Journal of Personality and Social Psychology
2009, Vol. 96, No. 3, 601–619

0022-3514/09/$12.00 DOI: 10.1037/a0013969

The Effect of the Transition to Parenthood on Relationship Quality: An 8-Year Prospective Study

Brian D. Doss
Texas A&M University

Galena K. Rhoades, Scott M. Stanley, and Howard J. Markman
University of Denver

This longitudinal study examined the effect of the birth of the 1st child on relationship functioning using data from 218 couples (436 individuals) over the course of the first 8 years of marriage. Compared with prebirth levels and trajectories, parents showed sudden deterioration following birth on observed and self-reported measures of positive and negative aspects of relationship functioning. The deterioration in these variables was small to medium in size and tended to persist throughout the remaining years of the study. Mothers and fathers showed similar amounts of change after birth. The amount of postbirth deterioration in relationship functioning varied systematically by several characteristics of the individual, the marriage, and the pregnancy itself. In a group of couples who did not have children, results indicated more gradual deterioration in relationship functioning during the first 8 years of marriage without the sudden changes seen in parents, suggesting that the results seen in the parent sample may be due to birth.

Keywords: transition to parenthood, parent, relationship functioning, prediction

For decades, there has been much debate in the marital and family literature on whether having a baby causes substantial declines in the average couple's relationship. It is difficult to overstate the importance of this question. For married couples, the first child is often born within the first 5 years of marriage—a period that has been shown to hold the highest risk for divorce (Bramlett & Mosher, 2001). If parenthood truly is a crisis, as suggested by early investigators (e.g., Lemasters, 1957), then clarification of the impact of a baby's birth could lead to increased understanding of early marital difficulties. Moreover, the quality of a couple's relationship following a baby's birth has critical implications for numerous aspects of the baby's early development, including physiological arousal (Gottman, Driver, & Tabares, 2002), attachment (e.g., De Wolff & Van Ijzdendoorn, 1997), and language development (e.g., Horwitz et al., 2003). Later child development (e.g., psychological, social, and school functioning) is also related to the status and quality of parent relationships (e.g., Amato, 2001; Davies & Cummings, 1994).

Despite this importance, there is little agreement among leading researchers about the impact of the transition to parenthood on relationship functioning. Cowan and Cowan (1995) stated, "we can conclude with some confidence that the transition to parenthood constitutes a period of stressful and sometimes maladaptive change for a significant proportion of new parents" (p. 412). However, Huston and Holmes (2004) concluded, "The preponderance of the data fail to support the view that parenthood typically undermines marital satisfaction" (p. 109). These disagreements arise primarily from the different methodologies that have been used to study the effect of the transition to parenthood; therefore, these methodologies are reviewed below.

Impact of the Transition to Parenthood on Relationships

Cross-Sectional Studies of Parenthood

One of the most straightforward ways to examine the impact of having a child is to conduct a cross-sectional study comparing parents with nonparents. In the most recent meta-analysis of this research, parents reported significantly lower relationship satisfaction than nonparents ($d = -0.19$; Twenge, Campbell, & Foster, 2003). Although this finding provides preliminary support for the notion that having a child is associated with declines in relationship quality, there are important limitations of cross-sectional designs in determining the true effect. Parents and nonparents are not equivalent groups, and, as identified by Huston and Holmes (2004), parents may be less satisfied than nonparents for several other reasons: (a) They may be less satisfied even before having children; (b) having children serves as a barrier to divorce but not to dissatisfaction; (c) couples who become parents may differ from nonparents in other unmodeled but meaningful ways; and (d) a cross-sectional sample of parents is likely to include relationships

Brian D. Doss, Department of Psychology, Texas A&M University; Galena K. Rhoades, Scott M. Stanley, and Howard J. Markman, Department of Psychology, University of Denver.

Support for preparation of this article was provided in part by National Institute of Child Health and Human Development Grants R03 HD051695 (awarded to Brian D. Doss) 5R01HD047564 and R01HD053314 (awarded to Scott M. Stanley and Howard J. Markman). Data collection was made possible through National Institute of Child Health and Human Development Grant R01 HD053314-20A1 and National Institute of Mental Health, Division of Services and Intervention Research, Adult and Geriatric Treatment and Prevention Branch Grant 5-RO1-MH35525-12 (awarded to Scott M. Stanley and Howard J. Markman). The contents are solely the responsibility of the authors and do not necessarily represent the official views of the National Institutes of Health. We thank the couples who participated in this research for their dedication to this project.

Correspondence concerning this article should be addressed to Brian D. Doss, Department of Psychology, MS 4235, Texas A&M University, College Station, TX 77843-4235. E-mail: bdoss@psych.tamu.edu

of longer duration than a sample of nonparents. Thus, cross-sectional designs can provide only limited information on the effect of having children on relationship functioning.

Longitudinal Studies Beginning in Pregnancy

Given the critical limitations of cross-sectional designs, researchers have recruited pregnant couples and examined longitudinal changes in relationship functioning from pregnancy onward (e.g., Belsky, Lang, & Huston, 1986; Belsky & Rovine, 1990; Clements & Markman, 1996; Collins, Dunkel-Schetter, Lobel, & Scrimshaw, 1993; Cowan & Cowan, 2000; Gottman et al., 2002; Grote & Clark, 2001; O'Brien & Peyton, 2002; Rholes, Simpson, Campbell, & Grich, 2001). These longitudinal studies have shown declines in relationship satisfaction following birth of a full standard deviation or more in 20%–59% of couples (see Cowan & Cowan, 1995) and "precipitous" drops in 70% of couples (e.g., Gottman et al., 2002). Indeed, one study showed that almost one third of partners fell into the clinical range of marital distress during the first 18 months after birth (Cowan & Cowan, 2000). Research has also demonstrated that parents show declines in positive relationship events and relationship-focused leisure time (e.g., MacDermid, Huston, & McHale, 1990), social support (Simpson, Rholes, Campbell, Tran, & Wilson, 2003), and increases in marital conflict (Cowan & Cowan, 2000).

These deteriorations in relationship functioning after birth have been documented for couples from a wide range of ethnicities, including both Caucasian and African American couples within the United States (Crohan, 1996) as well as for couples in Asia (Lu, 2006) and Europe (e.g., Clulow, 1982; Lorensen, Wilson, & White, 2004; Salmela-Aro, Aunola, Saisto, Halmesmaki, & Nurmi, 2006). Likewise, lesbian couples, who conceived a child through artificial insemination, evidenced decreases in love and increases in relationship conflict after the birth of their baby (A. E. Goldberg & Sayer, 2006). Therefore, some relationship deterioration after birth appears to be a relatively universal event for the average couple.

At the same time, evidence suggests that there may be gender differences in the magnitude and timing of changes in relationship functioning after birth. Several studies suggest that mothers tend to demonstrate sudden declines in relationship satisfaction after birth, whereas fathers show more gradual declines that are not evident until 6–15 months after birth (e.g., Belsky & Hsieh, 1998; Grote & Clark, 2001). Additionally, some studies suggest that the magnitude of changes in relationship satisfaction differs by gender (e.g., O'Brien & Peyton, 2002), although the direction of effect may depend on the timing of measurement.

Despite these important findings, there are limitations to the knowledge gained from longitudinal studies of parents. Similar to cross-sectional research, it is impossible to determine from these studies whether the declines that are typically seen after the birth would have occurred if the same couples had not had a baby. Furthermore, there are two major reasons to suspect that these studies overestimate the impact of the transition to parenthood on relationship functioning (see Huston & Holmes, 2004). First, by first assessing couples during pregnancy, it is possible that the observed declines are simply a return to the couple's baseline from a "honeymoon" of cooperation and togetherness that couples experience during pregnancy (Feeney, Hohaus, Noller, & Alexander, 2001). Thus, it seems important to examine trajectories both before and after birth. Second, given that relationship satisfaction declines, on average, during the early years of marriage (e.g., Clements & Markman, 1996; Huston, Caughlin, Houts, Smith, & George, 2001; Karney & Bradbury, 1997), natural maturation processes may be mistaken for the effects of birth.

Inclusion of Nonparents in Longitudinal Samples

To partially address the last concern, researchers have begun to use nonparents as a nonequivalent control group. With a nonparent group, it is possible to determine whether changes experienced after the birth of a child are also experienced by couples without children. The inclusion of nonparents as a nonequivalent control group allows one to investigate whether changes observed in parents after the birth of a baby are also observed in couples who do not have a baby. Indeed, results suggest that parents and nonparents tend to experience similar declines in relationship quality in most studies (e.g., Clements & Markman, 1996; Huston & Holmes, 2004; Kurdek, 1993; MacDermid et al., 1990; McHale & Huston, 1985; White & Booth, 1985), though there are exceptions (e.g., Crohan, 1996; Lawrence, Rothman, Cobb, Rothman, & Bradbury, 2008; Shapiro, Gottman, & Carrère, 2000). However, parents seem to consistently show sharper declines in cohesion and relationship-focused activities compared with nonparents (e.g., Kurdek, 1993; MacDermid et al., 1990).

In considering the implications of these studies, it is important to recognize that, because parents and nonparents differ in important ways before birth (e.g., MacDermid et al., 1990; Shapiro et al., 2000), changes that nonparents experience cannot be assumed to represent what parents would experience if they had not had a child. As a result, the field has yet to answer the central question of whether the transition to parenthood can be identified as the causal factor in the commonly noted declines in relationship quality among parents.

Using Information About Timing of Changes

Moving from a statement of the transition to parenthood being "associated with" to "causing" changes in the couple relationship is difficult because an experimental design is not possible; couples cannot be randomly assigned to give birth or not give birth. Instead, the field must rely on quasiexperimental designs—designs that use strategies other than random assignment or additional pieces of information to rule out potential confounds. One essential piece of information that can address whether parenthood plays a causal role in relationship deterioration after birth has been largely ignored in the literature—the shape of change in relationship functioning before and after the birth of the first baby.[1] By analyzing the levels and trajectories of change in relationship

[1] Previous studies have indirectly examined the shape of change in relationship variables beginning in either pregnancy or shortly following birth as part of examining assumptions of their statistical tests (e.g., O'Brien & Peyton, 2002; Schulz, Cowan, & Cowan, 2006). Additionally, a recent study (Lawrence et al., 2007) fit separate slopes of change before and after birth. However, no studies have examined the statistical fit of various models of change in relationship functioning before and after birth; it is this addition that is the central contribution of the present study.

functioning before and after birth, a particular type of quasiexperimental design—an interrupted time-series (ITS) design (cf. Shadish, Cook, & Campbell, 2002)—can provide a wealth of information that permits us to comment on the probable effect of the transition to parenthood on couple functioning.

An ITS design allows one to examine a series of measurements of a construct over time to determine whether a particular event affected that construct's time series in a predictable fashion. Within the context of the transition to parenthood, we can ask whether the birth affects ongoing changes in relationship functioning in predictable ways. In particular, given the changes that were occurring before birth, an ITS design can illuminate whether relationships show no additional change after birth, whether they show a sudden increase or decrease in relationship constructs (i.e., a change in level) following birth, or whether they show modifications to the rate of change in a construct from pre- to postbirth (i.e., a change in slope). For example, using an ITS design, we can ask whether there is a sudden increase or decrease in relationship satisfaction following the birth of the baby as well as whether any changes or stability before birth in relationship satisfaction continued to hold after the birth of the baby. As a result, this approach isolates change that can be attributed to birth from change that was expected based on ongoing changes in the couples' relationship. Additionally, by following couples for years after birth, this approach also allows us to determine whether the initial changes that couples experience after birth persist over time.

Combining ITS designs with the series of statistical model-fitting procedures used in the present study, we can also determine the most parsimonious model of change in relationship constructs over time for both parents and nonparents. For example, it may be that a linear or quadratic model of change is the most parsimonious model for nonparents but that models for parents require additional shifts in intercepts or slopes as discussed above. Therefore, the combination of a model-fitting and ITS approach permits direct statistical comparison of different change models and, within each of these models, statistical tests of various model components. ITS designs have been used to investigate the effects of various interventions (e.g., Biglan, Metzler, & Ary, 1994; Tilden & Shepherd, 1987; Velicer, 1994) using both within- and between-person time series, but it has not, to our knowledge, been applied to the transition to parenthood. If the assumptions of the model are met, then causal conclusions from an ITS design are nearly as strong as from a randomized design (Shadish et al., 2002).

