

**THE MENTAL HEALTH OF MOTHERS AND FATHERS BEFORE AND AFTER  
COHABITATION AND MARITAL DISSOLUTION\***

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Using data from years one and three of the Fragile Families and Child Well-being Study, changes in depressive and anxious symptoms are compared for mothers and fathers who: 1) dissolve a cohabitating union versus remain intact; 2) dissolve a marital union versus remain intact; and 3) dissolve a cohabiting as compared to a marital union. In order to take into account potential sources of third variable bias from selection factors that differentiate those who are in cohabitations from those who are in marriages, mothers and fathers were matched on several sociodemographic control variables that research has demonstrated to be related to union formation and mental health outcomes. Results indicated that fathers who dissolve cohabitating or marital unions have greater increases in depressive and anxious symptoms over time than those who remain in their unions. In contrast, mothers increased in depressive and anxious symptoms, regardless of the type or stability of the union. For both mothers and fathers, no differences were found in change in mental health by type of union dissolution. In this low-income sample of parents, results suggest that the impact of cohabitation and marital dissolution on mental health are similar in magnitude.

## **The Mental Health of Mothers and Fathers Before and After Cohabitation and Marital Dissolution**

Some demographers have characterized the dramatic changes in family structure and behavior over the past 40 years as the “second demographic transition” (Lesthaeghe 1995). Changes included in the second demographic transition include delays in marriage and increases in divorce, non-marital childbearing, and cohabitation. Of these, one of the most studied is consequences of divorce for adults and children. Researchers have found that divorce has economic, psychosocial, and behavioral consequences (Amato 2000). However, the rise in the divorce rate has been followed by a rise in another kind of union dissolution – cohabitation dissolution. Cohabitation has increased more than 1000 percent since 1970 (Fields and Casper 2001), including increasing from 2.9% of all households in 1996 to 4.2% of all households in 2003 (Fields 2003). Despite this dramatic rise in cohabitation, very little research has examined the consequences of cohabitation dissolution as compared to divorce (for exceptions see Avellar and Smock 2005; McManus and DiPrete 2001). Previous work by Sarah Meadows and colleagues (Meadows, McLanahan, and Brooks-Gunn, 2008; Meadows forthcoming) with the Fragile Families and Child Well-being data used in this study suggests that mental health, as measured by illicit drug use, heavy episodic drinking, and a major depressive episode is negatively impacted by a union dissolution. We build upon previous work by examining depressive and anxious symptoms, directly comparing cohabitation dissolution to marital dissolution, and attempting to carefully account for selection and time-invariant sources of heterogeneity.

It is important to understand the consequences of cohabitation dissolution, particularly because cohabiting unions often involve children. For example, it is estimated that about 40% of

cohabiting couples have children (Simmons and O'Connell 2003) and, indeed, evidence from the National Survey of Family Growth estimates that 40% of non-marital births are to unmarried cohabiting couples (Chandra et al. 2005). This paper seeks to fill this void in the literature by comparing the mental health consequences of cohabitation dissolution with divorce for mothers and fathers using data from the Fragile Families and Child Well-Being study.

*Background and conceptual frameworks.* Cohabiting relationships differ in many important ways from their marital counterparts. These relationships are generally less stable and satisfying (Bumpass and Lu 2000; Nock 1995) and are marked by elevated rates of violence (Kenney and McLanahan 2006) and infidelity (Treas and Giesen 2000), compared to marital relationships. In addition, individuals in cohabiting relationships generally experience more depressive symptoms than their marital counterparts (Brown 2000). Emphasizing the differences between cohabitation and marriage, some family scholars have even argued that cohabitation should be viewed as an alternative to being single and as an extension of sexual and dating relationships, rather than as an alternative to marriage (Rindfuss and VandenHeuvel 1990). The lower commitment characterizing cohabiting relationships (Nock 1995; Stanley, Whitton, and Markman 2004) lends some support to this argument.

Just as various other dimensions differ between cohabitation and marriage, it is possible that the process of relationship dissolution differs as well. In particular, we outline two competing rationales for why cohabitation dissolution may differ from marital dissolution: 1) differences in investment in relationship capital; and 2) differences due to the “incomplete institution” of cohabitation and its dissolution.

Becker, Landes, and Michael's (1977) economic theory of investment in relationship capital argues that individuals who expect the relationship to have a higher likelihood of

dissolution make fewer relationship-specific investments. This decrease in relationship-specific investments includes decreased emotional investment in the relationship. The lower level of commitment and shortened duration (Lichter, Quian, and Mellott 2006) in cohabiting unions as compared to marital unions suggests that individuals in cohabiting relationships may not invest as much in their relationships as do those in marriages. Cohabiters may anticipate that their unions will eventually dissolve due to the few constraints to exiting and the lower commitment. If cohabiting partners are less emotionally invested in their unions than are those in marital unions, then it is likely that married mothers and fathers will experience more severe declines in mental health when their unions end, compared to those who experience cohabitation dissolution.

On the other hand, family scholars (Cherlin 2004; Manning and Lamb 2003; Nock 1995) have argued that while social acceptance of cohabiting relationships has increased over the past thirty years, cohabitation is still an “incomplete institution.” That is, cohabiting relationship family members do not have established norms regarding how family members should treat each other, and the responsibilities of cohabiting partners to their partners’ children are not specified. We would argue that cohabitation dissolution is also an “incomplete institution.” The lack of norms in cohabiting unions creates ambiguity in terms of the obligations and rights of each cohabiting partner following dissolution, which may endure after the union has dissolved. Marriage is well-defined in our society and generally the expectation is that after a divorce fathers will share custody and maintain contact with their children. Families and friends are also accustomed to witnessing divorce and in many cases know how to react and support the divorcing individuals, monetarily and/or emotionally.

In contrast, no legal action is required for cohabitation dissolution. There is no expectation for shared custody, and the family court system does not help these families navigate

the process of dissolution. This may translate into mothers receiving less support from the formerly cohabiting fathers and formerly cohabiting fathers having more tenuous connections with their children. These ambiguous factors may make the experience of cohabitation dissolution more difficult to cope with than marital dissolution. Further, because cohabitation dissolution is also an incomplete institution in comparison to divorce, family members may not know how to react to the dissolution and may give less social and financial support to the mothers (in particular) and fathers following cohabitation dissolution as compared to divorce.

