
Does an Unplanned Pregnancy Have Long-Term Implications for Mother–Child Relationships?

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Abstract

The effect of pregnancy planning on the quality of mother–adolescent relationships 15 years later was examined among 373 first-time parents and 472 experienced parents using a mediated moderation model. Among first-time mothers only, the experience of an unplanned pregnancy was related to higher maternal depressive symptoms when mothers also experienced high parenting stress over the first three years. High maternal depressive symptoms over those early years were, in turn, related to more conflict and hostility in the parent–adolescent relationship according to mother and adolescent reports. Additionally, interactions between parity and pregnancy planning revealed that experienced mothers with unplanned pregnancies had the most early parenting stress, although an unplanned pregnancy and high parenting stress did not predict higher depressive symptoms for these mothers as it did for first-time mothers. The findings provide support for the importance of early parenting emotions and experiences on later parent–adolescent relationship quality.

Keywords

pregnancy planning, mother–adolescent relationship, mediated moderation, depressive symptoms, parenting stress

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Emotions are at the core of the parent-child relationship, reflecting both an overall caregiving environment and the quality of the relationship. One of the earliest emotions a mother experiences regarding her parenting role occurs when she discovers she is pregnant. For many mothers (and fathers as well), this discovery elicits intense positive emotion, especially if the pregnancy is planned. When parents have not planned the pregnancy, their emotions depend on their appraisals of the obstacles and supports accompanying the pregnancy (Dix, 1991). Parents who experience negative emotions regarding their unexpected parenting role and are unable to organize and cope with their emotions may establish a pattern of negativity that persists over time and is reflected in the quality of the parent-child relationship. The present study focuses on the processes and conditions under which such a pattern may occur and how it may affect the emotional quality of the mother-child relationship over time.

The Importance of Early Experiences on Later Relationship Quality

Developmental theorists have long acknowledged that the quality of the parent-child relationship has roots in early experiences (Ainsworth, 1973). It has been suggested that early experience has a special significance for children and parent-child relationships because of its place in the course of development (Sroufe, Egeland, Carlson, & Collins, 2005). This is not to say that later experience is inconsequential, but that some early experiences may have a particularly strong impact on relationship development or create a pattern of interaction. Empirical work has demonstrated that higher maternal depressive symptoms in infancy are related to more hostile behavior in children at age 5 years (Lyons-Ruth, Alpern, & Repacholi, 1993) and less maternal sensitivity and more intrusiveness during mother-child interactions at age 7 years (Easterbrooks, Biesecker, & Lyons-Ruth, 2000). Additionally, mothers' high parenting stress during infancy has been linked to more behavior problems in their 7-year-old children (Saylor, Boyce, & Price, 2003). The current study responds to a call to explain links between early and later experience by examining the processes and mechanisms that make the linkage possible (Sroufe et al., 2005).

Pregnancy Planning, Parenting Stress, and Depressive Symptoms

In 2001, almost half of all pregnancies in the United States were unplanned (Finer & Henshaw, 2006). Although many families are able to adapt to these

unexpected circumstances (Hilliard, Shank, & Redman, 1982), it has been shown that women experiencing unplanned pregnancies are more likely to display self-blame, negative feelings toward the baby, and higher perceptions of stress (Bouchard, 2005; Hilliard et al., 1982; Orr & Miller, 1997). Likewise, the experience of an unplanned birth has commonly been linked to higher maternal depressive symptoms (Bouchard, 2005; Orr & Miller, 1997), which have, in turn, been associated with a number of negative outcomes for children and parent-child relationships, such as decreased cognitive and social-emotional development in children over the preschool years (Feldman & Eidelman, 2009) and low-quality mother-child bonding (Moehler, Brunner, Wiebel, Reck, & Resch, 2006).

