A Comparison of Fathers' Mental Health Before and After

Cohabitation And Marital Dissolution

Claire M. Kamp Dush
Human Development and Family Science
135 Campbell Hall
1787 Neil Avenue
Columbus, OH 43210
The Ohio State University
ckamp-dush@ehe.osu.edu

Kate S. Adkins, Doctoral Student
The Ohio State University

April 2008

ABSTRACT

We compare the mental health consequences of cohabitation dissolution and marital dissolution using data from years 1 and 3 of the Fragile Families and Child Well-Being study. Using propensity score matching and fixed-effects regression to carefully account for the role of selection, we find that fathers who dissolved cohabiting unions had significantly greater increases in depressive and anxious symptoms than did fathers who remained in cohabiting unions between years 1 and 3. We also found that fathers who dissolved marital unions had significantly greater increases in depressive symptoms and a marginally to non-significant greater increase in anxious symptoms than did fathers who remained in marital unions between years 1 and 3. Finally, in analyses comparing cohabitation dissolution to marital dissolution, we found that the magnitude of the change in both depressive and anxious symptoms between years 1 and 3 was greater for previously married fathers than for previously cohabiting fathers. The magnitude of the difference between the two groups' change in mental health however was not statistically significant. In fixed-effects regression models, we examine several economic, education, family, social support, father involvement, and relationship quality covariates as time-varying covariates and we find little evidence that changes in these variables account for the mental health decline experienced by both married and cohabiting fathers who experience a union dissolution.

A Comparison of Fathers' Mental Health

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. One of the most studied of these changes is the study of the consequences of divorce for adults and children. Researchers have found that divorce has economic, psychosocial, and behavioral consequences (Amato, 2000). However, along with the rise in divorce was the rise of another kind of union dissolution – cohabitation dissolution. Cohabitation has increased greatly such that results based on the 2000 U.S. census estimates that there are nearly 5.5 million cohabiting couples in the U.S. today which represents a more than 1000 percent increase since 1970 (Fields & Casper, 2001). These cohabiting unions often involve children such that it is estimated that about 40% of cohabiting families include children (Simmons & O'Connell, 2003) and indeed, evidence from the National Survey of Family Growth estimates that 40% of non-marital births are births to unmarried cohabiting couples (Chandra, Martinez, Mosher, Abma, & Jones, 2005). Even given the dramatic rise in cohabitation, very little research has examined the consequences of cohabitation dissolution as compared to divorce (for an exception, see Avellar & Smock, 2005; McManus & DiPrete, 2001). This paper seeks to fill this void in the literature by comparing the mental health consequences of cohabitation dissolution as compared to divorce for fathers using the Fragile Families and Child Well-Being study.

Background

Mental health problems in men are highly overlooked in the literature. It has only been recently that researchers began examining the causes, development, and consequences of depression and anxiety in men. Some research argues men experience these disorders differently, particularly in the form of anger (Robbin & Tanck, 1997). Although this may very well be the case, fewer men than women seek treatment for depression (Bramesfeld, Thomas, & Schwartz, 2007). Some suggest that the stigma for admitting a problem or asking for help in men is so strong that it bars both men with mental illness as well as service professionals from appropriately addressing symptoms. Therefore, many men are unable to get the services they need to appropriately address their problems. These problems may become particularly salient after a union dissolution.

After a divorce, studies have found that spouses experience a mental health decline (e.g. Demo & Acock, 1996a; Simon & Marcussen, 1999). Similar findings have been found for dating partners following a break-up of a dating relationship for both men and women (Sbarra & Emery, 2005; Sprecher, 1994). However, spouses also report more social isolation following divorce which in turn can also lead to decreases in well-being (Ross, 1995; Umberson, Chen, House, Hopkins, & Slaten, 1996). This loss of social support may also be harmful to men in particular as they may rely on social support for encouragement to seek the help they often need following a divorce. Are these processes the same for cohabitation dissolution? We outline two competing rationales for why cohabitation dissolution may differ from marital dissolution: differences in investment in relationship capital and differences due to the "incomplete institution" of cohabitation and its dissolution.

Theoretical Framework

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. Previous research has found that cohabiting relationships are less committed (Nock, 1995; Stanley, Whitton, & Markman, 2004) and shorter in duration than marital relationships (Lichter, et al., 2006), hence individuals in cohabiting relationships may hedge their bets and insure against eventual dissolution through a decrease in relationship specific investments earlier than individuals in problematic marital relationships. If cohabiting partners are less emotionally invested in the relationship and are still on the "relationship" market and looking for other romantic relationships, then it is likely that cohabiting fathers will not experience as much of a decline in mental health when their union ends as do fathers who experience marital dissolution who have invested more.

On the other hand, family scholars (Cherlin, 2004, Manning & Lamb; 2003) have argued that while social acceptance of cohabiting relationships has increased in the past 30 years, cohabitation is still an "incomplete institution" whereby family members do not have established norms regarding how family members should treat each other and the responsibilities of cohabiting partners to their partner's children are not specified. We would argue that cohabitation dissolution is also an "incomplete institution". The lack of norms in cohabiting unions hence creates sources of parental ambiguity in terms of obligations and rights of a cohabiting partner, and this ambiguity may endure after the union has dissolved. Marriage is a legal status, and its dissolution—divorce—requires having some interaction with the courts and the legal system. It also is well defined in our society and generally the expectation is that after a

marital dissolution, fathers will share custody and still have contact with their child. Further, fathers who are married at the birth of their child are automatically listed on the birth certificate as the child's father and no other action is necessary to assert paternity.

