Youth Depression and Early Childrearing: Stress Generation and Intergenerational Transmission of Depression

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Objective: Broadening the concept of stress generation beyond acute life events, the current study explores predictors of the creation of stressful environments—specifically, selection into early childrearing by age 20. It was predicted that youth with early onset depressive disorders would be at higher risk for early childrearing accompanied by greater depression and parenting maladjustment. Additional analyses tested hypotheses about the roles of interpersonal vulnerability and intergenerational transmission of depression and examined gender differences. *Method:* A community sample of 706 adolescents and their mothers were studied at ages 15 and 20. The sample was originally selected to oversample families with depressed mothers. *Results:* Results confirmed the hypotheses for women but not men: Young women with depression by age 15 were at greater risk for interpersonal difficulties at age 15 and early childrearing, accompanied by further depression and parenting dysfunction at age 20. The effects of (grand)maternal depression were evident in predicting youth early onset depression and interpersonal difficulties, as well as higher rates of depression among their daughters who had children by age 20. *Conclusions:* The study expands the definition of stress generation to include the role of past depression and other risk factors as predictors of selection into a stressful childrearing environment. The findings also describe aspects of the intergenerational transmission of depression. The results highlight potentially important targets for interventions in young women to prevent recurrence of major depression and parenting dysfunction.

Keywords: stress generation, early childrearing, adolescent depression, intergenerational transmission of depression

A pattern of higher rates of acute negative life events among individuals with a history of depression, compared with never-depressed individuals, has been termed *stress generation* (Hammen, 1991), because studies have noted the occurrence of stressful events to which the person has contributed due to their behaviors and characteristics (events "dependent" on the person). Hammen (1991) found that interpersonal life events, and particularly those

with themes of interpersonal conflict, were especially likely to be more prevalent during a follow-up of women with histories of diagnoses of depression, compared with women with bipolar disorder, chronic medical ailments, and no disorders. Findings supportive of stress generation patterns have been widely replicated (e.g., as reviewed in Hammen & Shih, 2008).

A key implication of stress generation is the bidirectional association between stressors and depression, which portends a vicious cycle of stress and chronic or recurrent depression. A likely mechanism contributing to stress generation is maladaptive interpersonal characteristics—impaired social skills and problem-solving styles and dysfunctional relational cognitions. Research in depression has identified ample evidence of maladaptive interpersonal relationships, including impaired functioning in friendship, marital, and parenting relationships (e.g., Davila, Stroud, & Starr, 2009; Joiner & Timmons, 2009; Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Although depressive symptoms doubtless contribute to problems in social functioning, dysfunctional interpersonal characteristics are also risk factors for the development and recurrence of depression, because they create situations of interpersonal loss, rejection, upheaval, and discord that are highly stressful.

Although stress generation research has largely studied acute life events to which a person has contributed, there is also a broader level of analysis to which the concept may pertain: the creation of stressful contexts or selection into ongoing life circum-

stances that have a high likelihood of continuing or intermittent stressors. Specifically, a broadened application of the stress generation model involves selection into, or creation of, potentially demanding and negative contexts that have several features: They involve ongoing relationships with others and have certain performance requirements that may exceed the person's personal and material resources; they are enduring; and they typically affect life on a daily basis. The current study focuses on childbirth, which has these features, rather than pregnancy, which is more an example of an acute life event (although of course it may become an enduring context if birth occurs). By *selection into* or *creation* we refer to entering or making a situation happen due to decisions and actions on the part of the person, but there is no implication of necessarily deliberate, conscious, or goal-oriented actions with foreseen consequences. Moreover, it is acknowledged that childbirth is actually a complex chain of events involving multiple choices and actions, but the current study focuses only on the outcome of raising a child.

The study of adolescents in the transition to adulthood represents an opportunity to examine creation of life contexts, because a particularly salient developmental issue for youth is the expectations and demands that they will become increasingly independent of their families and construct career pathways and intimate relationships and families of their own. The current article explores the stress generation model of depression risk among older adolescents, with a focus on those whose childrearing at an early age may create a life pathway with long-term consequences and potential for stress. Specifically, we examine young women and men who became parents by age 20, a situation that might increase risk for adverse consequences, especially the younger the individual (e.g., Coley & Chase-Lansdale, 1998). In the following sections several hypotheses and their relevant research support are noted.

The first hypothesis is that youth who have histories of depression diagnoses are at higher risk for selecting into parenthood compared with those without depression. Much of the research on reproductive outcomes in youth has focused more broadly on teen pregnancy rather than parenthood as such, with an emphasis on the nonpsychiatric risk factors such as sociodemographic characteristics and family disadvantage (e.g., Coley & Chase-Lansdale, 1998). However, a few longitudinal studies have reported on the role of diagnoses and symptoms. Most of the research has noted the association of conduct and externalizing symptoms and disorders with pregnancy or early childbearing in women and men but has not explored associations with depression (e.g., Elster, Ketterlinus, & Lamb, 1990; Elster, Lamb, & Tavare, 1987). Kovacs, Krol, and Voti (1994) found that conduct but not depressive disorders predicted pregnancy, but their sample was relatively small and composed of clinically referred girls. Bardone et al. (1998) examined a large community sample of adolescent girls and found that conduct, but not depressive disorders, predicted early pregnancy; neither Kovacs et al. nor Bardone et al. reported on childbirth. A few studies have reported that elevated rates of depressive symptoms or disorders predicted early childbirth (Fergusson & Woodward, 2002; Kandel & Davies, 1986; Rao, Ryan, Birmaher, & Dahl, 1995). Fergusson and Woodward (2002) found that early onset depression predicted early parenthood in both women and men but did not examine the effects of conduct disorder. In the National Comorbidity Survey, retrospective analyses indicated that both depressive and conduct disorders predicted

girls' early parenthood, whereas conduct disorders but not depressive disorders predicted boys' early parenthood (Kessler et al., 1997).