Predictors of Relationship Changes Over the Transition to Parenthood

To this point, we have been discussing the transition to parenthood as though all couples evidence deterioration in relationship functioning. However, not all couples experience the same changes over the transition to parenthood; as noted earlier, approximately one third (e.g., Shapiro et al., 2000) to one half (e.g., Belsky & Hsieh, 1998; Belsky & Rovine, 1990) of couples evidence stability or increases in relationship satisfaction or love over the transition to parenthood. Therefore, it is important to examine variability in postbirth changes.

One way to understand changes in postbirth relationship functioning is by using the conceptual framework of the vulnerability–stress–adaptation (VSA) model (Karney & Bradbury, 1995). In the VSA model, changes in relationship quality are understood to be a function of three interrelated constructs: enduring vulnerabilities, stressful events, and adaptive processes. *Enduring vulnerabilities* of the individual and the couple (e.g., limited education, cohabitation history) increase chances of experiencing events as stressful and adapting poorly to those events. Additionally, although all the couples in the present study's sample of parents experienced the same potentially stressful event (birth of their first baby), the nature of that *stressful event* can vary substantially between couples. For example, the timing of the birth and the gender of the baby could alter the impact of the first baby on relationship functioning. Finally, couples have different levels of *adaptive processes* (e.g., communication, commitment) to help them cope with the stresses placed on their relationship functioning after birth. The VSA model suggests that each of these components—enduring vulnerabilities, the nature and timing of stressful events, and the degree to which couples can engage in adaptive processes—must be considered in order to understand changes in relationship functioning (Karney & Bradbury, 1995). Thus, the hypotheses for the present study are organized around this VSA model. Before detailing those hypotheses, we first discuss the existing literature on predictors of postbirth functioning by these three constructs.

Enduring Vulnerabilities

Several studies have investigated how various enduring vulnerabilities impact the transition to parenthood. For example, poor functioning in individuals' families of origin has been shown to predict declines in both marital satisfaction (Cowan & Cowan, 2000; Perren, von Wyl, Bürgin, Simoni, & von Klitzing, 2005) and observed communication (Perren et al., 2005) over the transition to parenthood. However, the literature is mixed on whether conflict in both partners' family of origin (Perren et al., 2005) or only the husband's family of origin (Cowan & Cowan, 2000) is predictive of declines in relationship functioning. Furthermore, although not investigated over the transition to parenthood, divorce and conflict in the family of origin may have differential impacts on satisfaction (e.g., Story, Karney, Lawrence, & Bradbury, 2004).

Additionally, there is a growing body of literature suggesting that couples who cohabit before marriage are at higher risk for a number of subsequent marital difficulties (e.g., Cohan, & Kleinbaum, 2002; Stanley, Whitton, & Markman, 2004). The effect of premarital cohabitation on relationship functioning after birth has yet to be examined to our knowledge. Finally, level of religiosity has been shown to moderate the impact of the transition to parenthood on marital satisfaction. Highly religious mothers experienced greater gains in marital satisfaction after birth than those with lower levels of religiousness (Nock, Sanchez, & Wright, 2008).

Nature of Stressful Event

Belsky and Rovine (1990) found that couples with unplanned pregnancies saw more deterioration in wife-reported (but not husband-reported) love, conflict, and ambivalence. Therefore, in the present study, individuals' reports of whether the pregnancy was planned were used as predictors of change after birth. Additionally, the existing evidence is mixed on whether having a child shortly after marriage is a risk factor for subsequent declines in

relationship functioning. Belsky and Rovine (1990) found that couples who had been together longer before birth showed smaller increases in relationship conflict and smaller decreases in husbands' reports of love. In contrast, O'Brien and Peyton (2002) found no relation between relationship duration and changes after birth. In the present study, timing of the birth after marriage was investigated as a predictor of change in relationship functioning.

Additionally, the amount of personal income at birth has been examined as a predictor of the transition to parenthood. One study found that higher income served as a buffer against increases in marital conflict and fathers' ambivalence after birth (Belsky & Rovine, 1990), whereas other studies (e.g., O'Brien & Peyton, 2002) have found no effect. One possible explanation for these mixed findings is that income is a single indicator of what is likely a complex construct composed of financial resources, employment pressures, and financial stressors. In the present study, both current income and amount of financial stress are used as predictors to separate these constructs. These variables are considered to reflect differing aspects of the stressful event (rather than enduring vulnerabilities) because they varied across time within couples; thus, giving birth at a time of relatively higher income and less financial stress for that couple could serve to buffer the couple against some of the stressors of birth.

Finally, the impact of the child's gender on relationship functioning is also mixed: Some studies have shown that having a female child places couples at higher risk for relationship problems after birth (e.g., Cox, Paley, Burchinal, & Payne, 1999; Raley & Bianchi, 2006), whereas other studies have found no effect of child gender (e.g., Kurdek, 1993). In the present study, we examined the impact of child gender on relationship functioning.

Adaptive Processes

Perhaps the most examined predictors of change after the transition to parenthood are levels of relationship functioning during pregnancy. Higher levels of both self-reported (e.g., Cox, Paley, Burchinal, & Payne, 1999; Crohan, 1996; Kluwer & Johnson, 2007) and observed (e.g., Shapiro et al., 2000) poor communication or conflict during pregnancy have been consistently found to predict larger declines in relationship functioning. However, previous studies have been mixed as to whether having higher levels of positive relationship qualities (e.g., satisfaction, romance) are associated with more or less deterioration after birth. In one study, greater marital satisfaction assessed just after birth predicted fewer declines in marital satisfaction during the following 3 years (O'Brien & Peyton, 2002). However, another study found that higher levels of romance during pregnancy predicted significantly greater deterioration in husbands' self-reported love as well as increases in both husbands' and wives' reported levels of relationship conflict (Belsky & Rovine, 1990).

Additionally, we examined in the present study two constructs that have not, to our knowledge, been examined as predictors of relationship functioning over the transition to parenthood: relationship commitment and confidence. Commitment has been shown to be an important construct in understanding general couple functioning and stability (Impett, Beals, & Peplau, 2001; Stanley & Markman, 1992); thus, we wished to examine how it relates to the transition to parenthood. Additionally, one's sense of confidence in the future of the relationship has been linked with not only better general relationship functioning but also lower levels of subsequent depression (Whitton et al., 2007). However, overly positive expectations about one's relationship and partner have also been found to predict more deterioration in relationship satisfaction among newlywed couples, especially when paired with high levels of poor communication (McNulty & Karney, 2004).

The Present Study

In Study 1, we explored four questions. First, within parents, is there evidence of change in relationship functioning following the birth of the baby that is distinct from any change that was occurring before birth? While a true experiment cannot be conducted to assess the effects of the transition to parenthood, marked postbirth changes from trajectories of relationship changes that were otherwise expected would support an arguement for a causal contribution of the transition to parenthood. Changes in several aspects of relationship functioning were explored: relationship satisfaction, observed and self-reported communication, problem intensity, as well as relationship dedication and confidence. Second, if a change in relationship functioning is evident, then what types of changes occur? Specifically, we examined both sudden changes in mean levels of relationship functioning as well as more gradual modifications to rates of change after the birth of the baby. Consistent with previous research, we expected that parents would show a postbirth decline in relationship functioning that is clearly associated with the transition itself. However, rather than simply fitting a linear or quadratic model used in previous research, we sought in the present analyses to fit the ITS model that best estimates the type and shape of this decline so that the most accurate picture of postbirth change can be obtained and tested. Third, will there be significant between-individual variability in observed changes in relationship functioning? Fourth, which enduring vulnerabilities, aspects of the stressful event, and adaptive processes will predict variability in changes in relationship functioning seen after the birth of the baby?

In Study 2, a sample of couples who did not have children were used to determine whether developmental processes unrelated to having a baby can serve as alternative explanations to the findings in Study 1. Specifically, we determined whether changes that appear to be a result of the birth of the first baby in the parent sample wee also observed in a sample of couples who did not have children during the same period. If similar changes are not found, then we can be more confident that the changes in Study 1 were attributable to birth.

Study 1: Parent Sample

Method

Participants

Couples in the present study had participated in a larger investigation of relationship development and the effectiveness of premarital education (see Markman et al., 2004; Stanley et al., 2001). Couples who had children from previous relationships or who did not complete an assessment at any point before having a child together were excluded. There were 132 couples who had their first child during the first 8 years of the study ("parents"); these couples were used in the present study's main analyses. When

parents began participation, they were 26.38 years old (SD = 4.42), on average, with 15.63 years of education (SD = 1.89). The median personal income level was $20,000–$29,999, and they were 89.8% White and 8.0% Latino; 2.2% were of some other race/ethnicity. Sixty-eight percent of couples cohabited before marriage. Twenty-seven percent of couples reported attending church at least once a week, and, on average, couples described themselves as "somewhat" religious. Forty-six percent of couples give birth to a girl; additionally, approximately 10% of both fathers and mothers reported that their pregnancy was unplanned. During the course of the present study, 3 couples divorced, and 3 couples withdrew from the study; however, all available data from these couples were used in the analyses.

Procedures

Couples were recruited before marriage through the religious organizations that would perform their weddings. These religious organizations were randomly assigned to require couples using their wedding services to receive either the naturally occurring premarital education services within the religious organization or the Prevention and Relationship Enhancement Program (PREP; Markman, Stanley, & Blumberg, 2001; Stanley, Blumberg, & Markman, 1999). Sixty-two percent of the parent sample completed PREP; the remainder of the sample received naturally occurring premarital education. The naturally occurring interventions reflected "treatment as usual" for premarital education efforts. Couples in that condition received an average of 5.9 hr of premarital education that reflected the gamut of approached typically conducted by religious organizations (see Stanley et al., 2001, for more details). Below, it was tested whether couples who received PREP differed from couples who received the naturally occurring intervention during the transition to parenthood.

As part of the larger study, couples were asked to complete measures and videotaped interactions before they were married and prior to premarital education (Time 1 [T1]), just after education (Time 2 [T2]), and yearly thereafter (Time 3–Time 10 [T3–T10]). However, in the present study, data on the dependent variables from the T1 assessment were omitted from analyses to avoid confounding change during the education program with natural change over time. Except for demographic information that was not expected to change over time (e.g., ethnicity), and where noted, the following measures were administered at every follow-up assessment. During each laboratory visit, partners completed questionnaires individually and completed a videotaped 10- to 15-min problem-solving discussion together. Couples were paid $40–$100 for each assessment, depending on the time point. All procedures of the study were approved by the university Institutional Review Board, and each individual in the study provided written informed consent.

Measures of Relationship Variables

Marital satisfaction. The first item from the Marital Adjustment Test (MAT; Locke & Wallace, 1959) was used to assess satisfaction. The item asks participants to rate the "degree of happiness" they experience in their relationships on a scale ranging from 1 (*very unhappy*) to 7 (*perfectly happy*). Consistent with previous calls (e.g., Fincham & Bradbury, 1987; Huston & Vangelisti, 1995), this item, rather than the full MAT, was used to obtain a pure measure of marital satisfaction that was not confounded with communication and commitment. This single item of satisfaction has been found to provide high levels of information about individuals' relationship satisfaction across a broad range of relationship functioning (Funk & Rogge, 2007).

Observed negative communication. The Interactional Dimensions Coding System, a global coding system for couples' discussions of relationship problems (Julien, Markman, & Lindahl, 1989; Kline, Julien, et al., 2004), was used to code couples' videotaped problem discussions. Intercoder reliability was high, with intraclass correlations ranging from .66 to .95 (Mdn = .87; Kline, Julien, et al., 2004). Only the negative communication subscale (made up of withdrawal, denial, conflict, dominance, and negative affect; α = .86 for mothers, α = .88 for fathers) was used in the present study.

Relationship confidence. The 10-item Confidence Scale (Stanley, Hoyer, & Trathen, 1994; Whitton et al., 2007) was used to measure one's sense that he or she and his or her partner can effectively manage their relationship and stay together. Participants rated each item on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Cronbach's alpha was .83 for mothers and .79 for fathers.

Relationship dedication. The 14-item Dedication Scale from the revised Commitment Inventory (Stanley & Markman, 1992) was used to measure dedication. This measure captures willingness to sacrifice for the relationship, intrinsic desire to maintain the relationship for the long term, considering the relationship a priority, and couple identity. Participants rated each item on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The Dedication Scale has shown acceptable levels of internal consistency across a range of samples (e.g., Adams & Jones, 1997; Stanley & Markman, 1992). In the present sample, the internal consistency is lowest at T1 (for mothers, α = .52; for fathers, α = .68) due to restriction of range; almost all couples reported being very dedicated to their relationship. At later time points, reliability is higher (e.g., at T7, α = .74 for mothers and α = .76 for fathers).

