than fathers and overwhelmingly seek their mothers for advice on personal issues (Greene & Grimsley, 1990). Depression may hinder a mother's ability to adequately serve as a source of counsel, which may impair the parent-child relationship.

Marital conflict has also been predictive of poor parent-child relationship during early adolescence (Fauchier & Margolin, 2004) and young adulthood (Frank, 2007; Yu, Pettit, Lansford, Dodge & Bates, 2010). A meta-analysis of 68 studies revealed that families with more negative marital relationships also had more negative parent-child relationships (Erel & Burman, 1995). Interestingly, research also shows that compared to when their children were of younger age, parents report experiencing more marital dissatisfaction when their children were adolescents (Holmbeck, Paikoff, & Brooks-Gun, 1995).

Several studies have found aspects of the parent-child relationship to mediate the association between maternal depression and offspring internalizing symptoms (Harnish, Dodge & Valente, 1995; Papp et al., 2005). Studies have also found that parent-child conflict mediated the association between marital conflict and adolescent internalizing problems at two time points (Gerard, Krishnakumar, & Buehler, 2006).

Self-Esteem

Positive regard for oneself is an important component of healthy development. However, a meta-analysis found that the largest difference in self-esteem between males and females emerged during adolescence (Kling, Hyde, Showers, & Buswell, 1999). Adolescence may be a particularly sensitive time for female's self-esteem due to the impact of puberty on physical development. Studies have found that self-perceived physical attractiveness is highly correlated with global self-worth, with correlations typically ranging between .70 to .80 (Harter, 1993). Moreover, while low self-esteem has been found to be related to internalizing behaviors (Dekovic, 1999), high self-esteem has been related to a host of positive child outcomes, such as positive academic, social, and psychological adjustment (Dahlbeck & Lightsey, 2008; Friedlander, Reid, Shupak, & Cribbie, 2007).

Children of depressed mothers have been found to have lower self-esteem (Politano, Stapleton, & Correll, 1992). Depressed mothers' negative, critical perceptions of their children have been found to be associated with children's lowered perceived self-worth (Goodman, Adamson, Riniti, & Cole, 1994). In addition, marital conflict has been shown to be related to low self-esteem in children (Maejima & Oguchi, 2001), adolescents (Amato, 1986) and young adults (Pawlak & Klein, 1997). Although the specific content of marital conflict has not received much empirical attention, Grych and Fincham (1990) suggest that conflict centered on the child may be especially distressing since the child may feel a greater sense of responsibility or guilt, which may alter his or her self-esteem.

Studies have found that low self-esteem mediates the relationship between maternal depression and adolescent depression (Garber & Cole, 2010; Garber, Robinson, Valentiner, & 1997). Although no study has specifically examined self-esteem as a mediator between marital conflict and internalizing behaviors in youth, studies have found that self-esteem mediates the relationship between stressful life events and adolescent depressed mood (Chang, 2001), and marital conflict is likely to be stressful to children (Cummings & Davies, 1994).

Therefore, both the maternal depression and marital adjustment literature show that each of these two risk processes are separately related to poor social functioning, poor parent-child relationship, insecure attachment styles, and low self-esteem. Moreover, such factors have all been shown to be related to youth internalizing behaviors. While some of these factors have been shown to be mediators between the main effect of maternal depression and marital adjustment on youth internalizing behaviors, further research on the mechanisms causing these relationships need to be conducted, particularly in terms of assessing outcomes as offspring transition to adulthood.

Developmental Considerations

Many studies that have examined the impact of maternal depression and marital adjustment on youth internalizing behaviors have utilized samples of children with a broad range of ages. For example, children between the ages of 4 and 10, 8 and 16, and even 6 to 23 years have all been included together at the same time point of measurement (Du Rocher Schulich & Cummings, 2003; Fendrich, Warner, & Weissman, 1990; Kouros et al, 2008; Papp et al., 2004). Hops (1995) stresses the importance of considering developmental milestones when studying the effects of parental depression on offspring. Moreover, adolescence is a developmental period marked by intensification of gender roles and increased risk to parental dysphoria (Hill & Lynch, 1983; Gelfand & Teti, 1990). While boys seem to exhibit more internalizing behaviors before the age of 13, (Forehand, Neighbors, Wierson, 1991), girls experience more depression at adolescence (Nolen-Hoeksema & Girgus, 1994). Therefore, it is important to consider whether the risk and outcome associations are different for male and female offspring.

The Present Study

The present study seeks to examine how the separate and combined effects of maternal depression and low marital satisfaction may predict risk processes during adolescence, which in turn increase the risk for the development of internalizing behaviors in the transition to young adulthood. The study extends the existing literature by examining social functioning, attachment, parent-child relationship, and self-esteem as potential causal mechanisms of the relationships among maternal depression, marital satisfaction, and youth internalizing behaviors. A strength of the current study is that it is longitudinal and includes children of the same age at each time point of assessment. In addition, outcomes are studied in young adulthood, which is a time frame that has received relatively little attention in past research.

Our proposed theoretical model is presented in Figure 1. It has three time periods and each time period is hypothesized to affect all subsequent time periods. It shows how maternal

depression and low marital satisfaction during childhood are anticipated to be related to several risk factors at age 15, which are then proposed to be related to internalizing behaviors at age 20.

Therefore, in this study, we hypothesized that:

Hypothesis 1. Maternal depression would predict youth internalizing behaviors at age 20

Hypothesis 2. Maternal depression and marital satisfaction would each have separate main effects on youth internalizing behaviors.

Hypothesis 3. Maternal depression and marital satisfaction would have an interactional effect on youth internalizing behaviors such that depressed mothers who experience low marital satisfaction would have youth who report more internalizing behaviors at age 20.

Hypothesis 4. Social functioning, attachment, parent-child relationship, and self-esteem would each predict youth internalizing behaviors.

Hypothesis 5. Maternal depression and marital satisfaction would have main and interactional effects on social functioning, attachment, parent-child relationship, and self-esteem.