Although it is clear that multiple factors including psychopathology predict teen parenthood, the present study focuses on extending the stress generation hypothesis by examining whether history of early onset depression predicts selection into young parenthood. The stress generation model postulates the presence of prior depression as a risk factor for stress occurrence, but there are additional conceptual and empirical reasons to predict an association between depression and early childbearing. Reviews of predictors of various adolescent reproductive outcomes have found, on the basis of longitudinal studies, evidence of a protective/risk relationship between pregnancy/birth and several constructs that have also been associated with risk for depression. Markham et al. (2010) found that "family connectedness" (attachment, parental warmth) and Gloppen, David-Ferdon, and Bates (2010) found that "confidence" (specifically, positive educational aspirations, and internal locus of control) were related to lower rates of pregnancy/ birth. Also, House, Bates, Markham, and Lesesne (2010) found that "competence" (measured by cognitive and social/behavioral indicators) predicted lower rates of pregnancy/birth. In each case, less positive levels of family attachment, confidence, and competence variables predicted high rates of pregnancy or birth. These findings are generally consistent with models of depression risk (e.g., Cole, Martin, Powers, & Truglio, 1996; Goodman & Brand, 2009; Joorman, 2009), in which depression is a consequence, as well as a correlate, of such characteristics. Thus, depression may itself serve as one risk factor for selection into early parenting and is the focus of the current study.

Second, in keeping with the interpersonal dysfunction approach to depression and stress generation, we hypothesize that interpersonal maladjustment by age 15 is a predictor of early childrearing and that such social difficulties mediate the association between youth history of depression and childrearing. Numerous studies have focused on marital and parenting relationship difficulties in adults with depression (reviewed in Davila et al., 2009; Goodman & Gotlib, 1999). A growing body of evidence also identifies difficulties in depressed adolescents' relationships with parents, peers, and romantic partners (Kandel & Davies, 1986; Lewinsohn, Rohde, Seeley, Klein, & Gotlib, 2000; Rudolph, Flynn, & Abaied, 2008). Recently, Keenan-Miller, Hammen, and Brennan (2007) found an association between adolescent depression by age 15 and severe interpersonal violence victimization in their romantic relationships before the age of 20. Importantly, interpersonal functioning at age 15 mediated the predictive role of youth depression on later domestic violence. The current study represents a further effort to test the potential link between interpersonal functioning at age 15 and selection into a different adverse environment, parenthood by age 20 among youth with early onset depression.

Third, we explore whether early childrearing is indeed an indicator of selection into a depressogenic life context, by examining the depressive symptoms and disorders of young parents at age 20. In keeping with the theory behind stress generation, which posits that the creation of stress is one mechanism responsible for chronicity and recurrence of depressive symptoms, we hypothesize that selection into the context of early parenthood will be associated with greater depression and poorer parental role functioning. Numerous studies have found that teen parents and their children

experience many adverse outcomes (Fergusson & Woodward, 1999; Jaffee, Caspi, Moffitt, Belsky, & Silva, 2001; Meade, Kershaw, & Ickovics, 2008; Shaw, Lawlor, & Najman, 2006). However, as noted by Coley and Chase-Lansdale (1998), few studies have reported on the presence of depressive symptoms in teen parents during their infants' young lives. Specifically we examine whether childrearing is associated with higher rates of depressive symptoms and diagnoses in late adolescent parents, and whether it may increase the risk for recurrence in those youth who were previously diagnosed with a depressive disorder. A large body of research has documented the negative impact of mothers' depressive symptoms on parenting and child development during the earliest months and years of the child's life (e.g., reviewed in Goodman, 2007; Hammen, 2009). However, few studies have specifically examined this issue in teen parents. We predict that depression will be associated with maladaptive parenting in those individuals who select into early childrearing roles.

Fourth, we explore issues relevant to the intergenerational transmission of depression, a chain that we predict includes depressed women (in this study, the grandmothers) having offspring who develop depressive disorders at an early age, who are then themselves more likely to give birth early and to be depressed and impaired parents, compared with offspring of never-depressed women. Given that high rates of depression in youth are often seen as outcomes of exposure to depressed parents (e.g., Goodman, 2007; Hammen, 2009), we examine whether risk for creation of a parenting lifestyle among teenage women and men is associated with maternal history of depression, that is to say, in the grandmother of the baby. Although there are likely many mechanisms that contribute to intergenerational transmission of depression, one hypothesized pathway is that teenage children of depressed mothers are particularly at risk for selection into an early childrearing role. To date, the few studies that have followed offspring of depressed parents into adulthood have not specifically reported on age of childbearing, but such studies unquestionably indicate continuing clinical and social impairments in the second generation (e.g., Klein, Lewinsohn, Rohde, Seeley, & Olino, 2005; Weissman et al., 2006). Three studies have reported specifically on comparisons of depressed offspring of depressed and nondepressed mothers, indicating greater negative family and personal functioning among the former (e.g., Hammen & Brennan, 2003; Shiner & Marmorstein, 1998; Weissman, Warner, Wickramaratne, Moreau, & Olfson, 1997). Such findings suggest that offspring of depressed women, especially those who were themselves depressed, may be more likely to have adverse social outcomes, consistent with the prediction of childbirth at an early age. Unfortunately, if true, such a pathway may be predictive of the further intergenerational transmission of depression: from depressed (grand)mother to depressed offspring experiencing early childrearing, and being a depressed young parent of a child with impaired parenting and its implications of risks to the child's healthy development.