Poor conflict management. The Communication Danger Signs Scale (Stanley & Markman, 1997) was used to assess self-reported conflict management. It has demonstrated adequate validity and reliability in two random samples (Johnson et al., 2002; Stanley et al., 2004). Only the seven (of eight) items related to the frequency of negative interaction patterns were used. Sample items include "My partner criticizes or belittles my opinions, feelings, or desires" and "Little arguments escalate into ugly fights with accusations, criticisms, name calling, or bringing up past hurts." Each item is rated on a scale ranging from 1 (*almost never*) to 3 (*frequently*). For mothers, α = .71; for fathers, α = .74.

Problem intensity. The Marital Agendas Protocol (MAP; Notarius & Vanzetti, 1983) asks participants to rate the intensity of their relationship problems in 16 areas (e.g., communication, money, sex) on a 0–100 scale. Scores reflect the average intensity across all areas, and higher scores reflect the intensity of how much of a problem the issues typically faced by young couples are from the participant's perspective. The MAP has been shown to be reliable and discriminates distressed from nondistressed couples (Notarius & Vanzetti, 1983). In the present study, for mothers, α = .70; for fathers, α = .75.

Measures of Enduring Vulnerabilities

Demographic information. A short form was used to gather descriptive information about each person, including race/ethnicity, individual annual income, years of education, and age. Religiosity was measured on this form by asking, "All things considered, how religious would you say that you are?" Scores ranged from 1 (*not at all*) to 7 (*very religious*).

Family of origin. Two aspects of participants' families of origin were explored: the level of interparental conflict and whether the participant's parents divorced. Three items regarding intensity and frequency of interparental conflict were derived from Grych, Seid, and Fincham's (1992) Children's Perceptions of Interparental Conflict scale; a modified response scale was used in the present study that ranges from 1 (*definitely false*) to 6 (*definitely true*). These items have been shown to be appropriate for use with adults (Kline, Wood, & Moore, 2003), and they had high internal consistency in the present study (αs = .92 for mothers and .91 for fathers). Participants also indicated whether their parents were divorced (yes or no). Family-of-origin information was collected only once during the study.

Premarital cohabitation history. Participants reported the dates that they began living together and the dates that they were married. On the basis of this information, participants were coded as having lived together premaritally or not.

Measures of Nature of Stressful Event

Child's gender and birth date. Participants indicated at each assessment whether they (or their partners) were pregnant or whether they had given birth to a child since their last visit. The birth date and gender of each child was recorded.

Timing of pregnancy. To compute how long couples had been married before giving birth, the birth date was subtracted from couples' wedding date; this variable was then used to investigate whether having children shortly after marriage predicted changes after birth.

Planned or unplanned pregnancy. When couples reported their child's birth date, both partners separately reported whether the pregnancy was planned (yes or no). Individual, rather than couples', reports were used in analyses below to permit partners to disagree about whether the pregnancy was planned.

Financial stress. Financial stress was assessed using items adapted from the Economic Hardship Questionnaire (Conger, Ge, Elder, Lorenz, & Simons, 1994), one measuring difficulty paying bills and one measuring having money remaining at the end of each month. Internal consistency was adequate for this two-item scale (αs = .73 for fathers and .77 for mothers).

Theoretical Models

Twelve potential models were fit to each individual's data (see Figure 1) to identify the best fitting model for six constructs: marital satisfaction, negative observed communication, poor conflict management, problem intensity, relationship confidence, and dedication. These models were based on Huston and Holmes' (2004) suggestion that postbirth change could occur gradually or suddenly and be maintained or not over time.

The first three models tested here, if identified as the best fitting model, would indicate no effect of the transition to parenthood because there were no changes at or after birth that could be attributed to the birth of the child. Specifically, Model 1a suggests there is no change in the construct either before, immediately

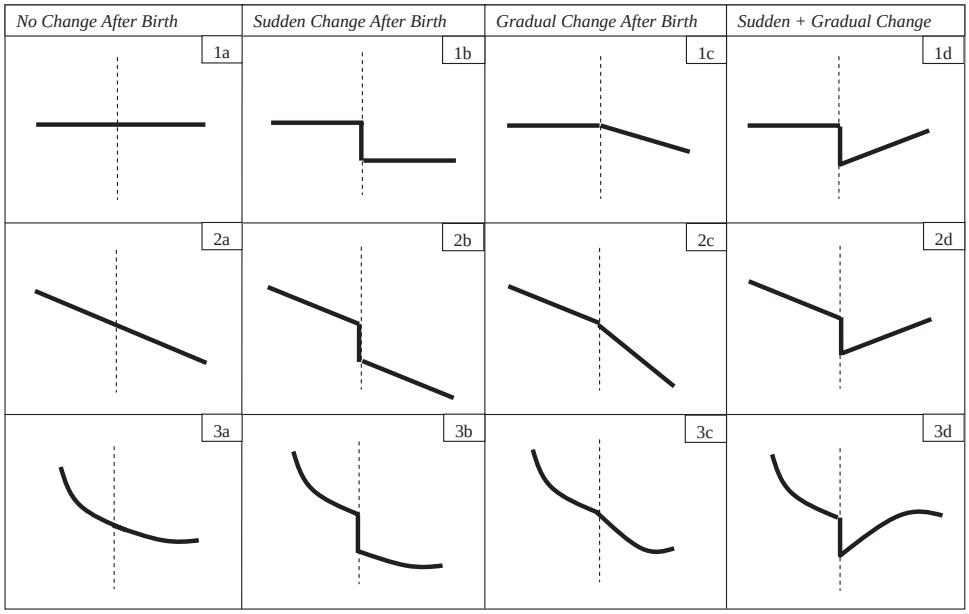

Figure 1. Twelve potential models of change over the transition to parenthood. In the fitted models, the pre- and postbirth linear and quadratic changes as well as sudden mean changes could have been positive or negative in direction. Dotted lines indicate timing of birth, and solid lines indicate possible changes in relationship functioning.

following, or after the birth of the baby (the vertical dotted line). Model 2a suggests linear changes in the construct both before and after birth, whereas Model 3a depicts initial steep decreases in the construct with a gradual slowing of those decreases; however, this slowing is not attributable to birth.

The remaining nine models expand on the three base models and indicate a potential effect of the transition to parenthood on the construct. Models 1b, 2b, and 3b indicate a sudden vertical shift (either increase or decrease) in the construct in the year following the birth of the baby. Such changes would be consistent with the fairly sudden declines in relationship functioning in the year after birth observed in the previous literature. Models 1c, 2c, and 3c indicate a more gradual shift (either increase or decrease) in the construct over several years following birth that differs from the rate of change in that construct before birth. Because the effect of the transition to parenthood has typically been examined in studies of limited duration, these gradual changes have not generally been examined. Finally, Models 1d, 2d, and 3d combine Models b and c to include both a sudden vertical shift in the year after birth as well as more gradual changes in the construct in the following years. Models 1d, 2d, or 3d would be indicated if the initial changes that have been repeatedly documented after birth in the previous literature gradually improve (or even further deteriorate) after birth.

Statistical Models

Multilevel analyses were conducted within the hierarchical linear modeling program (HLM 6.03; Raudenbush, Bryk, Cheong, & Congdon, 2004) and run separately by gender to permit changes over time to differ by gender.[2] In the multilevel approach, estimates of change over time within an individual are generated at Level 1; Level 2 accounts for any systematic variability due to the nesting of repeated assessments within individuals. Prior to analysis, the time (in years) of each parent's assessment was centered on the birth of the couple's child so that the intercept represented the estimated mean level of the relationship construct at the time of birth. This strategy maximizes the ability to examine changes in levels and trajectories of the measured constructs before and after having a baby.

Model estimation. Models 1a, 2a, and 3a were tested using parameterizations of an intercept-only model (Model 1a), an intercept + linear time model (Model 2a), and an intercept + linear time + quadratic time (Model 3a). Models 1b, 2b, and 3b were tested by adding a single variable ("level") to the base models that had a value of 0 for all assessments that occurred before the birth of a couple's child and a value of 1 for all the assessments that occurred after the birth. For example, Model 3b was tested by fitting Equation 1 to the data:

$$Y_{it} = \beta_{0it} + \beta_{1it}(\text{time}_{linear}) + \beta_{2it}(\text{time}_{quadratic}) + \beta_{3it}(\text{level}) + e_{it}. \quad (1)$$

Fixed effects at Level 1 were allowed to vary randomly at Level 2 if the difference in log likelihoods between models with and without the random effect was significant. Models 1c, 2c, 3c, as well as 1d, 2d, and 3d were fit to the data using a piecewise model (e.g., Raudenbush & Bryk, 2002) that estimated a linear rate of change before birth and a separate linear rate of change after birth that captured *deviations from the prebirth rate of change.*[3]

Model fit. To determine the best fitting model of the eight potential models for each dependent variable, values of the Bayesian information criterion (BIC; Schwarz, 1978) were calculated from the log-likelihood statistic obtained for each model using full maximum-likelihood estimation; these values were examined separately for each gender.[4] As part of this model fitting procedure, Level 2 random effects were tested by comparing the deviance of models with and without random effects; these random effects were retained when a chi-square test of the difference in model deviance was significant. This process selected the model that best captured both the mean trajectory of change as well as the between-individual variability of trajectories over time, satisfying both the descriptive and predictive goals of Study 1. As a result, some of the best fitting models include fixed effects with nonsignificant estimates because there was important between-individual variability in these effects. To ensure that the the best fitting model was selected in the above process, the model was also compared with its nested models using the deviance value of the full maximum-likelihood solution; in all cases, the chi-square difference test supported the model selected by the BIC criterion as the best fit.[5]

Testing gender differences. Once the best fitting models were identified for each gender, these models were run for both partners simultaneously following the guidelines presented by Raudenbush, Brennan, and Barnett (1995) for couple data. For example, Model 3b was fit using Equation 2:

$$Y_{it} = (\text{husband})_{it}[\beta_{h0i} + \beta_{h1i}(\text{time}_{linear}) + \beta_{h2i}(\text{time}_{quadratic}) + \beta_{h3i}(\text{level})] + (\text{wife})_{it}[\beta_{w0i} + \beta_{w1i}(\text{time}_{linear}) + \beta_{w2i}(\text{time}_{quadratic}) + \beta_{w3i}(\text{level})] + e_{it}. \quad (2)$$

By constraining the estimates of both partners to be equal and testing the deviance of the constrained and unconstrained models, it was possible to test whether the estimates for fathers and mothers were significantly different from each other. When models differed by gender, all relevant parameters were included in both models to permit testing across spouses.

Prediction of change after birth. For those variables that demonstrated significant variability in postbirth changes attributable to

[2] Running spouses separately was necessary because the model fitting procedure, described next, used the deviance of the entire model, which would capture fit of the model to both fathers' and mothers' data if run together. Once models were selected, spouses were run simultaneously, which permitted direct comparison of spouses' data.

[3] Typically, piecewise models are used to estimate two separate rates of change. However, given that our interest was in modifications to preexisting rates of change, an alternate parameterization was used. To obtain an estimate of the slope after birth, the two estimates of time can be summed.

[4] BIC values, rather than the log-likelihood values, were used to select the best fitting models because not all of the models were nested within the same statistical model. BIC values (Schwarz, 1978) adjust the log-likelihood to account for both the number of parameters and the sample size. When comparing models, Raftery (1995) suggested that BIC differences of 2–6 to be "positive" evidence, of 6–10 to be "strong," and over 10 to be "very strong."

[5] Log-likelihood and BIC statistics for each model are available from Brian Doss upon request.

the transition to parenthood, those changes were first correlated with the level of that variable at birth. Examination of these correlations revealed whether couples who were high or low in a variable before birth (e.g., high or low marital satisfaction) tended to show more or less change after birth.