Few studies have explored factors that may explain the processes or the conditions under which unplanned pregnancies are related to higher maternal depressive symptoms. Distress regarding one's family relationships has been proposed as a possible intervening factor, although its role as a mediator has not been supported (Leathers & Kelley, 2000). A significant positive association between family-related stress and depressive symptoms has been demonstrated among women experiencing first-time, unplanned pregnancies, and parenting stress has also been shown to increase the severity of depressive symptoms in the 2 years after childbirth (Horowitz & Goodman, 2004). It seems likely that mothers who did not plan their pregnancies and also perceive the parenting role to be highly stressful are more likely to experience depressive symptoms. Parenting stress in particular, as opposed to other stressors mothers may experience, has been shown to be associated with negative perceptions of children (Renk, Roddenberry, Oliveros, & Sieger, 2007). The moderating effect of parenting stress on the relation between pregnancy planning and maternal depressive symptoms has not been tested previously and will be explored in the current longitudinal study.

Emotional Quality of the Parent-Adolescent Relationship

Previous research on outcomes associated with unplanned pregnancy has typically spanned no more than a period of 6 months (Leathers & Kelley, 2000). In the current study, we test the potential longevity of effects over 15 years by examining the emotional quality of the mother-adolescent relationship.

Although adolescents become increasingly independent, parents' emotions remain an important influence in their development. At this stage, the emotional climate of the home environment, specifically within the parent-child relationship, assumes greater importance. For example, a general acceptance and support of both positive and negative emotions from parents has been associated with less anxiety and depression in adolescents (Stocker,

Richmond, Rhoades, & Kiang, 2007). Similarly, a nonhostile expressive home climate has been found to provide a buffer against early adolescent psychological problems and also relate to popularity and positive self-image (Bronstein, Fitzgerald, Briones, Pieniadz, & D'Ari, 1993).

During the adolescent period, emotional exchanges between parents and teens and perceptions of relationship quality must take into account the increasingly active role of adolescents. Because teens are spending more time away from home and receiving more emotional support from friends, emotional interactions with parents depend more on the adolescent's initiation and use of the parent as an emotional resource (Katz & Hunter, 2007). In addition to the active role adolescents play in shaping the affective environment of the home, they also have a unique perspective about the quality of parent-child relationships. Adolescent and parent perceptions of family relationships have been shown to differ in past research (Feldman, Wentzel, & Gehring, 1989; Ohannessian, Lerner, Lerner, & von Eye, 2000), and these disagreements have been identified as developmentally useful as adolescents' independence and autonomy increases in the family (Steinberg, 1990). For these reasons, mother- and adolescent-reports of their relationship quality were incorporated into the current study.

Recent research has suggested the importance of examining both positive (warmth and intimacy) and negative (conflict) dimensions as indicators of parent-child relationship quality. Positive perceptions from adolescents regarding the degree of warmth in their relationships with mothers and fathers has been found to predict less relational aggression between siblings (Updegraff, Thayer, Whiteman, Denning, & McHale, 2005), whereas negative perceptions predict adolescent aggression, delinquent behavior, and low self-esteem (Wissink, Deković, & Meijer, 2006). Thus, in the present study, we contribute to the literature by examining both positive and negative dimensions of the emotional quality of the parent-adolescent relationship using perceptions from mothers and their children.

The Role of Parity

Research to date has not explored whether the experience of an unplanned pregnancy differs substantially depending on whether a mother is having her first child or an additional child. The transition to parenthood has been examined as an important developmental stage for parents (Antonucci & Mikus, 1988), creating changes in parents' personal well-being (Keeton, Perry-Jenkins, & Sayer, 2008). Pregnancy planning has been shown to influence the way parents experience this transition (Bouchard, Boudreau, & Hébert,

2006); unfortunately, previous research on psychosocial consequences following an unplanned pregnancy has tended to focus only on first-time parents (Bouchard, 2005; Leathers & Kelley, 2000) or has not distinguished between the experiences of first-time versus experienced parents (Moos, Petersen, Meadows, Melvin, & Spitz, 1997; Orr & Miller, 1997). Experienced and inexperienced parents tend to encounter the same amount of parenting stress after the birth of a child (Krieg, 2007), although postpartum depressive symptoms have been shown to relate to more negative perceptions of well-being for first-time mothers than experienced mothers (Boyce et al., 2000). Pregnancy planning has not been examined in this literature, despite the likelihood of more maternal stress and depressive symptoms when pregnancies are unplanned (Bouchard, 2005). It is possible that first-time unplanned parents will experience more of these symptoms as they adjust not only to an unexpected pregnancy but also to a new role as a parent. Alternatively, experienced parents may report more parenting stress and depressive symptoms after an unplanned birth because of an increase in existing parenting demands. The interaction between parity and pregnancy planning will be explored.