In contrast, cohabitation is not a legal status, and no legal action is required for its dissolution. Children have a right to receive child support from a non-residential parent, regardless of whether their parents were ever legally married. In practice, however, mothers who were never married to the father of their child may, for a variety of reasons, avoid going through the legal system,[1] and may prefer informal child support agreements.[2] If mothers are not establishing child support orders, they also do not have to establish paternity. Nor do these mothers have to establish custody obligations, and the expectation of shared custody is not as salient as it is for married couples. Therefore, formerly cohabiting fathers may have a more tenuous connection to their child and thus may have less contact with their child post-dissolution hence decreasing their mental health. 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 support to the father 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 has less serious implications for mental health than marital dissolution. We seek to test this theory by examining whether controls for pre-dissolution relationship quality and commitment account for differences between previously cohabiting and divorced fathers' change in mental health. On the other hand, based

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[1] Unmarried low income families generally establish child support awards through the IV-D (or child support enforcement) agency rather than through the courts. In this paper we use the word 'legal' to refer both to the courts and the IV-D agency.
[2] Qualitative work by Waller (2002) provides evidence that many low income parents distrust the legal system.

on the argument that cohabitation and its dissolution represent "incomplete institutions", we expect that cohabitation dissolution has more serious implications for mental health than marital dissolution. We seek to test this theory by examining whether controls for change in family support or differences in father-child contact post-dissolution account for any observed differences between the mental health of formerly cohabiting and married men.

The Role of Selection

No study can attempt to compare individuals who cohabit to those that marry without a careful examination of the role of selection. The observable social, economic, and psychological characteristics of parents who cohabit differ from those who marry. Cohabiters are more likely to be younger, be Black or Hispanic, have less education, and the fathers are somewhat less likely to be employed (see Seltzer, 2000 for a review). Previous research has shown that cohabitors, in particular those without plans to marry, express less positive and more negative emotion in relationship conversations, report lower commitment, and lower relationship quality than do married couples (Nock, 1995; Stanley et al., 2004). Cohabitors have also been found to spend less time in religious activities (Stolzenberg, Blair-Loy, & Waite, 1995; Thornton, Axinn, & Hill, 1992) and have less attachment to parents and kin (Clarkburg, et al., 1995) compared to marrieds. Due to the instability of cohabiting unions compared to marital unions (Lichter, et al., 2006) and the higher likelihood of cohabiting women with children from a previous relationship to dissolve their union with their current partner (Lichter, Qian, & Mellot, 2006), cohabiting mothers have 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 & Furstenburg, 2006). Each of these characteristics associated with cohabitors could be reasoned to be associated with mental health as well (Mirowsky & Ross, 2003). Indeed, prior to dissolution, cohabitors have

been found to report lower levels of well-being than marrieds (Brown, 2000; Deklyen, Brooks-Gunn, McLanahan, & Knab, 2006; Kamp Dush & Amato, 2005). Further, Pevalin and Ermisch (2004) found poor mental health increased the 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. Because the observed and unobserved selection characteristics could be associated with the change in mental health, we use propensity score matching methods as well as fixed-effects regression methods to account for these potential competing explanations for the differences in mental health change between cohabiters and marrieds.

Data and Methods

This research uses the Fragile Families and Child Well-being Study, a study of new unwed mothers and fathers and their children. The baseline data includes 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. The study over sampled births to unmarried couples and is nationally representative of non-marital births in large US cities. Both mothers and fathers were interviewed in the hospital shortly after their child's birth with follow-up interviews conducted when the child was one, three, and five years old (see Reichman, Teitler, Garfinkel, & McLanahan, 2001 for a detailed discussion). The five-year follow-up survey is not yet publicly available.

To be in our analyses, fathers must have been married to or cohabiting with the mother at 1 year - the second wave of data collected at one year post-birth (n = 2326). Marriage with the mother at both years 1 and 3 was measured from the fathers in response to the question: *What is your relationship with mother now? Married, Romantically involved, Separated/Divorced, Just*

friend, or Not in any kind of a relationship? Cohabitation at both years 1 and 3 was measured as reporting being in a romantic relationship in response to the question, *What is your relationship with the mother now?,* as well as reporting that the he lives with the mother "all/most of the time".

Independent Variable

Our main independent variables in these analyses was an indicator of whether the union dissolved between year 1 and year 3. A relationship was coded as dissolved if 1) married fathers at Wave 1 reported at Wave 3 that they were Divorced/Separated and/or not cohabiting *always/most of the time*, and 2) if cohabiting fathers at Wave 1 reported at Wave 3 that they were no longer romantic and/or no longer living together *always/most of the time*. Between year 1 and year 3, 5% (n=55) of married couples had separated or divorced and 20% (n=181) of couples who were cohabiting at year 1 had separated from their partners. Further, approximately 17% of fathers who cohabited at year 1 had married the mother of their child by year 3. We do not include these fathers in our analyses. Information about marriage duration from the one-year survey suggests that the average parent married in 1995 – about 4 to 5 years before the baseline survey. A data issue is that our sample of married couples all separate before their child is 3 years old, so it is important to assess the generalizability of our results. By the three year survey, they would have been married 7 to 8 years. A National Center for Health Statistics (NCHS) report using the National Survey of Family Growth (NSFG) data (Bramlett & Mosher, 2002) reports that women with a child born more than 7 months after marriage had an 8% probability of divorce within 3 years of marriage, 14% within 5 years, 26% within 10 years, and 36% within 15 years. Therefore, on average between 2.4 and 2.7% of couples would be expected to separate

or divorce each year. We find that over 2 years, about 5% divorce, which is what would be expected based on national estimates of divorce rates.