Next, changes attributable to birth were predicted from variables hypothesized by the VSA model to be central to change in relationship functioning—enduring vulnerabilities, aspects of the stressful event (birth), and the couples' adaptive processes. Prediction analyses followed the recommendations by Raudenbush et al. (1995) for couple data, with gender-specific predictors entered in Level 2. Using the latent variable regression procedure in HLM 6.03, an individual's estimated amount of change attributable to birth (e.g., β_{h2i} or β_{w2i} in Equation 2) was predicted simultaneously from that individual's estimated level of the dependent variable before birth (i.e., β_{h0i} or β_{w0i} in Equation 2) and from the Level 2 predictor of interest. The value of the dependent variable before birth was included as a control variable because prebirth levels and postbirth changes were correlated for several of the dependent variables. Because we were interested in whether the predictor added information above and beyond that contained in the dependent variable itself, the estimated level of the dependent variable at birth was entered in all prediction equations. For predictors whose values varied over time, the value of the predictor during the year preceding birth was used. To reduce the total number of analyses run, cross-partner predictions were not conducted.

Influence of Premarital Education

As the couples in the present study received differing forms of premarital education, it was important to determine whether the type of education impacted the results. To this end, we compared, in two ways, couples who received the typical premarital education through the religious organization in which they were getting married with couples who received the empirically based premarital education program (PREP). First, the sample was split into couples that did and did not receive PREP, and the best fitting models in each of the four samples was determined using the BIC procedures above. The results revealed no systematic differences based on the type of education received. In a second approach, receipt of PREP was entered in each best fitting model as a predictor of parents' changes attributable to the birth of their baby. In all cases, the premarital education group did not significantly predict parents' changes following birth (all ps $> .25$). Therefore, the results of the present study indicate that the impact of birth on relationship functioning does not depend on the type of premarital education received.

Results

Mean Change in Relationship Functioning After Birth

Descriptive data for the eight periods of interest are detailed in Table 1. The primary question addressed in our first analyses was whether there was evidence of a change in relationship constructs associated with the birth of the baby in the parent sample. For mothers, all six measures of relationship functioning indicated a potential effect of the transition to parenthood (see Figure 2). However, although fathers reported significant postbirth changes in five of six domains of relationship functioning, changes in poor conflict management after birth did not differ from what was expected given changes already occurring before birth.

Regarding the nature of the changes that occurred, all of the relationship constructs that demonstrated effects of the transition to parenthood showed significant and sudden worsening of the relationship in either fathers or mothers (either declines in positives or increases in negatives; see Table 2). Specifically, marital satisfaction showed significant drops following the transition to parenthood of 2.81 points for mothers ($d = -0.71$, $p < .01$)[6] and 1.81 points for fathers ($d = -0.45$, $p < .05$).[7] Following the transition to parenthood, both fathers ($d = 0.61$, $p < .01$) and mothers ($d = 0.57$, $p < .05$) showed sudden increases in negative observed communication. Additionally, mothers, but not fathers, also reported sudden increases in poor conflict management ($d = 0.54$, $p < .001$) and problem intensity ($d = 0.77$, $p < .001$) as well as sudden decreases in relationship confidence ($d = -0.61$, $p < .05$) after birth. Finally, fathers, but not mothers, demonstrated significant sudden declines in relationship dedication after birth ($d = -0.47$, $p < .05$).

Additionally, for fathers only, two variables evidenced modifications to the prebirth rate of change following the birth of the baby. Compared with their nonsignificant increases in relationship confidence before birth, fathers reported significant gradual decreases after birth ($p < .05$). Additionally, although fathers did not report any mean changes in problem intensity immediately following birth (in contrast to their wives), fathers reported a steady increase in problem intensity following birth ($p < .01$) compared with their prebirth reports.

Gender Differences in Change in Relationship Functioning After Birth

Given that the model selection criteria suggested gender differences in the best fitting models for half of the relationship variables examined in the present study, it was important to determine whether mothers and fathers showed significant differences in relationship functioning after birth. To this end, we tested regression coefficients for the sudden and gradual changes that were constrained to be equal across gender and differences in model deviance between the constrained and unconstrained models. When the same parameters were not included in both fathers' and mothers' best fitting model, we included the parameter being tested for both partners and con-

[6] In all cases, Cohen's d was computed by dividing the estimate of the sudden change by the standard deviation of the intercept (the estimated level of the construct at birth) obtained from the HLM program.

[7] The full results for the MAT are not reported here to save space. However, the one-item measure of satisfaction and the full MAT were highly correlated ($r = .82$ for fathers and $r = .57$ for mothers) and showed similar changes over time. Specifically, the full MAT demonstrated a sudden drop of 6.31 points for mothers ($d = -0.66$, $p < .001$) and 5.63 points for fathers ($d = -0.56$, $p < .01$) following the birth of the first baby. Full results are available from Brian Doss upon request.

Table 1
Means and Standard Deviations for Relationship Variables Over Time in Parents

Time period	Satisfaction	Negative observed commun.	Poor conflict manage.	Problem intensity	Confidence	Dedication
			Fathers			
−3 to −4 years	29.50 (5.71)	2.72 (1.01)	1.29 (0.27)	11.53 (6.91)	6.68 (0.48)	6.44 (0.43)
−2 to −3 years	26.71 (7.60)	2.56 (0.91)	1.38 (0.38)	12.19 (7.40)	6.60 (0.57)	6.33 (0.51)
−1 to −2 years	26.43 (6.28)	2.47 (1.03)	1.36 (0.33)	13.37 (7.32)	6.70 (0.41)	6.34 (0.51)
−0 to −1 years	27.72 (5.84)	2.34 (1.00)	1.26 (0.25)	11.90 (8.56)	6.81 (0.31)	6.49 (0.39)
+0 to +1 years	25.35 (5.46)	2.53 (1.12)	1.33 (0.32)	11.90 (7.08)	6.69 (0.41)	6.37 (0.51)
+1 to +2 years	24.67 (7.68)	2.59 (1.12)	1.36 (0.42)	13.77 (8.88)	6.60 (0.63)	6.29 (0.62)
+2 to +3 years	22.90 (5.91)	2.06 (0.85)	1.37 (0.37)	16.17 (10.26)	6.58 (0.63)	6.34 (0.50)
+3 to +4 years	23.05 (6.82)	2.35 (0.93)	1.39 (0.37)	17.06 (10.31)	6.60 (0.48)	6.33 (0.60)
			Mothers			
−3 to −4 years	30.71 (5.73)	2.65 (0.97)	1.30 (0.27)	11.05 (6.18)	6.82 (0.38)	6.51 (0.38)
−2 to −3 years	26.51 (8.17)	2.57 (0.87)	1.41 (0.39)	13.41 (9.38)	6.63 (0.77)	6.43 (0.48)
−1 to −2 years	25.19 (7.16)	2.40 (1.06)	1.38 (0.31)	13.60 (7.94)	6.70 (0.61)	6.42 (0.42)
−0 to −1 years	26.38 (6.86)	2.41 (1.09)	1.29 (0.28)	11.17 (7.93)	6.73 (0.46)	6.44 (0.48)
+0 to +1 years	24.29 (7.00)	2.58 (1.07)	1.42 (0.35)	15.45 (9.30)	6.48 (0.58)	6.40 (0.51)
+1 to +2 years	21.85 (6.10)	2.57 (1.05)	1.47 (0.39)	17.70 (11.11)	6.42 (0.97)	6.23 (0.55)
+2 to +3 years	21.47 (2.47)	2.20 (0.98)	1.48 (0.37)	17.67 (10.64)	6.45 (0.70)	6.21 (0.60)
+3 to +4 years	21.51 (2.51)	2.36 (1.03)	1.45 (0.36)	17.92 (11.23)	6.49 (0.72)	6.23 (0.57)

Note. comm. = communication; manage. = management.

strained to be equal. Results revealed that, of the six relationship variables, only two showed significant gender differences in sudden gains (see Table 3). Specifically, mothers, compared with fathers, showed significantly larger sudden increases in problem intensity, $\chi^2(1, N = 131) = 13.41$, $p < .001$, and poor conflict management, $\chi^2(1, N = 131) = 4.18$, $p < .05$. There were no significant gender differences in postbirth gradual changes.

Between-Individual Variability in Change in Relationship Functioning After Birth

The third question we posed in the present study was whether there was significant variability in individuals' reactions to the transition to parenthood. Results indicated that fathers' and mothers' sudden changes in relationship satisfaction, problem intensity, and relationship dedication varied significantly between individuals (see Table 2). In other words, there was significant variability in individual trajectories around the average trajectories for changes over time. Additionally, mothers' sudden changes in poor conflict management and relationship confidence showed significant between-individual variability; fathers did not show sudden changes in these variables. However, individuals did not significantly differ in the amount of sudden changes in negative observed communication. Additionally, mothers showed significant variability in gradual change in relationship confidence but not relationship dedication; fathers did not show significant variability in gradual changes in any variable. To examine this variability in more detail, we obtained Empirical Bayes estimates of fathers' and mothers' sudden changes from the best fitting model for each individual. Table 4 presents the percentage of individuals who reported sudden changes of various sizes (according to the estimated standard deviation of the measure before birth). Results revealed that, for all variables with significant between-individual variability, some individuals reported increases, whereas others reported decreases over the transition to parenthood. For example, although both fathers and mothers in general showed significant sudden decreases in relationship satisfaction after birth, approximately 7% of mothers and 15% of fathers reported sudden gains in relationship satisfaction over the transition to parenthood.

Prediction of Change in Relationship Functioning After Birth

Given the variability of change in relationship functioning after birth, we explored predictors of this variability as a fourth question in the present study. Constructs that did not demonstrate significant variability in sudden or gradual changes after birth were not examined further.

Prediction from level of variable at birth. To investigate whether couples' level of relationship functioning at birth was related to changes in that same variable after birth, we examined correlations between the intercept and postbirth changes (in the tau matrix). The level of relationship satisfaction at birth was significantly negatively correlated with sudden changes in relationship satisfaction for fathers ($r = -.21$, $p < .05$) and mothers ($r = -.55$, $p < .001$), indicating that couples who were more satisfied at birth showed larger decreases in relationship satisfaction after birth. Similar patterns were seen for dedication for mothers ($r = -.47$, $p < .001$). However, for mothers, but not for fathers, we observed the opposite relation for relationship conflict. Specifically, for mothers, higher levels of prebirth poor conflict management and problem intensity were significantly associated with postbirth increases in poor conflict

management ($r = .55$, $p < .001$) and intensity ($r = .24$, $p < .01$), respectively (see Table 3).[8]

Prediction from enduring vulnerabilities. After controlling for levels of relationship functioning at birth, we entered several types of enduring vulnerabilities at Level 2 as predictors of variability in postbirth functioning. Family-of-origin variables did not significantly predict changes after birth for fathers. However, for mothers, greater declines in relationship satisfaction were predicted by parental divorce ($b = -3.28$), $t(112) = -2.30$, $p < .05$, as well as higher levels of parental conflict ($b = -0.82$), $t(112) = -1.99$, $p < .05$.

Fathers who cohabited before marriage, compared with those who did not, reported significantly larger sudden decreases in relationship dedication ($b = -0.31$), $t(90) = -2.15$, $p < .05$, and larger increases in observed negative communication (b = 0.71), $t(84) = 2.19$, $p < .05$, after birth. Similarly, mothers who cohabited before marriage reported higher observed negative communication after birth ($b = 0.65$), $t(84) = 2.03$, $p < .05$. Neither ethnicity nor level of religiosity were significantly predictive of changes in relationship functioning after birth.

Prediction from nature of stressful event. Characteristics of the birth also significantly predicted postbirth changes in relationship functioning after controlling for levels of functioning at birth. Mothers who gave birth to girls, compared with those who gave birth to boys, experienced significantly larger drops in marital satisfaction after birth ($b = -2.87$), $t(101) = -1.99$, $p < .05$. Moreover, being married longer before birth predicted significantly smaller decreases in marital satisfaction for fathers ($b = 0.58$), $t(124) = 2.24$, $p < .05$, but not for mothers. Results revealed that whether the pregnancy was planned was not significantly related to changes in marital satisfaction after birth.

Higher income level at birth was predictive of significantly smaller drops in relationship satisfaction ($b = 0.73$), $t(101) = 2.36$, $p < .05$, for fathers but not for mothers. Additionally, higher income level was predictive of smaller increases in problem intensity for mothers ($b = -0.73$), $t(101) = -2.12$, $p < .05$. In contrast, self-reported financial stress before birth was not predictive of any relationship changes after birth.

Prediction from relationship adaptive processes. Finally, we used levels of relationship adaptive processes at birth to predict postbirth changes in other domains of relationship functioning (after controlling for prebirth levels in the dependent variable). Results indicated that higher levels of relationship confidence at birth predicted significantly larger increases in problem intensity following birth for both fathers ($b = 5.66$), $t(110) = 2.19$, $p < .05$, and mothers ($b = 5.30$), $t(110) = 2.83$, $p < .01$. Additionally, mothers' higher levels of relationship confidence predicted significantly larger sudden increases in poor conflict management after birth ($b = 0.20$), $t(110) = 2.22$, $p < .05$. In contrast, higher levels of relationship confidence predicted smaller decreases in relationship satisfaction for fathers after birth ($b = 4.19$), $t(110) = 2.21$, $p < .05$.