Thus, based on the argument of the economic theory of investment in relationship capital (Becker et al. 1977), we expect that cohabitation dissolution will have less serious implications for mental health than will marital dissolution. On the other hand, based on the argument that cohabitation and its dissolution represent “incomplete institutions,” we expect that cohabitation dissolution will have more serious implications for mental health than will marital dissolution.

*The role of selection.* No researcher can successfully compare individuals who cohabit to those who marry, or those who dissolve their unions with those who keep them intact, without a careful examination of the role of selection. First, the observable (and unobservable) characteristics of parents who cohabit differ from those who marry. Cohabitors are likely to be younger, to have less education, are more often Black or Hispanic, and the fathers are somewhat less likely to be employed (see Seltzer 2000 for a review). Cohabiting mothers have also been found, in the Fragile Families and Child Well-Being dataset used for this project, to have more multi-partner fertility than married mothers (Carlson and Furstenburg 2006). Second, many of the aforementioned characteristics that distinguish cohabiting from married couples also predict whether a marriage or a union will remain intact or dissolve. Age at marriage, race, and education each predict divorce (Teachman 2002). Economic stress, including job instability and

economic status, has been found to increase marital conflict and subsequent marital distress and divorce (Ahituv and Lerman 2004; Conger, Rueter, and Elder 1999). Further, both qualitative (Smock, Manning, and Porter 2005) and quantitative studies (Brown 2000; Sassler and McNally 2003; Smock and Manning 1997) indicate that economic factors, particularly men's economic status, are associated with union transitions for cohabitators.

Previous research has shown that cohabitators, in particular those without plans to marry, express less positive and more negative emotion in relationship conversations, and report lower commitment and lower relationship quality than do married couples (Nock 1995; Stanley et al. 2004). Previous research on married couples has revealed that couples who exhibit those characteristics are more likely to divorce (Gottman 1994). Indeed, research has shown that cohabitators' relationship assessments, including their appraisals of relationship disagreement, conflict resolution, happiness, and interaction, are associated with separation (Brown 2000).

Each of the characteristics discussed above that distinguish cohabitators from marrieds, or those who remain in a union from those whose unions dissolve, could potentially be associated with mental health (Mirowsky and Ross 2003). Indeed, prior to dissolution, cohabitators have been found to report lower levels of well-being than marrieds (Brown 2000; DeKlyen et al. 2006; Kamp Dush and Amato 2005). Further, Pevalin and Ermisch (2004) found that poor mental health was associated with increased risk of dissolving a cohabiting union. To deal with these selection factors, we use pre- and post-measures of mental health to calculate the change in mental health across the transition to dissolution. This measure is used as our outcome variable. Because the observed and unobserved selection characteristics could be associated with the change in mental health, we not only conduct t-tests to compare differences in the change in mental health across the transition to dissolution, but we also borrow from the sociological and

economic literatures and use propensity score matching methods to take into account the role of observable selection in mental health change.

### **Data and Methods**

This research uses data from the Fragile Families and Child Well-being Study, a study of new unwed mothers and fathers and their children. The baseline data include a sample of 4,898 mothers and fathers ( $n = 3830$ ) who had children (3,711 nonmarital and 1,187 marital) in the US between 1998 and 2000. Both mothers and fathers were interviewed in the hospital shortly after their children's birth with follow-up interviews conducted when the child was one, three, and five years old (see Reichman et al. 2001 for a detailed discussion). We do not use mental health measures at birth because they were incomparable and could have been biased for mothers due to postpartum depression.

To be in our analyses, mothers and fathers must have been married to or cohabiting with their partners at year one- the second wave of data collected at one year post-birth ( $n=2639$  for mothers;  $n = 2326$  for fathers). Marriage at both years one and three was operationalized as response to the question: *What is your relationship with mother/father now? Married, Romantically involved, Separated/Divorced, Just friend, or Not in any kind of a relationship?* Cohabitation at both years one and three was operationalized as reporting being in a romantic relationship in response to the question, *What is your relationship with the mother/father now?*, as well as reporting that the respondent lived with her/his partner *all/most of the time*.

*Independent variable.* Our main independent variable in these analyses was an indicator of whether the union dissolved between years one and three. A relationship was coded as dissolved if 1) married mothers/fathers at year one reported at year three that they were Divorced/Separated and/or not cohabiting *always/most of the time*, and 2) if cohabiting



mothers/fathers at year one reported at year three that they were no longer romantically involved and/or no longer living together *always/most of the time*. Between years one and three, 5.36% (n=55) of the married father subsample separated or divorced and 24.66% (n=181) of the cohabiting father subsample separated from their partners. Further, 9.86% (n=116) of the married mother subsample and 35.79% (n=393) of the cohabiting mother subsample had separated from their partners.

*Dependent variables.* We utilized continuous measures of depression and anxiety for our measures of mental health. Depression and anxiety scores were coded at years one and three using diagnostic criteria from the Composite International Diagnostic Interview – Short Form (CITI-SF). Scoring of the CITI-SF follows the *Diagnostic and Statistical Manual of Disorders, Fourth Edition* diagnostic criteria for major depressive episode and generalized anxiety disorder (American Psychiatric Association, 1994). Items included, but were not limited to: *During the past 12 months, has there ever been a time when you felt sad, blue, or depressed for two or more weeks in a row? Has there ever been a time lasting two weeks or more when you lost interest in most things like hobbies, work, or activities that usually give you pleasure?* Our continuous coding of depression consisted of 8 items. Participants received a value of 1 for each *yes* response, and the sum of these items constituted their scores. This scale has an alpha of 0.95 both at years one and three for fathers, and of 0.88 at year one and 0.90 at year three for mothers. The diagnostic criteria for clinical depression is meeting at least 5 out of the 8 symptoms (American Psychiatric Association 1994). However, mothers and fathers who were taking medication for depression were not asked about their symptoms in the original Fragile Families Study survey. We assumed that mothers and fathers who were taking medication for depression had previously

met the criteria for clinical depression and give them a value of 8 on our continuous measure of depression ( $n = 1$ ).