Goals of the Current Study

Our goal in the current project is to determine whether an unplanned pregnancy colors the mother-child relationship over the long term. We look across 15 years examining processes that may explain the relationship between experiencing an unplanned pregnancy and mother-child relationship quality in adolescence. If women facing an unplanned pregnancy are more likely to experience negative feelings related to motherhood, additional stressors in the early years, particularly those related to their unanticipated parenting status, are likely to create greater negativity than that experienced by mothers who planned their pregnancies. In the current project, we explore consequences of an unplanned pregnancy for later mother-adolescent relationship quality, examining the mediating role of maternal depressive symptoms and the moderating role of early parental stress. We test these associations for first-time mothers and experienced mothers separately to determine whether their experiences differ. Additionally, we explore whether the relation between pregnancy planning and either maternal parenting stress or depressive symptoms differs for first-time versus experienced mothers.

The hypothesized model describing the relations between pregnancy planning, parenting stress, depressive symptoms, and mother-adolescent relationship quality examined among first-time and experienced mothers is

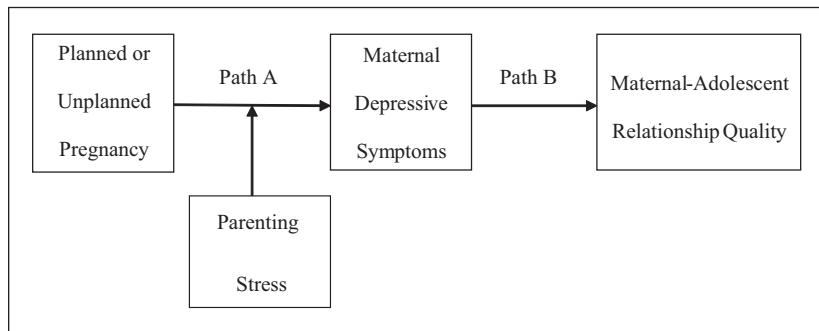


Figure 1. Hypothesized model

shown in Figure 1. We predict a significant interaction between pregnancy planning and parenting stress in predicting depressive symptoms; the experience of an unplanned pregnancy will be related to higher maternal depressive symptoms over the early years of the child's life for mothers that also experience high parenting stress over those early years. Furthermore, we hypothesize that maternal depressive symptoms will, in turn, be associated with mother-child relationship quality in adolescence; mothers that experience high depressive symptoms during the early years of the child's life will experience more negative and less positive mother-adolescent relationships. The role of parity is examined by testing the model separately for first-time and experienced mothers.

Method

Participants

Participants were enrolled in the National Institutes of Child Health and Human Development Study of Early Child Care and Youth Development (SECCYD), a prospective longitudinal study conducted at 10 research sites across the United States starting in 1991. During selected 24-hour intervals, all women giving birth were screened for eligibility and willingness to be contacted. Of the 8,986 mothers who gave birth during the sampling period, 5,416 (60%) agreed to be telephoned and met the eligibility requirements. Families were excluded if the mother was younger than 18 years; the family planned to move; there was a multiple birth; the infant had a known disability

or remained in the hospital more than 7 days; or the mother acknowledged substance abuse, did not speak English, or lived more than an hour from the laboratory site. A conditionally random sample of 3,015 was then selected (56%) for a 2-week phone call. The conditioning assured adequate representation ($\geq 10\%$) of single mothers, mothers without a high school degree, and ethnic minority mothers (not mutually exclusive). A total of 1,525 families were selected for the call as eligible and agreed to an interview. From that group, 1,364 families became study participants on completing a home interview when their infants were 1-month old. The recruited sample consisted of 52% boys, 24% children of color, 45% first-born children, 11% mothers not completing high school, and 14% single-parent families.