Additionally, higher levels of reported poor conflict management before birth predicted larger increases in problem intensity after birth for mothers ($b = 7.10$), $t(110) = 2.59$, $p < .05$, and fathers ($b = 8.93$), $t(110) = 2.80$, $p < .01$. Mothers' observed negative communication also predicted significantly larger increases in their reported poor conflict management ($b = 0.06$), $t(110) = 2.05$, $p < .05$.

Discussion

Of the six relationship constructs examined in the present study, the majority demonstrated patterns of change consistent with an immediate or delayed impact of the transition to parenthood. For mothers, five of six areas of relationship functioning showed sudden deteriorations from their trajectories of relationship functioning before birth. That is, relationship satisfaction, self-reported problem intensity, and poor conflict management, observed negative communication, and relationship confidence all showed sudden deteriorations. Fathers showed significant sudden deterioration in marital satisfaction, dedication, and negative observed communication; additionally, fathers showed significant gradual increases in problem intensity. When tested directly, mothers reported significantly larger, sudden increases than fathers in problem intensity and poor conflict management. For the average couple, no aspect of relationship functioning showed a positive effect of the transition to parenthood.

In addition to mean changes in relationship functioning after birth, there was also significant between-individual variability in many of the variables examined. Variability in changes in some aspects of relationship functioning after birth was related to the levels at birth. For both genders, higher levels of marital satisfaction were related to greater decreases in these variables after birth; additionally, for mothers, higher levels of relationship dedication before birth were related to greater decreases in dedication after birth. However, for mothers, higher levels of relationship conflict (poor management and severity) at birth were related to greater increases in conflict after birth. Additionally, postbirth changes were predicted from several other variables. In particular, the most consistent risk factors for postbirth declines included high levels of observed negative communication, difficulties in the mother's family of origin, shorter duration of the marriage at birth, and giving birth to a girl. However, it is important to note that there were numerous nonsignificant predictions in the present study,

[8] To further understand these relations, we conducted three post hoc analyses. First, individual' scores in the year preceding and following birth were correlated with each other; in all cases, these scores were significantly positively correlated. Thus, the rank order of individuals after birth remains similar for measures of both positive and negative relationship functioning. Second, we divided individuals into three groups on the basis of their scores in the year preceding birth: those scoring one standard deviation or more above the mean, within one standard deviation of the mean, and one standard deviation or more below the mean. For all three measures of positive relationship functioning (fathers' and mothers' relationship satisfaction and mothers' dedication), plots revealed that it was the high-functioning individuals who declined most after birth (rather than the lowest functioning individuals declining the least). However, for two measures of negative relationship functioning (mothers' reports of poor conflict management and problem intensity), the opposite pattern held; specifically, the lowest functioning group showed the largest postbirth increases in negative relationship functioning. Finally, we examined the possibility that the complex modeling procedures used in the present study were artificially creating these relations. To equate our analyses with those of previous studies, we eliminated data from all assessments that occurred before pregnancy and fit an intercept and linear slope to the pregnancy and postbirth data. In all cases, the signs of the correlations between the intercepts and postbirth change were consistent with the analyses presented above (i.e., higher levels of both positive and negative relationship functioning before birth predicted greater relationship deterioration after birth).

Table 2
Hierarchical Linear Modeling Results for Best Fitting Models in Parents

Variable	Fathers					Mothers				
	B	*SE B*	*SD* of level 2 random effect	*d*	*r* with level at birth[a]	*B*	*SE B*	*SD* of level 2 random effect	*d*	*r* with level at birth[a]
Relationship satisfaction										
Intercept	26.71	0.54	3.98***			26.04	0.57	3.97***		
Linear Δ	−0.46***	0.12	0.41*			−0.47***	0.13	0.12		
Level change	−1.81*	0.76	2.70*	−0.45	−.21*	−2.81**	0.85	3.68**	−0.71	−.55***
Negative observed communication										
Intercept	2.35	0.09	0.62***			2.36	0.09	0.65***		
Linear Δ	−0.15***	0.02	0.08			−0.13***	0.02	0.10		
Level change	0.38**	0.14	0.38	0.61	—	0.37*	0.14	0.42	0.57	—
Poor conflict management										
Intercept	1.36	0.02	0.24***			1.36	0.03	0.26***		
Linear Δ	0.01	0.01	0.03***			−.01	.01	0.04***		
Level change	—	—	—		—	0.14***	0.04	0.17**	0.54	.55***
Problem intensity										
Intercept	12.73	0.60	5.77***			13.03	0.62	5.57***		
Linear Δ after	0.60**	0.20	0.52		—	—	—	—		—
Level change	1.10	0.75	5.20***	0.19	.03	4.29***	0.74	5.54***	0.77	.24**
Confidence										
Intercept	6.70	0.04	0.32***			6.73	0.04	0.36***		
Linear Δ before	0.01	0.01	0.06***			—	—	—		
Linear Δ after	−0.04*	0.02	0.02		—	−0.01	0.03	0.18***		−.13
Level change	—	—	—	—	—	−0.22*	0.09	0.75***	−0.61	−.11
Dedication										
Intercept	6.41	0.04	0.33***			6.39	0.04	0.36***		
Linear Δ	0.02*	0.01	0.02			−0.02+	0.01	0.04**		
Level change	−0.13*	0.05	0.28***	−0.47	−.13	−0.08	0.06	0.33**	−0.25	−.47***

[a] *Note.* Correlations of postbirth change with level at birth (intercept) only when there was significant variability in both variables. Dashes indicate model components that were not estimated in the best fitting model for that gender or for correlations that were not conducted because there was not significant variability in the change component.
* $p < .05$. ** $p < .01$. *** $p < .001$.

consistent with the existing literature on change over the transition to parenthood. Possible reasons for the generally poor predictive ability are explored in more detail in the General Discussion section.

Study 2: Nonparent Sample

Before the results in the parent sample can be confidently attributed to the transition to parenthood, it is important to rule out common alternative explanations to which the ITS design used in Study 1 is particularly susceptible (Shadish et al., 2002). The primary threat to interpretation is the potential effect of *history*—that another variable or event acted at the time of birth to produce the effect that we attributed to parenthood. A second alternative explanation is *instrumentation*—a change in how data are collected, kept, or scored. For example, a systematic data entry or scoring error occurring for the assessment approximately 4 years into the study could be masquerading as the effect of birth in Study 1. In Study 2, a sample of nonparents was used to examine whether threats to internal validity (i.e., history and instrumentation) can explain the changes after birth observed in the parent sample. If similar changes are not observed, then we can be more confident that the sudden and gradual changes in relationship functioning observed in Study 1 can be attributed to the transition to parenthood. However, if similar changes are observed, then one of those alternative possibilities becomes the most likely explanation.

Method

Procedure

Participants in Study 2 participated in the same larger study as the participants in Study 1 and followed the same procedure described above. As with the parent sample, the type of premarital education received did not affect the selection of the best fitting model.

Participants

In Study 2, data from 86 couples who did not have children before or during the first 8 years of the study ("nonparents") were used as a nonequivalent control group. When nonparents began participation, they were 26.34 years old ($SD = 4.91$), on average, with 15.08 years of education ($SD = 1.77$). The median personal income level was \$20,000–\$29,999, and they were 90.1% White, 5.2% Latino, and 2.3% African American; 2.4% were of some other race/ethnicity. Seventy-five percent of nonparents cohabited before marriage. Twenty-seven percent of couples reported attending church at least

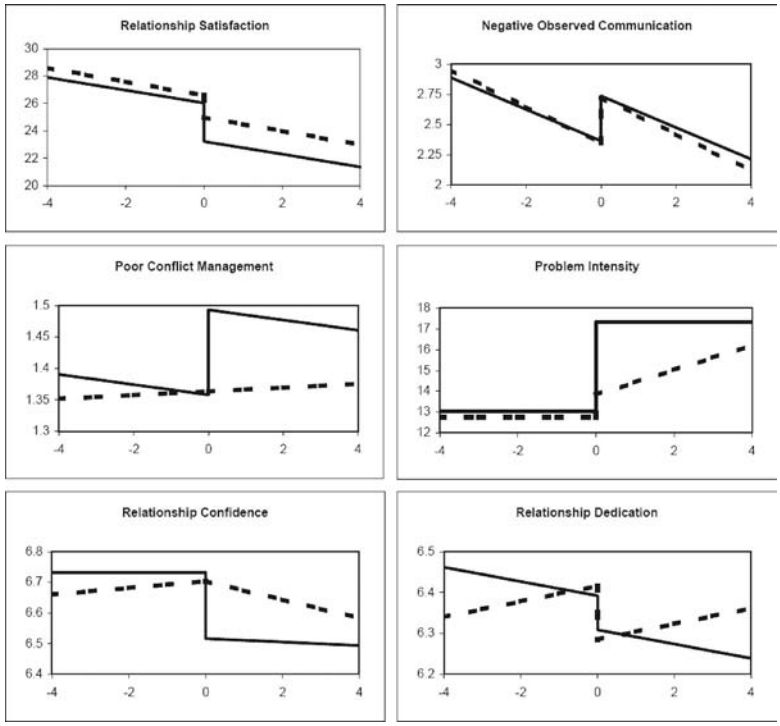

Figure 2. Estimated changes in relationship constructs for parents. The dotted line represents estimated changes for fathers; the solid line represents estimated changes for mothers. A time of zero on the *x*-axis represents the birth of the first child.

once a week, and, on average, couples described themselves as "somewhat" religious. During the course of the present study, 18 couples divorced, and 22 withdrew from participation. This divorce rate is consistent with previous longitudinal research of nonparents that begins just after marriage (e.g., Shapiro et al., 2000). All available data from the couples who divorced and withdrew were included in the analyses below, allowing for estimates of change to be fit for the majority of these couples who did not provide full data.

As expected, based on previous studies, there were a few differences between the parents in Study 1 and the nonparents in Study 2 at the initial assessment. Parents were more confident about their relationships, $F(1, 208) = 4.93$, $p < .05$, and had more years of education, $F(1, 216) = 6.93$, $p < .01$, than nonparents. There were no significant differences on any other relationship or demographic variables. Parents and nonparents did not significantly differ in terms of what type of premarital education they received, $\chi^2(2, N = 217) = 2.53$, $p > .25$.

Measures

The same measures described in Study 1 were used in Study 2.

Data Analysis

To determine whether nonparents experienced similar changes to parents at the same point in their relationships, the time of each nonparent's assessment was centered around mean time elapsed from the first assessment to birth for the parent sample used in Study 1 (3.51 years). This centering allowed us to examine whether relationship events other than birth of child (i.e., history or instrumentation effects) were viable explanations for the pattern of change in relationship functioning observed in parents. Other than this difference in centering, the same analytical and model fitting procedure used in Study 2.

Results

When the 12 models in Figure 1 were fit to the nonparent sample, all of the relationship constructs showed only linear or linear and quadratic change (see Figure 3); there was no evidence of change in intercepts or slopes at the time when parents were showing such changes for these relationship variables (see Table 5). As presented in Table 5, marital satisfaction showed significant linear declines over time ($p < .001$). Men and women also demonstrated significant decreases in negative observed communication over the course of the study (all ps $< .001$). Men, but not women, also reported a significant linear decline in relationship dedication ($p < .01$). In contrast, neither men nor women demonstrated significant changes during the course of the study in either problem intensity or poor conflict management.

