Reassessing the Link between Women's Premarital Cohabitation and Marital Quality

Spencer L. James and
Brigham Young University

Brett A. Beattie
Pennsylvania State University

Abstract

Using data from 2,898 women from the National Longitudinal Survey of Youth-1979, we employ a novel method to examine two perspectives, social selection and the experience of cohabitation, commonly used to explain the negative relationship outcomes cohabiting women report. Results reveal cohabitation is negatively related to marital happiness and communication and positively related to conflict. As in previous research, selection mechanisms appear to increase the odds of cohabitation while decreasing marital happiness. A closer examination of the problem also reveals a negative effect of the experience of cohabitation. This paper's primary contributions are the ability to model selection and experience in the same model and evidence of a robust effect of cohabitation on marital quality. These results underscore the complex pathways between union formation, family structure and marital outcomes.

One of the most dramatic changes affecting the American family over the past 50 years has been the rise of premarital cohabitation. Interest in how premarital cohabitation affects the individuals in these unions and the quality of the marriages they form has motivated research on the topic since at least the 1970s (Stein 1970). Since then, cohabitation prior to marriage has become normative, with more than half of all current marriages preceded by cohabitation (Kennedy & Bumpass 2008). A major reason for social scientific interest in cohabitation and marriage is because how and why individuals enter and exit romantic relationships have important implications for individuals and society writ large. For individuals, the quality and stability of romantic unions have been tied to adult physical and mental health (Hawkins & Booth 2005; Johnson & Wu 2002), and social, psychological and academic outcomes for children (Amato 2010). Because of this, marriage and cohabitation are contested areas of cultural debate (McLanahan, Amato & Furstenberg 2007), largely because welfare and tax policies can encourage or discourage one form of relationship over the other (Moffitt, Reville and Winkler 1998). For instance, because many cohabiting relationships involve children, implications of cohabitation for the stability and quality of a future relationship likely also have repercussions on the well-being of the partners' offspring (Brown 2004). Thus, as cohabitation becomes prevalent, any benefits or detriments associated with cohabitation may be realized by an increasing proportion of the population, with both individual and societal implications (Kennedy & Bumpass 2008).

Scholarly interest in the relationship between premarital cohabitation and marital outcomes has focused on differences in both marital quality and marital instability between cohabitors and noncohabitors, with results generally supporting the proposition that, on average, cohabitors tend to report poorer marital quality and experience greater marital instability

than those who move directly into marriage (Jose, O'Leary & Moyer 2010; Smock 2000). However, the true effect of cohabitation on marital quality, to the extent that it exists, cannot be reliably estimated simply by including a variable for whether an individual has cohabited or not prior to marriage. This is because the observed relationship between cohabitation and marital outcomes comprises at least two parts: selection into and the experience of cohabitation. Consequently, scholars have proposed two theories focusing on each of these aspects of cohabitation. The first, which we term the social selection perspective, posits that people who cohabit are different from people who enter directly into marriage, and it is these differences between the two groups that are responsible for the negative relationship outcomes that cohabitors experience. In contrast, the second theory refers to the experience of cohabitation. Scholars highlighting this perspective suggest that there may be something about cohabitation itself that increases the risk of marital disruption beyond one's characteristics at the beginning of the union.

To date, available research has provided conflicting evidence regarding why those who enter a cohabiting relationship prior to marrying report lower marital quality, on average, than those who enter directly into marriage. As a result, researchers have struggled to come to firm conclusions regarding the causal processes behind the differential marital quality among those who married directly and those who cohabited first. This difficulty exists because most studies on the topic have not been able to simultaneously test both theories. In what follows, we describe both the social selection into and experience of cohabitation and articulate three problems that may be partly responsible for the inconsistent findings on the selection and experience perspectives in the literature. We then propose, develop, and test a model for exploring the effect of both the social selection and the experience perspectives in the same model to compare the marital quality of women who cohabited with women who entered directly into marriage. This improves our ability to make claims regarding causal processes because we pay particular attention to the time ordering of variables, leading to less biased and more efficient estimates of both the social selection and experience perspectives.

Two Perspectives on Premarital Cohabitation and Marital Quality

The first perspective, social selection, suggests unmeasured differences between cohabitors and noncohabitors govern the decision to cohabit and future marital quality. Unmeasured differences like nontraditional values, attitudes or poor relationship skills may increase the risk of marital instability, poor marital quality, and cohabitation. Other studies have identified those who cohabit tend to be less religious (Thornton, Axinn and Hill 1992), advocate greater gender equality (Le Bourdais and Lapierre-Adamcyk 2004), report lower levels of education (McGinnis 2003) and come from less stable family backgrounds (Kamp Dush, Cohan and Amato 2003), potentially resulting in more pessimistic views of the stability of intimate relationships. Consequently, these individuals may also be more accepting of relationship dissolution than those who do not cohabit. Such beliefs could result in poor-quality marriages.

Additionally, selection mechanisms regarding homogamy may be at play. Mate selection studies find that, compared with cohabiting couples, married couples are more homogamous in age, religion and race/ethnicity. Although sig-nificant, any marital issues arising from these differences appear to be modest and declining over time (Smock 2000).

The second theory refers to the experience of cohabitation. Scholars highlighting this perspective suggest there may be something about cohabitation itself that increases the risk of marital disruption. There may be aspects of cohabitation that change individual's attitudes, beliefs or behaviors that are also associated with poorer marital outcomes.

Although this perspective has received less attention, it has received some support. For instance, Axinn and Thornton (1992) found individuals who cohabited expressed more favorable attitudes toward divorce after cohabitation, net of prior divorce attitudes. Thus, because cohabiting relationships tend to be relatively short-lived, individuals who experience cohabitation may be more likely to embrace the temporary nature of romantic relationships. For example, awareness of relationship impermanency may reduce investment, potentially resulting in a poorer quality marriage and a lower threshold for dissolution (Qian, Lichter and Mellot 2005). Similarly, there is evidence that people are less religious after cohabitation (Thornton, Axinn and Hill 1992). Because attendance at religious services has been tied to greater marital quality and stability (Eggebeen and Dew 2009), reduced religious activity may translate into decreased marital quality (Thornton, Axinn and Hill 1992). Cohabitors have also been found to espouse less traditional attitudes than noncohabitors (Woods and Emery 2002), as well as less confidence in the relationship's future (Thomson and Colella 1992).

These differences may stem largely from cohabitation's lack of institutionalization (Nock 1995). In spite of its diffusion, cohabitation is not yet governed by strong consensual social norms and formal laws. Consequently, cohabiting couples may not receive as much social support as married couples due to disapproval of cohabiting relationships or because of uncertainty in dealing with certain social situations (how to address a cohabiting partner, whether to treat them as a family member, etc.). Furthermore, the stress from this lack of social support may result in lower marital quality; this stress effect may amplify throughout the life course (Umberson et al. 2006). Additionally, relationship "inertia" may lead some couples to "slide into" cohabitation rather than making an explicit decision, resulting in some suboptimal marriages, in part because of marriage-specific capital (children, possessions, etc.) accumulated during cohabitation (Stanley, Rhoades and Markman 2006). Recent research also supports the experience perspective. Kamp-Dush, Cohan and Amato (2003) found even when accounting for mechanisms through which individuals select into cohabitation, cohabitors continued to report poorer marital quality and increased marital instability.

Issues in Previous Work

Previous research comparing cohabitors' and non-cohabitors' marital quality has identified two distinct possibilities, social selection and experience, for explaining why those who cohabited report lower marital quality than those who did not. However, our ability to adjudicate between perspectives is hindered by at least three difficulties involving the time metric, temporal ordering, and model specification.