Measures of anxiety were also coded continuously at years one and three. Anxiety items included the following items, among others: *Did you have a time in the past 12 months when you worried a lot more than most people would in your situation? Did/Do you find it difficult to stop worrying? Did/Do you have different worries on your mind at the same time? How often did/do you find it difficult to control your worry?* Other items assessed the frequency and duration of the anxiety or worry. Our continuous coding of anxiety used 7 total items producing an alpha for fathers of 0.96 and 0.97 at years one and three, respectively, and of 0.94 and 0.93 for mothers.

*Potential sources of selection.* Regarding factors that differentiate those who cohabit from those who marry as well those who dissolve a union from those who do not, we considered various demographic variables measured at baseline, including mothers' and fathers' age in years, the age difference between mothers and fathers ( $\text{Age}_{\text{father}} - \text{Age}_{\text{mother}}$ ), race (White, Black, Hispanic, and other) education (less than high school diploma, high school graduate, and at least some college). We also considered variables measured at year one of the study, the point at which we first measure mental health. These measures included whether or not the respondents were currently enrolled in an educational or training program (1= yes), respondents' employment status (1 = did work for pay the last week), the number of the mothers' and fathers' children under eighteen in the household, multi-partner fertility (respondent had children outside of the current relationship = 1), father ever incarcerated (incorporates data from baseline and year one and coded as ever incarcerated = 1), and the length of the union at year one in months .

*Data analysis and methods.* We began our analysis by conducting a series of probit regressions examining the role of selection in predicting whether a cohabiting union remained

intact (0) or dissolved (1), whether a marital union remained intact (0) or dissolved (1), and comparing cohabitation dissolution (1) to marital dissolution (0). We used the following variables as predictors in these models: mothers'/fathers' age, age difference, race, education, employment status, educational status, number of children cared for, multi-partner fertility, father history of incarceration, and union length. After running these regressions, we saved the predicted probabilities for each regression and used the predicted probability of dissolving a cohabiting union, as compared to remaining intact, of dissolving a marital union compared to remaining intact, and of dissolving a cohabiting union, as compared to a marital union to create propensity scores for each group. We then used these propensity scores to match 1) cohabiting mothers and fathers who dissolved to those whose relationships remained intact, 2) married mothers and fathers who dissolved to those whose relationships remained intact, and 3) mothers and fathers who dissolved a cohabitation as compared to a marriage. To conduct the matching, we employed propensity score matching (Morgan and Harding 2006; Rosenbaum and Rubin 1985) in Stata 10 using the `psmatch2` command (Leuven and Sianesi 2003).

We used propensity score matching, primarily in order to account for observable differences measured at the birth of the child and over time, and thus carefully isolated the appropriate comparison sample so that causality could be better inferred. The benefits of propensity score matching when combined with a change score outcome are 1) to account for the role of selection in the change in the outcome over time, and 2) to control for heterogeneity as time-invariant characteristics are differenced out of the model. When conducting a propensity score analysis, there are several matching estimators from which to choose. Morgan and Harding (2006), in a review of matching estimators, argue that nearest neighbor caliper matching with replacement, interval matching, and kernel matching are all closely related. For this

analysis, we use nearest neighbor caliper matching with replacement with a caliper of 0.01.

There are several steps to carrying out this matching method, and we detail each steps we took in Appendix 1. Our outcome in these models was change in depressive and anxious symptoms. In our analyses comparing those who dissolve their unions with those who did not, our “treatment” group included the mothers and fathers who experienced the dissolution. These respondents were then matched to their nearest neighbor in the “control” group, i.e. the mothers and fathers who did not dissolve their unions, who had a predicted probability of being in the dissolution group within 0.01 of the treated mother or father. The propensity score matching method compares the mean of the “treatment” group to the mean of the “control” group, and reports a t-statistic to indicate whether the difference in means is statistically significant. Those respondents in the “treatment” group who did not find a match (i.e. for whom no respondent in the “control” group had a propensity score within 0.01 of their propensity scores) were dropped from the analysis.

## **Results**

We used Stata (Version 10) to conduct all analyses.

*Descriptive results.* Our sample of fathers was slightly older in age than the mothers. For both mothers and fathers, however, average age was highest for those in the married stable group, followed by those in the married dissolving, cohabiting stable, and finally the cohabiting dissolved groups. There was an uneven distribution of racial identity such that a majority of cohabiting parents were Black and a majority of married parents were White.

Higher proportions of parents in stable marital unions had some college education than those in dissolved or cohabiting unions. We found cohabiters to have the highest percentages of less than high school education. Further, 17% of married stable fathers and 13% of married

stable mothers were in school at year one, along with about 20% of married dissolved parents. Only 12% of cohabiting stable fathers and 15% of cohabiting dissolving fathers, compared to 18% of cohabiting stable mothers and 21% of cohabiting dissolved mothers, were in school at year one.

More fathers than mothers were employed at year one, with the highest percentage employed being married fathers followed by cohabiting fathers. About half of the mothers were employed, with the exception of 62% of mothers who dissolved their marriages while working outside of the home. The average number of children reported by parents was similar for all groups as well as between mothers and fathers. However, married parents reported lower levels of multi-partner fertility (11% of fathers and 17% of mothers) compared to their cohabiting counterparts (25% of cohabiting stable fathers and 40% of cohabiting stable mothers). Further, parents in dissolving unions reported higher levels of multi-partner fertility than those remaining in stable unions (for fathers, 18% of those whose marriages dissolved and 24% of those whose cohabiting relationships dissolved; and 28% of mothers whose marriages dissolved and 44% of mothers whose cohabiting relationships dissolved reported multi-partner fertility). Similar to this trend, the percent of unions in which the father had ever been incarcerated was highest for the cohabitation dissolution groups for both mothers and fathers, followed by the cohabiting continuously, marital dissolution, and continuously married groups.

The length of union, reported in years, was similar for mothers and fathers. Parents in stable marital unions reported the longest relationship duration, of about 6 years, for married stable parents at year one. Relationship duration for parents who eventually divorced was shorter at year one (less than five years). Cohabiting unions were shorter in duration at year one, averaging about 3.5 years for those whose relationships remained intact. Cohabitors who

eventually dissolved their unions reported the shortest relationship duration at year one (of about three years).