A fifth goal of the study is to explore gender differences in early parenting and its predictors and correlates, given the extensive body of research on gender differences in stress and depression (e.g., Hammen, 2005; Nolen-Hoeksema & Hilt, 2009). Although women are at higher risk for depression in response to stressors, and depressed women are typically more likely than men to generate acute stressful life events (reviewed in Hammen, 2005), there is relatively little information on depression in adolescent men who have children. Thus, gender differences are examined, with the expectation that the link between depression and childrearing will be stronger for women than men, and the role of conduct disorder in parental outcomes of men and women is also examined in view of somewhat mixed or limited findings in previous studies.

Hypotheses were addressed in a large community sample of adolescent women and men, whose families were selected to represent a range of maternal depression histories, including never depressed. The youth were studied at age 15 with a follow-up 5 years later when they turned 20.

Method

Participants

Participants were 20-year-old youth retained from 816 families previously studied at youth 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 MUSP study originally followed a birth cohort born between 1981 and 1984 of more than 7,000 women who were assessed during pregnancy and after birth, at 6 months, and 5 years to study health and development. The sample consisted of mostly publicly funded obstetrical patients, broadly representative of the Brisbane community served by the Mater Hospital, and they were largely of middle to lower socioeconomic status (Najman et al., 2005). When the children were 15 years old, the present investigators selected families to represent mothers with diverse experiences in severity and chronicity of depressive symptoms (including no or minimal depression) over the child's early life. Selection was based on administrations of a depression questionnaire given to mothers during pregnancy and three additional times in the first 5 years of the child's life. Following sample selection, actual diagnostic information was collected as described below. Further details of the sampling procedures are reported in Hammen and Brennan (2001). The age 15 sample was 92% White and included primarily those of working class socioeconomic status; median mothers' education was Grade 10; and the mothers' mean age at the time of the youth 15-year follow-up was 41 years. Seventy-seven percent of the mothers were currently married or cohabiting, and overall 65% were currently married to the biological father of the youth.

Of the original 816 youth, 706 (87%) were interviewed in the age 20 follow-up (344 men, 362 women; 2 were deceased, 51 refused, and 52 could not be located or scheduled; 5 participants did not complete diagnostic interviews). Those who were included were marginally more likely to have mothers who were depressed, $\chi^2(1, N = 816) = 3.56, p = .059$. Men were less likely to participate in the follow-up than women, $\chi^2(1, N = 816) = 12.63, p = .006$. Participants did not differ from nonparticipants on their own prior depression status, $\chi^2(1, N = 816) = 1.32, p = .25$, or on any prior diagnosis. Nonparticipants also came from families with lower incomes, $t(783) = 2.11, p < .05$. Sample sizes for analyses may differ slightly due to missing data, and one person withdrew previously collected data.

Procedure

At age 15 the youth and their mothers were interviewed individually and privately at home and also completed questionnaires.

For the age 20 follow-up, the youth and their mothers (henceforth referred to as [grand]mothers) were interviewed separately at home or in a convenient location and completed a questionnaire packet. Parental informed consent and youth assent were obtained when the youth was 15, and informed consent was obtained from the youth at age 20. All procedures were reviewed and approved by institutional review boards at the University of California, Los Angeles; Emory University; and the University of Queensland. Participants were paid for their time. Interviewers were clinically trained postgraduate students in psychology, trained to proficiency and reliability on all interview procedures. Interviewers in both the age 15 study and the age 20 follow-up were blind to diagnostic status of the (grand)mother, and in the follow-up, blind to youth prior diagnostic status.

Measures

Maternal and family variables. Lifetime and current diagnostic status of the (grand)mother was evaluated at the age 15 follow-up with the Structured Clinical Interview for *DSM–IV* (SCID; First, Spitzer, Gibbon, & Williams, 1995), which yielded weighted kappas of .87 for current depression diagnoses (major depression or dysthymic disorder) and .84 for past depression diagnoses, based on independent judges' ratings of 52 women's audiotaped interviews. Three hundred nineteen (grand)mothers had a history of depressive disorder (major depressive episode [MDE] or dysthymic disorder) by youth age 15, and 387 had never had diagnosable depression.

Family income at the age 15 follow-up was based on an ordinal scale of mother-reported income.

Youth variables at age 15. Depressive disorders in the youth by age 15 were ascertained with the Schedule for Affective Disorders and Schizophrenia for School-Age Children—Epidemiologic version (K–SADS–E; Orvaschel, 1995). The semistructured interview was administered separately to both youth and their mothers by trained clinical interviewers, covering current and lifetime disorders. Diagnostic decisions were reviewed by the clinical rating team, with judgments based on all available information. The original K–SADS (e.g., Orvaschel, Puig-Antich, Chambers, Tabrizi, & Johnson, 1982) reported excellent reliability and validity for use with clinical samples, and Orvaschel (1995) provided further evidence of interrater reliabilities for the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM–IV*; American Psychiatric Association, 1994) version. Reliability in the present sample was based on 75 interviews, yielding weighted kappas of .82 for current depressive diagnoses (MDE or dysthymia) or subclinical depression and .73 for past depressive diagnoses or subclinical depression.

The semistructured UCLA Life Stress Interview for adolescents (LSI; Hammen & Brennan, 2001) was administered to obtain information on interpersonal adjustment in youth at the age 15 follow-up. The LSI probes for acute stressful life events and ongoing conditions in various domains of the youth's life (e.g., family, peer, academic). Each domain is probed for ongoing conditions over at least the past 6 months and is scored by the interviewer on a 1–5 scale, with behaviorally specific anchors for each point. For example, in the family relationships domain, a score of "3" indicates good quality of relationship with one parent but some problems with the other parent (poor communication or lack of trust, availability, or closeness), with other members of the family to turn to for support. The current study includes three domains that serve as indicators of interpersonal functioning: close friendships, romantic relationships/dating, and family relationships. Interrater reliabilities (intraclass correlations) based on 88 to 96 corated interviews (depending on the quality of audiotapes) were .76 for close friendships, .84 for relationships with family members, and .55 for romantic relationships. Validity data for youth and their mothers have been reported elsewhere (e.g., Hammen, Brennan, & Keenan-Miller, 2008).