Hypothesis 6. Social functioning, attachment, parent-child relationship, and self-esteem would mediate the main and interactional effects of maternal depression and marital satisfaction on youth internalizing behaviors.

Methods

Participants

Participants were 20-year old youth retained from 816 families previously studied at 15 years of age. The original 816 families were a subset drawn from the Mater-University Study of Pregnancy (MUSP) in Brisbane, Australia (Keeping et al., 1989). The original birth cohort (N=7,223) consisted of women and their children who were born between 1981 and 1984 at Mater Misericordiae Mother's Hospital in Brisbane, Queensland, Australia. MUSP examined children's physical, cognitive, and psychological health as a function of pregnancy and obstetric

conditions and psychosocial history. The MUSP cohort was predominantly Caucasian, lower middle or working socioeconomic status. Mothers in this sample completed interviews and questionnaires about themselves and their children at five different time points: pregnancy (mean gestation = 18 weeks), birth (3-4 days after delivery), 6 months, 5 years, and 13 years.

Sample Selection

Sample selection at age 15 was based on mothers' depression scores on the Delusions-Symptoms-States Inventory (DSSI; Bedford & Foulds, 1978). The DSSI was chosen as the measure of maternal mental health for the Mater Hospital birth cohort study because it was a valid screening instrument for mental health (e.g., Bedford & Foulds, 1977) and did not include symptoms that might be confused with the effects of pregnancy or childbirth. The DSSI had been given on four previous occasions between pregnancy and child age 5. These scores were used to identify women varying in level and frequency of elevated depression histories (or never depressed) using specific algorithms (e.g., elevated scores on two or more occasions, elevated scores on only one occasion). After sample selection for the age-15 follow-up (predominantly high risk for maternal depression), maternal diagnostic information was collected as described below.

Participants were informed that the purpose of the study was an examination of the relationship between maternal psychological and emotional functioning and youth behavioral and mental health outcomes. Families were included in the study if the mother and the child agreed to the interview. For recruitment at age 15, a total of 991 families were targeted for inclusion in the high-risk subsample. Of the 991, 816 consented and were included in the age 15 follow-up (82%); 68 families could not be located; 103 declined to participate; 3 could not participate due to the child's hearing or visual impairment; and 1 child had died.

The current study at age 20 was focused on the adolescents from the age-15 follow-up who also provided complete questionnaires and diagnostic interview outcome data. Inclusion in the current study was based on mothers' depression scores on the DSSI.

Sample Characteristics

Of the 816 who originally participated in the age 15 study, 749 mothers and their children (380 females, 369 males) participated in the 20-year follow-up. Fathers were included when available, but are not reported in the current study. The overall sample was 91.5% white, 4.7% Asian, 2.0% Pacific Islander, and 1.9% Aboriginal. Median family income at the 20-year follow-up indicated lower/middle SES. Median mothers' education was grade 10 (equivalent to U.S. high school graduation).

At age-20 follow-up, 59.9% of youth were living at home. Moreover, 82.6% of the mothers were either married or co-habitating and 68.5% of the mothers' current partners were the children's biological fathers.

The sample for the 20-year follow up did not differ from the overall birth cohort in terms of youth gender (χ^2(df=1,7223) = 2.41, p = .12), ethnic minority representation (χ^2(df=1,7018)= 3.55, p=.06), maternal education (t (df = 7164) = -1.85, p = .07), family income (t (df = 6747) = -.40, p = .69), or partnership status at birth (χ^2 (df = 1,7161) = 2.03, p = .16).

Procedures

Interviews with the mother and 15-year-old child were conducted in the family homes. When the child was 20 years of age, interviews with the youth were conducted at the family homes if the adult child was still living with the mother, or at the youth's own home. Interviewers were blind to the mother's depression status or history, and a team of two interviewers conducted the parent and youth interviews separately and privately. The parents and

youths gave written informed consent and were compensated for their time, which was approximately 3.5 hours.

The team of interviewers was trained by Dr. Constance Hammen from UCLA, who is a co-principle investigator on this study, to conduct the diagnostic evaluations and life stress interviews. All interviewers were advanced graduate students in clinical psychology and had prior clinical and research interview experiences. They were trained to proficiency and were closely supervised by means of audiotape and periodic visits by Dr. Hammen.

Measures

Maternal Depression. As mentioned, a self-report instrument, the DSSI, was used to select women and their families into the study, but actual maternal depressive diagnoses in the current study were based on the Structured Clinical Interview for DSM-IV (First, Spitzer, Gibbon, & Williams, 1995), administered when the child was 15 years old. The presence of lifetime and current diagnoses were ascertained blind to the woman's previous scores on the DSSI. Ratings by independent judges yielded weighted kappa values of 0.87 for current diagnoses of major depressive episode, dysthymic disorder, and subsyndromal depression, and kappa values of 0.84 for past depressive diagnoses or symptoms. In the current study maternal depression was operationalized as major depression or dysthymia that occurred during the child's lifetime (up to the age of 15 years). A total of 302 women (40.3% of the sample) were classified as depressed according to these criteria.

Marital Satisfaction. The Dyadic Adjustment Scale (Spanier, 1976) was given to mothers to report on their satisfaction in married or cohabiting relationships. Lower scores indicate less satisfied relationships, whereas higher scores indicate more satisfied relationships. The DAS is rated on a 5-point scale ranging from 1 (all the time) to 5 (never). Sample items include "How often do you and your partner quarrel?" and "If you have an argument with your partner, is the

child involved?" Marital satisfaction was assessed at pregnancy, child's birth, age 6 months, 5 years, and 13 years. The DAS score used in data analysis was created by taking the minimum DAS score ever reported throughout the five time points, which indicates the lowest satisfaction ever experienced. Out of the whole sample, 96% of mothers reported having a partner at least three out of the five time points, and only .7% of mothers never had a partner. All mothers were included in the DAS analysis, since our statistical program is able to impute missing data.