The analysis sample in the present report includes 373 first-born children and their families and 472 later-born children and their families. Criteria for inclusion in the sample were complete data on the dependent measures of parent–adolescent relationship quality at 15 years and the 1-month assessment item indicating whether the pregnancy was planned. Of the 373 first-born children who met the criteria, 49% were female, and 76% were White, non-Latino. Of the 472 later-born children, 52% were female, 77% were White, non-Latino, 62% had one sibling living in the home, 25% had two siblings, and 13% had three or more siblings. In the first-born sample, 41% of the target pregnancies were unplanned; in the later-born sample, 38% were unplanned. Mothers having their first child and mothers with unplanned pregnancies both spent less time partnered over the child's first 3 years, were younger, and had higher average family income-to-needs ratios over the first 3 years (see Table 1).

Procedure

Participating families reported demographic information and completed questionnaires during a home visit when the child was approximately 1 month old. Additional assessments at 6, 15, 24, and 36 months took place at home and in the laboratory where participants updated demographic information, completed questionnaires, and engaged in observational tasks. Assessments continued at regular time intervals until ninth grade when study children were approximately 15 years old ($M = 179.77$ months, $SD = 1.92$ months) resulting in 17 waves of data collection. At this point, mothers completed questionnaires and adolescents responded to computerized presentations of questionnaires about parent–child relationships.

Table I. Demographic Comparisons

Variable	First-Born						Later-Born						First-Born						Later-Born					
	First-Born		Later-Born				Planned		Unplanned				Planned		Unplanned				Planned		Unplanned			
	M	SD	M	SD	t		M	SD	M	SD	t		M	SD	M	SD	t		M	SD	M	SD	t	
Proportion of time partnered (6-36 months)	0.83 (0.34)	0.89 (0.27)	-3.03***	0.94 (0.18)	0.65 (0.44)		-8.81**		0.95 (0.18)	0.79 (0.35)		-6.40***												
Maternal age	27.55 (5.47)	30.00 (5.18)	-6.66***	29.26 (5.03)	25.10 (5.14)		-7.77**		30.78 (4.86)	28.73 (5.43)		-4.27**												
Income-to- needs ratio (6-36 months)	4.28 (3.12)	3.46 (2.53)	4.19***	5.21 (3.22)	2.93 (2.40)		-7.41**		4.09 (2.79)	2.42 (1.53)		-7.32**												

*** $p < .01$.

Measures

Pregnancy planning. At the 1-month assessment, mothers were asked to report whether they and the child's father planned, expected, or hoped for their pregnancy. These reports were coded 0 if *neither the mother nor the father planned for the birth of the study child* and 1 if *both parents planned the birth (or that the mother planned the pregnancy but was no longer involved with the baby's father)*. Partnered participants who reported that one parent planned the birth while the other did not ($n = 57$) were dropped from the sample because of the fact that the meaning of these responses is unclear.

Maternal parenting stress. Mothers completed a 30-item, shortened version of the 101-item Parenting Stress Index (PSI; Abidin, 1983) at the 6-month assessment. The PSI is designed to identify stress associated with parenting an infant and risk for development of dysfunctional parenting. The measure has demonstrated adequate reliability and discriminant validity in several studies (see Abidin, 1990). After the 6-month assessment, the PSI was no longer administered to mothers in the SECCYD; instead, mothers reported on parenting stress at the 15-, 24-, and 36-month assessments using a shortened version of the 30-item Parent Role Quality Scale (Barnett & Marshall, 1991). The adaptation consists of 10 negative, or concern, items, and 10 positive, or reward, items. Respondents are asked to indicate on a 4-point scale to what extent each item is a concerning or rewarding part of their experiences as parents. Internal reliability, test-retest reliability, and predictive validity have been demonstrated by scale authors (Barnett & Marshall, 1991). Parenting stress scores from assessments at 6, 15, 24, and 36 months were standardized and then averaged to create a total score over the first 3 years of the child's life. Alphas ranged from .79 to .80 over the four assessments. Pearson correlations between assessments ranged from .36 to .63 (all $p < .01$), with a correlation of .41 ($p < .01$) for 6- and 15-month assessments when the measure change occurred.