*Probit regression results predicting dissolution from observed characteristics.* Results of the probit regression analyses predicting dissolution from observed characteristics are reported in Table 2. The predicted probabilities from these regressions were saved and used as propensity scores in the propensity score matching analyses. We found that younger fathers and mothers were more likely to dissolve their unions, regardless of type. A greater age difference between partners predicted marital dissolution only for fathers. When comparing cohabitation and marital dissolution, we found that younger mothers were more likely to dissolve a cohabiting union than they were to dissolve a marital union, confirming that the mothers in the cohabiting subsample were significantly younger than in the marital subsample.

Turning to race, Hispanic fathers and mothers were less likely to dissolve a cohabiting union than were White parents. Black mothers were more likely to dissolve a marital union than were White mothers. Black fathers and mothers were significantly more likely to dissolve cohabiting rather than marital unions, compared with their white counterparts. Thus, consistent with previous research, Black parents were significantly more likely to be cohabiting than married, compared to White parents.

With regard to education, we found mothers with some college were less likely to dissolve a cohabiting versus a marital union than were mothers with a high school education, indicating that mothers with some college were significantly more likely to be married than cohabiting. This is consistent with previous research. We also found that, when fathers were employed at the first wave, mothers were somewhat less likely to dissolve than to stay in their marriages, but when mothers were employed at the first wave, both mothers and fathers were

significantly more likely to dissolve their marriages. In couples in which multipartner fertility existed, mothers were more likely to dissolve a cohabiting than a marital union. Hence, consistent with previous research, more multipartner fertility was present among the cohabiting mothers. Among fathers, those with a history of incarceration were more likely to experience cohabitation versus marital dissolution. Finally, shorter union duration was associated with increased probability of dissolving cohabiting compared to marital dissolutions among both mothers and fathers. This confirmed the descriptive results that marital unions at wave one were significantly longer in duration than were cohabiting unions. Other marginally significant differences were found in these analyses among a variety of variables, but in the interest of space we do not discuss marginally significant findings, though they are reported in Table 2. Overall, the descriptive and probit results indicate important differences that distinguish both those who dissolve their unions from those who remain in them, and those who cohabit versus those who marry. Because many of these factors are associated with change in mental health over time, we next sought to take these potential causes of Type I errors into account by 1) using a change score method, and 2) using propensity score matching to ensure sample comparability.

*Propensity score matched results of differences in change in mental health.* Results from the propensity score matching models are reported in Table 3 for both mothers and fathers. The propensity score matching results indicated that 99% of fathers who experienced cohabitation dissolution were matched with fathers who remained cohabiting. Specifically, 99% of fathers in the cohabitation dissolution group were matched with fathers in the stable cohabitation group who had propensity scores (the predicted probability of experiencing a cohabitation dissolution based on the probits detailed above) within 0.01 of their propensity scores. Results indicated that, for fathers, both cohabitation dissolution and marital dissolution negatively impacted mental

health. In particular, results indicated that both cohabiting fathers who dissolved their unions reported marginally significant greater increases in depressive and anxious symptoms between years one and three than fathers who remained in their cohabiting unions. Following conventions outlined by Amato, Booth, Johnson, and Rogers (2007) that an effect size (Cohen's *d*) of less than one-fifth of a standard deviation difference between groups is weak, between .20 and .39 of a standard deviation is moderate, between .40 and .59 are strong, and an effect size of .60 or greater is very strong, the difference in the change in mental health between the cohabiting fathers who dissolved their unions and those who remained in their cohabiting unions was moderate. The moderate effect could be partially attributed to the increase in depressive symptoms among those cohabitators who remained in their unions.

Turning to divorce, 100% of fathers who experienced a marital dissolution were matched with fathers who remained married. Results indicated that fathers who dissolved their marital union increased in depressive symptoms, while fathers who remained married actually decreased in depressive symptoms. The difference between fathers who remained married and those who dissolved was significant and the effect size indicated a very strong effect. Fathers who dissolved their marital unions also increased in anxious symptoms, though the magnitude of the increase was smaller than the magnitude of the increase in depressive symptoms. Fathers who remained married also decreased in anxious symptoms. Overall, the difference between those who dissolved their marital unions and those that remained married was marginally statistically significant.

We next compared those who dissolved cohabiting unions with those who dissolved marital unions. In contrast to the models comparing fathers who dissolved unions to fathers whose unions remained intact, a smaller 68% of treated fathers who experienced cohabiting



dissolutions were matched control group fathers who experienced a marital dissolution and who had propensity scores within 0.01 of their scores. Thus, there were indeed greater disparities between cohabiting and married fathers than fathers who were married or fathers who were cohabiting, regardless of whether their unions were intact or dissolved.

Overall, we found no statistically significant difference between fathers who dissolved their cohabiting unions and fathers who dissolved their marital unions. Although the direction of effects indicated that fathers who experienced cohabitation dissolutions had greater increases in depressive and anxious symptoms than fathers who experienced marital dissolutions, the differences between the two groups were weak. We also used a “difference-in-difference-in-difference” model from the econometric literature. For each respondent who dissolved his/her union, we subtracted the matched control’s (the match who remained in her/his union from the first two models) change in mental health from the respondent who dissolved his/her union’s change in mental health. This produced an indicator that allowed us to examine whether the magnitude of difference between cohabitators who dissolved their unions versus stayed intact was greater than the magnitude of difference between marrieds who dissolved their unions versus stayed intact. We again found that cohabitators who dissolved had a greater mean change in mental health than cohabitators who stayed intact, while the magnitude of the difference between marrieds who dissolved versus stayed intact was smaller. The difference-in-difference-in-differences model test, i.e. the test of whether the magnitude of difference between cohabitators who dissolved versus their matches who stayed intact was different from the magnitude of difference between marrieds who dissolved versus their matches whose unions stayed intact, was not statistically significant. Thus we found evidence that union dissolution is detrimental to

mental health for fathers overall, but no evidence that any one kind of union dissolution is worse than others for fathers' mental health over time.