One problematic issue in past research has been the proper measurement of the time metric for cohabiting relationships. Previous work has often used the beginning of the marriage as the start of the time metric. While this may be intuitive (one can't measure marital quality without a marriage, for obvious reasons), using the beginning of the marriage as the first time point can lead to ambiguous findings because of the well-established negative relationship between marital duration and marital quality (VanLaningham, Johnson and Amato 2001). If relationship quality declines as a romantic relationship matures, one would expect premarital cohabitors, a priori, to report lower levels of marital quality at every marriage duration because they have been living together longer than those who married directly. The solution is to use the beginning of the coresidential union as the time metric, rather than the beginning of the marriage. Failure to do so confounds any effect of cohabitation with the influence of relationship duration, leading to ambiguous interpretations regarding whether findings support the social selection perspective or the experience of cohabitation proposition.

Second, the temporal ordering of variables matters because a true selection effect can exist only when selection processes or mechanisms occur prior to relationship formation. Perhaps an example using educational attainment can illustrate. Much work on selection into cohabitation has found those with lower educational attainment are more likely to cohabit. However, there is little evidence individuals forgo cohabitation to pursue education. In fact, there is evidence that the pursuit of education is more compatible with cohabitation than marriage (Oppenheimer 2003), meaning cohabitation often precedes final educational attainment. However, only current, not final, educational attainment can act as a selection factor into cohabitation.[1] If postcohabitation factors are included in a model estimating the effect of premarital cohabitation on subsequent marital quality, we lose our ability to distinguish between social selection and the experience of cohabitation because such factors cannot have selected the individual into the cohabiting union. It is necessary to insure proper temporal ordering. Otherwise, one is, in essence, conflating the effect of factors selecting individuals into cohabitation with any effect the actual experience of cohabitation may have, thereby contaminating the estimate of social selection with the experience of cohabitation, and vice versa.

Conclusions can also be misleading because of a third problem – the inability to include measures of both social selection into and the experience of cohabitation. Most work has been unable to directly test both theories because of the difficulty involved in specifying the model by explicitly and simultaneously incorporating both perspectives. This is largely due to the difficulty of parsing factors that act as selection mechanisms into cohabitation from factors that result from the experience of cohabitation. To deal with this, previous work has often estimated the zero-order effect of cohabitation on marital quality, and then included variables thought to influence both the likelihood of cohabitation and an individual's marital quality. If the observed negative effect of cohabitation decreases in effect size or loses significance, this is seen as evidence against the experience of cohabitation in favor of the social selection perspective. However, such conclusions could be inaccurate representations of the social processes thought to govern the relationship between cohabitation and marital quality because the two perspectives are not both represented in the model. It is also difficult to know whether the decreased effect size or lack of significance is because the relationship is spurious, per social selection, or if the newly included variables mediate the path between cohabitation and marital quality. Thus, it is not an explicit test of experience versus selection; rather researchers pursuing this line of inquiry must rely on inference and theory for support of the social selection perspective. Any conclusions drawn are tenuous because adjudication between the two theories requires the presence of both in the same statistical model. Without explicitly including the social selection perspective in the same model with a measure of the experience of cohabitation, we are limited in what we can say about why couples who cohabit prior to marriage tend to report lower levels of marital quality than those who enter directly into marriage.

A New Model for Examining the Effect of Cohabitation on Marital Quality

Figure 1 presents the proposed model for this paper. The model is comprised of two components, one for addressing how precohabitation characteristics influ-ence the likelihood of entry into premarital cohabitation (the social selection perspective) and another for examining how factors that occur after the cohabitation begins affect marital quality.

Precohabitation traits, including nativity and assimilation features, attributes of the family of origin, demographic and labor market characteristics, attitudes toward gender issues and

---

[1]Unmeasured genetic, psychological, social or interpersonal characteristics may drive entry into cohabitation and subsequent events, but factors prior to initial entry into cohabitation are uniquely responsible for it.

family formation and religious orientation are first used to estimate the likelihood an individual will cohabit, and then postcohabitation factors such as the number of hours worked, income, educational attainment, the number and age of children in the household, length of relationship, and race-ethnicity are modeled to examine the effect of both the experience of cohabitation and social selection on marital quality.

Our theoretical model addresses the three weaknesses outlined by exploiting the strengths of several statistical techniques, such as propensity score and random effects models, leading to more efficient, less biased estimates of both the selection into and experience of cohabitation perspectives.[2]

First, we incorporate the length of relationship as our time metric. This is important because claims regarding the relative strength of social selection or experience of cohabitation without first controlling for the length of the relationship are dubious. In our model, relationship length is allowed to span cohabitation and marriage and is modeled as a predictor of marital quality. Thus, in our model, any negative effect of either selection into or the experience of cohabitation cannot be attributed to cohabitors' lengthier coresidential unions.

Second, the model distinguishes between factors that occur before and after the beginning of the cohabitation. This mitigates concerns that time-ordering problems influence the results because only factors occurring prior to entry into cohabitation affect our measure of selection and only factors that occurred after the cohabitation are allowed to affect measures of marital quality. Because we exercise great caution regarding the temporal ordering of variables, we are able to more precisely represent the social selection and experience perspectives. Thus, the results from this model will yield more accurate estimates of selection and experience than those from previous work.

Third, our model allows a large number of predictors to influence social selection. Previous work examining mechanisms selecting individuals into cohabitation has been hampered because incorporating information on the individual's nativity and assimilation features, attributes of the family of origin, demographic and labor market characteristics, attitudes toward gender issues and family formation and religious orientation, as we do here, required the inclusion of each variable separately, exhausting many degrees of freedom and potentially leading to model overspecification and collinearity issues. Essentially, this model allows us to retain many of the benefits a propensity score offers but allows us to use it in a larger, causal model while using up only one degree of freedom. This approach, then, couples the advantages of statistical parsimony with the exigencies of empirical rigor.

Measuring Marital Quality

Before proceeding further, a quick note on how we measure marital quality is in order. Marriage scholars have articulated three perspectives regarding measurement of marital quality. The first perspective, marital adjustment, rooted in marital therapy, seeks to improve marital functioning by identifying factors associated with troubled and well-adjusted marriages (Spanier 1976). Scholars who embrace the marital adjustment perspective often pursue a single ordering of marriages, ranging from well-adjusted to troubled marriages. The second perspective, or global evaluation, argues partners' subjective evaluations of their union quality, reflected in global happiness or satisfaction, are the most reliable indicator of marital quality. Studies focusing solely on marital satisfaction or marital happiness can be

---

[2]Obtaining completely unbiased and efficient estimates of selection or experience is impossible because of at least two factors: measurement error and unobserved heterogeneity due to omitted variable(s) bias.

said to be in accord with this perspective. However, each of these perspectives is limited because of conceptual and analytical weakness in implementing them. For example, because the marital adjustment perspective seeks a single ordering of marriages, it is difficult to disentangle the positive (marital happiness, satisfaction, interaction, etc.) and negative (conflict, problems, divorce proneness, etc.) dimensions of marital quality (Johnson et al. 1986). Additionally, using marital quality to refer only to global assessments of the marriage does not allow for the measurement of behavioral and evaluative components tapping the dynamic nature of marital relations. Because of these weaknesses, we use a third approach to measure marital quality. Our approach conceptualizes and operationalizes marital quality as a multidimensional construct. Rather than attempting to delineate a single ordering of marriages or employing a single dimension, we see marital quality as a set of traits, attitudes and behaviors that together compose a reliable and valid measurement of marital quality, which serves as an umbrella term grouping distinct concepts. Researchers influenced by this perspective often tap multiple, separately measured dimensions of marital quality (Amato et al. 2007). By including a scale tapping happiness or satisfaction with marriage, like the subjective evaluation perspective, and by including measures of other dimensions, such as conflict and interaction, like the marital-adjustment perspective, scholars can incorporate many of the benefits gained from the marital adjustment and evaluation perspectives while mitigating several potential limitations.

This paper builds on this perspective by examining the effect of premari-tal cohabitation on multiple dimensions of marital quality (happiness, communication, conflict) using nationally representative data covering nearly three decades of cohabitation and marital experiences (1979–2008) of young women. Furthermore, the novel method we employ allows us to explicitly measure both selection into and experience of cohabitation on subsequent marital quality, something previous studies have rarely achieved.