The LSI also probes for the occurrence of acute life events in the past 12 months, modeled after the contextual threat assessment of stressful life events (Brown & Harris, 1978), obtaining information about the nature of the event and the circumstances in which it occurred. The interviewer prepared a narrative of each event and presented it to a rating team whose members were blind to the participant's emotional reaction to each event and scored the objective severity of the event on a scale from 1 (*no or minimal impact*) to 5 (*extremely severe impact*). Interrater reliability (intraclass correlation) based on independent teams that rated all events of 10% of the participant sample was .92. Each acute life event was also coded by raters as *primarily interpersonal* or *not interpersonal* in content.

As previously used in the Keenan-Miller et al. (2007) study, an overall index of interpersonal functioning was computed on the basis of three measures of ongoing functioning (quality of close friendships, family relationships, and romantic relationships) and the number of acute interpersonal life events in the past 12 months, with each variable standardized and then summed.

Youth variables at age 20. Depression diagnoses (MDE, dysthymic disorder) covering the period of age 15 to age 20 were assessed at the age 20 interview using the SCID. Independent judges' ratings of 55 taped interviews yielded significant kappas for current (.83) and past 5 years (.89) depressive diagnoses.

Current self-reported depressive symptoms at age 20 were based on the Beck Depression Inventory–II (BDI–II; Beck, Steer, & Brown, 1996). The BDI–II has excellent psychometric properties and is highly sensitive and specific for the detection of depressive disorders (e.g., Lasa, Ayuso-Mateos, Vazquez-Barquero, Diez-Manrique, & Dowrick, 2000).

Childbearing and current pregnancy status information was obtained from the age 20 interview of the youth. Measures of parenting quality in the young adults who had biological children in their care were based on the interviewer ratings of the Parenting scale of the Social Adjustment Scale (SAS; Weissman & Bothwell, 1976). Separate interviewers administered the SAS as an interview to the mother about the youth's parenting and to the youth about his or her own parenting. Adequate reliability and validity of the scales have been reported by Weissman and colleagues (Weissman & Bothwell, 1976; Weissman, Olfson, Gameroff, Feder, & Fuentes, 2001; Weissman, Prusoff, Thompson, Harding, & Myers, 1978). Mother- and youth-reported Parenting scale ratings of youth parenting were correlated ($r = .47$, $p < .001$).

Results

Selection Into Childrearing

There were 42 women who had children by age 20 (30 had one child, and 12 had two children) and 21 men with children (16 had

one child; 5 had two children). All of the women were living with their child(ren). Among the men, 16 had children in their care, and five were not living with the child. Young women were significantly younger at the birth of their (first) child ($M = 18.7$, $SD = 1.42$) than young men ($M = 19.7$, $SD = 0.95$), $t(60) = 3.12$, $p = .003$, Cohen's $d = 0.83$. See Table 1 for means and distributions.

Preliminary analyses explored the roles of socioeconomic status at age 15, indexed by family income, and conduct disorder; both variables have been found to predict teen pregnancy in the literature. Boys who had become parents in their teens came from families who had significantly lower family income at age 15 than did those with no children, $t(330) = 2.91$, $p = .04$. However, for women there was no significant difference in family income for those who did or did not have children, $t(347) = 1.91$, $p = .24$, and logistic regression analyses indicated that income did not affect the association between girls' early depression and childbirth, nor in other analyses was it related to age 15 interpersonal functioning or age 20 depression. Thus, income was included in subsequent analyses for men but not for women. For women, logistic regression analyses indicated that conduct disorder history was not predictive of childrearing, and after controlling for conduct disorder the effects of depression on childrearing remained significant ($Wald = 4.70$, $p = .030$, $OR = 2.27$, 95% CI [1.08, 4.76]). However, for boys, the effect of conduct disorder was significant ($Wald = 7.38$, $p = .007$, $OR = 8.38$, 95% CI [1.81, 38.86]), but the effect of early depression was not significant ($Wald < 1$, $p = .34$). Accordingly, where relevant, analyses on

Table 1
Descriptive Statistics on Childbirth Status by Age 20 and Depression by Gender

Variable	Had child	No children
Female, *n* (%)	42 (12)	320 (88)
Male, *n* (%)	21 (6)	323 (94)
Age at birth of child		
Female		
M (*SD*)	18.7 (1.42)	
Age ≤17, %	34	
18, %	24	
19, %	29	
20, %	13	
Male		
M (*SD*)	19.7 (0.95)	
Age ≤17, %	0	
18, %	24	
19, %	47	
20, %	29	
Diagnosis of depression by age 15		
Female, *n* (%)	13 (31)	57 (18)
Male, *n* (%)	2 (10)	27 (8)
Current BDI–II at age 20		
Female, *M* (*SD*)	13.3 (13.2)	7.4 (8.2)
Male, *M* (*SD*)	7.5 (7.2)	5.7 (7.2)
Current MDE at age 20		
Female, *n* (%)	10 (24)	33 (10)
Male, *n* (%)	2 (13)	21 (6)

Note. BDI–II = Beck Depression Inventory—Revised; MDE = major depressive episode.

the male sample but not the female sample controlled for youth conduct disorder by age 15.

