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Abortion and Distress: The Role of State-Level Restrictive Policies Regarding
Reproduction

by
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Abortion and Distress: The Role of State-Level Restrictive Laws Regarding
Reproduction

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University of Nebraska, 2012

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Does state legal context modify the association between abortion and distress among women in the United States? Adjusting for individual characteristics that could be associated with distress based on stress and stigma frameworks, I examine if state legal context modifies the association between abortion and distress using a nationally representative sample of American women ages 25-45. The use of state-level factors as a proxy for social context in this research has not been part of previous studies of the consequences of abortion. In order to appropriately examine the cross-level modifying effects of state level legal context on abortion status with depressive symptoms (measured on a CES-D scale), I used hierarchical linear modeling. I compare women who have had abortions to women who have had an unintended birth or an intended birth. According to the stress process theory, a lack of control should be associated with higher distress; therefore I use pregnancy intention and outcome as a proxy for reproductive control. The results indicate that women who have had an intended birth experience significantly less distress than women who have had an unintended birth or an abortion, regardless of state context. Contrary to what the stigma framework suggests, state legal context does not modify the association between abortion history and distress. State legal context does, however, modify the association between unintended pregnancy history and distress. In states with more restrictive laws the association between unintended birth history and distress is lower than in states with fewer restrictive laws. These results suggest that distress associated with pregnancy intention and outcome is only partly influenced by state contexts. The stigma associated with abortion is likely to be more national than state specific. Further research is necessary to more fully explain the association between pregnancy intention and outcome, distress, and social context.

Introduction

Is abortion associated with depressive symptoms among American women? Past research on the association between abortion and mental health provides inconsistent findings. Recent reviews of research on mental health following abortion have found that social and personal factors are related to mental health, but not the abortion procedure itself (Adler et al. 1990; American Psychological Association 2008; Major et al. 2000; Munk-Olsen et al. 2011; Steinberg and Finer 2010). Despite the empirical evidence of no association, reports continue to cite that women experience elevated mental distress or depression after experiencing an abortion (Coleman et al. 2009; Fergusson, Horwood, and Ridder 2006; Gordon 2002; Turell, Armsworth, and Gaa 1990).

Abortion has been legal until a fetus is viable in the United States since 1973, but restrictions on access to services have been implemented within the majority of states through state policies (Boonstra et al. 2006). These state policies are legal as long as they do not “create an undue burden” for women (Ferree et al. 2002). Mandatory counseling, waiting periods, and parental consent laws are examples of restrictions. These restrictions on abortion services are likely to push women with unintended pregnancies to carry the pregnancy to term. Women who carry unintended pregnancies to term are at risk for more mental distress than women who have intended births (Barber, Axinn, and Thornton, 1999; Gipson, Koenig, and Hindin, 2008). A lack of access to abortion and contraceptive services limits women’s options to choose the outcome of an unintended pregnancy. Stress process theory suggests that this lack of autonomy can increase stress, which can in turn manifest in distress symptoms (Pearlin et al. 1981). Those women who persist and conclude their pregnancy through abortion are likely to feel more stigma in states with

more compared to fewer legal restrictions. Compared to an intended birth, the stress of an unintended birth when an abortion is preferable or the stigma of being a woman who has had an abortion in the United States could increase distress for women.

I take advantage of state variation in legal restrictions on abortion to assess if more restrictive state legal contexts create more stigma and less control, and therefore lead to more distress from abortion compared to less restrictive legal contexts. State-level factors have not been part of previous studies of the consequences of abortion compared to unintended birth and intended birth. Prior research has included only individual-level factors such as social support, personal religiosity, coping strategies, and experience of harassment (Cozzarelli 1993; Cozzarelli et al. 2000; Major et al. 1990; Munk et al. 2011; Turell, Armsworth, and Gaa 1990).

My goal is to expand current understanding of the impact of social context on the experience of abortion. In addition, I hope to expand thinking about the meaning of abortion in relation to the alternative – an unintended birth. I therefore use two comparison groups of women: those who have had an intended birth and those who have had an unintended birth. I know of no prior research to include both comparisons groups. I use state restrictive reproductive policies as a proxy for the general attitude toward abortion and the women who have them, as well as actual restrictions to reproduction-related resources. I use the National Survey of Fertility Barriers (NSFB), a nationally representative sample of American women ages 25-45 for the analysis.

There is considerable variation in the number of restrictive policies per state; I would like to discover if women in states with more policies experience higher levels of distress than women in states with fewer policies, controlling for individual

characteristics. There are two possible theories that shape my analysis. The stress of seeking an abortion in a state that has many restrictions may constrain women with unintended pregnancies in their choice to see the pregnancy to term or obtain an abortion, contributing to their distress (Pearlin et al. 1981). Those women who have had abortions in states with more restrictive policies could therefore be less distressed than women who have unintended births because they were able to resolve their pregnancy as they chose despite barriers to services. Second, the more restrictive policies a state has in place, the greater the feeling of stigma for women who want to obtain an abortion, again constraining their freedom of choice on the outcome of their pregnancy and possibly leading to higher distress (Turner and Lloyd 1999). Therefore I advance knowledge of the experience of abortion and unintended birth in the US by combining measures of the social legal contexts and individual level characteristics in a single model.