Maternal depressive symptoms. The Center for Epidemiological Studies–Depression Scale (CES-D; Radloff, 1977) is a self-report scale intended to measure symptoms of depression in nonclinical populations. Participants rated the frequency of 20 symptoms during the past week as *rarely or none of the time (less than 1 day)*, *some or a little of the time (1-2 days)*, *occasionally or a moderate amount of time (3-4 days)*, or *most or all of the time (5-7 days)*. Scores can range from 0 to 60, with a score of 16 identified as a cutoff for potential clinical problems. Higher scores indicate higher levels of depressive symptomatology. Internal reliability for the CES-D has been demonstrated across ethnic groups (Roberts, 1980) and concurrent validity has been established

with other depression scales (Radloff, 1977). Depressive symptoms scores from assessments at 6, 15, 24, and 36 months were standardized and averaged. Alphas ranged from .89 to .91 over the four assessments. Pearson correlations between assessments ranged from .46 to .58 (all $p < .01$).

Mother–adolescent relationship quality. Mothers and adolescents reported separately on their perceptions of the quality of the mother–adolescent relationship. Mothers completed the Child–Parent Relationship Scale—short form (adapted for parents from the Student–Teacher Relationship Scale; Pianta, 1992), which includes 15 items scored on a 5-point Likert-type scale. Two subscales are derived from this measure. The 7-item conflict scale scores could range from 7 to 35 with higher scores indicating more conflict between mothers and the study child ($\alpha = .87$), and the 8-item closeness with child scale scores could range from 8 to 40 with higher scores indicating more mother–child closeness ($\alpha = .78$). Adolescents separately completed the Getting Along With My Parent Questionnaire (Conger & Ge, 1999; Conger, Wallace, Sun, McLoyd, & Brody, 2002), which includes 17 items about the relationship with the mother scored on a 4-point Likert-type scale. Adolescents reported on mothers' warmth and support (9 items, $\alpha = .92$) and hostility (8 items, $\alpha = .79$). Warmth and support scores could range from 9 to 36, with higher scores indicating the perception of a warmer, more supportive parent–adolescent relationship. Hostility scores could range from 8 to 32, with higher scores indicating greater hostility in the parent–adolescent relationship.

Correlations were statistically significant between mothers' reports of conflict and adolescents' reports of hostility, $r(845) = .28$, $p < .01$, and between mothers' reports of closeness and adolescents' reports of warmth and support, $r(845) = .29$, $p < .01$. Thus, mothers' and adolescents' reports were standardized and summed to create two dyadic composite scores, one representing negative perceptions and one positive perceptions of the quality of the relationship.

Covariates. To determine whether demographic variables needed to be included as covariates in the analyses, we examined the relation between demographic and study variables. Maternal age, family income-to-needs ratio, and proportion of time the mother was partnered were related to pregnancy planning as well as negative mother–adolescent relationship quality. The current covariates are consistent with previous research that has consistently found these demographic factors to contribute to the likelihood of an unintended pregnancy (Bouchard, 2005; Orr & Miller, 1997). Maternal age at the time of the child's birth was used, family income-to-needs ratios were averaged across the first 3 years of the child's life (6, 15, 24, and 36 months),

and partner status was indexed by the proportion of time the mother was partnered during the first 3 years.

Analysis Plan

Preliminary analyses were conducted to examine the frequencies, distributions, and correlations for all study variables. Next, the role of pregnancy planning and parity was further explored by testing the interaction in predicting parenting stress and depressive symptoms. Third, the mediated moderation model was tested among the first- and later-born samples separately for positive and negative relationship quality perceptions. For results to support mediated moderation, two significant effects must be present: the interaction effect must be a significant predictor of the proposed mediator variable (Path A in Figure 1), and the mediator must be a significant predictor of the proposed dependent variable (Path B in Figure 1). When the conditions were met for mediated moderation (see Morgan-Lopez & MacKinnon, 2006), or conditional indirect effect, bootstrapping, a resampling procedure, was used to assess the significance of the indirect effect using the SPSS macro available from Preacher, Rucker, and Hayes (2007). Five thousand samples were drawn with replacement from the original sample. The bootstrapping procedure generates a reference distribution, allowing for significance testing using 95% confidence intervals. Preacher et al.'s (2007) macro allows users to obtain bias-corrected confidence intervals for specific values of the moderator variable. In the current study, confidence intervals were obtained for the moderator mean, one standard deviation above the mean, and one standard deviation below the mean. Confidence intervals that do not include zero indicate significant indirect effects (Preacher & Hayes, 2004).