Among mothers, 100% of those experiencing cohabitation dissolution and 100% of those experiencing marital dissolution were matched with mothers who remained in their cohabiting or marital unions. In contrast, 86% of mothers who experienced cohabitation dissolution were matched with mothers who experienced marital dissolution, a higher proportion than for fathers (68%). Overall, the results for mothers indicated that there were few differences between mothers who dissolved and those who remained in their unions, and only one significant difference by type of dissolution. Mothers who dissolved cohabiting unions experienced greater increases in anxiety than mothers who remained stable in their cohabiting unions. The difference between the two groups was weak. In each of the other comparisons of mothers who dissolved their unions and mothers who remained in their unions, mothers who dissolved their unions experienced substantial changes in depressive and anxious symptoms, but none of these differences were statistically significant. We also found that, while the magnitude of change in mental health symptoms was greater for mothers who dissolved cohabiting unions as compared to marital unions, the differences were statistically nonsignificant. Finally, we also found that difference between the mean difference between cohabitators who dissolved their unions and their matches who stayed in their cohabiting unions and the mean difference between marrieds who dissolved their unions and their matches who stayed married was small and statistically nonsignificant as well. Thus, we did not find systematic evidence that mothers' mental health varied by union type or union status.

We also ran our analyses without the matching restriction. For these analyses, we did simple *t*-tests on the full sample of respondents. Results are presented in Appendix B. The

results comparing mothers and fathers who dissolved cohabiting or marital unions with mothers and fathers who remained in their cohabiting unions were largely consistent. There was a systematic difference, however, in the two sets of results for the change in mental health among respondents who dissolved cohabiting unions versus marital unions. In both the matched results, presented in Table 3, and the unmatched results, the *t*-test results were nonsignificant. However, the observed differences were in opposite directions. In the matched results, cohabitators experienced a greater change in mental health following dissolution than respondents who dissolved their marriages. In contrast, in the unmatched results, the marrieds experienced a greater change in mental health following dissolution than respondents who dissolved their cohabiting unions. The mean level of change in mental health for the respondents who experienced marital dissolution was greater in the unmatched results than in the matched results. In contrast, the mean level of change in mental health for respondents who experienced cohabitation dissolution decreased in the unmatched results relative to the matched results. Thus, though these differences did not change the overall significance of the results, they highlight that cohabitators are indeed select in comparison to marrieds.

In a final set of analyses (not shown), we compared the change in mental health between men and women after cohabitation dissolution and marital dissolution. We found no significant gender differences by union dissolution status or union type.

### **Discussion**

We began this paper by arguing that cohabitation dissolution and marital dissolution have different associations with mental health, based on two theories. The economic theory of investment in relationship capital (Becker et al. 1977) predicts that cohabitation dissolution would have less serious implications than marital dissolution for change in mental health. And,

based on the concept of cohabitation dissolution as an “incomplete institution,” we expected it to have more serious implications for mental health than would marital dissolution. Overall, we did not find strong support for either argument individually, as we found no significant differences in the mental health change of those who experienced cohabitation versus marital dissolution among fathers or mothers.

We began our analyses by using known predictors of divorce and cohabitation dissolution, and that distinguish cohabiting from married partners, to predict whether each respondent experienced a union dissolution or a marital dissolution as compared to a cohabitation dissolution. The predicted probabilities from these analyses were then saved as propensity scores. Propensity score analyses were then run, wherein mothers and fathers in “treated” groups (those who dissolved their unions in within-union comparisons and those who dissolved cohabiting unions in analyses comparing marital to cohabitation dissolution) were matched to mothers and fathers in “control” groups (those who remained in their unions in within-union comparisons and those who dissolved marital unions in analyses comparing marital to cohabitation dissolution) based on the proximities of their propensity scores. The outcome used was the mothers and fathers’ change in depressive or anxious symptoms. We used change scores to take into account all time-invariant sources of heterogeneity.

In the propensity score models, we found that fathers who experienced cohabitation dissolution increased in both depressive and anxious symptoms compared to fathers who remained in their cohabiting unions. Similarly, fathers who experienced marital dissolution increased in depressive symptoms and anxious symptoms compared to fathers who remained in their marital unions. In direct comparisons of fathers experiencing cohabitation dissolution and marital dissolution, we found that both increased in depressive and anxious symptoms, but that

there were no significant differences in the change in depressive and anxious symptoms between the two groups. Turning to mothers, we found only one difference in change in mental health between the examined groups. We found only that mothers who dissolved cohabiting unions experienced significantly greater increases in anxiety symptoms than mothers who remained in their cohabiting unions, who actually declined in anxious symptoms. We found no other significant differences in the change in mothers' mental health by union status or union type.

Thus we found no significant differences in mental health changes between marital and cohabitation dissolution. We believe it is likely that both theorized processes are occurring. Fathers and mothers may invest less in their cohabiting unions than do fathers and mothers who are married, but they also may receive less support from their social networks in the event of dissolution. Our finding that fathers appeared to be particularly impacted by the union dissolution may be attributable to the more tenuous relationships low-income fathers appear to have with their families (Edin and Kefalas 2005). It is also of note that within this population of low-income parents, many mothers and fathers who remained in their unions experienced worsened mental health over the two-year period of the study. Economic stress appears to have an adverse impact on the health of both individuals and relationships.

*Limitations.* One limitation of this study is that only cohabitators who did not marry between years zero and three were used in the models. We excluded cohabitators who married because they would have experienced marital rather than cohabitation dissolution. Future research might use this as a comparison group which has similarities with both the cohabitation dissolution and the marital dissolution groups. We also did not investigate mechanisms associated with declines in mental health. We can only speculate as to mechanisms which may

have affected mental health. Community samples may be used in future research to determine what mechanisms link mental health and union dissolution.

Extreme caution is warranted in generalizing beyond the urban, low-income families represented in the Fragile Families dataset. Future research should compare cohabitation and marital dissolution in a more diverse sample, such as young adults without children. Finally, an inference of causality would have been more strongly supported if two measures of mental health before the dissolution and afterwards had been utilized, because mental health could have begun to decline prior to the dissolution. If so, this would suggest that individuals who decline in mental health are more likely to dissolve their unions. We are not able to examine causality rigorously due to the data restrictions.