Dependent Variables

We utilized continuous measures of depression and anxiety for our measures of mental health. Depression and anxiety scores were coded at years 1 and 3 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. 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 becomes their score. This scale has an alpha of 0.95 both at years 1 and 3.The diagnostic criteria for clinical depression is meeting at least 5 out of the 8 symptoms (American Psychological Association, 2000). At wave 2, only 10% (n = 25) of dissolving fathers and 6.17% (n = 94) of fathers in stable relationships met the clinical criteria for depression. However, fathers who were taking medication for depression were not asked about their symptoms in the original Fragile Families Study survey. We assumed 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 1 and 3. 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. Full diagnostic criteria is met if the respondent has worry lasting for more than 6 months about more than one issue and answers positively to at least 3 of the 6 possible symptoms. The percent of respondents meeting criteria for a clinical level of anxiety disorder, known as Generalized anxiety disorder, was lower than those meeting clinical depression criteria at 1.37% (n = 24) of the full sample. Our continuous coding of anxiety used 7 total items producing an alpha of 0.96 and 0.97 at years 1 and 3, respectively. Due to the low incidence of clinical depression and generalized anxiety disorder in this sample of fathers, we only examined the continuous measures of depressive and anxious symptoms.

Control Variables

We controlled for various demographic variables measured at baseline, including fathers' age in years, race (White, Black, and Hispanic) and fathers' education (less than high school diploma, high school graduate, and at least some college). Fathers' age and race were only asked of mothers at baseline; therefore, thus we relied on mothers' reports for these two control variables.

Fathers' employment status was measured at each wave as 1 for a positive answer and 0 for answering no to the question, *Did you do any regular work for pay last week?* Mothers' employment was coded in the same way but measured from the mothers. Fathers' ongoing education was dummy coding 1 if fathers were currently enrolled in an educational or training program and 0 if they were not. Further, a dichotomous variable at each wave indicated if the father had completed an educational or training program since the previous wave. These measures of education and employment were meant to serve as indicators for socioeconomic

status as the Fragile Families and Child Wellbeing Study, not unlike other large datasets, had large amounts of missing data (33.17%) on direct income.

We controlled for fathers' perception of their available support, which may change during or after a separation when fathers live with family or rely on family for financial or childcare assistance. Our variable for support, which was measured at both waves 2 and 3, includes the following items: *Could you count on someone to loan $200 in the next year? Could you count on someone to loan $1000 in the next year? Could you count on someone to provide a place to live in the next year? Could you count on someone to help with emergency child care? Could you count on someone to co-sign for a loan for $1000? Could you count on someone to co-sign for a loan for $5000?* These items were combined in our support scale if they answered yes to these questions. Fathers received a zero for each item if they responded "no" or "don't know", since it was the perception of support we were interested in (alphas 0.96 at baseline and 0.99 at final wave). We also included religious involvement in our controls. This variable is coded incrementally from 0-5. Scores indicate attendance (0) "never" attending religious services, (1) attending less than once a year, (2) a few attendances per year, (3) a few times in a month, (4) one time per week, (5) more than once a week. Therefore, a higher score on this variable indicates more involvement.

Turning to child support measures, we used a dichotomous indicator of whether the mother received any child support, either through a formal (court negotiated) or informal agreement. In-kind support was measured as how often the father bought: clothes, toys, medicine, child care items, food or formula, anything else. Note that the child care item was dropped from Wave 3 given the age of the child at that point. If the father answered that he often

or sometimes bought any of the items on the list, the in-kind support variable was coded 1, otherwise, it was coded 0. The fathers' in-kind scale produces an alpha of 1.00.

Days the father saw his child were coded as the number of days in the past month the father saw their shared child. The variable was coded based on the question: *During the past 30 days, how many days have you seen your child?* Also for those fathers who experienced a union dissolution between the two waves, we coded whether they had entered a romantic relationship with a new partner (1) or remained out of a union (0).

Further, we created variables using an indicator of relationship quality and father involvement at year 1. Relationship quality was coded using the following items: *How often does the mother or is the mother a) fair and willing to compromise? b) express affection or love? c) insult or criticize you? d) encourage/help with things important to you? e) try to isolate you from friends/family? f) try to prevent you from going to work/school? g) try to control your money h) listen when you need someone to talk to i) really understand your hurts and joys?* We gave a value of 1 for each father who reported each item occurred either *often* or *sometimes* for the positive questions, and a value of 0 for a response of *never*. For items c, e, f, and g, we reverse coded the results as a 1 for responses of *never* and a 0 for *often* or *sometimes*. We then summed the mean of each item for our relationship quality value.

We also coded father involvement at year 1 using the questions: *How many days per week 0-7 do you: a) play games like peek-a-book or gotcha with your child? b) sing songs or nursery rhymes to your child? c) read stories to your child? d) tell stories to your child? e) Play inside with toys such as blocks or legos with your child? f) take your child to visit relatives? g) hug or show physical affection to your child? h) put your child to bed?* We used the mean value of items to construct the father involvement variable.

Data Analysis and Methods

We began our analysis by conducting a series of probit regressions examining the role of selection in predicting 1) whether a cohabiting union remained intact (0) or dissolved (1), 2) whether a marital union remained intact (0) or dissolved (1), and 3) comparing cohabitation dissolution (1) to marital dissolution (0). We use the following variables as predictors in these models: fathers' age, race, education, employment status, educational status, total number of children, and multi-partner fertility. After running these regressions, we save the predicted probabilities for each regression and use the predicted probability of dissolving a cohabiting union as compared to remaining intact, of dissolving a marital union compared to remaining intact, and the predicted probability of dissolving a cohabiting union as compared to a marital union. We then used these propensity scores to match 1) cohabiting fathers who dissolved to those that remain intact, 2) similar married fathers who dissolved to those that remain intact, and 3) similar fathers who dissolved a cohabitation as compared to a marriage. To conduct the matching, we employed propensity score matching (Morgan & Harding, 2006; Rosenbaum & Rubin, 1985; Smith, 1997) in Stata 10 using the psmatch2 command (Leuven & 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 isolate the appropriate comparison sample so that causality could be better inferred. 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 of the steps we

take in Appendix 1. Our outcome in these models was a change score of change in depressive or anxious symptoms. In our analyses comparing those who dissolve their unions with those who did not, our "treatment" group included the fathers who experienced the dissolution, and these fathers were then matched to their nearest neighbor in the "control" group, i.e. the fathers who did not dissolve their unions. In our analyses comparing those who dissolved a cohabiting as opposed to a marital union, our "treatment" group included fathers who experienced a cohabitation dissolution, and the "control group included fathers who dissolved a marital union. 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 has a propensity score is within 0.01 of the propensity score of the treated respondent) were dropped from the analysis.