Social Functioning. At age 15, the UCLA Stress Interview (Hammen et al. 1987), a semi-structured interview that assesses for ongoing conditions and attempts to capture relatively stable features in a person's life, was conducted. Although there are a total of six domains related to youth functioning in the UCLA Stress Interview, youth social life was the only domain used in the current study. Interviewers probed about typical circumstances in the past six months relating to the youth's social life (e.g. "Do you get invited to social activities?"). The social life domain was then scored by the interviewer on a five point scale ranging from 1 (exceptional social life) to 5 (severe social problems) and also could have been scored on 0.5 increments.

Attachment. At age 15, the Bartholomew Attachment Scale (Bartholomew & Horowitz, 1991) was filled out by youth to assess youth attachment prototypes. It is rated on a 7-point scale ranging from 1 (not at all like me) to 7 (very much like me). The attachment prototypes included in our study were secure attachment (it is easy for me to be close to others…I feel accepted by others…) and fearful attachment (I am uncomfortable getting close to others…I worry that I will be hurt if I allow myself to become too close to others). Each attachment prototype was scored as a continuous variable.

Parent-Child Relationship. At age 15, the Children's Report of Parental Behavior Inventory (CRPBI; Schludermann & Schludermann, 1970) was filled out by youth to assess youth perception of both maternal and paternal behavior. It is rated on a 3-point scale ranging

from 1 (not like) to 3 (a lot like). The CRPBI consists of three dimensions, which includes parental acceptance ("believes in showing his/her love for me"), parental psychological control ("wants to control whatever I do"), and parental firm control ("is very strict with me"). Lower scores on each dimension indicate less of that parental behavior, whereas higher scores indicate more of that parental behavior. Each parental behavior dimension was scored separately for the mother and the father as a continuous variable, and this study focused on the acceptance and psychological control subscales only.

Self-esteem. At age 15, the Self-Perception Profile for Adolescents (Harter, 1985) was filled out by youth to assess for self-esteem. In the current study, Global Self-Worth was the only subscale used to assess for youth self-esteem. The Global Self-Worth subscale consists of five items. Participants pick between two statements (e.g. "Some teenagers like the kind of person they are, BUT Other teenagers often wish they were someone else") and then rate how reflective each statement is of the youth themselves. Each item is rated on a scale of 1 to 4, with 4 being the best score possible. The final Global Self-Worth score used in data analysis was created by summing the five individual global item scores.

Youth Internalizing Behaviors. At age 20, The Young Adult Self-Report (YASR; Achenbach, 1997) was completed by the youth and the Young Adult Behavior Checklist (YABCL; Achenbach, 1997) was completed by the mother and a peer (i.e. friend, romantic partner, or sibling). The construct of youth internalizing behaviors was a latent variable created from the three individual manifest variables obtained from youth report, mother report, and peer report. Behavioral items on the YASR and the YABCL are rated on a 3-point scale ranging from 0 (not true) to 2 (very true or often true). Only the internalizing behaviors syndrome scale, which consists of anxious/depressed and withdrawn scales, was used. Sample items include "I feel lonely" and "I am shy or timid." High scores indicate more internalizing behaviors, whereas low

scores indicate less internalizing behaviors. A total score is computed by summing the individual item scores.

Statistical Analysis

Structural equation modeling (SEM) was used as the primary method for data analysis due to its ability to estimate concurrent regression equations required for testing mediation models and to assess latent variables like our age 20 internalizing disorder measure (Tabachnick & Fidell, 1996). By extracting the shared variance among the measured variables to create a latent variable, measurement and reporter biases are minimized in the latent construct. The AMOS 17.0 program (Arbuckle, 2008), a SEM program that accounts for missing data using full information maximum likelihood procedures for parameter estimates, was used to test the structural equation models.

Although the chi-square statistic is traditionally used as a test of good fit, it is sensitive to sample size and large chi-square values are not unusual for sample sizes as large as the one used in the present study (Bentler, 1990). Therefore, multiple goodness-of-fit indexes were considered to assess for appropriate model fit. In addition to the chi-square, the comparative fix index (CFI) and the root mean square error of approximation (RMSEA) were examined. The CFI compares the sample model with the independence model and yields values ranging from 0 to 1. RMSEA tests the lack of fit between the sample model and the estimated population model covariation matrix and yields values ranging from 0 to 1 (Kline, 2005). In assessing the fit between the hypothesized model and the observed data, CFI values of .90 or higher are considered acceptable (Bentler, 1989). RMSEA values less than .05 are considered indicative of a good fit, values between .05 and .08 indicate fair fit, and values greater than .10 indicate poor fit (Browne & Cudeck, 1993).

According to Baron and Kenny (1986), certain criterion must be met to establish mediation: 1) The independent variable (i.e. maternal depression, marital satisfaction, or their interaction term) must predict the dependent variable (i.e., youth internalizing behaviors); 2) The independent variable must predict the mediator; 3) the mediator must predict the dependent variable (i.e. youth internalizing behaviors); and 4) statistical control for the mediator must decrease (or nullify) the association between the independent and dependent variables. We tested each of these criteria using regression analyses and SEM techniques.

Results

Table 1 shows the means and standard deviations of all our variables. Table 2 presents the intercorrelations among the mother, youth, and peer reported measures of youth internalizing behaviors; each was significantly correlated with the other, suggesting that the latent variable measurement approach is appropriate in this case. Table 3 presents intercorrelations among all the variables that were tested as potential mediators in this study. Correlations between these factors were in the expected direction, but most were rather low in magnitude. We also conducted bivariate correlations and found that maternal depression and marital satisfaction were slightly related (r = -.07, p = .052), such that more maternal depression was related to less marital satisfaction. Moreover, independent sample t-tests also revealed that the depressed group had a trend toward lower marital satisfaction (t = 1.86, p = .064).