Most research examining the relationship between premarital cohabitation and subsequent marital quality has employed either a global measure of marital happiness or satisfaction (Glenn 1998) or some measure of marital adjustment (Bradbury 1998). In this study, we employ three separate measures of marital quality: happiness, communication and conflict. Marital happiness is the most commonly used measure of marital quality and previous research has tied pre-marital cohabitation to marital happiness (Brown and Booth 1996). Research on premarital cohabitation has also shown couples who cohabited prior to marriage tend to have poorer marital communication (Cohan and Kleinbaum 2002) and greater marital conflict (Stanley, Whitton and Markman 2004) compared with noncohabitors.

Methods

Data

To examine the relative strength of the selection into and the experience of cohabitation perspectives on marital quality, we employed the nationally representative, longitudinal data available in the National Longitudinal Survey of Youth 1979 (NLSY79). A total of 12,685 people, born between 1957 and 1964 and aged 14–22 years when first interviewed in 1979, were interviewed annually between 1979 and 1994, and biennially thereafter, the last available wave in 2008.

However, because only women's marital quality was ascertained at all available time points (even years between 1992 and 2008), we restrict our analyses to women who reported being married at some point during our observation window. We further restrict our sample to women in first marriages for whom we have information about their cohabitation history, thereby excluding those who were married at the first wave. We also exclude those who

report cohabitation at the first wave because we have no information prior to 1979. This brings our final analytical sample size to 2,898 women, with 21,245 person years between 1992 and 2008.

Although exploiting the repeated measures of marital quality in the NLSY79 is an improvement over prior research, the NLSY79 is also limiting. First, we are missing many "starter" marriages that began and ended prior to 1992 (807 respondents, or 21% of marriages), although the often conflictual and unstable nature of these unions (Glenn, Uecker and Love 2010) may render our estimate of cohabitation's impact on subsequent marital quality conservative. Second, the 2-year intervals between interviews exclude some short-duration marriages. Third, the extent to which the findings generalize to men is unclear, a point to which we return in the discussion section.

Variables

Table 1 displays descriptions, means, standard deviations, and ranges for all variables. Measures of marital conflict and marital communication were standardized.

Missing Data

Like most surveys, the NLSY79 has missing values. Although the amount of missing data was almost never more than 10% of the sample and usually around 3 percent, missing data can influence the coefficients and standard errors (Acock 2005). Using Stata's ice program, we generated five datasets of values to represent the distribution of plausible values (Royston 2007). These datasets were jointly analyzed to adjust for possible bias caused by missing data. After imputation and before analysis, the data were examined for irregularities that may have occurred during the imputation process. No meaningful variations were found in the means, standard deviations or ranges.

Research Procedure

We estimate a two-step model. First, we use propensity score matching methods to estimate the propensity someone will cohabit. Second, we use a random effects model to compare the effect of selection into and experience of premarital cohabitation on marital happiness, communication and conflict. To measure social selection, we include the propensity score estimated in the first step. Our measure of experience of cohabitation is a dummy variable for whether a person has cohabited or not.[3] We also control for the effects of (postcohabitation) time-varying covariates such as the number and age of children living in the respondent's household, the number of hours the respondent worked as well as their income and educational attainment. Because research (Addo and Sassler 2010) has identified race/ethnicity and the relationship length among the most important predictors of marital quality, we include these in the second equation as well.

Step 1: Estimating the Propensity Score

Previous research, as noted above, has identified a plethora of mechanisms thought to influence selection into cohabitation. Simultaneous inclusion of all these variables in a single equation, however, is cumbersome and makes heavy requirements on data quality. Given the strong preference for statistical parsimony in quantitatively driven fields, a more simple approach incorporating such variables is desirable.

---

[3]Thus, when included in a model without the selection measure, a variable representing cohabitation experience represents cohabitation's overall effect on marital quality.

To further our knowledge regarding the selection and experience perspectives, we use a novel way of measuring selection into cohabitation by borrowing from propensity score models (see Frisco, Muller and Frank 2007 for an example). Although subject to critique (DiPrete and Gangl 2004), propensity scores have one very appealing feature: the propensity score itself, which, if estimated correctly, can be thought of as the latent probability of cohabiting, whether one has done so or not.[4] We use the following binary logistic regression equation to estimate the propensity to cohabit:

$$\Pr(T_i = 1 | X_i) = \frac{\exp(x_i \beta_i)}{1 + \exp(x_i \beta_i)} \quad (1)$$

where χ_i is a vector of covariates associated with the probability of cohabiting and potential confounders in the relationship between marital quality and cohabitation. β_i represents the estimated slopes associated with each covariate, and $T_i = 1$ if individual i cohabited. (Table 1 lists variables included in the propensity score equation.) This model permits the inclusion of a very large number of predictors of the propensity score, limiting the ability to model selection into cohabitation only by the richness of our data rather than the confines of our model.

Decisions regarding which variables were entered into the equation predicting selection into cohabitation were carefully undertaken. Variables such as current educational attainment, parental background, age, income and hours of employment, religion and religiosity, gender beliefs, attitudes toward marriage, race, etc. were all measured *prior to* entry into cohabitation. For women who have not cohabited, we use values at the median age at cohabitation (among cohabitors) to estimate the propensity of cohabitation. In our second equation, we include race-ethnicity as well as all information from our time-varying covariates that occurred after the cohabitation began; these include relationship duration, the number and age of children in the household, income, education and the number of hours worked by the respondent.

Functionally, propensity score models use observed covariates to estimate the latent propensity score distribution of observations in the treatment and control groups, the treatment being cohabitation. By performing significance tests across the entirety of the distribution of the propensity score, estimation of the propensity score ensures the treatment and control groups are homogenous on all observed variables.

Homogeneity across treatment and control groups ensures the propensity score is a more efficient, less biased measure of selection into cohabitation than those employed in previous work because it incorporates information from a large number of mechanisms thought to influence selection into cohabitation, such as nativity and assimilation features,[5] attributes of the family of origin, demographic and labor market characteristics, attitudes toward gender issues and family formation, and religious orientation. Thus, one way we build upon previous work and advance knowledge is by including this propensity score[6] in an equation including whether one cohabited in a model predicting marital quality. Although not new to sociological studies (Berk et al. 1986), this method, which to our knowledge has never been used to address differences in premarital cohabitors' and directly marrieds' marital quality, enables us to simultaneously test both the social selection and the experience of cohabitation

---

[4]Some respondents with a high estimated propensity to cohabit did not cohabit, whereas others with low propensity to cohabit did.
[5]Non-Natives often hold high aspirations for marriage but may be less likely to marry and more likely to cohabit due to low socioeconomic standing (Oropesa 1996).
[6]Note that we do not employ propensity score matching models.

perspectives and examine their independent effects on marital quality while controlling for the impact of the other.

Step 2: Estimating the Random Effects Model

The second step involved the estimation of a random effects model to ascertain the relationship between the social selection and experience perspectives of cohabitation on marital quality, as shown in equation 2.

$$MarQual = \alpha_i + b_1(Experience_i) + b_2(Selection_i) + b_3(Relationship\ Length_{it})$$
$$+ b_4(Income_{it}) + b_5(Education_{it}) + b_6(No\ Children\ in\ the\ Household_{it})$$
$$+ b_7(Presence\ of\ Children\ under\ 5\ in\ Household_{it})$$
$$+ b_8(Presence\ of\ Children\ 5\ to\ 9\ in\ Household_{it}) \quad\quad (2)$$
$$+ b_9(Presence\ of\ Children\ over\ 9\ in\ Household_{it})$$
$$+ b_{10}(\#\ of\ Hours\ Worked_{it}) + b_{11}(Black_i) + b_{12}(Hispanic_i)$$
$$+ \xi_{it}$$

where ξ_{it} is as follows:

$$\xi_{it} = \zeta_i + \varepsilon_{it} \quad (3)$$

Thus, marital conflict, happiness and communication, respectively, are modeled as a function of an individual-level intercept (α_i) and coefficients estimating the association between marital quality and selection into and the experience of cohabitation (b_1 and b_2). Also included are the other covariates of marital quality, as well as an error term comprised of two components. Here, ζ_j is a time-constant error component varying between individuals. ε_{it} is a transitory error component varying both within and between individuals, representing the effects of time nested within individuals and any other error. Both errors are assumed to be independent, normally distributed, with a mean of 0. Each of these terms (ζ_j & ε_{it}) is represented as a random effect in the tables that follow. b stands for estimated parameters, i indexes individuals, and t marks time periods (survey waves).