The benefits of propsenity score matching with a change score are 1) to carefully account for the role of selection, and 2) to control for unobserved time-invariant heterogeneity as time-invariant characteristics are differenced out of the model via the change score. However, a limitation of the propensity score matching method with a change score is that observed heterogeneity between waves cannot be examined with this method. One way to account for observed heterogeneity that is time-variant is to utilize fixed effects regression, where time-variant characteristics can be examined as part of the model. The general equation for a fixed effects model is as follows (Allison 2006):

$$y_{it} = \mu_t + \beta x_{it} + \gamma z_i + \alpha_i + \varepsilon_{it}$$

Within the above equation, y_{it} is the mental health outcome for each individual measured at two time points. μ_t is the intercept for each point in time. β represents the vector of coefficients for

the predictor variables (x_{it}) that vary over time. γ represents the vector of coefficients for the predictor variables (z_i) that do not vary over time. α_i and ε_{it} are both error terms. α_i represents all unobserved variation that effects y that is constant over time. Conversely, ε_{it} represents any random variation for each individual at each time point.

Because we are using two waves of data in our analysis, our fixed effects analysis will consist of two equations, which are as follows:

$$y_{i1} = \mu_1 + \beta x_{i1} + \gamma z_i + \alpha_i + \varepsilon_{i1}$$

$$y_{i2} = \mu_2 + \beta x_{i2} + \gamma z_i + \alpha_i + \varepsilon_{i2}$$

We can assess change between times 1 and 2 by subtracting equation 1 from equation 2:

$$y_{i2} - y_{i1} = (\mu_2 - \mu_1) + \beta(x_{i2} - x_{i1}) + (\varepsilon_{i2} - \varepsilon_{i1})$$

In the above equation the coefficients and error terms that do not vary over time, γz_i and α_i, are differenced out. Therefore, only observed time-variant variables are entered into the equation when estimating the fixed effects results. We examine the role of the following time-varying covariates in models comparing fathers who dissolve their unions versus remain intact: fathers' employment status, educational status, having completed education, and total number of children, perceived social support, and religious involvement. In addition to the time-varying co-variates used in comparing fathers who dissolved their union versus stay intact, we also examined additional time-varying co-variates in models comparing fathers who dissolved a cohabiting versus a marital union: giving informal or formal child support, giving any in-kind support, having a new partner, having no contact with the shared child, and as well as an indicator that is equal to an interaction for relationship quality and father involvement at the year 1. We interact these time-invariant variables with a dichotomous indicator of time so that they can be entered into the model. Thus, in these models, there remains a single source of un-

modeled heterogeneity that could serve as a source of third-variable bias – unobserved, time-varying heterogeneity.

Despite the many advantages of fixed effects methods, using fixed effects methods alone is not adequate if an observed time-invariant characteristic, such as educational attainment or race, both distinguishes the groups of interest and also predicts change in the outcome over time. For example, if college graduates and high school dropouts experience changes in mental health differently over time, a fixed effects regression model would not be able to capture these differences. One solution to this dilemma would be to run the fixed effects models separately for college graduates and high school dropouts, or to estimate interactions between education and the change in mental health. However, in order to utilize interactions one must have an adequate sample size. Within this analysis, our sample size is too small to run several interactions that would provide robust estimates for each of the subgroups that distinguish cohabitors and marrieds. Therefore, we ran our fixed-effects regression models using only our propensity score matched sample. Note that again because we use nearest-neighbor matching with replacement, some respondents in the control group are allowed to match to more than one respondent in the treatment group. Thus, the fixed-effects regression results are frequency weighted by the number of times respondents in the control group were used as matches. Essentially this means that some individuals are represented more than once in these analyses.

Results

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

Descriptive Results

Descriptive statistics on the dependent, independent, and control variables are presented in Table 1. We find that the average number of depressive symptoms at year 1 for fathers was

0.44 on a scale of 0-8 and 0.45 for symptoms of anxiety on a scale from 0-7. This is due to the high skew in these variables such that a majority (72%) of fathers in the sample experienced no symptoms of depression or anxiety. Slightly less than half of our fathers were cohabiting at year 1. The average age of the fathers was 31.

Turning to the racial identity of the fathers, we found the greatest percentage of the fathers were Black as compared to White or Hispanic. On average, a majority of the fathers had attended at least some college, followed by slightly less than a third having a high school diploma. About 16% of fathers had ever been incarcerated. A large majority of fathers reported being employed at year 1, while a majority of their female partners, the mothers of the focal child, were also employed. Only 3% were using welfare at year 1 of the survey and15% were students in an education or training program.

Fathers had an average of 1.67 children and a quarter of our fathers had a child with another partner. Fathers reported high levels of social support, and a majority of fathers participated in religious services between a few times a month and a few times per year.

Probit Regression Results Predicting Dissolution from Observed Characteristics

The results from probit regression predicting dissolution from observed characteristics are reported in Table 2. Overall, we found that younger fathers were more likely to dissolve both a cohabiting union and a marital union. In comparing cohabitation and marital dissolution, we found that younger fathers were more likely to dissolve a cohabiting union than they were to dissolve a marital union, confirming that the fathers in the cohabiting sub-sample were younger than in the marital sub-sample. Hispanic fathers were less likely to dissolve a cohabiting union than were White fathers. Black fathers were marginally significantly more likely to be in a cohabiting rather than a marital union compared with White fathers, consistent with the

literature. We found no other race differences in the probability of dissolution or the probability of a certain type of dissolution.