Hypothesis 1. To test whether maternal depression predicted youth internalizing behaviors, we created a structural equation model that had a direct path from maternal depression to youth internalizing behaviors. The model demonstrated good fit for the data (χ^2 (df = 2) = 6.59, p = .04; CFI = .98; RMSEA = .06). Maternal depression significantly predicted youth internalizing behaviors in this model (β = .21, p < .001)[1].

Hypothesis 2. To test whether marital satisfaction had effects on youth internalizing behaviors above and beyond maternal depression, we used SEM to simultaneously test the direct effects of maternal depression and marital satisfaction on youth internalizing behaviors at age 20. The model demonstrated adequate fit for the data (χ^2 (*df* = 4) = 15.82, *p* = .003; CFI = .95; RMSEA = .06). Results revealed that both maternal depression (β = .20, *p* < .001) and marital satisfaction (β = -.20, *p* < .001) had direct effects on youth internalizing behaviors at age 20.

Hypothesis 3. We tested to see whether maternal depression and marital satisfaction would interact to predict youth internalizing behaviors at age 20 such that depressed mothers who experience less marital satisfaction would have youths who reported more internalizing behaviors. We adapted the model we used in Hypothesis 2 by adding an interaction term between maternal depression and marital satisfaction (see Figure 2). The model demonstrated a good fit for the data (χ^2 (*df* = 6) = 15.47, *p* = .02; CFI = .96; RMSEA = .05) and revealed that maternal depression and marital satisfaction had a significant interactional effect on youths' internalizing behaviors (β = -.16, *p* = .002).

To test the direction of the interaction, we conducted post hoc SEM analyses by first conducting a median split to divide the sample into high and low marital satisfaction subgroups. We then created a model in which there was a direct path from maternal depression to youth internalizing behaviors and tested this model separately for the high and low marital satisfaction subgroups. The model testing the relationship between maternal depression and youth internalizing behaviors in the context of low marital satisfaction demonstrated excellent fit (χ^2 (*df* = 2) = .973, *p* = .62; CFI = 1.00; RMSEA = .00). The model testing the relationship between maternal depression and youth internalizing behaviors in the context of high marital satisfaction demonstrated an acceptable fit (χ^2 (*df* = 2) = 4.70, *p* = .10; CFI = .90; RMSEA = .06). Results revealed that the relationship between maternal depression and youth internalizing behaviors was

stronger in the presence of low marital satisfaction (β = .26, $p < .001$) than it was in the presence of high marital satisfaction (β = .18, $p = .04$).

Importantly the results from Hypothesis 2 and 3 satisfy the first criterion for mediation set forth by Baron and Kenny (1986).

Hypothesis 4. In order to test whether youth social functioning, parent-child relationship qualities, attachment, or self-esteem predicted youth internalizing behaviors at age 20, we created a model in which we drew a direct path from each proposed mediator to youth internalizing behaviors. Such a model was repeated for each of the eight proposed mediator variables. Results revealed that all proposed mediators significantly predicted youth internalizing behaviors, with the exception of mother acceptance (see Table 4).

Hypothesis 5. In order to test whether maternal depression and marital satisfaction had main and interactional effects on social functioning, parent-child relationship qualities, attachment, or self-esteem, we conducted multiple regression analyses in SPSS (Norusis, 2010). Results indicated that maternal depression predicted mother psychological control (β =.09, t = 2.61), secure attachment (β = -.09, t = -2.42), fearful attachment (β = .11, t = 2.91), and self-esteem (β = -.08, t = -2.72). Marital satisfaction predicted father psychological control (β = -.10, t = -2.61). The interactional effect between maternal depression and marital satisfaction did not predict any of the proposed mediators (see Table 5).

The results from Hypothesis 4 and 5 satisfy the second and third criterion for mediation set forth by Baron and Kenny (1986).

Hypothesis 6. In order to test if any of our proposed factors mediated the relationship between any of the independent variables and youth internalizing behaviors, we took the model used in Hypothesis 2 and added a direct path from an independent variable (i.e. maternal depression) to the proposed mediator and then added another direct path from the proposed

mediator to youth internalizing behaviors (see Figure 3 for an example). In order to be considered a full mediator, the addition of that variable to the model must reduce the relationship between the independent variable and youth internalizing behaviors to nonsignificance.

We tested whether mother psychological control, secure attachment, fearful attachment, and self-esteem mediated the main effect of maternal depression on youth internalizing behaviors. We also tested whether father psychological control mediated the main effect of marital satisfaction on youth internalizing behaviors. All of the models that included potential mediators fit the data acceptably or well (see Table 6). However, none of the factors acted as mediators as the relationship between the independent and dependant variables remained significant, even when the potential mediator was added to the model.

Since the interaction between maternal depression and marital satisfaction did not predict any of the proposed mediators (see Table 3), it was not necessary to perform further statistical analyses to test for mediation in that case.

Discussion

Results revealed that the relationship between maternal depression and youth internalizing behaviors was stronger in the presence of low marital satisfaction than it was in the presence of high marital satisfaction. This finding makes sense in light of the detrimental effects that have been associated with both maternal depression and marital conflict in previous studies (Cummings & Davies, 1994; Goodman & Gotlib, 2002). Ours is the first study to find such an interaction, and stands in contrast to other findings in the literature (Essex et al., 2003; Murray et al., 1999; Kouros, et al., 2008; Trapolini et al., 2007) that did not find such an effect. Importantly, these other studies primarily examined outcomes in very young children, usually under the age of five. Therefore, our results suggest that adolescents may be more vulnerable than younger offspring to the combined effects of maternal depression and marital

dissatisfaction. Therefore, it is important to study parental psychopathology and family functioning in a developmentally relevant context.