Results

Preliminary Analyses

Descriptive information about study variables can be seen in Table 2 for the first- and later-born samples. Zero-order correlations between control and study variables for the first- and later-born samples can be seen in Table 3. Correlations revealed that among the first-born sample, pregnancy planning at 1 month was associated with negative perceptions of relationship quality at age 15 years, $r(371) = -.10$, $p < .05$, but not with positive perceptions. Among the later-born sample, pregnancy planning was unrelated to negative and positive perceptions.

Table 2. Study Variable Descriptive Data

Variable	First-Born			Later-Born		
	M	SD	Range	M	SD	Range
Maternal parenting stress (6-36 months)	-0.06	0.73	-1.67 to 2.29	0.11	0.83	-2.08 to 2.75
Maternal depressive symptoms (6-36 months)	-0.02	0.75	-1.10 to 3.44	0.01	0.86	-1.10 to 3.66
Negative relationship quality (15 years)	0.12	1.59	-2.92 to 7.52	-0.15	1.60	-2.92 to 7.08
Positive relationship quality (15 years)	-0.11	1.61	-5.74 to 2.69	0.08	1.58	-5.40 to 2.69

Note: All variables were standardized prior to creating composites.

Interaction Between Pregnancy Planning and Parity

In testing whether pregnancy planning and parity interact to predict parenting stress and depressive symptoms, 2×2 analyses of covariance were conducted, controlling for mothers' proportion of time partnered, age, and average income-to-needs ratio. Overall, mothers in the later-born sample reported more parenting stress over the first 3 years of the child's life, $F(1, 831) = 7.53$, $p < .01$, and mothers in the later-born sample with unplanned pregnancies reported more parenting stress than first-time unplanned parents, $F(1, 831) = 9.38$, $p < .01$. No differences emerged in predicting maternal depressive symptoms.

Test of Mediated Moderation

The first condition for mediated moderation (a significant Path A in Figure 1) was met only by the first-born sample. The interaction between pregnancy planning and parenting stress was a significant predictor of maternal depressive symptoms controlling for the main effects of pregnancy planning and parenting stress and the control variables (mothers' proportion of time partnered, age, and average income-to-needs ratio) for the first-born sample, $\beta = -.14$, $t(366) = -2.13$, $p < .05$, but not the later-born sample, $\beta = -.03$, $t(465) = -87$, $p = ns$. A graph of the interaction can be seen in Figure 2. Results from the first and second mediated moderation conditions (Paths A and B in Figure 1) among the first-born sample are shown in Table 4. Maternal depressive symptoms were found to be significantly related to negative perceptions of parent-adolescent relationship quality controlling for

Table 3. Correlations Among Study Variables

Variable	1	2	3	4	5	6	7	8
1. Proportion of time partnered		.40**	.43**	.42**	-.09	-.28**	-.15**	.08
2. Maternal age	.28**		.58**	.37**	.03	-.23**	-.13*	.06
3. Average income-to-needs ratio	.32**	.40**		.36**	-.07	-.28**	-.20**	.10*
4. Pregnancy planning	.28**	.19**	.32**		-.01	-.19**	-.10*	.02
5. Maternal parenting stress	-.17**	-.04	-.20**	-.18**		.51**	.13*	-.25**
6. Maternal depressive symptoms	-.29**	-.25**	-.30**	-.19**	.54**		.21**	-.12*
7. Negative relationship quality	-.13**	-.08	-.05	-.03	.11*	.18**		-.48**
8. Positive relationship quality	.04	.04	.04	-.00	-.10*	-.12*	-.49**	

Note: The data above the diagonal are from the first-born sample ($n = 373$); data below the diagonal represent the later-born sample ($n = 472$).
 * $p < .05$. ** $p < .01$.