Discussion

In contrast to the results for parents in Study 1, nonparents in Study 2 showed no evidence of sudden changes. Over the first 8 years of marriage, couples generally evidenced deterioration in relationship satisfaction, consistent with other longitudinal studies over the early years of marriage (e.g., Huston et al., 2001; Johnson et al., 2002). Men, but not women, also reported significant de-

Table 3
Gender Differences in Postbirth Relationship Functioning

Variable	Sudden changes			Gradual changes		
	Deviance	*df*	$\chi^2(1)$	Deviance	*df*	$\chi^2(1)$
Relationship satisfaction						
Unconstrained	9861.43	22		—	—	—
Constrained	9862.15	21	0.72	—	—	—
Negative observed communication						
Unconstrained	3172.21	17		—	—	—
Constrained	3172.22	16	0.01	—	—	—
Poor conflict management						
Unconstrained	324.43	22		—	—	—
Constrained	328.62	21	4.18*	—	—	—
Problem intensity						
Unconstrained	10819.82	16		10819.32	17	
Constrained	10833.23	15	13.41***	10822.97	16	3.65†
Confidence						
Unconstrained	1795.93	23		1797.29	22	
Constrained	1799.17	22	3.24†	1797.65	21	0.36
Dedication						
Unconstrained	1533.62	22		—	—	—
Constrained	1534.01	21	0.39	—	—	—

Note. When the best fitting model for only one gender included a sudden or gradual change, these changes were added to the model for both spouses so that they could be constrained to be equal. Dashes indicate constructs for which the best fitting models suggested no sudden changes in relationship functioning.
* $p < .05$. *** $p < .001$. † $p < .10$.

creases in relationship dedication over time. In contrast, self-reported problem intensity and poor conflict management did not significantly change for nonparents over time; additionally, negative observed communication significantly improved over the course of the study.

Overall, the results of Study 2 suggest that the most serious threats to the validity of an ITS design cannot explain the postbirth changes seen in Study 1. First, the most serious potential confound—history—was ruled out because none of the changes attributable to birth in the parent sample were evidenced in Study 2, reducing the possibility that these changes in levels or slopes are attributable to a common event that occurred around the same time as birth. The second threat to validity explored in Study 2 was instrumentation. Results indicated that nonparents, who completed

Table 4
Variability in Parents' Sudden Increases or Decreases After Birth

Variable	<-2 *SD*	-2 to -1 *SD*	-1 to 0 *SD*	0 to $+1$ *SD*	$+1$ to $+2$ *SD*	$>+2$ *SD*
			Mothers			
Relationship satisfaction	0.8%	28.0%	64.4%	6.8%	0.0%	0.0%
Observed negative communication	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
Poor conflict management	0.0%	0.8%	3.0%	90.9%	5.3%	0.0%
Problem intensity	0.0%	0.8%	9.0%	54.6%	28.8%	6.8%
Confidence	9.8%	21.2%	36.4%	40.1%	1.5%	0.8%
Dedication	0.8%	6.1%	64.9%	27.4%	0.8%	0.0%
			Fathers			
Relationship satisfaction	0.8%	9.1%	75.6%	14.5%	0.0%	0.0%
Observed negative communication	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
Poor conflict management	—	—	—	—	—	—
Problem intensity	0.0%	3.1%	43.5%	44.3%	10.7%	1.5%
Confidence	—	—	—	—	—	—
Dedication	0.8%	10.7%	70.9%	15.3%	2.3%	0.0%

Note. Dashes indicate constructs for which the best fitting models suggested no sudden changes in relationship functioning.

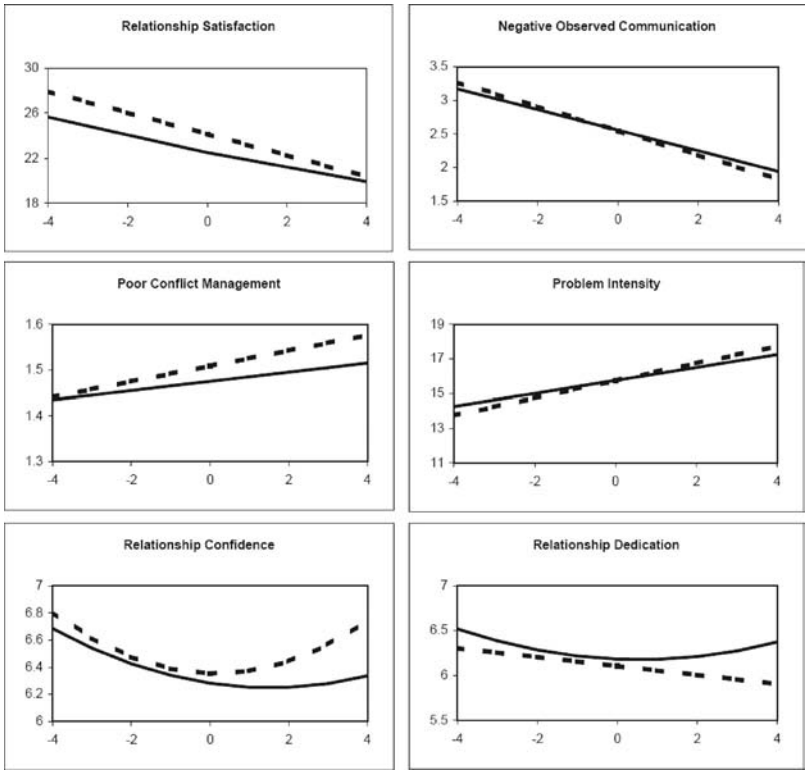

Figure 3. Estimated changes in relationship constructs for nonparents. The dotted line represents estimated changes for men; the solid line represents estimated changes for women. A time of zero on the *x*-axis is 3.51 years following the first assessment, the mean timing of birth in the parents sample.

the same measures and procedures as parents, did not show changes similar to those in Study 1 that we have attributed to birth. Therefore, instrumentation is an unlikely explanation of the results in the parent sample. In addition to history and instrumentation, Shadish and colleagues (2002) identified a third threat to ITS designs—*selection*. Selection effects could potentially explain the results observed in Study 1 if different subsamples of couples completed measures before and after the birth of the baby. However, examinations of the data from both Study 1 and Study 2 did not reveal differential study dropout immediately before or following these time points. Therefore, based on these results, the most likely cause of the sudden deterioration in the parent sample remains the birth of the first baby.

General Discussion

Sudden and Gradual Changes After Birth

The primary aim of the present study was to determine the effect of the birth of the first child on marital functioning by using an ITS design. This approach addressed several of the most pressing concerns about the previous literature and was able to (a) provide an estimate of change in relationship functioning attributable to birth by separating change after birth from change that was occurring in the couple before birth, (b) determine whether couples generally recover from the effects of birth or whether instead these effects are stable or even worsen with time, (c) examine gender differences in the effect of the transition to parenthood, and (d) compare parents and nonparents in appropriate ways.

Across positive and negative aspects of the relationship and across both self-report and observed variables, the birth of the first child has a small to medium negative effect on both fathers' and mothers' relationship functioning. The magnitude of this deterioration was smaller than many previous studies of the transition to parenthood (e.g., Cowan & Cowan, 1995, 2000; Gottman et al., 2002) but consistent with others (e.g., Kurdek, 1993; Simpson et al., 2003). The smaller effects of birth revealed in the present study support criticisms of previous studies of the transition to parenthood. Specifically, as noted by Huston and Holmes (2004), previous studies may have inadvertently captured a "honeymoon" period for the couples during pregnancy and confounded typical relationship deterioration occurring even before birth with problems attributable to the transition to parenthood.

The present study also answered previous calls (e.g., Huston & Vangelisti, 1995) to investigate the stability of the effect of the transition to parenthood. Results indicated that the negative effects on relationship functioning tended to persist through at least the first 4 years after birth. Indeed, there was not a single variable that showed evidence of even nonsignificant recovery after birth; parenthood tended to be experienced as sudden changes that persisted over time. In contrast to the general pattern of sudden and persistent change, fathers' relationship confidence and problem intensity continued to deteriorate in the years following birth.

Table 5
Hierarchical Linear Modeling Results for Best Fitting Models in Nonparents

Variable	Men			Women		
	B	*SE B*	*SD* of level 2 random effect	*B*	*SE B*	*SD* of level 2 random effect
Relationship satisfaction						
Intercept	24.15	0.71	3.88***	22.49	1.00	5.34***
Linear Δ	−0.94***	0.19	0.40*	−0.79***	0.19	0.73
Quadratic Δ	—	—		0.15*	0.07	0.24
Negative observed communication						
Intercept	2.55	0.08	0.41*	2.56	0.12	0.58**
Linear Δ	−0.18***	0.03	0.20*	−0.15***	0.03	0.07†
Poor conflict management						
Intercept	1.50	0.05	0.33***	1.48	0.05	0.34***
Linear Δ	0.02	0.01	0.04***	0.01	0.01	0.03**
Problem intensity						
Intercept	15.74	1.20	8.56***	15.75	1.07	7.46***
Linear Δ	0.50†	0.27	0.88**	0.37	0.24	0.65**
Confidence						
Intercept	6.37	0.18	1.06***	6.25	0.17	1.00***
Linear Δ	−0.03	0.02	0.09	−0.31†	0.12	0.08
Quadratic Δ	0.02†	0.01	0.06	0.02	0.01	0.06
Dedication						
Intercept	6.11	0.07	0.49***	6.18	0.12	0.82***
Linear Δ	−0.05**	0.02	0.06***	−0.02	0.01	0.02
Quadratic Δ	—	—	—	0.02	0.01	0.06***

Note. Dashes indicate model components that were not estimated in the best fitting model for that gender.
* $p < .05$. ** $p < .01$. *** $p < .001$. † $p < .10$.

Generally, mothers and fathers evidenced statistically similar patterns in postbirth relationship functioning, though there were two areas in which mothers reported significantly larger sudden declines than fathers. Consistent with previous research (e.g., Belsky & Hsieh, 1998; Grote & Clark, 2001), mothers reported significantly larger sudden increases in poor conflict management and problem intensity than fathers, indicating that they may be more sensitive to the impact of having a first baby on these negative aspects of relationship functioning than are their husbands. In other areas of relationship functioning, however, the patterns tended to be similar.

Finally, the statistical approach in the present study also provided novel information about the similarities and differences between parents and nonparents in changes in relationship functioning over the first 8 years of marriage. Had we instead fit only linear and quadratic slopes over time (omitting the possibility of sudden or gradual changes occurring at birth) and compared the amount of change between parents and nonparents, we would have concluded, along with previous studies (e.g., MacDermid et al., 1990; McHale & Huston, 1985), that parents and nonparents showed similar types of change over the course of the first few years of marriage. Instead, the results of the present study suggest that parents and nonparents generally show similar *amounts* of decline in overall relationship functioning over the first 8 years of marriage but that these changes tend to occur suddenly following the birth of the baby for parents and more gradually over time for nonparents. Additionally, parents showed clear increases in negativity, conflict, and problem intensity following the birth of a child, whereas nonparents did not show such changes at the same point in time, nor did they show such declines over time more generally. Given the sudden nature of the negative relationship changes following birth for parents, the most likely explanation is that they are caused by stressors encountered during the transition to parenthood that are not handled well.

Variability and Prediction of Change After Birth

In addition to examining change over the transition to parenthood for the average couple, we were interested in exploring variability in couples' adjustment to birth. In the present study, although the average individual's relationship functioning deteriorated, some individuals reported improvements over the transition to parenthood, consistent with previous studies (e.g., Belsky & Hsieh, 1998; Belsky & Rovine, 1990). The variability in individuals' reactions and adjustments to childbirth is important because it suggests avenues for future research on risk and resiliency during this typically stressful time. To understand why some couples deteriorate, whereas others improve after birth, Karney and Bradbury's (1995) VSA model is especially useful. Consistent with that model, the present study focused on three constructs that are understood to impact changes in relationship satisfaction over time: (a) enduring vulnerabilities, (b) the nature of the stressful event (birth), and (c) the couples' quality of adaptive processes.

First, several types of enduring vulnerabilities predicted relationship deterioration after birth. For mothers, a history of parental divorce or conflict was predictive of larger decreases in relationship satisfaction after birth. In previous studies, relationship functioning in the family of origin, particularly in that of the female partner, has been found to impact couples' current relationship functioning (e.g., D'Onofrio et al., 2007; Sanders, Halford, &

Behrens, 1999; Story et al., 2004). Additionally, in the present study, both fathers and mothers who cohabited premaritally had more difficulty over the transition to parenthood than couples who had not cohabited before marriage. This difference is perhaps due to a combination of prior risk factors and the nature of the way their relationships initially formed (Stanley, Rhoades, & Markman, 2006). The increased risk of cohabiting couples is consistent with previous research suggesting that those who cohabit before marriage (e.g., Kamp Dush, Cohan, & Amato, 2003; Stanley et al., 2004) are more at risk for marital problems and divorce.