Estimating this two-step model offers advantages beyond alleviating the three problems previously articulated. For instance, although propensity score matching methods can produce less biased and more efficient estimates of an independent variable on an outcome, such methods may be biased if a significant amount of time lapses between the measurement of the independent and dependent variables. This is because confounding variables not included in the propensity score equation may have influenced the outcome beyond the impact of the observed traits used to create the propensity score. Our model, in contrast, uses the propensity score in a larger causal model and controls for confounders potentially altering our estimate of the relationship between cohabitation and marital quality. Another advantage of the random effects model is the ability to employ a time-varying dependent variable. Because marital quality is known to change across time, the ability to model this is imperative to obtaining reliable estimates.

Although other estimation techniques, such as fixed effects, offer the advantage of dealing with unobserved heterogeneity, our research question is focused on differences between individuals who have cohabited and those who entered directly into marriage. Because our two variables of primary interest, selection into and experience of cohabitation, do not vary over time, we cannot employ these methods. Thus, this model provides an estimate of both social selection into and the experience of cohabitation that controls for the influence of the other perspective. Employing random effects models allows us to use longitudinal panel data

to examine the question. Our use of the National Longitudinal Survey of Youth 1979 cohort of married women allows us to do so with a nationally representative sample.

Results

We begin by presenting the zero-order coefficients for cohabitation on each measure of marital quality (Table 2). In line with previous research, the association between cohabitation and marital quality is negative on all measures of marital quality. For marital conflict and marital happiness, the association is statistically significant. On average, individuals who cohabited report lower marital happiness and greater marital conflict than those who married directly. Thirty-seven percent of our sample reported cohabiting with their spouse prior to marriage, similar to the 41 percent reported elsewhere for women in the same time period (National Center for Family & Marriage Research 2010).

Due to space constraints, we forgo discussion of the estimation of the propensity score (available from the first author). Note the equation balanced when including all variables specified in Table 1 and fit the data well, and we exclude observations outside the region of common support in the remaining analyses.

We then moved to examine whether the observed negative association between marital quality and cohabitation is driven more by social selection or by the experience of cohabitation. Table 3 presents the results when both selection into (measured by the propensity score) and the experience of cohabitation (measured by the dummy variable indicating premarital cohabitation) are included in the model, along with time-varying controls for relationship length, income, education, the number and age of children in the household, the number of hours worked in the past year and race-ethnicity.

This first column of Table 3 presents the results for marital conflict. We find those who reported experiencing premarital cohabitation on average tend to report higher marital conflict as well. The difference between those who did and did not cohabit is about one-tenth of a standard deviation, indicative of a substantively small effect. We find no evidence that selection into cohabitation is associated with marital conflict, net of the experience of cohabitation. The length of relationship is negatively related to marital conflict. In terms of the other predictors, we find women's income and education are both negatively associated with marital conflict, whereas the presence of children and longer work hours are associated with higher marital conflict. We also find evidence of racial differences in marital conflict, with black and Hispanic women reporting significantly higher levels of conflict than their counterparts.

For marital happiness, we find a somewhat different pattern. Here, the experience of cohabitation is again significantly and negatively related to happiness, with cohabitors reporting somewhat lower happiness than those who married directly. In contrast to conflict, however, selection into cohabitation here exerts a significant negative effect. A one-unit increase in the probability of cohabiting is associated with more than one-tenth of a point drop in marital happiness, which is nearly three times larger than the comparable effect size of experience. Length of relationship is negatively associated with marital happiness, as is the number of older (aged 5 or older) children in the home. We again find evidence of differences in race-ethnicity, with both black and Hispanic women reporting lower marital quality than the reference group of white and Asian women.

In terms of marital communication, we again find the experience of cohabitation appears to exert a negative influence on marital quality. Women who experienced premarital cohabitation report less frequent communication, with an average difference of .06 standard deviations. Similar to conflict, we find no evidence that selection into cohabitation

influences marital quality. In terms of the covariates, we find the same robust pattern as in the other models, with the length of the relationship, the number of hours worked and race-ethnicity negatively associated with marital communication, whereas a respondent's educational attainment appears to be positively related to communication. The absence of children in the household was associated with greater marital communication.

To examine model fit, we employed two information criteria, the Akaike information criterion (AIC) and Bayesian information criterion (BIC), and deviance-based hypothesis tests (Table 4). Because we use the same set of independent variables, we can use the AIC and BIC to compare the non-nested models predicting marital conflict, happiness and communication, although evidence of differences should be viewed as suggestive rather than conclusive. Our model for marital happiness (model E) fits the data better than our models for either marital conflict or marital communication. This is not surprising in light of the influence of selection on happiness; we do not observe the same effect of selection for the other two outcomes.

Deviance-based hypothesis tests also confirmed the results. While the addition of the experience of cohabitation to the model improves model fit for all outcomes, the inclusion of selection improves model fit only for marital happiness. The tests in model D attest to this, demonstrating that while experience improves model fit net of the influence of selection for all three outcomes, only the controlled test of selection approached significance. Not surprisingly, the inclusion of our covariates significantly improves the fit of the model to the observed data (model E).

However, any claims regarding causality between premarital cohabitation and marital quality must first deal with two problems. We addressed each of these in subsequent analyses (not shown but available upon request). First, the propensity score, our measure of selection into cohabitation, was derived by estimating a logit model where the outcome was a dummy variable with cohabitors coded as 1. Hence, our selection measure is the predicted values ($\hat{y}$'s) from an equation predicting the experience of cohabitation (the y's). One would therefore expect the two to be correlated. Further, including the $\hat{y}$'s and y's in the same equation, as we do in the second step of our model, could be problematic because the variables share similar information, leading to biased, inefficient and unstable estimates. The solution is to make our measures of social selection and experience of cohabitation orthogonal, so the two are uncorrelated ($Cov(b_1, b_2) = 0$) in Equation 2. We did this by saving the propensity score from the original logit equation and the residuals. Because the residuals and the propensity score are, by definition, not correlated, the estimates are free of any bias caused by correlation between our measures of selection into and the experience of cohabitation. Because we took care to ensure proper temporal ordering, the propensity score represents that part of the equation associated with the likelihood of premarital cohabitation (selection), and the residuals represent everything not associated with the likelihood of cohabitation – the experience of cohabitation (plus error, which most likely serves to attenuate the correlation the residuals and marital quality).

We then re-estimated the final random effects model, replacing our dummy variable measure of experience with the residuals. We found the same pattern of results, suggesting our results are not driven by collinearity between our measures of selection into and experience of cohabitation. The experience of cohabitation was related to poorer marital happiness and communication and higher conflict. Again, selection appeared to influence only marital happiness.