One possible explanation for our interaction finding could be that high marital satisfaction may suggest the presence of a healthy father figure. Therefore, even though the presence of maternal depression puts the child at risk for developing negative outcomes, having a highly functional father may buffer these negative effects. Contrastingly, a marital relationship in which the mother is dissatisfied may suggest the presence of a poorly functioning father figure. Therefore, the combination of having both parents functioning insufficiently, as opposed to just one, and feeling dissatisfied with each other may have worse effects on child outcomes. For example, research has shown that maternal depression and paternal substance abuse interact to predict youth depression such that maternal depression was found to be related to youth depression in the context of paternal substance abuse, but this relationship was no longer significant when there was no diagnosis of paternal substance abuse (Brennan, Hammen, Katz, & Le Brocque, 2002). Therefore, other paternal characteristics may moderate the relationship between maternal depression and child outcomes and marital satisfaction may be an indicator of fathers' level of functioning.

As predicted, maternal depression was negatively related to secure attachment and self-esteem, and positively related to fearful attachment and mother psychological control, and marital satisfaction was found to be negatively related to father psychological control. However, none of these proposed factors served as significant mediators between the main effects on youth internalizing behaviors. Perhaps the effect of maternal depression or low marital satisfaction on youth internalizing behaviors emerges through several different factors that each explains a small portion of the mechanism. In support of this idea, partial mediators are often reported in the literature often (Hong & Woody, 2007; Humphreys, Mankowski, Moos, & Finney, 1999;

Samaniego & Gonzales, 1999). Attachment to fathers, parental hostility, maternal acceptance, inconsistency, and intrusiveness have all been found to partially mediate the relationship between marital conflict and offspring internalizing behaviors (Benson, Buehler, & Gerard, 2008; El-Sheikh & Elmore-Staton, 2004; Low & Stocker, 2005). Individually, these factors may not fully explain the effect. However, when combined together, they may explain the link between parental adjustment and youth outcomes.

Another possible explanation for our results may be the methodological weaknesses in our mediator measures. For example, past studies that have examined attachment have primarily studied parent-child attachment, whereas our measure of attachment measured general attachment styles. Although primary attachment is said to be transferred from parents to peers and romantic partners during adolescence (Hazan & Zeifman, 1999), our measure of attachment asked for general attachment and did not specify attachment to a target individual. Also, although self-esteem was not found to be a mediator between maternal depression and youth internalizing behaviors, our measure was focused on global self esteem, and particular aspects of self esteem may have differential associations with maternal depression and marital conflict. Additionally, neither mother psychological control nor father psychological control were found to mediate the relationship between maternal depression and low marital satisfaction on youth internalizing behaviors, respectively. It could be that our measure of parent-child relationships was not adequate in assessing more subtle factors present in these relationships, such as children being comfortable viewing their parents as a secure base.

Besides potential methodological weaknesses in our mediator variables, our study also used a different approach to statistical analyses when testing the mediators for maternal depression and marital dissatisfaction. The majority of studies examining causal mechanisms between low marital satisfaction or maternal depression and youth internalizing behaviors did

not control for one of these factors when studying the other (i.e. did not control for depression when studying marital satisfaction) the way our analyses did (Benson et al., 2008; Cummings et al., 2006; El-Sheikh & Elmore-Staton, 2004; Fauber, Forehand, Thomas, & Wierson, 1990; Hammen et al., 2004). Our statistical controls may have resulted in a more stringent test of mediation.

Moreover, while mother psychological control, secure attachment, fearful attachment, and self-esteem were all related to maternal depression, only father psychological control was related to marital dissatisfaction (see Table 5). Although maternal depression and quality of marital relationships are related, different family processes may contribute to each separately. For example, low marital satisfaction was only related to father psychological control, which is a characteristic related to the father. This may suggest that one of the main avenues in which low marital satisfaction impacts the family is by disrupting the father-child relationship, as studies have found that father-child rejection and father-child hostility mediate the link between marital conflict and child internalizing behaviors (Low & Stocker, 2005; Shelton & Harold, 2008). Additionally, maternal depression was related to the mother-child relationship and several personal characteristics of the youth. This may suggest that maternal depression not only negatively impacts the mother-child relationship, but also influences other areas of youth functioning that are important for proper adjustment outside the family. However, an alternative explanation could simply be that, since this sample was selected to be high risk for maternal depression, perhaps more factors were related to maternal depression rather than marital conflict since the study was designed (and the measures were selected) to specifically understand the impact of maternal depression on child adjustment and functioning.

Although the main effect of maternal depression was related to many of the proposed mediators, the interactional effect of maternal depression and marital satisfaction was not related

to any of our proposed mediators. This reveals that studying maternal depression in isolation and studying it in the context of other family processes yields a different story. Since this is the first study to find an interactional effect of maternal depression and negative marital relationships on internalizing behaviors in young adult children, more studies need to be conducted to better understand the mechanisms that mediate this interaction. For example, the mechanism could be a factor we did not measure, such as youth romantic relationships. Highly discordant parents and a depressed mother may both serve as "poor models" of interpersonal communication, which may cause the youth to develop dysfunctional interpersonal skills. Young adulthood is an especially salient time to engage in romantic relationships and dysfunctional interpersonal skills could make this process more stressful, which may then lead to internalizing behaviors.

Moreover, although none of our proposed mediators (e.g. social functioning, parent-child relationship, attachment, and self-esteem) mediated the relationship between the main or interactional effects of maternal depression and marital satisfaction on youth internalizing behaviors at age 20, such mechanisms are still important with respect to prevention and intervention strategies that are age-relevant for adolescents. For example, all of our proposed mediators measured at age 15, with the exception of mother acceptance, predicted youth internalizing behaviors at age 20 (See Table 4). Therefore, such factors are still relevant and shed some light on to risk factors for the development of internalizing disorders.

Although gender predicted internalizing behaviors in young adulthood, it did not moderate our results. Therefore, our study suggests that the association between maternal depression, marital satisfaction, and youth internalizing behaviors is similar for males and females. This finding is inconsistent with findings in the literature that claim adolescent daughters of depressed women are at higher risk for developing depressive disorders and symptoms than are adolescent sons (Goodman & Gotlib, 2002). However, adolescent females are

also more likely to experience depressive symptoms in general (Nolen-Hoeksema & Girgus, 1994). Therefore, the finding that adolescent daughters of depressed women are at higher risk could be conflated with the fact that females are more likely to develop internalizing symptoms during adolescence (Nolen-Hoeksema & Girgus, 1994). For example, a study looking at depressed adolescents of depressed and nondepressed mothers found a trend that depressed girls were equally likely to come from either group (Hammen & Brennan, 2001).