Effects of youth depression status by age 15 on childrearing. Among the young women, logistic regression analyses indicated that there was a significant association between diagnosis of depression by age 15 and childrearing by age 20 ($Wald = 3.98$, $p = .046$, $OR = 2.07$, 95% CI [1.01, 4.22]). Among the young men, there was no significant association ($Wald < 1$, $p = .75$). Among young women with children, those with a history of depressive disorder by age 15 were marginally younger ($M = 18.1$, $SD = 1.7$) at first birth than those without depression histories ($M = 18.9$, $SD = 1.2$), $t(39) = 1.79$, $p = .08$ (two-tailed).

Interpersonal Difficulties as Mediator of the Association Between Early Depression and Childrearing

Interpersonal functioning at age 15 was tested as a mediator between history of depressive disorder by age 15 and childrearing by age 20. Because there was no association between young men's depression and later childrearing, the mediation analyses were conducted only for young women. A series of regression analyses was conducted to test associations between youth depression by age 15 and childrearing (logistic regression), youth depression and interpersonal functioning (ordinary least squares regression), and interpersonal functioning and childrearing (logistic regression). Youth depression was predictive of childrearing by age 20 ($Wald = 3.98$, $p = .046$, $OR = 2.07$, 95% CI [1.01, 4.22]), and of poorer interpersonal functioning at age 15 ($B = 1.32$, $SE = 0.195$; $t = 6.77$, $p < .001$). The association between interpersonal functioning at age 15 and childrearing was significant ($Wald = 4.10$, $p = .043$, $OR = 1.24$, 95% CI [1.01, 1.51]). In a logistic regression controlling for interpersonal functioning, depression by age 15 was no longer predictive of childrearing ($Wald = 1.38$, $p = .24$). An estimate of the indirect, or mediated, effect was calculated as the product of the coefficient of depression predicting interpersonal functioning at age 15 (path α) and the coefficient of interpersonal functioning at age 15 predicting childrearing, controlling for depression (path β; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Adjustments were made prior to the calculation in order to resolve the scaling issues introduced by combining coefficients from ordinary least squares and logistic regressions (MacKinnon & Dwyer, 1993), and the product of $\alpha\beta$ was tested by the Sobel statistic (1.95, $p = .05$). Thus, the results were consistent with the hypothesis that the influence of early depression on childrearing before age 20 is mediated by interpersonal dysfunction at age 15.

Childrearing, Current Depression, and Parenting

Analyses of the association between current depression symptoms at age 20 and having a child were conducted separately by gender. As shown in Table 1, young women who had care of their child(ren) had significantly higher BDI–II depression scores at age 20 ($M = 13.31$, $SD = 13.22$) than did those who did not have children ($M = 7.37$, $SD = 8.24$), $t(330) = 3.89$, $p < .0001$, Cohen's $d = 0.54$. Young men with children in their care were no more depressed ($M = 7.5$, $SD = 7.21$) than those with no children ($M = 5.73$, $SD = 7.17$), $t(293) < 1$, *ns*. Regarding current

diagnoses of depression, logistic regression analyses indicated that young women with children were also significantly more likely to be depressed (MDE, dysthymic disorder, or both) at age 20 than those without children (24% vs. 10%; *Wald* = 6.06, *p* = .014, *OR* = 2.72, 95% CI [1.23, 6.03]). There was no significant association between current depression and having a child among men (*Wald* < 1, *p* = .355).

The next goal was to evaluate the contribution of childbirth to current depression (or in effect, recurring depression) beyond the effects of early depression history. A multiple regression analysis was computed to predict women's BDI–II scores at age 20 as a function of women's childbirth status, early depression status, and their interaction. The purpose of testing the interaction was to determine whether depression vulnerability to the stress of having a child is greater among young women with histories of prior depression. Prior depression, R^2 = .066, $F(1, 330)$ = 23.25, *p* < .0001, and childrearing, R^2 = .098, ΔR^2 = .032, $F(1, 329)$ = 11.60, *p* < .001, both significantly predicted current BDI–II scores for the young women. The interaction also accounted for a significant increment in variance after the main effects were entered, R^2 = .111, ΔR^2 = .014, $F(1, 328)$ = 5.08, *p* = .025. Figure 1 illustrates the interaction, indicating that girls' diagnoses of depression by age 15 predicted worse depression symptoms at age 20 primarily for those young women who had children.

Logistic regression analyses were also employed to test the associations of early onset depression and having a child, and their interaction, on current depression diagnoses at age 20. Significant effects were observed for having experienced prior depression (*Wald* = 7.86, *p* = .005, *OR* = 2.70, 95% CI [1.35, 5.41]) and having a child (*Wald* = 4.46, *p* = .035, *OR* = 2.41, 95% CI [1.07, 5.44]), but the interaction effect was not significant. With respect to the male sample, because childrearing status was unrelated to men's depression, no parallel analyses were conducted.

Ratings of parenting effectiveness associated with current depression diagnoses were obtained from the SAS administered to the youth and their mothers for those who had children. Only two men with children had current depression diagnoses, so analyses were performed on women only. As reported in Table 2, a comparison among currently depressed versus nondepressed young women with children indicated that depressed young women rated themselves as having significantly worse parenting experiences than did nondepressed young women, $t(45)$ = 4.13, *p* < .0001, Cohen's *d* = 1.5. Thirty-two percent of those depressed rated themselves in the range of mild maladjustment to marked maladjustment in parenting. Similarly, comparisons based on ratings by the mothers of the young women also showed that those who were currently depressed functioned significantly worse in the parenting role than did nondepressed young women, $t(40)$ = 3.23, *p* < .002, Cohen's *d* = 0.83, with 24% rated by their own mothers as having mild to very marked maladjustment in parenting.