The second issue deals with bias due to unobserved heterogeneity and omitted variables, which occurs when factors related to cohabitation and marital quality are not controlled in

the models. If a (set of) variable(s) exerts a significant influence on both, our estimates of the selection into and experience of cohabitation perspectives will be incorrect. To address this possibility, we employed bivariate probit models to simultaneously model entry into cohabitation and marital quality. We first dichotomized our marital quality measures and then included all time-invariant covariates from Table 1 in the equations. We then examined the correlation between the error terms for the two equations predicting entry into cohabitation and subsequent marital quality. A significant correlation parameter ($\hat{p}$) indicates the two equations are not independent (i.e., a bivariate probit model fits the data better than a probit model), which in turn suggests the existence of unobserved factors impacting both outcomes. Results suggest that unobservables likely influence both cohabitation and marital conflict ($\hat{p} = 0.14$; $sig = 0.000$), but less so for marital happiness ($\hat{p} = 0.04$; $sig = 0.096$) and marital communication ($\hat{p} = 0.001$; $sig = 0.988$).

Discussion

Previous research has established a relationship between premarital cohabitation and subsequent marital outcomes, with cohabitors reporting, on average, lower marital quality and greater marital instability. However, the mechanisms driving the negative association between premarital cohabitation and subsequent marital quality remain unclear because prior work has been unable to simultaneously include measures of the two most prominent explanations for the relationship between cohabitation and marital quality: social selection into and the experience of cohabitation. Using data from 2,898 women from the NLSY79, we employed a novel method for concurrently examining the impact of both perspectives. By first estimating a propensity score to assess the likelihood a given individual reported premarital cohabitation with their spouse (social selection) and then employing this propensity score along with a measure of the experience of cohabitation in a random effects model predicting subsequent marital quality, we find that, in line with previous research (Brown and Booth 1996), selection mechanisms do appear to be linked to both the likelihood of cohabitation and poorer marital happiness, the most common measure of marital quality in the literature. However, we find no evidence the selection mechanisms operate similarly for marital communication or marital conflict. In contrast, the results revealed a robust, negative effect of the experience of cohabitation. The experience of cohabitation itself, net of selection mechanisms, was found to be related to greater marital conflict, lower marital happiness and less frequent marital communication.

However, because of heterogeneity among cohabitors, it seems likely cohabitation is negatively associated with marital quality for some individuals, whereas for others it may have a null or even positive effect; this possibility of offsetting effects is likely responsible for the modest results observed. We must therefore be quick to point out the observed differences in marital quality between premarital cohabitors and those who entered directly into marriage are not striking in magnitude. In no case would the aggregated impact of the social selection and experience perspectives amount to more than one-fifth of a standard deviation. In fact, the effect is often smaller. The experience of cohabitation, for example, appears to decrease marital happiness by .03 points on a 3 point scale. Although the effect size is larger for marital conflict, where cohabitors report differences of one-tenth of a standard deviation compared to those who did not cohabit, net of the impact of social selection, the substantive importance of such a difference is modest. Further, these effects may be declining in degree over time (Smock 2000). Yet the wealth of factors associated with the decision to cohabit and subsequent marital quality may explain the moderate effect sizes we observe. Future research would do well to pursue the circumstances under which premarital cohabitation is likely to have the largest effect. Although the average influence of premarital cohabitation on a couple's ensuing marital quality may be modest, there are likely to be circumstances under which the impact of premarital cohabitation on subsequent

marital outcomes is larger. Tach and Halpern-Meekin (2009) and Brown and Booth (1996) have already provided excellent starting points for this line of thought, indicating the effect premarital cohabitation can have on marital outcomes depending on whether a couple experiences a premarital birth or plans to marry.

The approach we take here is not without limitations. First, because our sample includes only women, our findings may not be generalizable to men. Despite evidence women report lower overall marital quality than men (Skinner et al. 2002), evidence of gender differences in how cohabitation influences subsequent trajectories of marital quality has not been forthcoming. In fact, some research has found men and women experience marital change similarly (Amato et al. 2007). However, theoretical reasons, currently untested, suggest the relationship between cohabitation and marital quality may be stronger for women than men. If cohabiting women are more likely than men to prioritize financial independence, it is possible that egalitarian women may be more dissatisfied with a more traditional subsequent marriage (Gerson 2010).

Second, we do not have full relationship histories for the respondents or their spouses, meaning serial cohabitation could be partly responsible for the observed associations. Third, the threat of bias due to unobserved heterogeneity and omitted variable bias remains ever present. For example, because we do not have information regarding motivations to cohabit, we cannot identify unions resulting from engagements. Because cohabiting unions formed because of an engagement are likely to be a prelude to marriage rather than a replacement for it, cohabitations formed after the couple is engaged may experience better outcomes than those with no plans to marry (Brown 2003).

Fourth, we cannot measure the influence of cohabitation's lack of institutionalization or attitudes toward divorce. Fifth, the measurement of the length of the relationship is problematized by the difficulty in defining when cohabitations begin and end (Manning and Smock 2005). Sixth, because the NLSY79 contains data only on the late baby boomers, we are unable to address how the changing nature of cohabitation may influence our results. It is conceivable, and perhaps likely, that the negative association between premarital cohabitation and subsequent marital quality has attenuated, as is the case for marital instability (Reinhold 2010). However, the evidence thus far has not substantiated this proposition.

Despite these limitations, this paper advances the literature in several ways. Specifically, the paper makes three methodological contributions. First, the two-step process incorporates more information from the data into the model. Propensity score models allow for the inclusion of a large number of covariates in the equation predicting entry into cohabitation. We therefore obtain a more efficient and less biased estimator of selection into cohabitation than previous work, which in turn allows us to model the impact of factors known to affect selection into cohabitation on marital quality without consuming the numerous degrees of freedom necessary for including them in the model predicting marital quality. This approach couples the advantages of statistical parsimony with the exigencies of empirical rigor.

Second, because the model explicitly distinguishes between factors occurring before and after entry into cohabitation, time-order issues in previous work are clarified. Because we exercise great caution regarding temporal ordering, only allowing factors that occurred prior to entry into cohabitation to influ-ence our measure of selection, we are able to more precisely represent the social selection and experience of cohabitation perspectives. Thus, the results derived from this model will yield new information about the estimates of the effect of each perspective. Third, our use of a random effects model enables us to use time-varying variables on both sides of the equation. Because our dependent variables of marital

conflict, marital happiness and marital communication are known to change over time (Amato et al. 2007), the ability to model shifting components of marital quality and its covariates is essential to ensuring reliable estimates.

We also make three theoretical contributions. The first of these is the ability to weigh the relative effects of the two most prominent perspectives vis-à-vis the previously observed negative association between premarital cohabitation and marital quality, namely, social selection into and the experience of cohabitation. Because of the methodological procedures implemented, we were able to test both the social selection and experience of cohabitation perspectives in the same model, something previous work on the topic has seldom been able to do. Our results suggest not only that selection mechanisms negatively influence relationship happiness, as previous research has found (Brown 2003), but also provide evidence of a robust effect of the experience of cohabitation. Thus, in overcoming statistical difficulties involved in properly specifying a model including both social selection into and the experience of premarital cohabitation, we found the inclusion of both variables in the model provided evidence for both perspectives, with social selection associated negatively with marital happiness, and the experience of cohabitation negatively associated with marital happiness and marital communication, and positively linked to marital conflict.

Second, we extend prior literature showing marital quality covaries with marital duration to demonstrate that marital quality is also influenced by the length of the relationship, whether that relationship began as a cohabitation or not. The idea that premarital factors set the stage for subsequent marital quality supports past work by Huston, Niehuis and Smith (2001), and suggests it is length in coresidential unions, regardless of type, that influences the quality of the those unions. Third, we employ three measures of marital quality, thereby enabling us to speak of marital quality as a multidimensional construct rather than focusing exclusively on marital happiness or marital satisfaction. Although assessments of relationship happiness or satisfaction are certainly important when tapping the quality of romantic unions, the emphasis on marital happiness as the defin-ing feature of a high-quality relationship is likely the result of the cultural value placed on self-fulfillment and self-expression. Different dimensions of marital quality are likely to exhibit different patterns of covariance with time and may have unique sets of correlates (Johnson et al. 1986). Our findings support this conclusion by showing that although selection factors may influence women's marital happiness, we find no evidence such mechanisms operate to negatively influence marital commitment and marital communication.[7] We encourage the exploration of other dimensions of marital quality, such as divorce proneness, marital interaction, marital problems or perhaps measures of the amount of validation and fulfillment individuals seek and gain from their marriages, because it remains unclear whether the processes governing selection into cohabitation and the experience of cohabitation operate similarly or differently as the ones observed here.