With respect to child gender being a moderator of the effects of marital conflict on child internalizing behaviors, Buehler and colleagues (1996) conducted a meta-analysis that did not find child gender to moderate the relationship between marital conflict and internalizing behaviors. Moreover, studies that have found gender to be a moderator have mixed results as to which gender is more vulnerable (Davies & Lindsay, 2001). Some investigators propose that the mixed findings surrounding gender as a moderator may reflect chance findings due to the large number of gender analyses that have been conducted and nonsignificant findings from the meta-analysis further supports this conclusion (Buehler et al., 1996; Cummings & Davies, 2010).

Alternatively, perhaps more sensitive measures might reveal gender differences that underlie different aspects of marital conflict (i.e. type of conflict, response to conflict, timing of conflict, etc). For example, gender may act as a moderator depending on child age, as the relationship between marital conflict and internalizing symptoms has been found to be stronger for adolescent girls (Davies & Lindsay, 2004). However, despite speculative ideas for examining gender as a moderator, at this point researchers on marital conflict seem to agree that child gender cannot confidently be said to moderate the effects of marital conflict on child outcomes (Cummings & Davies, 2010; Grych & Fincham, 2001).

Clinical Implications

The results of the present study can be used to improve prevention and intervention programs aimed at reducing youth internalizing disorders, such as depression and anxiety. Since the relationship between maternal depression and youth depression became less significant in the presence of high marital satisfaction, this suggests that positive marital functioning may serve as a protective mechanism against the development of depression in children of depressed mothers. Moreover, concentrating more on the marital dyad may be a promising focus in family therapy when working with depressed mothers and their children.

Strengths

There were several advantages to the present study. It had a large sample size and used a prospective, longitudinal design with multiple points of assessment, which allowed us to test for causal mechanisms and determine what events preceded youth internalizing behaviors at age 20. Clinical samples of depressed individuals often limit generalizability due to the severity level of the depression, and clinical samples may often be treatment-seeking, which itself may be affected by family circumstances. However, the use of community samples, as employed in our study, allows for greater generalizability to other community samples. Our study also included youth of the same age at each point of measurement to ensure that our results accurately reflected developmental changes. Moreover, we studied outcomes in young adulthood, which receives considerably less attention than childhood.

Limitations

Several limitations to the study should also be noted. First, the sample was comprised of predominantly white, middle class Australians born during a particular period in Queensland, Australia. Even though Australian culture is similar to US culture, there may still be limitations to generalization. Second, other possible causal mechanisms that were not measured or included could explain the relationship between the main and interactional effect of maternal depression

and marital satisfaction on youth internalizing behaviors. For example, genetics, neuroregulatory processes, negative parental cognitions, behaviors, or affect, and stressful events could serve as potential explanatory mechanisms (Goodman & Gotlib, 1999). Third, our measure of marital satisfaction was a crude instrument and more sensitive measures may yield additional information about the interaction between maternal depression and marital satisfaction. Moreover, a measure specifically measuring conflict, as opposed to satisfaction, may also yield additional information. Additionally, our measure of depression was a retrospective report of past depressions, so the reliability is modest, although there is agreement between the DSSI and retrospective SCID interview reports of depression during the same period. Also, since maternal depression was a categorical variable, the effect of the chronicity, severity, and timing of maternal depression on child outcomes was not examined. Such factors would be important to study as past research as shown that severity of maternal depression has worse effects on youth development (Hammen & Brennan, 2003).

Future Directions

Since the effects of low marital satisfaction was one of the primary factors investigated in the current study, future studies should seek to include data about paternal characteristics, which may reveal more information about how family dynamics change under marital stress and how fathers additionally contribute to the effect of marital dissatisfaction on child outcomes. For example, other studies that have used the same sample have found paternal psychopathology to interact with maternal depression to predict youth psychopathology (Brennan et al., 2002). Moreover, we only examined youth internalizing behaviors as an outcome in the current study, although maternal depression and marital conflict have both been found to lead to several adverse child outcomes (Davies & Cummings, 1994; Downey & Coyne, 1990). For example, the interactional effect of maternal depression and marital satisfaction on externalizing behaviors

may yield different results as some studies have found marital discord to be more strongly linked with externalizing behaviors in young children (Grych & Fincham, 1990), although this effect has not yet been shown in young adults.

Conclusion

Past studies have primarily shown that maternal depression leads to marital conflict which then leads to negative child outcomes (Cummings et al., 2005; Davies & Windle 1997; Du Rocher Schudlich & Cummings, 2003; Spence et al. 2002;). Therefore, our study fills the gap in the literature by showing how maternal depression and marital dissatisfaction can work simultaneously to influence negative youth outcomes. Overall, this study provides important insights into how negative family processes may work together to affect child outcomes. Our findings highlight the important role marital dissatisfaction may play with regards to the effect of maternal psychopathology on offspring adjustment in young adulthood. This developmental context is important to consider when planning treatment strategies aimed at reducing internalizing behaviors in high-risk youth.

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Footnotes

[1] Gender, income, parent education, mother's age at child's birth, and number of siblings were all tested as potential confound variables in this study. Gender and income emerged as potential confounds as they correlated with internalizing behavior problems at age 20. However, when we added gender and income as variables to the models used to test Hypothesis 1-6, their addition resulted in a poorer model fit, and none of the results changed in terms of significance. Therefore, models and results are presented without controls for gender or income. Moreover, we conducted all of our analyses separately for males and females and found similar results across genders, suggesting that gender did not moderate our findings. Therefore, we present results for the whole sample (males and females together).

Figure 1.