Association Between (Grand)mother Depression and Youth Childrearing and Depression

Logistic regression analyses indicated that daughters of depressed (grand)mothers were not significantly more likely to be a parent by age 20 than daughters of never-depressed mothers (14.4% vs. 9.4%; *Wald* = 2.12, *p* = .145). There were no group differences for men (*Wald* < 1, *p* = .413). However, among women with children, daughters of depressed (grand)mothers were significantly younger at the birth of their child (*M* = 18.2, *SD* = 1.44) than daughters of nondepressed (grand)mothers (*M* = 19.2, *SD* = 1.24), $t(39)$ = 2.28, *p* = .028, Cohen's *d* = 0.69.

Grandmother depression status was also examined as a predictor of youth depression in the parenting role. Logistic regression analyses examined associations between the girls' presence/absence of current diagnoses of depression at age 20 and childrearing status. Among offspring of depressed (grand)mothers, having a child was significantly more likely to be associated with current depressive diagnoses (*Wald* = 7.41, *p* = .006, *OR* = 4.03, 95% CI [1.48, 11.01]), but among daughters who were offspring of nondepressed women, there was no association between childbirth and depression diagnoses (*Wald* < 1, *p* = .861). Specifically, among adolescent women with children, those who were themselves daughters of depressed (grand)mothers had a significantly higher rate of current major depressive disorder (34.8%) compared with daughters of nondepressed women (10.5%). However, when controls for girls' early depression history were added, logistic regression analyses indicated that (grand)maternal depression was no longer a significant predictor of depression diagnosis (*Wald* = 1.477, *p* = .224), but having a child (*Wald* = 3.965, *p* = .046, *OR* = 2.035, 95% CI [1.01, 5.24]) and prior depression history (*Wald* = 7.176, *p* = .007, *OR* = 2.599, 95% CI [1.29, 5.23]) remained significant predictors of current depressive diagnoses. Among men, childrearing status was unrelated to depression diagnoses for sons of both depressed (grand)mothers (*Wald* < 1, *p* = .684) and of nondepressed (grand)mothers (*Wald* < 1, *p* = .364).

Multiple regression analyses also examined predictors of current BDI–II scores among women who were daughters of depressed or nondepressed mothers, first controlling for youth early depression, then entering (grand)maternal depression history, whether the daughter had a child, and the interaction of maternal depression and child status. After controlling for early depression history, there were significant main effects of (grand)maternal depression status, ΔR^2 = .033, $F(1, 329)$ = 12.02, *p* < .001, and childrearing, ΔR^2 = .028, $F(1, 328)$ = 10.64, *p* < .001, but the interaction did not add a significant increment after the main effects were entered,
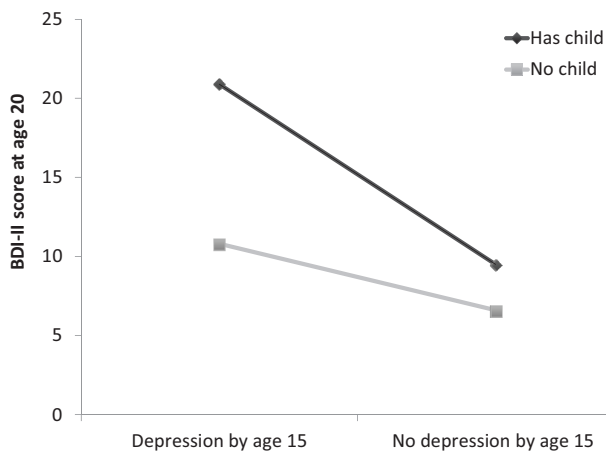

Figure 1. Girls' depression score (Beck Depression Inventory—Revised [BDI–II]) at age 20 as a function of childrearing and early depression diagnosis by age 15.

Table 2
Social Adjustment Scale: Young Women's Parenting at Age 20

Social Adjustment Scale—Parenting scale	Depressed young mothers, M (SD)	Nondepressed young mothers, M (SD)	Comparison between depressed and nondepressed groups
Self-report	3.3 (0.95)	2.1 (0.80)	$t(45) = 4.13, p = .0001$
(Grand)mother-report	3.3 (2.11)	2.0 (0.73)	$t(40) = 3.23, p = .002$

$\Delta R^2 = .0001$, $F(1, 327) < 1$, $p = .67$. Figure 2 displays the means of the groups adjusted for the effects of early onset depression.

Regression analyses to predict boys' age 20 BDI–II scores showed that after controls for prior depression history, family income, and conduct disorder were added, there were no significant effects of maternal depression or childbirth status on current depression (all ΔR^2s $\leq .001$, *ns*).

Discussion

The current study explored a broad facet of stress generation, namely, selection into potentially problematic life circumstances that may be stressful and contribute to depression and dysfunction. Specifically, the present study examined the factors that predict early childbirth (before age 20) and its consequences. The results supported the hypothesis based on prior research on stress generation that young women with previous histories of depression by age 15 have higher rates of early childrearing compared with those with no early history of depression. In contrast to the generation of acute life events, the "creation" of a stressful context may affect multiple relationships and entail enduring challenges and demands that unfold over time and permeate daily life—in other words, create a potentially adverse lifestyle. In keeping with the interpersonal perspective on depression, we found support for the hypothesis that girls' interpersonal dysfunction at age 15 is a mediator of the link between youth early depression and childrearing. Also as predicted, early childrearing is indeed a challenging experience that is associated with elevated rates of depressive symptoms and diagnoses of depression in women. Moreover, young depressed mothers have significantly more difficulties in parenting as reported by both themselves and their own mothers.
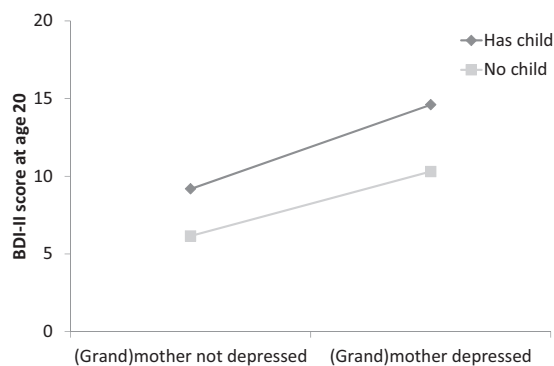

Figure 2. Girls' depression score (Beck Depression Inventory—Revised [BDI–II]) at age 20 as a function of childrearing and (grand)mother depression status.