As a first conclusion, this paper calls on researchers to pay attention to selection issues in investigating individuals in unions. Neglecting factors that distinguish cohabitators from marrieds, exacerbates the risk of omitted-variable bias in research results. We found no evidence that union dissolution negatively impacted the mental health of mothers and some evidence of a negative effect of union dissolution on mental health for fathers. However, the effects of cohabitation dissolution were indistinguishable from those of marital dissolution in this low-income population. These findings should be of value to researchers and policy-makers interested in the impact of cohabitation dissolution. This is a transition that families apparently manage largely on their own, and intervention may be appropriate to help them renegotiate relationships and households, particularly when children are involved.

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**Table 1. Descriptive Statistics: Means, Standard Deviations (in parentheses), and Percentages by Parent Gender, Union status, and Dissolution**

Variables	Fathers				Mothers			
	Married		Cohabited		Married		Cohabited	
	Intact <sup>1</sup>	Dissolved <sup>2</sup>	Intact <sup>1</sup>	Dissolved <sup>2</sup>	Intact <sup>1</sup>	Dissolved <sup>2</sup>	Intact <sup>1</sup>	Dissolved <sup>2</sup>
Age	31.26 (6.52)	28.47 (7.91)	27.04 (6.67)	25.60 (6.48)	28.77 (5.88)	25.56 (5.88)	24.30 (5.67)	23.04 (4.92)
Race								
% White	0.42	0.33	0.13	0.19	0.43	0.27	0.16	0.15
% Black	0.26	0.36	0.50	0.61	0.23	0.41	0.46	0.61
% Hispanic	0.26	0.29	0.33	0.15	0.27	0.28	0.37	0.21
% Other	0.07	0.02	0.04	0.05	0.07	0.04	0.02	0.03
Education								
% Less than High School	0.17	0.20	0.40	0.38	0.17	0.28	0.41	0.39
% High School	0.23	0.42	0.38	0.36	0.21	0.29	0.34	0.38
% At least Some College	0.60	0.38	0.22	0.26	0.62	0.42	0.25	0.23
% Currently in School	0.17	0.22	0.12	0.15	0.13	0.21	0.18	0.21
% Employed	0.92	0.87	0.75	0.76	0.54	0.62	0.50	0.52
Number of Children	2.06 (1.11)	1.91 (1.01)	2.07 (1.27)	2.02 (1.11)	2.07 (1.13)	2.08 (1.10)	2.03 (1.20)	2.07 (1.22)
% Multi-Partner Fertility	0.11	0.18	0.25	0.24	0.17	0.28	0.40	0.44
% Ever Incarcerated	0.10	0.15	0.32	0.39	0.10	0.23	0.31	0.36
Length of Union	6.13 (4.11)	4.97 (3.44)	3.77 (3.12)	3.32 (3.24)	6.24 (4.12)	4.87 (4.09)	3.54 (2.19)	2.95 (2.49)
Sample Size	970	55	553	181	1061	116	705	393

<sup>1</sup>Continuously intact between years 1 and 3. <sup>2</sup>Separated or divorced between years 1 and 3.

**Table 2. Probit Regression Predicting Membership into Marital Status and Dissolution Groups**

Variable	Fathers						Mothers					
	Cohabitation Dissolution Versus Stable		Marital Dissolution versus Stable		Cohabitation versus Marital Dissolution		Cohabitation Dissolution Versus Stable		Marital Dissolution versus Stable		Cohabitation versus Marital Dissolution	
	b	e(b)	b	e(b)	b	e(b)	b	e(b)	b	e(b)	b	e(b)
Age	-0.03** (0.01)	0.97** (0.01)	-0.06*** (0.02)	0.95*** (0.02)	-0.02 (0.02)	0.98 (0.02)	-0.03* (0.01)	0.98* (0.01)	-0.04** (0.01)	0.97** (0.01)	-0.04* (0.02)	0.96* (0.02)
Age Difference	0.02 (0.02)	1.02 (0.02)	0.07*** (0.02)	1.08*** (0.02)	-0.00 (0.03)	1.00 (0.03)	-0.00 (0.01)	1.00 (0.01)	0.01 (0.01)	1.01 (0.01)	-0.02 (0.01)	0.98 (0.01)
Race												
White	-		-		-		-		-		-	
Black	-0.15 (0.15)	0.86 (0.13)	0.09 (0.18)	1.10 (0.20)	0.64* (0.26)	1.90* (0.50)	0.17 (0.12)	1.19 (0.14)	0.34* (0.14)	1.40* (0.20)	0.53** (0.19)	1.70** (0.32)
Hispanic	-0.68*** (0.17)	0.51*** (0.09)	-0.03 (0.19)	0.97 (0.19)	-0.14 (0.29)	0.87 (0.25)	-0.34** (0.13)	0.71** (0.09)	0.03 (0.15)	1.03 (0.15)	0.00 (0.20)	1.00 (0.20)
Other Race	-0.05 (0.28)	0.95 (0.26)	-0.60 (0.44)	0.55 (0.24)	0.83 (0.68)	2.30 (1.56)	0.30 (0.28)	1.34 (0.37)	-0.19 (0.27)	0.82 (0.22)	0.07 (0.39)	1.07 (0.41)
Education												
Less than H.S.	-0.02 (0.13)	0.98 (0.13)	-0.21 (0.21)	0.81 (0.17)	0.26 (0.27)	1.30 (0.36)	-0.05 (0.10)	0.95 (0.09)	0.20 (0.16)	1.23 (0.20)	-0.11 (0.18)	0.90 (0.16)
H.S. Graduate College	- 0.17 (0.14)	- 1.19 (0.17)	- -0.32+ (0.17)	- 0.73+ (0.12)	- 0.11 (0.24)	- 1.12 (0.27)	- -0.09 (0.11)	- 0.91 (0.10)	- -0.14 (0.14)	- 0.87 (0.12)	- -0.44* (0.17)	- 0.64* (0.11)
Enrolled In School	0.06 (0.16)	1.06 (0.17)	0.19 (0.17)	1.20 (0.21)	-0.35 (0.26)	0.70 (0.18)	-0.03 (0.10)	0.97 (0.10)	0.18 (0.15)	1.20 (0.17)	-0.21 (0.17)	0.81 (0.14)
Father Employed	0.08 (0.13)	1.08 (0.14)	-0.19 (0.23)	0.82 (0.19)	-0.36 (0.28)	0.70 (0.20)	-0.01 (0.10)	0.99 (0.10)	-0.31+ (0.17)	0.74+ (0.12)	-0.21 (0.18)	0.81 (0.15)
Mother Employed	0.05 (0.11)	1.05 (0.12)	0.34* (0.15)	1.40* (0.21)	-0.32 (0.22)	0.73 (0.16)	-0.00 (0.09)	1.00 (0.09)	0.30* (0.12)	1.35* (0.16)	-0.18 (0.15)	0.84 (0.12)
Number of Children	0.03 (0.05)	1.03 (0.05)	-0.04 (0.08)	0.96 (0.07)	-0.04 (0.11)	0.96 (0.10)	0.02 (0.04)	1.02 (0.04)	-0.04 (0.06)	0.96 (0.06)	-0.07 (0.07)	0.93 (0.07)
Multipartner Fertility	-0.03 (0.13)	0.97 (0.12)	0.18 (0.20)	1.19 (0.24)	0.08 (0.25)	1.08 (0.27)	0.10 (0.10)	1.11 (0.11)	0.22 (0.15)	1.25 (0.19)	0.44* (0.19)	1.56* (0.29)
Farther Incarceration	0.14 (0.12)	1.15 (0.13)	-0.10 (0.22)	0.91 (0.20)	0.53* (0.25)	1.71* (0.42)	0.05 (0.09)	1.05 (0.09)	0.18 (0.15)	1.20 (0.18)	0.26 (0.16)	1.30 (0.21)
Length of Union	-0.00 (0.00)	1.00 (0.00)	0.00 (0.00)	1.00 (0.00)	-0.01* (0.00)	0.99* (0.00)	-0.00+ (0.00)	1.00+ (0.00)	0.00 (0.00)	1.00 (0.00)	-0.01** (0.00)	0.99** (0.00)
Constant	0.19 (0.33)	1.21 (0.39)	0.00 (0.50)	1.00 (0.51)	1.66* (0.66)	5.28* (3.48)	0.27 (0.26)	1.31 (0.34)	-0.38 (0.38)	0.69 (0.26)	2.19*** (0.46)	8.95*** (4.11)