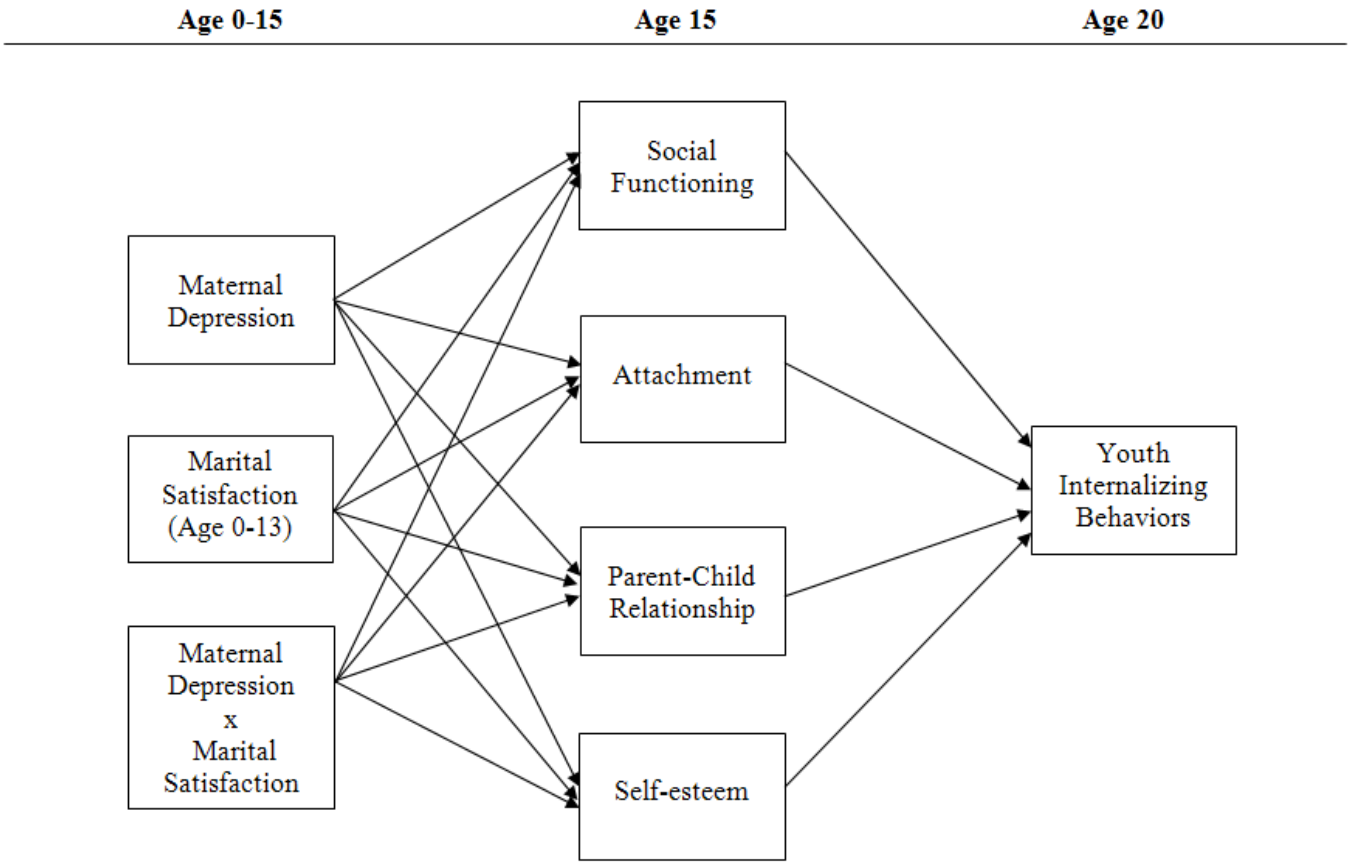
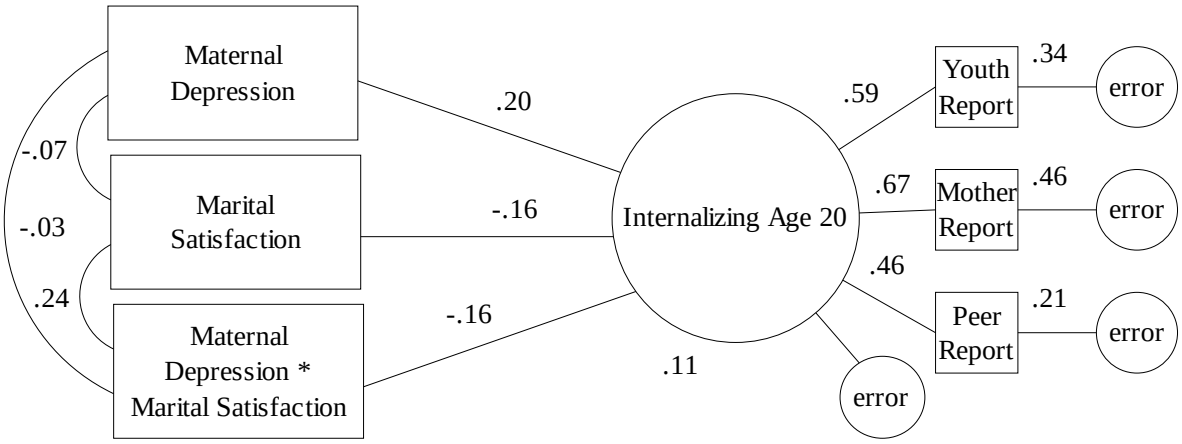

Age 0-15
Age 15
Age 20
Maternal Depression
Marital Satisfaction (Age 0-13)
Maternal Depression x Marital Satisfaction
Social Functioning
Attachment
Parent-Child Relationship
Self-esteem
Youth Internalizing Behaviors

Figure 2.