Turning to education, we found that fathers with less than a high school education were more likely than fathers with a high school degree to dissolve a cohabitation as compared to a marriage. This again is consistent with the cohabitation literature in that cohabitors tend to be less educated than marrieds. We also found that fathers with at least some college were less likely to dissolve their marital union than were fathers who had a high school education. We found no differences in the probability of dissolution or type of dissolution by employment status, fathers' school enrollment, and the total number of children in the household. Turning to multi-partner fertility, we found that fathers who had children with other women were more likely to dissolve their marital union as compared to remaining in their marital union. It was not found to distinguish marital and cohabiting unions that dissolve in this sample.

Propensity Score Matched Results of Differences in Change in Mental Health

Results from the propensity score matching models are reported in Table 3. In the cohabitation dissolution subsample, almost 100% of the "treated" respondents, those fathers experienced cohabitation dissolution, found a match in the "control" sample of fathers who remained in their cohabiting union. The results indicated that cohabiting fathers who dissolved their union reported a significantly greater magnitude of an increase in depressive and anxious symptoms between years 1 and 3 compared to those fathers who remained in their cohabitating unions. Indeed, cohabiting fathers who remained cohabiting on average experienced no increase in anxious symptoms between year 1 and 3.

Turning next to married fathers, 100% of the married fathers who dissolved their marital union found a match among the married fathers who remained married. Further, married fathers

who dissolved their union reported a significantly greater magnitude of increase in depressive symptoms between years 1 and 3 than fathers who remained in their marriages. Married fathers who dissolved their union also reported a greater magnitude of an increase in anxious symptoms, though the difference did not attain statistical significance, likely due to the small sample size of fathers who experienced a marital dissolution. Similar to the cohabiting fathers who remained in their unions, married fathers who remained in their unions on average experienced no increase in anxious symptoms.

Next we turn to the comparisons of fathers who dissolved a cohabiting union and those whom dissolved a marital union. Ninety-four percent of fathers who dissolved a cohabiting union found a match among the fathers who dissolved a marital union. Results indicated that fathers who experienced a marital dissolution experienced a greater magnitude of increase in depressive symptoms compared to fathers who experienced a cohabitation dissolution, though the difference was not statistically significant. Similarly, fathers who experienced a marital dissolution had a greater magnitude of increase in anxious symptoms than did fathers who experienced a cohabitation dissolution, and the difference reached marginal significance. Thus, these models indicated that fathers who experienced both marital and cohabitation dissolution experienced increases in depressive and anxious symptoms across the transition as compared to those fathers who remained in their unions, though the magnitude of the increase in symptoms was greater for formerly married fathers as compared to formerly cohabiting fathers.

Fixed-effects Regression Results Predicting Change in Mental Health

Our final step in the analysis was to conduct fixed-effects regression on change in mental health using the propensity score matched sample in order to examine the role of time-varying covariates as potential mechanisms through which union dissolution was associated with mental

health. We report the fixed effects regression results for depressive symptoms in Table 4. We find in Model 1 that fathers experiencing cohabitation dissolution experienced a significant increase in depressive symptoms between years 1 and 3, while cohabiting fathers who remained cohabiting did not. In analysis not shown, we find that the magnitude of the difference (0.88) was statistically significant at the $p < .001$ level, indicating that the difference between cohabiting fathers who dissolve their union and those that remain in their union was statistically significant. This result was consistent with the propensity score matching results. In Model 2 we find that the magnitude of the difference actually increased after taking into account the time varying covariates. Thus, we find no evidence that changes in fathers' employment status, school status, education completion, total children, social support, or religious involvement accounted for the differences in the magnitude of the change in mental health between cohabiting fathers that remain cohabiting and those that dissolve.

Turning to marital dissolution, in Model 3 we find that married fathers who dissolved their union experienced a greater increase in depressive symptoms than did fathers who remained married. Again, in analyses not shown, we find that the magnitude of the difference (0.96) was statistically significant at the $p < .05$ level. These results were consistent with the results for cohabitors as well as the propensity score matching results. Also consistent, we found that the magnitude of the difference actually increased after taking into account time varying covariates as shown in Model 4. Thus, we again find no evidence that changes in the time-varying covariates accounted for the differences in the magnitude of change in mental health between married fathers that dissolved their union and those that remained married.

Next we turn to Models 5 through 7 in Table 4 that compare cohabiting fathers who dissolved their union to married fathers who dissolved their unions. As seen in Model 5, we find

that both married and cohabiting fathers who dissolved their unions experienced an increase in depressive symptoms between year 1 and 3, though the magnitude of the increase was greater for the married fathers. In analysis not shown, we find that the magnitude of the difference (0.40) was not statistically significant $p > .10$, which was consistent with the propensity score matching results. As seen in Model 6, the time-varying economic, education, family, social support, child-support, and father-child contact variables did not account for the changes in mental health over time among these fathers, and the magnitude of the differences actually increased. In this sample of only fathers who dissolve, we found that fathers who were entered school between years 1 and 3 had a greater magnitude of increase in depressive symptoms, perhaps from juggling the roles of non-resident father, student, and support provider. Further, we also find that fathers who had additional children also experienced an increase in depressive symptoms while fathers who experienced an increase in social support decreased in depressive symptoms. Note that none of the time-varying covariates related to child-support and father-child contact appeared to have a significant impact on depressive symptoms. Finally, in Model 7, we included the interaction terms for pre-dissolution relationship quality and father involvement. We found no significant differences in depressive symptoms by relationship quality or father involvement. However, their inclusion in the model did cause the previously significant coeffcents for the changes in mental health over time among cohabiting and married fathers to fall to a moderately significant (for fathers experiencing cohabitation dissolution) or non-significant level (for fathers experiencing marital dissolution). However, the size of the coefficients increased slightly. Therefore, while it appears that pre-dissolution relationship quality and father involvement may account for some of this association, the sample size available for these analyses may not be sufficient to test the role of each of these variables.