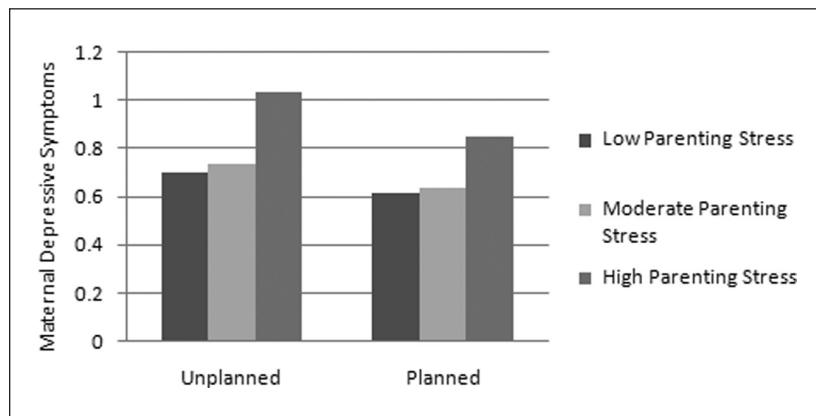


Figure 2. Pregnancy planning by parenting stress predicting depressive symptoms

Table 4. Indirect Effect of Pregnancy Planning on Negative Parent–Adolescent Relationship Quality Via Depressive Symptoms at Various Levels of Parenting Stress

Variable	Path A		Path B	
	B	t	B	t
Proportion partnered	-.24	-2.20*	-.21	-.78
Maternal age	-.01	-1.87	-.00	-0.03
Income-to-needs ratio	-.03	-2.20*	-.07	-2.04*
Pregnancy planning	-.10	-1.32	—	—
Parenting stress	.61	9.35**	—	—
Depressive symptoms	—	—	.35	3.07**
Interaction (PP × PS) ^a	-.19	-2.13*	—	—

Note. The data are from the sample of first-born children only ($n = 373$). Boldfaced entries are numbers of interest in model, the first predicting to depressive symptoms and the second predicting to negative relationship quality.

a. Interaction between pregnancy planning (PP) and maternal parenting stress (PS).

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

the covariates, $\beta = .16$, $t(368) = 3.07$, $p < .01$, but not significantly related to positive relationship quality, $\beta = -.10$, $t(368) = -1.75$, $p = ns$.

Bootstrapping was conducted to test the significance of the indirect effect among the first-born sample at specific values of the moderator. Maternal parenting stress was examined at one standard deviation below the mean, at the mean, and at one standard deviation above the mean to better describe the

interaction between pregnancy planning and parenting stress as it relates to maternal depressive symptoms. The confidence interval that did not contain zero was at one standard deviation above the mean ($-.21, -.004$), indicating that an unplanned pregnancy was related to maternal depressive symptoms among mothers who experienced high parenting stress, but not when parenting stress was low or moderate.

Discussion

In the present study, we examined how unexpected parenting can create an atmosphere of negativity under certain conditions that is linked to long-term relationship quality differences between mothers and their children. The tested mediated moderation model illustrates a developmental framework describing the processes and mechanisms through which the emotional quality of the parent–adolescent relationship at age 15 years is predicted by early parenting circumstances, such as pregnancy planning, early parenting stress, and depressive symptoms.

The current study suggests that the presence of negative relational outcomes stemming from an unplanned pregnancy depends on whether the pregnancy is the first or not. Although unplanned pregnancies still occurred among women having a second- or later-born child at a fairly common rate (38%), and these mothers tended to experience *more* parenting stress than first-time mothers with an unplanned pregnancy, the combination of an unplanned pregnancy and high parenting stress did not lead to greater depressive symptoms among experienced mothers. This combination did, however, create a unique risk for first-time mothers, affecting the quality of the parent–child relationship 15 years later. The present study did not examine the ways in which mothers coped with stress, but this, along with the role of social support, would be a useful topic for future research. Qualitative research on how first-time and experienced parents define their unplanned parenting experiences over time would also provide valuable insight.

In addition to examining process differences between families with a first-born and a second- or later-born child, we compared mothers having a planned and an unplanned pregnancy. Previous research has suggested that demographic and relational characteristics of these mothers differ in many ways (Bouchard, 2005; Orr & Miller, 1997). Both first-time mothers and experienced mothers with unplanned pregnancies were younger, and over the first 3 years of the child's life they were less likely to be with a partner and had lower incomes, suggesting that these demographic factors are central to whether or not mothers plan for a child regardless of prior children. These

findings are consistent with previous research and emphasize the need to recognize the factors that put all women at risk for having an unplanned pregnancy.