Finally, aspects of the intergenerational transmission of depression were illuminated. Results indicated that (grand)mothers' depression plays a role in the chain of events associated with early childrearing, and depression and parenting difficulties in young mothers. Although (grand)mother depression did not predict higher rates of young childrearing in daughters, it predicted elevated depression scores associated with parenting beyond the effects of early onset depression. A key aspect of the intergenerational transmission of depression appears to be interpersonal impairments and early onset depression especially in daughters, which in turn are risk factors for young childrearing and for being depressed and impaired in the maternal role.

In all of the analyses, gender differences were explored, and the predicted patterns were seen for young women but not young men. Men's having children was associated with lower family socioeconomic status and conduct disorder, but not depression, whereas these predictors were reversed for young women. The finding that men's depression was not related to early parenthood, but conduct disorder was related, is similar to results from the National Comorbidity Survey (Kessler et al., 1997). However, caution is in order given the small sample of young men with children—and especially of those with conduct disorder—in the current sample. The small sample precluded further analyses of mediating processes, but findings suggest that further study of young parenthood in men, and its relevance to stress generation processes and to maternal psychopathology, is warranted.

Depression in young women by age 15 is a risk factor for early childbirth by age 20. This result is consistent with several prior studies that have found that youth depressive symptoms or diagnoses predicted early pregnancy or childbirth (e.g., Fergusson & Woodward, 2002; Kessler et al., 1997), although other research has shown associations with externalizing/conduct disorders rather than depression (e.g., Bardone et al., 1998; Kovacs et al., 1994), consistent with patterns for men observed in the present study. Limited numbers of girls with conduct disorder in the present study may have precluded detecting such patterns.

The results support the expansion of the construct of stress generation beyond the initial focus on associations between a previous history of depression and subsequent elevated rates of acute negative life events (Hammen, 1991). The current study extends the predictions of stress generation models to suggest that selection into potentially chronically stressful life circumstances may also be a high-risk outcome of depression history, perhaps particularly of early onset depression in young women. Elsewhere we have also shown that young women with histories of early onset depression select themselves into maladaptive romantic relationships in which they have an increased likelihood of being victims of severe domestic violence (with legal and medical involvement; Keenan-Miller et al., 2007). Maladaptive partner se-

lection with violent discord and early childrearing are two areas that may have long-term stressful, disruptive, and threatening consequences. The creation of a parenting relationship with a child is certainly challenging. Women who are teens at the birth of a first child may face a cascade of stressors that could include stressful home environments and difficulties in parenting skills, and as well as educational, financial, and occupational disadvantage (e.g., Fergusson & Woodward, 1999; Jaffee et al., 2001). Thus, becoming a mother at a young age is commonly fraught with stressful challenges that may increase the likelihood of psychological maladjustment.

Although we use the term *selection* into stressful circumstances (e.g., Kendler, Karkowski, & Prescott, 1999), it is not meant to imply conscious or deliberate action, and it is certainly not a single decision but a complex set of choices and actions that likely differ from person to person. Considerable research has shown varied predictors of different reproductive decisions and behaviors in teens (e.g., age and nature of sexual activity, contraception use, number of partners, pregnancy, sexually transmitted diseases), but we agree with the authors of recent reviews who noted that understanding the mechanisms by which these predictors operate remains a further stage of research (e.g., Gloppen et al., 2010; House et al., 2010; Markham et al., 2010).

In the present study we also tested the hypothesis of a mediating role of interpersonal difficulties at age 15 as a link between early depression and early childrearing in women. The significant mediating effect is consistent with the hypothesis that difficulties in peer, family, and romantic relationships not only predict future depression outcomes but also predict creation of social environments that are contentious and demanding. Such patterns are evident by at least age 15, but in fact may be developing from a young age and over a long period of time. It may be speculated that such patterns reflect dysfunctional attachments in the family, exposure to conflict in intimate relationships, and maladaptive models of social problem solving—and may also reflect temperament and personality predispositions. Further study is needed to explicate how interpersonal difficulties and depression may eventuate in pregnancy and the decision to give birth, and such research should consider social–cognitive processes, interpersonal skills, problem solving, and the role of supportive resources (or lack thereof) among the many factors that come into play.

A further implication of the stress generation model is the vicious cycle of depression–stress–depression. The pattern is illustrated in the present study, revealing that those girls who were depressed by age 15 and who had babies at an early age were more likely to experience depression symptoms and recurrent diagnoses at age 20 than those who did not have children early. BDI–II scores showed an interaction effect such that childrearing was particularly strongly associated with current symptoms for those women with early onset depressive disorders, possibly indicating heightened sensitivity to stressors among those with early onset depression.