Certainly, though, the results presented for the three measures of marital quality used here provide evidence that both social selection into and the experience of cohabitation itself are associated with lower levels of marital quality. On average, women who report having cohabited with their future spouses prior to marriage report higher conflict and lower happiness and communication than women who moved directly into marriage. These effects, however, are but average effects across a very heterogeneous population. Future research should attempt to articulate the conditions under which premarital cohabitation is likely to prove most influential over the life course. Doing so will allow us a better understanding of

---

[7]Bivariate probit analyses suggested the presence of unobserved heterogeneity in the process that governs the decision to cohabit and subsequent marital conflict. The evidence was considerably weaker for communication and conflict.

the nuanced and complex pathways between union formation, family structure and marital outcomes.

Acknowledgments

References

Acock, Alan C. Working with Missing Values. Journal of Marriage and Family. 2005; 67:1012–28.

Addo, Fenaba R.; Sassler, Sharon. Financial arrangements and relationship quality in low-income couples. Family Relations. 2010; 59:408–23. [PubMed: 22844174]

Amato, Paul R. Research on Divorce: Continuing Trends and New Developments. Journal of Marriage and Family. 2010; 72(3):650–66.

Amato, Paul R.; Booth, Alan; Johnson, David R.; Rogers, Stacy J. Alone together: How Marriage in America is Changing. Harvard, MA: Harvard University Press; 2007.

Axinn, William G.; Thorton, Arland. The relationship between cohabitation and divorce: Selectivity or causal influence? Demography. 1992; 29(3):357–74. [PubMed: 1426434]

Berk, Richard; Newton, Phyllis J.; Berk, Sarah Fenstermaker. What a difference a day makes: An empirical study of the impact of shelters for battered women. Journal of Marriage and Family. 1986; 48(3):481–90.

Bradbury, Thomas N. The Developmental Course of Marital Dysfunction. Cambridge, UK: Cambridge University Press; 1998.

Brown, Susan L. Relationship quality dynamics of cohabiting unions. Journal of Family Issues. 2003; 24(5):583–601.

Brown, Susan. Family Structure and Child Well-Being: The Significance of Parental Cohabitation. Journal of Marriage and Family. 2004; 66(2):351–67.

Brown, Susan L.; Booth, Alan. Cohabitation versus marriage: A comparison of relationship quality. Journal of Marriage and the Family. 1996; 58(3):668–78.

Cohan, Catherine L.; Kleinbaum, Stacey. Toward a Greater Understanding of the Cohabitation Effect: Premarital Cohabitation and Marital Communication. Journal of Marriage and Family. 2002; 64(1):180–92.

DiPrete, Thomas A.; Gangl, Markus. Assessing bias in the estimation of causal effects: Rosenbaum bounds on matching estimators and instrumental varibles estimation with imperfect instruments. Sociological Methodology. 2004; 34:271–310.

Eggebeen, David J.; Dew, Jeffrey. The role of religion in adolescence for family formation in young adulthood. Journal of Marriage and Family. 2009; 71:108–21.

Frisco, Michelle L.; Muller, Chandra; Frank, Kenneth A. Family structure change and adolescents' school performance: A propensity score approach. Journal of Marriage and Family. 2007; 69:721–41. [PubMed: 20300482]

Gerson, Kathleen. The Unfinished Revolution: How a New Generation is Reshaping Family, Work, and Gender in America. New York, NY: Oxford University Press; 2010.

Glenn, Norval D. The course of marital success and failure in five American 10-year marriage cohorts. Journal of Marriage and the Family. 1998; 60(3):569–76.

Glenn, Norval D.; Uecker, Jeremy E.; Love, Robert WB, Jr. Later First Marriage and Marital Success. Social Science Research. 2010; 39(5):787–800. [PubMed: 22948068]

Hawkins, Daniel N.; Booth, Alan. Unhappily ever after: Effects of long-term, low-quality marriages on well-being. Social Forces. 2005; 84(1):451–71.

Huston, Ted L.; Niehuis, Sylvia; Smith, Shanna E. The early marital roots of conjugal distress and divorce. Current Directions in Psychological Science. 2001; 10(4):116–9.

Johnson, David R.; White, Lynn K.; Edwards, John N.; Booth, Alan. Dimensions of marital quality: Toward methodological and conceptual refinement. Journal of Family Issues. 1986; 7(1):31–49.

Johnson, David R.; Wu, Jian. An empirical test of crisis, social selection, and role explanations of the relationship between marital disruption and psychological distress: A pooled time-series analysis of four-wave panel data. Journal of Marriage and Family. 2002; 64:211–24.

Jose, Anita; O'Leary, Daniel; Moyer, Anne. Does Premarital Cohabitation Predict Subsequent Marital Stability and Marital Quality? A Meta-Analysis. Journal of Marriage and Family. 2010; 72(1): 105–16.

Kamp Dush, Claire M.; Cohan, Catherine L.; Amato, Paul R. The relationship between cohabitation and marital quality and stability: Change across cohorts? Journal of Marriage and Family. 2003; 65(3):539–49.

Kennedy, Sheela; Bumpass, Larry L. Cohabitation and children's living arrangements: New estimates from the United States. Demographic Research. 2008; 19:1663–92. [PubMed: 19119426]

Le Bourdais C, Lapierre-Adamcyk E. Changes in conjugal life in Canada: is cohabitation progressively replacing marriage? Journal of Marriage and Family. 2004; 66(4):929–42.

Manning, Wendy D.; Smock, Pamela J. Measuring and modeling cohabitation: New perspectives from qualitative data. Journal of marriage and family. 2005; 67:989–1002.

McGinnis SL. Cohabiting, dating, and perceived costs of marriage: A model of marriage entry. Journal of Marriage and Family. 2003; 65(1):105–16.

McLanahan, Sara; Amato, Paul R.; Furstenberg, Frank F. Should Government Promote Marriage? Journal of American Public Policy and Management. 2007; 26(4):951–64.

Moffitt, Robert A.; Reville, Robert; Winkler, Anne E. Beyond Single Mothers: Cohabitation and Marriage in the AFDC Program. Demography. 1998; 35(3):259–78. [PubMed: 9749319]

National Center for Family & Marriage Research. NCFMR Family Profiles. Bowling Green State University; 2010. Trends in cohabitation: Twenty years of change, 1987–2008.

Nock, Steven L. A comparison of marriages and cohabiting relationships. Journal of Family Issues. 1995; 16(1):53–76.

Oppenheimer, Valerie K. Cohabiting and marriage during young men's career-development process. Demography. 2003; 40(1):127–49. [PubMed: 12647517]

Oropesa RS. Normative Beliefs about Marriage and Cohabitation: A Comparison of Non-Latino Whites, Mexican Americans, and Puerto Ricans. Journal of Marriage and Family. 1996; 58(1):49–62.

Qian, Zhenchao; Lichter, Daniel T.; Mellot, Leanna M. Out-of-Wedlock Childbearing, Marital Prospects, and Mate Selection. Social Forces. 2005; 84(1):473–91.

Reinhold, Steffen. Reassessing the link between premarital cohabitation and marital instability. Demography. 2010; 47(3):719–33. [PubMed: 20879685]

Royston, Patrick. Multiple imputation of missing values: further update of ice, with an emphasis on interval censoring. Stata Journal. 2007; 7(4):445.

Skinner, Kevin B.; Bahr, Steven J.; Russell Crane, D.; Call, Vaughn RA. Cohabitation, marriage, and remarriage: A comparison of relationship quality over time. Journal of Family Issues. 2002; 23(1): 74–90.