Second, several characteristics of the stressful event (birth) predicted changes in couples' relationship functioning after birth. Specifically, fathers who had a child more quickly following marriage evidenced more declines in relationship satisfaction after birth than parents who waited longer after getting married. This finding is consistent with some (e.g., Belsky & Rovine, 1990) but not all (O'Brien & Peyton, 2002) research. It may be that couples who have been married longer have more time to develop a shared understanding of relationship responsibilities and goals that help to buffer them from the stressors of increased childcare and general disorganization after birth. Interestingly, whether the baby was planned was generally unrelated to postbirth functioning in this sample. In interpreting this finding, it should be noted that it was not possible in the present study to differentiate couples who did not plan to get pregnant but were happy about it from couples who had an unplanned and undesired pregnancy. In previous research, the postbirth relationship outcomes for these two types of couples have been shown to be very different (Cowan & Cowan, 2000); therefore, combining these groups in the present study may cause the overall prediction to be nonsignificant.

Additionally, the gender of the baby affected parents' relationship functioning after birth, with female children leading to larger decreases in mothers' relationship satisfaction and larger increases in fathers' reports of problem intensity. These findings are consistent with previous studies that have shown that male children are associated with lower rates of divorce and higher marital satisfaction (see Raley & Bianchi, 2006), possibly because fathers of girls are less active in childcare than fathers of boys. Pregnant couples may need specific help in understanding and communicating their expectations about the gender of their babies and childcare so that they can stop declines in relationship functioning from occurring. Finally, consistent with previous research (e.g., Belsky & Rovine, 1990), lower individual incomes (but not more financial stress) tended to predict more deterioration in fathers' relationship functioning after birth. Therefore, it appears that the additional resources, supports, and alternative sources of self-esteem afforded by a higher income, rather than reduced financial stress, serves to buffer the relationship from declines in relationship quality. In future studies, it will be important to identify these protective resources and supports.

Third, several aspects of couples' adaptive processes before birth predicted declines in relationship functioning after birth. Consistent with previous research (e.g., Cox et al., 1999; Crohan, 1996; Kluwer & Johnson, 2007), individuals who reported more problems with poor conflict management and problem intensity before birth showed significantly larger increases in these problems after birth. Additionally, more observed negative communication in mothers before birth predicted their reports of increases in postbirth poor conflict management, also consistent with previous research (e.g., Shapiro et al., 2000). Thus, as in previous studies, high levels of negative communication before birth placed individuals at risk for greater postbirth increases in problematic communication.

Interestingly, the present results also suggest that individuals with high prebirth levels of positive relationship functioning were at risk for more postbirth deterioration in the positive aspects of their relationships. Specifically, the sudden declines in fathers' and mothers' relationship satisfaction as well as mothers' dedication were larger when individuals showed higher levels of these constructs before birth; these findings are consistent with some (Belsky & Rovine, 1990) but not all (O'Brien & Peyton, 2002) previous literature. This pattern could indicate that couples who have the highest romantic connections find the transition to the tasks of parenting the most challenging, at least to the positive aspects of their relationships.

Additionally, reporting more relationship confidence before birth was associated with greater increases in negative relationship constructs (problem intensity and poor conflict management) after birth. Relationship confidence has not been previously examined over the transition to parenthood, but the risks of having unrealistically high relationship expectations have been demonstrated in newlywed couples, especially those with poor communication (McNulty & Karney, 2004). Taken together, these results suggest that the impact of the transition to parenthood may be especially potent when couples are at the extremes of both positive and negative relationship constructs. However, it should be noted that regression to the mean could also explain the associations of the positive (but not negative) relationship behaviors with changes after birth. Therefore, these results should be interpreted with caution until they are replicated in future research.

Despite the predictive ability of these variables, we should note that many other variables were not predictive of change in relationship functioning after birth. Given that the present study defines the "effect" of birth differently than previous studies, we wanted to include many of the predictors that have been used in previous studies. Many to most of these predictors had received equivocal support in previous research; the results in the present study were similar. There are likely several reasons for the difficulty in differentiating couples who will and will not have relationship difficulties after the transition to parenthood; we focus on three here. First, predicting change after birth requires predicting the development of some important aspects of the relationship that simply do not exist before birth. For example, the most commonly reported conflict after birth is division of childcare (e.g., Cowan & Cowan, 2000), something that couples have not previously dealt with. A second reason for the difficulty in predicting change after birth is that factors that cannot be known before birth may be some of the strongest determinants of change in relationship functioning over the transition to parenthood (e.g., child temperament; Kochanska, Friesenborg, Lange, & Martel, 2004). Third, in the present study, we purposely tested a restrictive definition of a predictor. Consistent with our desire to separate change in the relationship attributable to changes before birth from changes attributable solely to the transition to parenthood, we tested whether variables would be able to predict changes following birth after controlling for the couples' functioning at the time of birth. In other words, the only predictors identified in the present study were those that had an additional effect on relationship functioning

following birth above and beyond the effect they had already had on relationship functioning up to that point. Future research may wish to expand the list of predictors.

Limitations and Future Directions

The results of the present study should be considered in the context of its limitations. Most important, generalizability may be somewhat limited due to several factors. Although the sample is reasonably representative of the metro area from which it was drawn, and much effort was expended not to obtain a convenience sample (Stanley et al., 2001), participants were mainly well educated and Caucasian. Additionally, all couples received some form of premarital education and were married within a religious organization. The potential impact of these factors on generalizability is tempered for three reasons. First, analyses demonstrated that the type of education received did not systematically affect the shape of change in the relationship variables; furthermore, type of intervention did not significantly predict the amount of change following the birth of the baby. Second, because of the way participants were recruited, the selection effects are expected to be minimal. Each participating couple was required to receive premarital education through the religious organization that would perform their wedding (as a condition of being married there); therefore, this was not a sample that purposely sought out premarital education. Furthermore, over 75% (Johnson et al., 2002; Stanley, Amato, Johnson, & Markman, 2006; Sullivan & Bradbury, 1997) of couples who receive premarital education do so through a religious organization. Third, although all couples in the present study were married by an official associated with a religious organization, this is true for most couples in the United States (Stanley et al., 2006). Additionally, the average couple described themselves as only "somewhat religious," and only 27% of couples attend church once a week or more. Nevertheless, it could be that the findings here most specifically generalize to those couples who seek to marry in a religious organization.

A second limitation of the present study was that we were unable to separate the impact of the first child on changes in relationship functioning from the impact of later children. Assuming that later children have a negative impact on relationship functioning, this impact may be reflected in the gradual changes (and, to a lesser extent, sudden changes) seen after the birth of the first child. Future studies with more frequent assessments could address the issue of multiple children more directly.

We should also note that the larger study was originally designed to track changes in relationship functioning over time rather than the impact of the transition to parenthood. Although these types of designs have some advantages over studies that specifically target future parents (for a review of these advantages, see Huston & Holmes, 2004), it meant that the timing of the assessment before birth varied between couples. For some couples, the final prebirth assessment (from which the values of the time-varying predictors were obtained) occurred before the couple was pregnant, whereas it occurred in the third trimester for other couples. As a result, additional variability was added to the predictor, reducing power to find an effect of those predictors. In future studies, it would be useful to combine an ITS design with measures that are more specific to changes and challenges faced by couples over the transition to parenthood. For example, it may be that that relationship constructs other than those measured in the present study (e.g., prenatal expectations; Lawrence, Nylen, & Cobb, 2007) are more predictive of relationship change after the birth of the baby. Additionally, to expand researchers' understanding of the transition to parenthood, examination of the role the couple relationship plays in the developing coparenting relationship is critical. The data set used here contains an unusually broad assessment of relationship constructs, allowing for tests of various relationship effects over time. However, because child variables such as temperament are likely to have important impacts on relationship functioning after birth (Kochanska et al., 2004), researchers' ability to understand this process would be enhanced by inclusion of these variables in future studies. Finally, the internal reliability of some of our measures (e.g., dedication) was low at some of the initial assessment points, likely due to a restriction of range in newlywed couples.

Conclusion

In summary, using an extensive database of 218 couples spanning the first 8 years of marriage, the present study answers a long-standing and central question in the field; this investigation demonstrated that the transition to parenthood has a significant impact on marital functioning. For the average couple, these effects were negative, small to medium in magnitude, and consistent across a number of relationship domains. Moreover, these effects tended to be sudden and persist over time. Additionally, results revealed significant variability in changes after birth. This variability was systematically related to a number of factors associated with the individual, the marriage, and characteristics of the birth itself.

References

Adams, J. M., & Jones, W. H. (1997). The conceptualization of marital commitment: An integrative analysis. *Journal of Personality and Social Psychology, 72,* 1177–1196.

Amato, P. R. (2001). Children of divorce in the 1990s: An update of the Amato and Keith (1991) meta-analysis. *Journal of Family Psychology, 15,* 355–370.

Belsky, J., & Hsieh, K. (1998). Patterns of marital change during the early childhood years: Parent personality, coparenting, and division-of-labor correlates. *Journal of Family Psychology, 12,* 511–528.

Belsky, J., Lang, M., & Huston, T. L. (1986). Sex typing and division of labor as determinants of marital change across the transition to parenthood. *Journal of Personality and Social Psychology, 50,* 517–522.

Belsky, J., & Rovine, M. (1990). Patterns of marital change across the transition to parenthood: Pregnancy to three years postpartum. *Journal of Marriage and the Family, 52,* 5–19.

Biglan, A., Metzler, C. W., & Ary, D. V. (1994). Increasing the prevalence of successful children: The case for community intervention research. *Behavior Analyst, 17,* 335–351.

Bramlett, M. D., & Mosher, W. D. (2001). *First marriage dissolution, divorce, and remarriage: United States* (Advance data from Vital and Health Statistics, No. 323). Hyattsville, MD: National Center for Health Statistics.

Clements, M., & Markman, H. J. (1996). The transition to parenthood: Is having children hazardous to marriage? In N. Vanzetti & S. Duck (Eds.), *A lifetime of relationships* (pp. 290–310). Pacific Grove, CA: Brooks/Cole.

Clulow, C. F. (1982). *To have and to hold: Marriage, the first baby and*

parenting during the transition to parenthood. Aberdeen, Scotland: Aberdeen University Press.

Cohan, C. L., & Kleinbaum, S. (2002). Toward a greater understanding of the cohabitation effect: Premarital cohabitation and marital communication. *Journal of Marriage and Family, 64,* 180–192.

Collins, N. L., Dunkel-Schetter, C., Lobel, M., & Scrinshaw, S. C. M. (1993). Social support in pregnancy: Psychosocial correlates of birth outcomes and postpartum depression. *Journal of Personality and Social Psychology, 65,* 1243–1258.

Conger, R., Ge, X., Elder, G. H., Jr., Lorenz, F., & Simons, R. (1994). Economic stress, coercive family process, and developmental problems of adolescents. *Child Development, 65,* 541–561.

Cowan, C. P., & Cowan, P. A. (1995). Interventions to ease the transition to parenthood: Why they are needed and what they can do. *Family Relations: Journal of Applied Family & Child Studies, 44,* 412–423.

Cowan, C. P., & Cowan, P. A. (2000). *When partners become parents: The big life change for couples.* Mahwah, NJ: Erlbaum.

Cox, M. J., Paley, B., Burchinal, M., & Payne, C. C. (1999). Marital perceptions and interactions across the transition to parenthood. *Journal of Marriage and the Family, 61,* 611–625.

Crohan, S. E. (1996). Marital quality and conflict across the transition to parenthood in African American and White couples. *Journal of Marriage and the Family, 58,* 933–944.

Davies, P.T., & Cummings, E.M. (1994). Marital conflict and child adjustment: An emotional security hypothesis. *Psychological Bulletin, 116,* 387–411.

De Wolff, M. S., & Van Ijzdendoorn, M. H. (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child Development, 68,* 571–591.

D'Onofrio, B. M., Turkheimer, E., Emery, R. E., Harden, K. P., Slutske, W. S., Heath, A. C., et al. (2007). A genetically informed study of the intergenerational transmission of marital instability. *Journal of Marriage and Family, 69,* 793–809.

Feeney, J. A., Hohaus, L., Noller, P., & Alexander, R. P. (2001). *Becoming parents: Exploring the bonds between mothers, fathers, and their infants.* New York: Cambridge University Press.

Fincham, F. D., & Bradbury, T. N. (1987). The assessment of marital quality: A reevaluation. *Journal of Marriage and the Family, 49,* 797–809.

Funk, J. L., & Rogge, R. D. (2007). Testing the ruler with item response theory: Increasing precision of measurement for relationship satisfaction with the Couples Satisfaction Index. *Journal of Family Psychology, 21,* 572–583.