In addition to illustrating the vicious cycle of depression–stress– depression that portends chronic and recurrent depression, the results also highlight an important mechanism of the intergenerational transmission of depression. The current study captures the dysfunctional parenting of young depressed mothers, many of whom are offspring of depressed (grand)mothers. For those daughters of depressed (grand)mothers who have a child and who are depressed, their parenting may also contribute to the eventual transmission of depression and maladjustment in their own children. Daughters of depressed (grand)mothers were not more likely to bear children than daughters of nondepressed (grand)mothers, but they were significantly younger at the birth of a first child than daughters of nondepressed (grand)mothers. Also, daughters of depressed (grand)mothers who had a child were more likely to be depressed at age 20 than daughters of nondepressed (grand)mothers who had a child. In addition to contributing to earlier age of childbearing and greater depression associated with childrearing, having a depressed (grand)mother also contributed in two indirect ways. (Grand)maternal depression contributed to youth depressive diagnoses by age 15 and also to more maladaptive interpersonal functioning at age 15, both factors in predicting early childbirth. These findings are all consistent with a large body of evidence of mother to child transmission of risk for depression (e.g., reviewed in Goodman, 2007; Hammen, 2009) and with emerging studies of patterns of depression and disorder in three generations (e.g., Pettit, Olino, Roberts, Seeley, & Lewinsohn, 2008; Weissman et al., 2005). In much of the research on intergenerational transmission of depression, a key mechanism appears to be dysfunctional parenting (e.g., Goodman, 2007). The current study does not report on psychological maladjustment in the offspring of young children of depressed daughters of depressed (grand)mothers. However, it does illustrate the risk for dysfunctional parenting, especially among those young women who are currently depressed—a pattern that could portend maladjustment in the young children.

Gender differences consistently indicated more associations of depression with having children for women than men. As noted, the sample size of men who became parents was small, and a larger sample may yield different findings. However, there are reasons to speculate that the gender differences reflect several factors that put young women at greater risk: They typically have more control and more responsibility for decisions about childbearing after becoming pregnant and certainly may have more responsibility for day-to-day care of infants, especially in nonmarital situations. Also, women are more susceptible to depressive reactions to stress; daughters of depressed women, more than sons, experience greater likelihood of early onset recurrent depression (Hammen, Brennan, Keenan-Miller, & Herr, 2008). Young women with interpersonal difficulties may be more likely to perceive the parenting role as a desirable and available option than young men would. However, men with depression histories may have different pathways to stress generation in selecting maladaptive environments, and further study of such choices is needed.

It must be clearly acknowledged that early childrearing is by no means a negative outcome for many women. Yet selection into early parenting may be problematic for some youth, with consequences including depression, parenting impairment, and adverse economic and social outcomes (Fergusson & Woodward, 1999; Jaffee et al., 2001; Meade et al., 2008). Further study is warranted that attempts to clarify the conditions under which such families may thrive rather than experience dysfunction. Moreover, it is noted that the present results may not necessarily generalize to different cultural contexts. In Australia, where the current study was conducted, the sample was predominately White, and there is less concern for the issue of teenage childbirth at the level of public policy, compared with the United States and some other Western nations, according to a United Nations Children's Fund (UNICEF) report (Shaw, Lawlor, & Najman, 2006; UNICEF,

2001). Nevertheless, the current study indicates problematic potential outcomes for parents and their children stemming from early childrearing among youth with early onset of depression in young adolescence. It is possible that results might be different in U.S. samples where teen births are considered to be a significant public health concern and are more heavily concentrated in non-White populations where poverty is high and access to supportive care and medical services is inadequate. Socioeconomic status factors were not significantly related to early birth in the female Australian youth population, which was relatively economically and racially homogeneous. Conceivably, greater social disadvantage and different ethnic and cultural experiences could play more of a role than depression in predicting early childbirth, and thus it is unclear whether the results of the present study would generalize to non-White or economically more disadvantaged groups.

Several further limitations of the current study are acknowledged. The childrearing sample included those with births by age 20; findings based on younger samples might yield different patterns. Parenting data were limited to self- and (grand)mother-reports, rather than observations, and also no behavioral or developmental data on the babies themselves were available. The construct of interpersonal functioning at age 15 was based on a composite of indicators of functioning in various social roles, but more specific probes of the kinds of interpersonal behaviors that are predictive of selection into childrearing are needed. Similarly, the current study focused on the role of youth and (grand)maternal prior depression in the pathway to childrearing by age 20 and its consequences, but obviously multiple factors that were not the focus of the present study are likely to also play a role, including educational attainment, (grand)mothers' own early childrearing, other forms of psychopathology, social supports, and quality of the relationship with the baby's father. Moreover, it is likely that various factors in the mothers' lives at age 20, in addition to having a child, affect the occurrence of depression. In future studies, more complete models of prediction of depression in young mothers should include quality/presence of intimate and supportive relationships, living conditions, and income, among others.

Despite caveats about its generality to men and non-White samples, the study contributes to further understanding of one of the deleterious correlates of depression: its tendency to contribute to the creation of acute stressors and problematic life contexts that portend further depression and stress. There are several notable clinical implications. Diagnoses of depression by age 15 are a risk factor identifying young women who may need to be targeted for treatment and prevention of depression. Specifically, they also may be at risk for interpersonal difficulties that can lead them to select into challenging life situations that portend further depression. Early onset depression is commonly accompanied by difficult and stressful family and peer relationships that may overwhelm youths' coping capabilities, so that interventions are needed that treat not just the depression but also the underlying vulnerabilities and skill deficits. The study also underscores the risks to offspring of depressed mothers, especially to daughters of depressed women who suffer from early onset depression and interpersonal difficulties. Depression may continue to run in families, unless deflected with interventions that identify youth at risk at early ages (e.g., Compas et al., 2009; Garber et al., 2009). The current study also highlights the potential impact of young women's depression on their parenting skills, with the threat of maladjustment in the

children who are exposed to significant nonoptimal parenting. Thus, early childrearing in girls at risk for depression might be a particularly high-risk situation for both the welfare of the young mother and her child. Programs for low-income mothers who have high levels of risk factors, such as assistance that provides integrated psychological care and supportive services, might serve as models for intervention (e.g., Ammerman, Putnam, Bosse, Teeters, & Van Ginkel, 2010).

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