Smock, Pamela J. Cohabitation in the United States: An appraisal of research themes, findings, and implications. Annual Review of Sociology. 2000; 26:1–20.

Spanier, Graham B. Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. Journal of Marriage and Family. 1976; 38(1):15–28.

Stanley, Scott M.; Rhoades, Galena K.; Markman, Howard J. Sliding Versus Deciding: Inertia and the Premarital Cohabitation Effect*. Family Relations. 2006; 55(4):499–509.

Stanley, Scott M.; Whitton, Sarah W.; Markman, Howard J. Maybe I do: Interpersonal commitment and premarital or nonmarital cohabitation. Journal of Family Issues. 2004; 25(4):496–519.

Stein, Stuart J. Common-law marriage: Its history and certain contemporary problems. Journal of Family Law. 1970; 9(3):271–99.

Tach, Laura; Halpern-Meekin, Sarah. How does premarital cohabitation affect trajectories of marital quality? Journal of Marriage and Family. 2009; 71:298–317.

Thomson, Elizabeth; Colella, Ugo. Cohabitation and marital stability: Quality or commitment. Journal of Marriage and the Family. 1992; 54(259–267):259.

Thornton, Arland; Axinn, William G.; Hill, Daniel H. Reciprocal effects of religiosity, cohabitation, and marriage. American Journal of Sociology. 1992; 98(3):628–51.

Umberson, Debra; Williams, Kristi; Powers, Daniel A.; Liu, Hui; Needham, Belinda. You make me sick: Marital quality and health over the life course. Journal of Health and Social Behavior. 2006; 47(1):1–16. [PubMed: 16583772]

VanLaningham, Jody; Johnson, David R.; Amato, Paul R. Marital happiness, marital duration, and the U-shaped curve: Evidence from a five-wave panel study. Social Forces. 2001; 78(4):1313–41.

Woods, LaKeesha N.; Emery, Robert E. The Cohabitation Effects on Divorce: Causation or Selection? Journal of Divorce and Remarriage. 2002; 37(3–4):101–19.
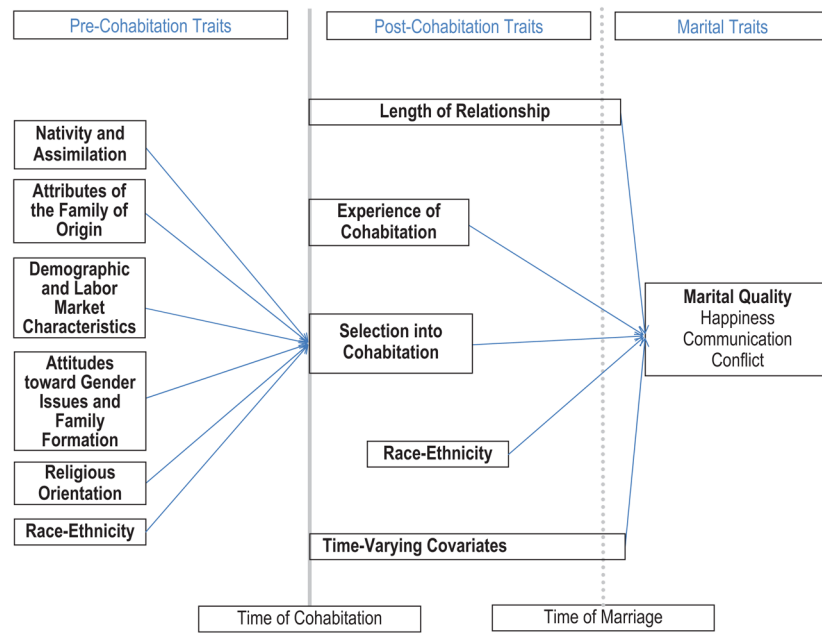
Figure 1.
A Theoretical Model for Including Both Social Selection into and the Experience of Cohabitation to Predict Marital Quality

NIH-PA Author Manuscript NIH-PA Author Manuscript NIH-PA Author Manuscript

Table 1

Mean, Standard Deviation and Range of All Variables Included in the Analytical Models (N = 2898)

Variable	Description	Mean or Percent	Standard Deviation	Range	Alpha
Included as Dependent Variables					
Marital conflict	Scale of how often (1 = *never* 4 = *often*) respondents reported arguing with their spouse over chores and responsibilities, children, money, showing affection, religion, leisure, drinking, other women and his and her relatives. Standardized for all analyses.	17.05	4.54	9–36	.78
Marital happiness	Respondent's degree of happiness with the marriage (1 = *not too happy* 3 = *very happy*)	2.68	.53	1–3	
Marital communication	Scale of how often (1 = *less than once a month* 4 = *almost every day*) respondents laugh together or calmly discuss something. Standardized for all analyses.	7.43	1.08	2–8	.73
Premarital cohabitation	Indicates whether a respondent cohabited with (and only with) their spouse (1 = *yes*)	.37	.48	0–1	
Included in the Propensity Score Equation					
Nativity and Assimilation					
R is foreign-born	Respondent is foreign born	.07	.25	0–1	
R's father is foreign-born	Respondent's father is foreign born	.11	.31	0–1	
R's mother is foreign- born	Respondent's mother is foreign born	.11	.32	0–1	
Attributes of the Family of Origin					
2 parent, biological family	Respondent was living in intact biological family at 14 years of age	.72	.45	0–1	
Father employed	Respondent's father was employed full time when respondent was 14	.92	.28	0–1	
Mother employed	Respondent's mother was employed full-time when respondent was 14 years of age	.53	.5	0–1	
Father's education	Father's total years of schooling	10.96	4.11	0–20	
Mother's education	Mother's total years of schooling	10.92	3.23	0–20	
R's number of siblings	No. of siblings in respondent's family	3.78	2.64	0–18	
R lived in city at 14 years of age	Respondent lived in urban setting at 14 years of age	.8	.4	0–1	
Respondents' Demographic and Labor Characteristics					
R's education	Respondent's years of schooling at time of cohabitation	12.7	2.28	0–20	
R's income <$15K	Respondent averaged less than $15,000 in annual income prior to cohabitation	.81	.39	0–1	
R's income >15K & <40K	Respondent averaged between $15,000 and $40,000 in annual income prior to cohabitation	.16	.4	0–1	
R's income >$40K (Reference)	Respondent averaged greater than $40,000 in annual income prior to cohabitation	.03	.16	0–1	
R is black	Respondent's reported race/ethnicity.	.23	.42	0–1	

Variable	Description	Mean or Percent	Standard Deviation	Range	Alpha
R is Hispanic	Respondent's reported race/ethnicity.	.16	.37	0–1	
R is nonblack, non-Hispanic (reference)	Respondent's reported race/ethnicity.	.61	.49	0–1	
R's age	Respondent's age at first interview (1979)	17.43	2.22	14–22	
Hours worked	No. of hours respondent worked in previous year	1171.25	890.76	0–4640	
Children in the household	No. of children living with respondent	.2	.58	0–1	
Attitudes toward Gender Issues and Family Formation					
Gender attitudes	Standardized scale of gender attitudes (measured in 1979) regarding respondent's feelings (1 = *strongly disagree* 4 = *strongly agree*) about whether women's place is in the home, maternal employment leads to less family time and juvenile delinquency (respectively), traditional gender roles work best and women are happier in traditional gender roles.	0	1	–5–4	.76
R's desired # of children	No. of children respondent desires	2.59	1.6	0–10 +	
Marry before 20 years of age	Age at which respondent expects to marry	.07	.25	0–1	
Marry between 20 and 24 years of age	Age at which respondent expects to marry	.57	.5	0–1	
Marry between 25 and 29 years of age	Age at which respondent expects to marry	.3	.46	0–1	
Marry after 30 years of age	Age at which respondent expects to marry	.04	.2	0–1	
Expect not to marry (reference)	Respondent never expects to marry	.03	.16	0–1	
Religious Orientation					
Raised Protestant	Religion in which respondent was raised	.03	.16	0–1	
Raised Baptist	Religion in which respondent was raised	.04	.19	0–2	
Raised Episcopalian	Religion in which respondent was raised	.26	.44	0–3	
Raised Lutheran	Religion in which respondent was raised	.02	.13	0–4	
Raised Methodist	Religion in which respondent was raised	.05	.22	0–5	
Raised Presbyterian	Religion in which respondent was raised	.08	.28	0–6	
Raised Catholic	Religion in which respondent was raised	.03	.17	0–7	
Raised Jewish	Religion in which respondent was raised	.37	.48	0–8	
Raised no religion	Religion in which respondent was raised	.01	.11	0–9	
Raised other religion (reference)	Religion in which respondent was raised	.11	.31	0–10	
Church never/rarely	Frequency R attends religious services	.37	.48	0–11	
Church monthly	Frequency R attends religious services	.21	.41	0–12	
Church at least weekly (reference)	Frequency R attends religious services	.42	.49	0–13	