In the final table of the paper, Table 5, we present the fixed-effects regression results for change in anxious symptoms. Model 1 indicated that similar to depressive symptoms, fathers who experienced cohabitation dissolution significantly increased in anxious symptoms between years 1 and 3, while fathers who stayed in their cohabiting relationship did not. In results not shown, we found the magnitude of the difference (0.40) was statistically significant at the $p < .05$ level, consistent with the propensity score matching results. As seen in Model 2, time-varying covariates did not account for the increase in anxious symptoms experienced by cohabiting fathers who dissolved their union. Also similar to results for depressive symptoms, in Model 3 we found that fathers who experienced marital dissolution experienced significant increase in anxious symptoms between years 1 and 3, while those fathers who remained continuously married did not. In analyses not shown, we found the magnitude of the difference (0.51) was not significant, consistent with the propensity score matching results. After taking into account the time-varying covariates, we found the level of significance declined to marginal significance, and in results not shown, we found that the difference between fathers who dissolve their marriage and those that remained intact remained non-significant.

In our final set of models, we compare changes in anxious symptoms between the fathers who experienced cohabitation dissolution as compared to marital dissolution. In Model 5, we find that both fathers who experienced cohabitation dissolution and marital dissolution experienced an increase in anxious symptoms between years 1 and 3, and again, the magnitude of change was greater for those experienced marital dissolution than cohabitation dissolution. In analyses not shown, we find that the magnitude of the difference (0.49) was marginally significant $p < .10$, which was consistent with results from the propensity score matching. In Model 6 we enter the time-varying economic, education, family, social support, child support,

and father-child contact covariates and find that the coefficients increase for fathers who dissolved marital or cohabiting unions but in results not shown we find that the difference between the groups (now 0.27) is now non-significant. In terms of the covariates, we find that fathers who dissolved their unions and whom were enrolled in school or had more children significantly increased in anxious symptoms, consistent with our findings for depression. We also found that those fathers who had greater perceived social support had fewer anxious symptoms. Fathers who gave any child support had fewer anxious symptoms, as did fathers who had a new partner. Therefore, it seems that the mechanisms that link mental health to union dissolution may operate differently for depressive and anxious symptoms as these variables were not statistically significant in models of depressive symptoms.

In the final model, Model 7, we find that again, neither the interaction term for pre-dissolution relationship quality nor father involvement was significant. Further, contrary to the results for depressive symptoms, the coefficients for the change in anxious symptoms for fathers who dissolved marital or cohabiting unions remain significant, though the level drops. The coefficients also increase as they did for depressive symptoms when pre-dissolution relationship quality and father involvement were controlled for. Thus, our results from the propensity score matching models and the fixed-effects regression models presented here are largely consistent. We find in both that the magnitude of change in depressive and anxious symptoms is greater for those fathers who dissolved a cohabiting union as compared to stayed in their cohabiting union. For married couples, we find that the magnitude of change in depressive symptoms only is greater for those fathers who dissolved a marital union as opposed to stayed married. Finally, we find that both marital dissolution and cohabitation dissolution are equally negative for change in both depressive and anxious symptoms, though the magnitude of the difference tends to be

greater among divorcing fathers. For the most part, we find no observed time-varying co-variates that accounted these changes.

Discussion

At the beginning of this paper, we began by arguing for differences in the implications of cohabitation dissolution and marital dissolution based on two theories. Based on the economic theory of investment in relationship capital (Becker et al., 1977), we expected that cohabitation dissolution would have less serious implications for change in mental health compared to marital dissolution. Based on the concept of cohabitation dissolution as an "incomplete institution", we expected that cohabitation dissolution would have more serious implications for mental health than marital dissolution. Overall, we did not find strong support for either argument, and perhaps suggestive or mixed evidence for both.

We found that fathers who experienced cohabitation dissolution increased in both depressive and anxious symptoms in comparison with fathers who remained in their cohabiting union. However, similarly we also find that fathers who experienced marital dissolution increased in depressive symptoms, though not anxious symptoms, in comparison with 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. The magnitude of change was greater for formerly married fathers compared to formerly cohabiting fathers, but this difference in the magnitude of change was not statistically significant.

Thus, we would conclude first that the concept of cohabitation as an incomplete institution was partially supported in that cohabitation dissolution had serious implications for both anxious and depressive symptoms. Also in support of the importance of sources of social

support which is posited to be higher in and following marital unions, we found that fathers who increased in social support across this transition declined in depressive and anxious symptoms. However, we did not find that time-varying controls for change in perceived social support accounted for the mental health decline experienced by formerly married and cohabiting fathers. In support of the economic theory of investment in relationship capital, we found that the magnitude of change in mental health for formerly married fathers was consistently greater than the magnitude of change for formerly cohabiting fathers. However, the differences between the two groups were not statistically significant. We attempted to control for pre-dissolution proxies for relationship capital as measured by relationship quality and father involvement, and we found inconsistent evidence that these controls accounted for the decline in mental health over time among both of these groups. This last finding was the key finding in violation of both perspectives; that is to say that there were largely few significant differences between the mental health consequences of cohabitation dissolution and marital dissolution.

Given the pattern of findings from this study, we would argue that both processes as posited by the economic theory of relationship capital and the concept of cohabitation dissolution as an incomplete institution are likely working here. All of these fathers, for the most part, lost much in these dissolutions, including for most daily contact with their child. Even if a cohabiting father is investing less in the mother, he may not be doing so with his child. On the other hand, married fathers may be investing more in relationships with both the mother and child, given the long-term horizon of marriage. Thus, these fathers may stand more to lose, including their perhaps more satisfying marital union, and the economic theory of relationship specific capital would support this argument.