**Table 2. Probit Regression Predicting Membership into Marital Status and Dissolution Groups (Continued)**

Observations	693	986	224	1043	1150	470
Pseudo $R^2$	0.05	0.10	0.17	0.04	0.09	0.16
$\chi^2$	35.26**	40.52***	41.86***	52.96***	66.15***	81.29***

*Note.* Standard errors in parentheses. \*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.10$

**Table 3. Propensity Score Matching Results for Mental Health Change by Marital and Dissolution Status**

	Treated		Control		Difference <sup>2</sup>	Pooled SD	Cohen's <i>d</i>	<i>t</i>	On Support <sup>3</sup>	<i>n</i> on Support <sup>4</sup>	<i>n</i> Treated on Support <sup>5</sup>
	<i>M</i> <sup>1</sup>	<i>SD</i>	<i>M</i> <sup>1</sup>	<i>SD</i>							
Fathers											
Cohabitation Dissolution versus Stable <sup>6</sup>											
Δ in Depressive Symptoms	0.88	2.37	0.43	1.92	0.46	2.17	0.21	1.92+	99%	691	167
Δ in Anxious Symptoms	0.43	2.15	0.07	1.11	0.35	1.72	0.20	1.88+	99%	691	167
Marital Dissolution versus Stable <sup>7</sup>											
Δ in Depressive Symptoms	1.25	2.41	-0.15	2.08	1.40	2.35	0.60	3.26**	100%	986	55
Δ in Anxious Symptoms	0.51	2.20	-0.13	1.55	0.64	1.92	0.33	1.75+	100%	986	55
Cohabitation versus Marital Dissolution <sup>8</sup>											
Δ in Depressive Symptoms	1.03	2.39	0.67	2.04	0.36	2.22	0.16	1.22	68%	170	115
Δ in Anxious Symptoms	0.45	2.24	0.16	1.70	0.30	1.99	0.15	1.13	68%	170	115
Δ in Depressive Symptoms <sub>Dissolved</sub> – Δ in Depressive Symptoms <sub>Stable</sub>	0.65	2.53	0.55	2.72	0.10	2.62	0.04	0.29	68%	168 <sup>9</sup>	113 <sup>9</sup>
Δ in Anxious Symptoms <sub>Dissolved</sub> – Δ in Anxious Symptoms <sub>Stable</sub>	0.42	2.52	0.02	2.02	0.40	2.28	0.18	1.31	68%	168	113
Mothers											
Cohabitation Dissolution versus Stable <sup>6</sup>											
Δ in Depressive Symptoms	0.46	2.46	0.28	2.20	0.18	2.33	0.08	1.02	100%	1042	360
Δ in Anxious Symptoms	0.15	1.68	-0.16	1.93	0.31	1.82	0.17	2.26*	100%	1042	360
Marital Dissolution versus Stable <sup>7</sup>											
Δ in Depressive Symptoms	0.67	2.66	0.25	2.21	0.42	2.45	0.17	1.27	100%	1150	109
Δ in Anxious Symptoms	0.19	2.01	-0.02	1.42	0.21	1.74	0.12	0.89	100%	1150	109
Cohabitation versus Marital Dissolution <sup>8</sup>											
Δ in Depressive Symptoms	0.53	2.48	0.28	2.97	0.24	2.74	0.09	1.10	86%	419	310
Δ in Anxious Symptoms	0.17	1.69	0.11	1.97	0.06	1.83	0.03	0.44	86%	419	310
Δ in Depressive Symptoms <sub>Dissolved</sub> – Δ in Depressive Symptoms <sub>Stable</sub>	0.11	2.95	0.09	3.49	0.02	3.23	0.01	0.09	86%	418 <sup>9</sup>	309 <sup>9</sup>
Δ in Anxious Symptoms <sub>Dissolved</sub> – Δ in Anxious Symptoms <sub>Stable</sub>	0.11	1.93	0.06	2.20	0.04	2.07	0.02	0.26	86%	418	309