Variable	Description	Mean or Percent	Standard Deviation	Range	Alpha
Included in the Random Effects Equation					
R's income	Time-varying covariate for respondent's annual income after cohabitation	26697.77	21498.43	0–299059.5	
R's education	Time-varying covariate for respondent's years of schooling after cohabitation	13.47	2.39	0–20	
No children in household	Time-varying dummy indicator for absence of children in household after cohabitation	.17	.38	0–1	
1+ child < 5 in household	Time-varying dummy indicator for presence of children younger than 5 years of age in the household after cohabitation	.19	.39	0–1	
1+ child 5 to 9 in household	Time-varying dummy indicator for presence of children aged 5 to 9 years in the household after cohabitation	.31	.46	0–1	
1+ child >9 in household	Time-varying dummy indicator for presence of children older than 9 years of age in the household after cohabitation	.58	.49	0–1	
R's hours worked	Time-varying covariate for the number of yearly hours respondent worked after cohabitation	1526.871	68.04	0–5000 +	
Relationship length	Length of relationship in years	13.91	4.76	0–28	
R is black	–see above–				
R is Hispanic	–see above–				
R is nonblack, non- Hispanic (reference)	–see above–				

Note: Missing values not imputed for descriptive statistics.

Table 2

Zero-order Effect From Random Effects Model of Cohabitation on Women's Marital Quality (Conflict, Happiness and Communication) NLSY79 1979–2008 (n = 2898)

	Marital Conflict	**Marital Happiness**	**Marital Communication**
Fixed Effects			
Cohabitation	0.09 **	−0.05 ***	−0.04
	(0.03)	(0.01)	(0.03)
Constant	−0.02	2.69 ***	0.00
	(0.02)	(0.01)	(0.02)
Random Effects			
ζ_i-Variance of the Intercept	0.32 ***	0.07 ***	0.25 ***
e_{it}-Residual Variance	0.70 ***	0.21 ***	0.77 ***
N	2898	2898	2898
Person-Years	21,263	21,263	21,263

*** p <.001,

** p <.01,

* p <.05.

Note: Missing values imputed.

Table 3

Random Effects Model Predicting Women's Marital Quality (Conflict, Happiness and Communication), with Selection into and Experience of Cohabitation as Predictors, NLSY79 1992–2008 (n = 2898)

	Marital Conflict	Marital Happiness	Marital Communication
Fixed Effects	(1)	(2)	(3)
Experience of Cohabitation	0.117 ***	−0.039 **	−0.065 *
	(0.028)	(0.013)	(0.027)
Selection into Cohabitation	−0.10	−0.112 **	0.134
	(0.088)	(0.043)	(0.079)
Length of Relationship	−0.015 ***	−0.008 ***	−0.006 **
	(0.002)	(0.001)	(0.002)
Income (*20000)	−0.009 *	0.002	0.005
	(0.004)	(0.002)	(0.003)
Educational Attainment	−0.021 ***	0.002	0.02 ***
	(0.005)	(0.002)	(0.005)
No Children in Hold	−0.367 ***	0.046	0.124 **
	(0.040)	(0.018)	(0.039)
1+ Child < 5 in Hold	0.058 **	0.011	0.015
	(0.026)	(0.013)	(0.030)
1+ Child 5 to 9 in Hold	0.082 ***	−0.024 *	−0.026
	(0.020)	(0.010)	(0.020)
1+ Child >9 in Hold	0.043 *	−0.025 *	−0.047
	(0.021)	(0.012)	(0.033)
of Hours Worked (*100)	0.004 *	−0.001	−0.004 ***
	(0.001)	(0.001)	(0.001)
Respondent is Black	0.091 *	−0.13 ***	−0.201 ***
	(0.034)	(0.017)	(0.031)
Respondent is Hispanic	0.117 ***	−0.095 ***	−0.119 ***
	(0.035)	(0.019)	(0.036)
Intercept	0.447 ***	2.887 ***	−0.108
	(0.087)	(0.041)	(0.087)
Random Effects			
ζ_i-Variance of the Intercept	0.28	0.07	0.23
e_{it}-Residual Variance	0.68	0.20	0.76
N	2898	2898	2898
Person-Years	21,263	21,263	21,263

***
p <.001

**
p <.01

*
p <.05

Notes: Standard errors in parentheses. Missing values imputed.

Table 4

Model Fit Statistics for Deviance-Based Hypothesis Testing

	Null (Model A)	Experience Only (Model B)	Selection Only (Model C)	Experience and Selection (Model D)	Experience, Selection and Covariates (Model E)
Marital Conflict					
LL	−145770.2	−145763	−145769.7	−145763	−141273.9
# of Parameters	3	4	4	5	15
Deviance	291540.4	291526	291539.4	291526	282547.8
AIC	291546.3	291534	291547.4	291536	282577.9
BIC	291575.4	291572.8	291586.1	291584	282722.8
Deviance-based Hypothesis Tests					
$H_0{:}\beta_{Experience} = 0$		0.0001478***		0.00***	0.00***
$H_0{:}\beta_{Selection} = 0$			0.317310508	1.00	
Marital Happiness					
LL	−73862.22	−73853.99	−73858.17	−73853	−71001.6
# of Parameters	3	4	4	5	15
Deviance	147724.44	147707.98	147716.34	147705	142003.2
AIC	147730.4	147716	147724.3	147715	142033.2
BIC	147759.5	147754.7	147763.1	147764	142178.1
Deviance-based Hypothesis Tests					
$H_0{:}\beta_{Experience} = 0$		0.00***		0.00*	0.00***
$H_0{:}\beta_{Selection} = 0$			0.00***	0.10†	
Marital Communication					
LL	−151781	−151779	−151780.3	−151777	−147514.2
# of Parameters	3	4	4	5	15
Deviance	303562.4	303558	303560.6	303554	295028.4
AIC	303568.3	303565.9	303568.6	303564	295058.4
BIC	303597.4	303604.7	303607.3	303612	295203.3
Deviance-based Hypothesis Tests					
$H_0{:}\beta_{Experience} = 0$		0.0359389*		0.00815**	0.00***

NIH-PA Author Manuscript

NIH-PA Author Manuscript

NIH-PA Author Manuscript

	Null (Model A)	Experience Only (Model B)	Selection Only (Model C)	Experience and Selection (Model D)	Experience, Selection and Covariates (Model E)
$H_0: \beta_{Selection} = 0$			0.179712495	0.12134	

*
***
p < .001

**
p < .01

*
p < .05

#
p < .10

Notes: Models B and C correspond to the models presented in Table 2. Fit statistics for Model E correspond to estimates found in Table 3. The deviance-based hypothesis tests for Models B and C are uncontrolled tests that BExperience and BSelection = 0. For Models D and E, the tests control for selection (BExperience in Model D), experience (BSelection in Model D), and both selection and experience for the test in Model E.