In the current study, mother–adolescent relationship quality was conceptualized in accordance with theory and previous research as an active construction by both members of the dyad and was defined that way by incorporating reports by mothers and adolescents. We also examined positive and negative dimensions of parent–adolescent relationships separately, finding different results depending on the dimension. Pregnancy planning was related to negative relationship quality; in other words, the experience of an unplanned pregnancy was associated with perceptions of more harshness and conflict. Although all mothers in the sample were older than 18 years, first-time mothers with an unplanned pregnancy tended to be younger than other mothers. Because young maternal age has been shown to relate to harsh parenting (Lee, 2009), this may be an additional factor that places mothers at risk. However, the direct effect of pregnancy planning on negative relationship quality was small, providing further support for the examination of intervening mediating and moderating factors.

The fact that pregnancy planning was not associated with positive aspects of the parent–adolescent relationship is consistent with previous research on the relational predictors of negative adolescent outcomes (Wissink et al., 2006) and may suggest that mothers form close bonds with their children despite higher conflict. This demonstrates that an unplanned pregnancy is not an inherently negative experience, and even when paired with high parenting stress and depressive symptoms among first-time parents, still does not reduce warmth and closeness in the parent–adolescent relationship. Early experience has been known to have a special significance for children and parent–child relationships (Sroufe et al., 2005), and it is plausible that some experiences increase later conflict and hostility whereas others decrease closeness and warmth.

There are limitations to note in the current study. First, information on mothers' stress and depressive symptoms was not available prenatally. As a result, we cannot be sure whether mothers' psychosocial distress occurred as a result of the unplanned pregnancy or existed prior to the pregnancy and is actually a risk factor for becoming pregnant unexpectedly (Bouchard, 2005). Second, pregnancy planning was assessed after the birth of the child. This may introduce biases based on social desirability or other factors, such as the experience of carrying a pregnancy full-term and caring for the child for a month before being interviewed. This potential bias is common in most prior investigations on unintended pregnancy (see Orr & Miller, 1997). Third,

mothers' reporter bias may have played a role in finding significant links between mothers' reports of pregnancy planning, parenting stress, depressive symptoms, and relationship quality. This limitation is tempered somewhat by the fact that our measure of relationship quality included both adolescent reports and mother reports. Additionally, what have been termed depressive symptoms in the current study may, in fact, incorporate postpartum depressive symptoms to some extent. Although the initial 1-month assessment was excluded from the composite for this very reason, postpartum symptoms may have persisted for 6 months or more after the birth. Similarly, depressive symptoms may have been stable or cyclical in some women, such that early symptoms may have been associated with continuing or recurrent symptoms over time that were reflected in their perceptions of relationship quality more than a decade later. And finally, information on the early constructs of interest was not available from fathers, limiting our conclusions to mothers only. However, links between unplanned pregnancy, stressful family relationships, and depressive symptoms have been found among fathers as well, with family stress serving as a mediator rather than a moderator (Leathers & Kelley, 2000). Future research is needed to address the experiences of fathers when an unplanned pregnancy occurs and to understand how the relationship between parents can either buffer or exacerbate negative outcomes for parents and children.

Much additional work is needed to fully understand the experience and consequences of unplanned pregnancies in the United States. Maternal responses to an unplanned pregnancy may vary based on social and family support, religious views, and cultural beliefs. Therefore, the effects of pregnancy planning on family dynamics and relationships should be examined in more diverse samples. Similarly, fathers should be included in future studies on pregnancy planning to assess potential implications for father-child relationship quality, as well as relationship quality between parents. In addition, many intervening processes beyond those tested in the current study are likely to influence the link between early parenting experiences on the emotional quality of parent-adolescent relationships and should be examined empirically.

In conclusion, the innovation of the tested model provides important information about the processes and conditions under which very early emotions surrounding parenting can have long-term effects on parent-child relationships. An unplanned pregnancy, in combination with high parenting stress during the first 3 years of the child's life, increased the likelihood of mothers' depressive symptoms. High maternal depressive symptoms during the first 3 years were linked to more negative mother-adolescent relationships at age

15 years. These results suggest that long-term negative effects of unplanned pregnancies may be best prevented by increasing maternal coping skills during the first 3 years following an unplanned first birth. This information can assist professionals as they work to prevent negative consequences of unplanned pregnancies, which affect approximately one out of every two pregnant mothers in the United States.

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