**Table 3. Propensity Score Matching Results for Mental Health Change by Marital and Dissolution Status (Continued)**


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<sup>1</sup>Reported are the means for each group based on the ATT, the average treatment effect of the treated. <sup>2</sup>Differences reported are the mean of the “treated” sub-sample minus the mean of the “control” sub-sample. <sup>3</sup>On [common] support indicates the percent of respondents in the treated group (not missing on variable) who were used in the matching analysis; i.e. for whom matches were found. <sup>4</sup>The “*n* on Support” is the *n* of all respondents available to be used in the analysis. <sup>5</sup>The “*n* Treated on Support” is the *n* of treated respondents whom were matched in the analysis. <sup>6</sup>The “treated” group is respondents who experienced cohabitation dissolution and the “control” group is respondents who remained cohabiting. <sup>7</sup>The “treated” group is respondents who experienced marital dissolution and the “control” group is respondents who remained married. <sup>8</sup>The “treated” group is respondents who experienced cohabitation dissolution and the “control” group is respondents who experienced marital dissolution. <sup>9</sup>The sample *n* is discrepant for the test of  $\Delta$  in *Symptoms* as compared to  $\Delta$  in *Symptoms*<sub>Dissolved</sub> –  $\Delta$  in *Symptoms*<sub>Stable</sub> because the first test draws from the full sample of respondents who dissolved a union, while the second test draws only from those respondents who dissolved a union who also found a match in the population of respondents who remained stable in their union, as is required to compute  $\Delta$  in *Symptoms*<sub>Dissolved</sub> –  $\Delta$  in *Symptoms*<sub>Stable</sub>.

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.10



## Appendix A. Further Details on the Propensity Score Matching Method

After obtaining a propensity score for each outcome and sub-sample, we used Leuven and Sianesi's (2003) matching estimator for Stata, *psmatch2*, and its post-matching covariate imbalance testing indicator *pstest* (to obtain the test statistics and significance levels). Other estimators also exist for Stata (reviewed in Morgan and Harding 2006), but *psmatch2* is one of the more popular and user-friendly of the matching estimators available, and comparisons among matching estimators has not shown a clear advantage to one estimator over another. The propensity scores calculated from each of the probits conducted were used in analyses using single nearest-neighbor matching with replacement. Thus, respondents in the "treatment" group (those mothers or fathers who experienced dissolution, or in the comparisons by type of dissolution those who experienced cohabitation dissolution) were matched to their nearest neighbors in the "control" group (those mothers or fathers who either did not dissolve a union or, in the comparisons by type of union, those who dissolved a marital union) with the closest propensity score to the treated respondent's own. In the event of ties, or when respondents in the non-treated group had identical propensity scores, the matched respondent nearest to the treated respondent was selected. We made sure that our data were in random order before we ran this procedure. Further, a matched father or mother was allowed to be used more than once and was not withdrawn from the pool after a match, allowing each respondent in the "treated" group to find his or her best match from the entire pool of respondents in the "control" group. Finally, we also set a limit, or caliper, on the distance from which the matched respondent's propensity score could fall from the treated respondent's propensity score. We use a stringent caliper, 0.01, whereby more than 68% of the mothers and fathers in the "treated" group were matched.

## Appendix B. Unmatched t-test Results for Mental Health Change by Marital and Dissolution Status

	Treated		Control		Difference <sup>1</sup>	Pooled SD	Cohen's <i>d</i>	<i>t</i>	<i>N</i> <sup>2</sup>	<i>n</i> Treated <sup>3</sup>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>						
Fathers										
Cohabitation Dissolution versus Stable <sup>4</sup>										
Δ in Depressive Symptoms	0.96	2.42	0.20	1.59	0.76	1.85	0.41	4.86***	734	181
Δ in Anxious Symptoms	0.41	2.08	-0.22	1.28	0.43	1.52	0.28	3.32***	734	181
Marital Dissolution versus Stable <sup>5</sup>										
Δ in Depressive Symptoms	1.25	2.41	0.21	1.69	1.04	1.75	0.59	4.32***	1025	55
Δ in Anxious Symptoms	0.51	2.20	0.00	1.23	0.51	1.30	0.39	2.85**	1025	55
Cohabitation versus Marital Dissolution <sup>6</sup>										
Δ in Depressive Symptoms	0.96	2.42	1.25	2.41	-0.30	2.41	-0.12	-0.80	236	181
Δ in Anxious Symptoms	0.41	2.08	0.51	2.20	-0.10	2.10	-0.05	-0.31	236	181
Mothers										
Cohabitation Dissolution versus Stable <sup>4</sup>										
Δ in Depressive Symptoms	0.44	2.47	0.26	2.05	0.18	2.21	0.08	1.27	1098	393
Δ in Anxious Symptoms	0.16	1.66	0.00	1.53	0.16	1.58	0.10	1.59	1098	393
Marital Dissolution versus Stable <sup>5</sup>										
Δ in Depressive Symptoms	0.66	2.59	0.25	1.86	0.41	1.95	0.21	2.15*	1177	116
Δ in Anxious Symptoms	0.22	2.06	0.11	1.49	0.10	1.55	0.07	0.68	1177	116
Cohabitation versus Marital Dissolution <sup>6</sup>										
Δ in Depressive Symptoms	0.44	2.47	0.66	2.59	-0.22	2.50	-0.09	-0.83	509	393
Δ in Anxious Symptoms	0.16	1.66	0.22	2.06	-0.06	1.76	-0.03	-0.31	509	393

<sup>1</sup>Differences reported are the mean of the “treated” sub-sample minus the mean of the “control” sub-sample. <sup>2</sup>The “*N*” is the *N* of all respondents used in the analysis. <sup>3</sup>The “*n* Treated” is the *n* of treated respondents. <sup>4</sup>The “treated” group is respondents who experienced cohabitation dissolution and the “control” group is respondents who remained cohabiting. <sup>5</sup>The “treated” group is respondents who experienced marital dissolution and the “control” group is respondents who remained married. <sup>6</sup>The “treated” group is respondents who experienced cohabitation dissolution and the “control” group is respondents who experienced marital dissolution.

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.10