Maternal Depression
Marital Satisfaction
Maternal Depression * Marital Satisfaction
-.07
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Internalizing Age 20
.11
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Youth Report
Mother Report
Peer Report
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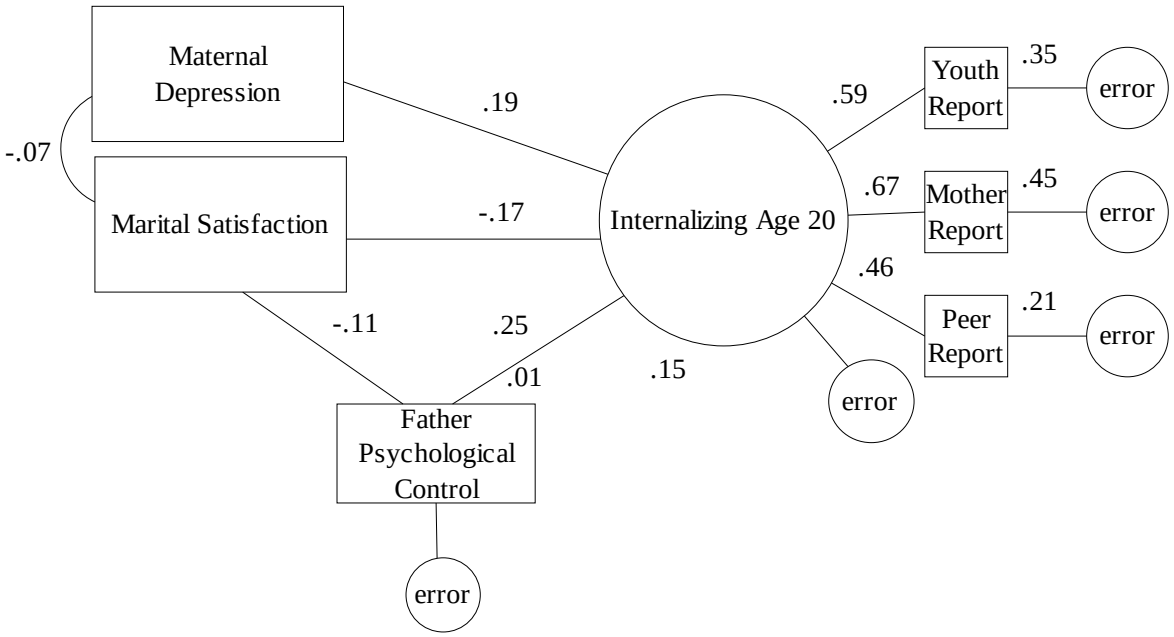
Figure 3.


Maternal Depression
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Father Psychological Control

Table 1

Means and Standard Deviations of All Variables

	M	SD
Marital Satisfaction	31.18	4.49
Social Functioning	2.28	0.48
Father Psychological Control	15.92	4.40
Father Acceptance	20.85	5.34
Mother Psychological Control	16.85	4.18
Mother Acceptance	23.55	4.65
Secure Attachment	5.13	1.64
Fearful Attachment	2.52	1.62
Self-esteem	13.26	1.50
Youth Internalizing – Youth	9.95	8.02
Youth Internalizing – Mother	7.15	5.98
Youth Internalizing – Peer	7.77	6.52

Table 2

Intercorrelations Among Multiple Reporters of Age 20 Internalizing Behaviors

	1	2	3
1. Youth	-	.40	.34
2. Mother	-	-	.26
3. Peer	-	-	-

Note. All correlations $p < .001$

Table 3

Intercorrelations Among Proposed Mediator Variables

	1	2	3	4	5	6	7	8
1. Social Functioning	-	.10*	-.10**	.12**	-.08*	-.22**	.15**	.06
2. Father Psychological Control	-	-	-.30**	.49**	-.09*	-.15**	.18**	-.10*
3. Father Acceptance	-	-	-	-.10*	.39**	.13**	-.09*	.08*
4. Mother Psychological Control	-	-	-	-	-.35**	-.17**	.23**	-.18**
5. Mother Acceptance	-	-	-	-	-	.16**	-.12**	.16**
6. Secure Attachment	-	-	-	-	-	-	-.20**	.14**
7. Fearful Attachment	-	-	-	-	-	-	-	-.07
8. Self-esteem	-	-	-	-	-	-	-	-

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

Table 4

Regression Analysis for Proposed Mediators Predicting Internalizing Symptoms at Age 20

	β	*p*
Social functioning	.35	<.001
Father psychological control	.27	<.001
Father acceptance	-.14	.008
Mother psychological control	.26	<.001
Mother acceptance	-.06	.23
Secure attachment	-.27	<.001
Fearful attachment	.26	<.001
Self-esteem	-.16	<.001

Table 5

Regression Analysis for Main and Interactional Effects Predicting Proposed Mediators

	Depression		Satisfaction		Depression* Satisfaction	
	β	*t*	β	*t*	β	*t*
Social functioning	.07	1.87	-.06	-1.75	.03	0.67
Father psychological control	.04	0.92	-.10	2.61**	-.003	-0.07
Father acceptance	-.05	-1.19	.04	0.89	-.01	-0.27
Mother psychological control	.09	2.61**	-0.05	-1.24	-.005	-0.14
Mother acceptance	-0.04	-1.00	-.002	-0.06	.06	1.51
Secure attachment	-.09	-2.42*	.04	1.18	-.03	-0.90
Fearful attachment	.11	2.91**	-.06	-1.62	-.03	-0.88
Self-esteem	-.08	-2.27*	-.06	-1.45	.003	0.07

Note. *p<.05. ** p <.01.

Table 6.

Model Fit Indices and Beta Values After Addition of Proposed Mediator to Model

	χ^2 (*df*)	CFI	RMSEA	β
Mother psychological control	21.01 (7)*	.94	.05	.18**
Secure attachment	20.66 (7)*	.94	.05	.18**
Fearful attachment	19.47 (7)*	.95	.05	.18**
Self-esteem	16.67 (7)*	.96	.04	.19**
Father psychological control	16.91 (7)*	.96	.04	-.17**

Note. *$p < .05$ ** $p < .001$