Yet, the process of dissolving these two unions is very different, and family, community, and church members may not know how to react to cohabitation dissolution. After twenty years of high divorce rates, however, these same family, community, and church members may have well worn scripts for dealing with divorce. The concept of cohabitation dissolution as an incomplete institution would support these arguments, and thus, we believe that both potential causal processes may be working here.

Limitations of this study are primarily 1) the small sample size particularly of divorcing fathers, limiting the power to detect differences, and 2) the representativeness of our findings. Our sample of divorcing fathers was small, and this sample of divorcing fathers may not be representative of all divorcing fathers, as these relationships dissolved rather quickly after the birth of a child. In general, the birth of a child tends to decrease marital satisfaction while increasing marital stability. Further, it is likely that were we to replicate our analyses in a non-lower-class sample of men, particularly if they were to be without children, that our results may be very different, and we may actually find some beneficial mental health consequences of union dissolution, and perhaps in particular for cohabitation dissolution.

A third limitation is that we did not have more waves of data from which to examine adjustment over time to divorce for two reasons. First, it is possible that the consequences of union dissolution dissipate with the passage of time and we are not able to pick this up. Further, the decline in mental health surrounding union dissolution may have begun years earlier, as posited by the divorce-stress-adjustment perspective that argues that the consequences of union dissolution begins before the dissolution actually occurs (Amato, 2000). Ideally, future research should use two waves pre- and post- dissolution to better isolate the mental health consequences of the dissolution itself from pre-dissolution family dysfunction. A final limitation of this work

was that we were unable to identify the underlying causal mechanisms linking cohabitation

dissolution and marital dissolution to change in mental health over time. Future research might

incorporate data on personality, communities, networks, and other variables that may mediate or

moderate these findings.

In conclusion, cohabitation rates have increased dramatically in the past twenty years,

and these informal unions do not appear to be going anywhere. Thus, it is imperative that family

scholars from across disciplines begin to study and understand the implications of cohabitation

dissolution for adults and children, in order to assist them as they negotiate these difficult

transitions. The fear of divorce is real among many couples (Waller & Peters, 2007), but

perhaps thoughts about the consequences of cohabitation dissolution should also be considered

as couples navigate their relationship trajectories.

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Appendix 1. *Further Details on the Propensity Score Matching Method*

After obtaining a propensity score for each outcome and sub-sample, 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), were used. Other estimators also exist for Stata (see Morgan and Harding (2006) for a review), 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, the fathers in the "treatment" group (those who experience a dissolution, or in the comparisons by type of dissolution, those who experience cohabitation dissolution) are matched to their nearest neighbor in the "control" group (the fathers who either did not dissolve a union or in the comparisons by type of union, the fathers who dissolved a marital union) with the closest propensity score to the treated mother's own. In the event of ties, or when fathers in the non-treated group had identical propensity scores, the matched mother nearest to the treated mother is selected. Therefore, we ensured that our data were in random order before we ran the procedure. Further, a matched father was allowed to be used more than once and was not withdrawn from the pool after a match, allowing each father in the "treated" group to find her best match from the entire pool of fathers in the "control" group. Finally, we also set a limit, or caliper, on the distance from which the matched father's propensity score could fall from the treated father's propensity score. We use a more stringent caliper 0.01, where for most variables more than 94% of our sample is "on common support", or, put another way, where more than 94% of the fathers in the "treated" group of that subsample find a match.

Table 1. *Descriptive Statistics for Sample*

	M	*SD*
Symptoms of Depression	0.44	1.30
Symptoms of Anxiety	0.45	1.08
Percent Cohabiting[1]	0.42	
Percent Dissolved between Years 1 and 3[1,2]	0.13	
Fathers' Age	31.25	6.96
Fathers' Race[1]		
White	0.30	
Black	0.37	
Hispanic	0.28	
Fathers' Education[1]		
Less than High School Diploma	0.26	
High School Diploma or GED	0.30	
At least some College	0.44	
Father Ever Incarcerated[1,2]	0.16	
Fathers' Employed[1]	0.88	
On Welfare[1]	0.03	
In School[1]	0.15	
Total Number of Children	1.67	0.93
Had Multi-Partner Fertility[1]	0.25	
Perceived Social Support	4.77	1.61
Religious Involvement	2.55	1.54
Observations	1759	

[1]Indicates dichotomous variable. [2]Reported at Year 3. All other variables reported at Year 1.

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

	Cohabitation Dissolution versus Stable[a]			Marital Dissolution versus Stable[b]			Cohabitation versus Marital Dissolution[c]		
	β	SE (β)	e^β	β	SE (β)	e^β	β	SE (β)	e^β
Fathers' Age	-0.02*	0.01	0.98*	-0.02*	0.01	0.98*	-0.03*	0.02	0.97*
Fathers' Race									
White	-	-	-	-	-	-	-	-	-
Black	-0.08	0.14	0.93	0.21	0.17	1.23	0.40+	0.24	1.50+
Hispanic	-0.72***	0.16	0.49***	0.14	0.18	1.15	-0.44	0.28	0.65
Fathers' Education									
Less than High School	0.08	0.12	1.09	-0.23	0.2	0.79	0.60*	0.25	1.82*
High School Diploma	-	-	-	-	-	-	-	-	-
At least some College	0.13	0.14	1.14	-0.33*	0.16	0.72*	0.05	0.23	1.05
Father Employed	0.15	0.14	1.16	-0.11	0.24	0.89	-0.19	0.29	0.83
Father In School	0.05	0.16	1.05	0.15	0.17	1.16	-0.39	0.25	0.68
Number of Children	-0.1	0.07	0.9	-0.13	0.09	0.88	-0.21	0.14	0.81
Multipartner Fertility	-0.09	0.12	0.91	0.36*	0.17	1.43*	-0.01	0.22	0.99
Constant	0.09	0.3	1.1	-0.57	0.41	0.57	1.82***	0.54	6.17***
N	725			1009			233		
Chi-square	42.52***			28.66***			27.59***		