Goldberg, A. E., & Sayer, A. (2006). Lesbian couples' relationship quality across the transition to parenthood. *Journal of Marriage and Family, 68,* 87–100.

Gottman, J. M., Driver, J., & Tabares, A. (2002). Building the sound marital house: An empirically-derived couple therapy. In A. S. Gurman & N. S. Jacobson (Eds.) *Clinical handbook of couple therapy* (3rd ed., pp. 373–399). New York: Guilford Press.

Grote, N. K., & Clark, M. S. (2001). Perceiving unfairness in the family: Cause or consequence of marital distress? *Journal of Personality and Social Psychology, 80,* 281–293.

Grych, J. H., Seid, M., & Fincham, F. D. (1992). Assessing marital conflict from the child's perspective: The Children's Perception of Interparental Conflict Scale. *Child Development, 63,* 558–571.

Horwitz, S. M., Irwin, J. R., Briggs-Gowan, M. J., Heenan, J. M. B., Mendoza, J., & Carter, A. S. (2003). Language delay in a community cohort of young children. *Journal of the American Academy of Child & Adolescent Psychiatry, 42,* 932–940.

Huston, T. L., Caughlin, J. P., Houts, R. M., Smith, S. E., & George, L. J. (2001). The connubial crucible: Newlywed years as predictors of marital delight, distress, and divorce. *Journal of Personality and Social Psychology, 80,* 237–252.

Huston, T. L., & Holmes, E. K. (2004). Becoming parents. In A. Vangelisti (Ed.), *Handbook of family communication* (pp. 105–133). Mahwah, NJ: Erlbaum.

Huston, T. L., & Vangelisti, A. L. (1995). How parenthood affects marriage. In M. A. Fitzpatrick & A. L. Vangelisti (Eds.), *Explaining family interactions* (pp. 147–176). Thousand Oaks, CA: Sage.

Impett, E. A., Beals, K. P., & Peplau, L. A. (2001). Testing the investment model of relationship commitment and stability in a longitudinal study of married couples. *Current Psychology, 20,* 312–326.

Johnson, C. A., Stanley, S. M., Glenn, N. D., Amato, P. R., Nock, S. L., Author, H. J., et al. (2002). *Marriage in Oklahoma: 2001 baseline statewide survey on marriage and divorce (S02096 OKDHS*). Oklahoma City: Oklahoma Department of Human Services.

Julien, D., Markman, H. J., & Lindahl, K. M. (1989). A comparison of a global and a microanalytic coding system: Implications for future trends in studying interactions. *Behavioral Assessment, 11,* 81–100.

Kamp Dush, C. M., Cohan, C. L., & Amato, P. R. (2003). The relationship between cohabitation and marital quality and stability: Changes across cohorts? *Journal of Marriage and Family, 65,* 539–549.

Karney, B. R., & Bradbury, T. N. (1995). The longitudinal course of marital quality and stability: A review of theory, method, and research. *Psychological Bulletin, 118,* 3–34.

Karney, B. R., & Bradbury, T. N. (1997). Neuroticism, marital interaction, and the trajectory of marital satisfaction. *Journal of Personality and Social Psychology, 72,* 1075–1092.

Kline, G. H., Julien, D., Baucom, B., Hartman, S. G., Gilbert, K., Gonzales, T., et al. (2004). The Interactional Dimensions Coding System: A global system for couple interactions. In P. K. Kerig & D. H. Baucom (Eds.), *Couple observational coding systems* (pp. 113–127). Mahwah, NJ: Erlbaum.

Kline, G. H., Wood, L. F., & Moore, S. (2003). Validation of revised measures of family and interparental conflict for use with young adults. *Journal of Divorce and Remarriage, 39*(3/4), 125–142.

Kluwer, E. S., & Johnson, M. D. (2007). Conflict frequency and relationship quality across the transition to parenthood. *Journal of Marriage and Family, 69,* 1089–1106.

Kochanska, G., Friesenborg, A. E., Lange, L. A., & Martel, M. M. (2004). Parents' personality and infants' temperament as contributors to their emerging relationship. *Journal of Personality and Social Psychology, 86,* 744–759.

Kurdek, L. (1993). Nature and prediction of changes in marital quality for first-time parent and nonparent husbands and wives. *Journal of Family Psychology, 3,* 255–265.

Lawrence, E., Nylen, K., & Cobb, R. J. (2007). Prenatal expectations and marital satisfaction over the transition to parenthood. *Journal of Family Psychology, 21,* 155–164.

Lawrence, E., Rothman, A. D., Cobb, R. J., Rothman, M. T., & Bradbury, T. N. (2008). Marital satisfaction across the transition to parenthood. *Journal of Family Psychology, 22,* 41–50.

Lemasters, E. E. (1957). Parenthood as a crisis. *Marriage and Family Living, 19,* 352–355.

Locke, H. J., & Wallace, K. M. (1959). Short marital-adjustment and prediction tests: Their reliability and validity. *Marriage and Family Living, 21,* 251–255.

Lorensen, M., Wilson, M. E., & White, M. A. (2004). Norwegian families: Transition to parenthood. *Health Care for Women International, 25,* 334–348.

Lu, L. (2006). The transition to parenthood: Stress, resources, and gender differences in a Chinese society. *Journal of Community Psychology, 34,* 471–488.

MacDermid, S. M., Huston, T. L., & McHale, S. M. (1990). Changes in marriage associated with the transition to parenthood: Individual differences as a function of sex-role attitudes and changes in the division of household labor. *Journal of Marriage and the Family, 52,* 475–486.

Markman, H. J., Stanley, S. M., & Blumberg, S. L. (2001). *Fighting for your marriage: Positive steps for preventing divorce and preserving a lasting love.* San Francisco: Jossey-Bass.

Markman, H. J., Whitton, S. W., Kline, G. H., Thompson, H., St. Peters, M., Stanley, S. M., et al. (2004). Use of an empirically based marriage education program by religious organizations: Results of a dissemination trial. *Family Relations, 53,* 504–512.

McHale, S., & Huston, T. L. (1985). The effect of the transition to parenthood on the marriage relationships. *Journal of Family Issues, 6,* 409–435.

McNulty, J. K., & Karney, B. R. (2004). Positive expectations in the early years of marriage: Should couples expect the best or brace for the worst? *Journal of Personality and Social Psychology, 86,* 729–743.

Nock, S. L., Sanchez, L. A., & Wright, J. D. (2008). *Covenant marriage: The movement to reclaim tradition in America.* New Brunswick, NJ: Rutgers University Press.

Notarius, C. I., & Vanzetti, N. (1983). Marital Agendas Protocol. In E. E. Filsinger (Ed.), *Marriage and family assessment: A sourcebook for family therapy* (pp. 209–227). Beverly Hills, CA: Sage.

O'Brien, M., & Peyton, V. (2002). Parenting attitudes and marital intimacy: A longitudinal analysis. *Journal of Family Psychology, 16,* 118–127.

Perren, S., Von Wyl, A., Bürgin, D., Simoni, H., & Von Klitzing, K. (2005). Intergenerational transmission of marital quality across the transition to parenthood. *Family Process, 44,* 441–459.

Raftery, A. E. (1995). Bayesian model selection in social research. *Sociological Methodology, 25,* 111–163.

Raley, S., & Bianchi, S. (2006). Sons, daughters, and family processes: Does gender of children matter? *Annual Review of Sociology, 32,* 401–421.

Raudenbush, S. W., Brennan, R. T., & Barnett, R. C. (1995). A multivariate hierarchical model for studying psychological change within married couples. *Journal of Family Psychology, 9,* 161–174.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods.* Thousand Oaks, CA: Sage.

Raudenbush, S. W., Bryk, A. S., Cheong, Y. F., & Congdon, R. T. (2004). *HLM 6: Hierarchcial linear and nonlinear modeling.* Lincolnwood, IL: Scientific Software International.

Rholes, W. S., Simpson, J. A., Campbell, L., & Grich, J. (2001). Adult attachment and the transition to parenthood. *Journal of Personality and Social Psychology, 81,* 421–435.

Salmela-Aro, K., Aunola, K., Saisto, T., Halmesmaki, E., & Nurmi, J. (2006). Couples share similar changes in depressive symptoms and marital satisfaction anticipating the birth of a child. *Journal of Social and Personal Relationships, 23,* 781–803.

Sanders, M. R., Halford, W. K., & Behrens, B. C. (1999). Parental divorce and premarital couple communication. *Journal of Family Psychology, 13,* 60–74.

Schultz, M. S., Cowan, C. P., & Cowan, P. A. (2006). Promoting healthy beginnings: A randomized controlled trial of a preventive intervention to preserve marital quality during the transition to parenthood. *Journal of Consulting and Clinical Psychology, 74,* 20–31.

Schwarz, G. (1978). Estimating the dimensions of a model. *Annals of Statistics, 6,* 461–464.

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference.* Boston: Houghton Mifflin.

Shapiro, A. F., Gottman, J. M., & Carrère, S. (2000). The baby and the marriage: Identifying factors that buffer against decline in marital satisfaction after the first baby arrives. *Journal of Family Psychology, 14,* 59–70.

Simpson, J. A., Rholes, W. S., Campbell, L., Tran, S., & Wilson, C. L. (2003). Adult attachment, the transition to parenthood, and depressive symptoms. *Journal of Personality and Social Psychology, 84,* 1172–1187.

Stanley, S. M., Amato, P. R., Johnson, C. A., & Markman, H. J. (2006). Premarital education, marital quality, and marital stability: Findings from a large, random household survey. *Journal of Family Psychology, 20,* 117–126.

Stanley, S. M., Blumberg, S. L., & Markman, H. J. (1999). Helping couples fight for their marriages: The PREP approach. In R. Berger & M. T. Hannah (Eds.), *Preventive approaches in couples therapy* (pp. 279–303). Philadelphia: Brunner/Mazel.

Stanley, S. M., Hoyer, L., & Trathen, D. W. (1994). *The Confidence Scale.* Unpublished manuscript, University of Denver.

Stanley, S. M., & Markman, H. J. (1992). Assessing commitment in personal relationships. *Journal of Marriage and Family, 54,* 595–608.

Stanley, S. M., & Markman, H. J. (1997). *Marriage in the 90s: A nationwide random phone survey.* Denver, CO: PREP.

Stanley, S. M., Markman, H. J., Prado, L. M., Olmos-Gallo, P. A., Tonelli, L., St. Peters, M., et al. (2001). Community-based premarital prevention: Clergy and lay leaders on the front lines. *Family Relations, 50,* 67–76.

Stanley, S. M., Rhoades, G. K., & Markman, H. J. (2006). Sliding versus deciding: Inertia and the premarital cohabitation effect. *Family Relations, 55,* 499–509.

Stanley, S. M., Whitton, S. W., & Markman, H. J. (2004). Maybe I do: Interpersonal commitment and premarital or nonmarital cohabitation. *Journal of Family Issues, 25,* 496–519.

Story, L. B., Karney, B. R., Lawrence, E., & Bradbury, T. N. (2004). Interpersonal mediators in the intergenerational transition of marital dysfunction. *Journal of Family Psychology, 18,* 519–529.

Sullivan, K. T., & Bradbury, T. (1997). Are premarital prevention programs reaching couples at risk for marital dysfunction? *Journal of Consulting and Clinical Psychology, 65,* 24–30.

Tilden, V. P., & Shepherd, P. (1987). Increasing the rate of identification of battered women in an emergency department: Use of a nursing protocol. *Research in Nursing and Health, 10,* 209–215.

Twenge, J. M., Campbell, W. K., & Foster, C. A. (2003). Parenthood and marital satisfaction: A meta-analytic review. *Journal of Marriage and Family, 65,* 574–583.

Velicer, W. F. (1994). Time series models of individual substance abusers. In L. M. Collins & L. A. Seitz (Eds.), *Advances in data analyses for prevention intervention research* (NIDA Research Monograph No. 142, pp. 264–299). Rockville, MD: National Institute on Drug Abuse.

White, L. K., & Booth, A. (1985). The transition to parenthood and marital quality. *Journal of Family Issues, 6,* 435–449.

Whitton, S. W., Olmos-Gallo, P. A., Stanley, S. M., Prado, L. M., Kline, G. H., St. Peters, M., & Markman, H. J. (2007). Depressive symptoms in early marriage: Predictions from relationship confidence and negative marital interaction. *Journal of Family Psychology, 21,* 297–306.

Received January 15, 2008
Revision received May 16, 2008
Accepted May 19, 2008 ■