[a]1 = cohabitation dissolution; 0 = cohabiting stable [b]1 = marital dissolution; 0 = married stable [c]1 = cohabitation dissolution; 0 = marital dissolution.
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

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

	Treated M^1	Control M	Difference[2]	t-stat	On Support[3]	n on Support[4]	n Treated On Support[5]
Cohabitation Dissolution versus Stable[6]							
Depressive Symptoms	.96	.08	..88	4.34***	99.86%	724	177
Anxious Symptoms	.40	0	.40	2.21*	99.86%	724	177
Marital Dissolution versus Stable[7]							
Depressive Symptoms	1.25	.29	.96	2.38*	100%	1009	55
Anxious Symptoms	.51	0	.51	1.55	100%	1009	55
Cohabitation versus Marital Dissolution[8]							
Depressive Symptoms	.88	1.20	-.32	-1.13	93.99%	219	164
Anxious Symptoms	.46	.92	-.46	-1.80+	93.99%	219	164

[1]Reported are the means for each group based on the ATT, the average treatment effect of the treated. [2]Differences reported are the mean of the "treated" sub-sample minus the mean of the "control" sub-sample. [3]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. [4]The "n on Support" is the n of all respondents available to be used in the analysis. [5]The "n Treated on Support" is the n of treated respondents whom were matched in the analysis. [6]"treated" is cohabitation dissolution; "control" is cohabiting stable. [7]"treated" is marital dissolution; "control" is married stable. [8]"treated" is cohabitation dissolution; "control" is married dissolution.
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

Table 4. *Fixed Effects Regression Results for Depressive Symptoms using Propensity Score Matched Sample*

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	β	SE (β)	β	SE (β)	β	SE (β)	β	SE (β)	β	SE (β)	β	SE (β)	β	SE (β)
Cohabitation Dissolution	0.96***	0.14	1.15***	0.18					0.94***	0.22	1.93**	0.42	2.00+	1.08
Cohabitation Stable	0.08	0.14	0.1	0.16										
Marital Dissolution					1.25***	0.29	1.28***	0.34	1.34***	0.22	2.24***	0.36	2.31	1.11
Marital Stable					0.29	0.29	0.15	0.32						
Fathers' Employment Status			0.23	0.23			0.61	0.51			0.54	043	0.57	0.44
Father Currently in School			0.25	0.25			-0.03	0.4			-1.98***	0.45	-1.94***	0.46
Father Completed Education			-0.13	0.28			0.45	0.58			0.55	0.83	0.57	0.58
Total Children			0.11	0.09			0.08	0.17			0.51**	0.23	0.51**	0.18
Perceived Social Support			0	0.06			-0.17	0.14			-0.31*	0.12	-0.32**	0.12
Religious Involvement			0.08	0.07			0.22	0.15			0.12	0.2	0.14	0.14
Any Child Support Given											-.43	1.02	-0.48	.73
Any In-Kind Support Given											1.18	1.21	1.22	0.55
New Partner at Final Wave											-0.71	0.63	-0.70	0.41
Days Father Saw Child											0.00	0.04	0.00	0.95
Relationship Quality													0.21	0.60
Father Involvement													-0.09	0.15
Constant	0.67***	0.07	0.11	0.38	0.39**	0.14	0.03	0.97	0.60***	0.11	.01	0.94	0.03	0.95
Observations	708		691		220		219		516		426		424	
Number of Fathers	354		353		110		110		258		257		255	
R^2 within	0.11		0.14		0.16		0.20		0.18		0.41		0.41	
R^2 between	0.05		0.02		0.03		0.01		0.01		0.04		0.06	

$+p<.10.$ $*p<.05.$ $**p<.01.$ $***p<.001.$

Table 5. *Fixed Effects Regression Results for Anxious Symptoms using Propensity Score Matched Sample*

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	β	SE (β)	β	SE (β)	β	SE (β)	β	SE (β)	β	SE (β)	β	SE (β)	β	SE (β)
Cohabitation Dissolution[a]	0.40**	0.13	0.39*	0.16					0.48*	0.2	1.22**	0.39	2.15*	1.00
Cohabitation Stable[b]	0	0.13	-0.01	0.14										
Marital Dissolution[d]					0.51*	0.23	0.53+	0.28	0.97***	0.2	1.49***	0.33	2.48*	1.01
Marital Stable[d]					0	0.23	-0.07	0.27						
Fathers' Employment Status			0.38+	0.2			0.01	0.42			0.21	0.39	0.18	0.40
Father Currently in School			0.05	0.22			-0.27	0.33			-1.28**	0.42	-1.26**	0..42
Father Completed Education			0.05	0.25			0.14	0.48			0.61	0.52	0.64	0.52
Total Children			-0.04	0.08			0.04	0.14			0.05	0.16	0.05	0.16
Perceived Social Support			-0.08	0.06			0	0.12			-0.33**	0.11	-0.33**	0.11
Religious Involvement			-0.06	0.06			0.07	0.13			0.03	0.12	0.03	0.12
Any Child Support Given											-0.73*	0.66	-0.67*	0.67
Any In-Kind Support Given											0.67	0.50	0.72	0.51
New Partner at Final Wave											-1.37***	0.37	-1.31***	0..37
Days Father Saw Child											0.02	0.02	0.01	0.02
Relationship Quality													-0.22	0.55
Father Involvement													-0.13	0.14
Constant	0.53***	0.06	0.71*	0.34	0.48***	0.12	0.27	0.81	0.50***	0.1	1.50+	0.87	1.55+	0.87
Observations	708		691		220		219		516		426		424	
Number of Fathers	354		353		110		110		258		257		255	
R² within	0.03		0.05		0.04		0.05		0.10		0.29		0.30	
R² between	0.04		0.04		0.02		0.03		0.00		0.09		0.11	

+$p<.10$.*$p<.05$.**$p<.01$. ***$p<.001$.