Pregnancy Intention Concepts

Pregnancies are typically categorized as intended, unplanned, mistimed, unwanted, or unintended. Intended pregnancies occur when women are consciously trying to get pregnant at the time of conception (Barber, Axinn, and Thornton 1999). Unplanned pregnancies occur in the case of contraceptive failure or nonuse of a contraceptive when women did not wish to become pregnant. Mistimed pregnancies occur earlier than women wanted (Barber, Axinn, and Thornton 1999; Santelli et al. 2003; Wildsmith, Guzzo, and Hayford 2010). Unwanted pregnancies occur when no children or no more children are desired at the time of conception (Santelli et al. 2003). Unintended pregnancies can be either unwanted or mistimed. Ideally, unwanted

pregnancies would be separated from mistimed pregnancies because they “frequently reflect distinct concerns at different points in a woman’s life”, with more negative outcomes for unwanted pregnancies. Many surveys, including the NSFB data for this project, do not provide measures that could be used to make these distinctions in analyses (Barber, Axinn, and Thornton 1999; Santelli et al. 2003; Wildsmith, Guzzo, and Hayford 2010).

Previous Research on Abortion and Distress

Many studies that find a direct relationship between abortion and negative mental health outcomes have methodological flaws; therefore it is unclear if there is an association between abortion status and distress. These flaws include the lack of comparison groups, disregard for compounding social and personal factors such as economic hardship or previous mental health history, and nonprobability sampling procedures using small samples with little to no reporting on the procedures (for a summary see American Psychological Association 2008). Most research on abortion and mental health outcomes uses convenience samples of women who are seeking abortion services (Cohan, Dunkel-Schetter, and Lydon 1993; Williams 2001). These samples cannot be generalized to women of reproductive age in the United States.

In contrast to the idea that abortion leads to distress, Major et al. (2000) found that the most common response to abortion among women was relief and willingness to do it again. Even two years after their abortion, Major et. al. (2000) found that the majority of women were satisfied with their decision to abort their pregnancy. Despite slight increases in negative emotions over time, eighty percent of the women (308 women out

of 386) were not clinically depressed at the end of the study (Major et al. 2000).

Unfortunately, the study conducted by Major et al. (2000) did not include a reference group, so we are unable to know if this rate is consistent with women from the community who did not receive abortion services.

Previous research on abortion and mental health neglected to include social context in their examination. By investigating state policies, I intend to assess if state context makes a difference on distress for women who have had abortions. There are two potential reasons state restrictive policies should modify the association between pregnancy intention/outcome abortion or unintended birth and mental health: stigmatization and stress amplification.

Theoretical Frameworks

Stigma

Stigmatization consists of women's loss of status within society, including labeling, discrimination or separation based on their status as women who have received an abortion (Goffman 1963; Link and Phelan 2001). Even though abortion is a medical right protected by law for all women in the United States, because of anti-abortion efforts such as picketing or violence against abortion providers and legal restrictions many women feel negatively judged for having had an abortion (Cozzarelli et al. 2000; Major and Gramzow 1999). Women who have had abortions could feel that they are stigmatized even without direct contact with community members acknowledging their loss of status. The knowledge that they live in a community that places restrictive policies on their behavior could lead women who experience abortion to feel that people would disrespect

them for their choice, causing the women to consciously avoid disclosure and even suppress thoughts of the experience for themselves (Major and Gramzow 1999). Lewis et al. (2006) refer to this expectation of prejudice in a stigmatized group as stigma consciousness. Researchers have documented differing degrees of depressive symptoms among women who have had abortions and encountered anti-abortion protestors (Cozzarelli et al. 2000), but little has been done to investigate stigma consciousness without observed negative interactions. Stigma consciousness can lead to negative mental health outcomes, regardless of experiences of overt discrimination (Lewis et al. 2006).

Cook and Dickens (2003) explain that laws, especially those pertaining to families, can be seen as indicators of shared cultural values in a community. The restrictive policies implemented within states could be viewed as indicators of shared cultural value toward abortion itself and the women who receive them by extension (Flavin 2009). Women may feel more mental distress following an abortion as they recognize that they violate public attitudes and actions that are against abortion.

State restrictive policies regarding abortion within the United States reflect community values that oppose access to abortion services for women and stigmatize the women who experience abortions in that state. Even if women who have experienced an abortion have not been met with overt discrimination, their stigma consciousness could impact their distress. Therefore, if having an abortion leads a woman to feel stigmatized and stigma leads to negative mental health outcomes, then women who have had an abortion in a state with more restrictive policies will be more likely to exhibit depressive symptoms than one in a state with fewer policies.

Stress

Each restrictive policy within a state adds another barrier to services for women seeking abortion. For example, several states have implemented mandatory waiting periods for women seeking abortion services. This causes stress not associated with the procedure itself, especially if a woman must travel a substantial distance to reach a service provider. In 1992, twenty-four percent of women who experienced an abortion traveled 50 or more miles to reach a non-hospital facility that provided abortion services (Henshaw 1995). If any of those women went to a facility within a state with mandatory waiting periods, they may have to make the commute more than once, adding financial as well as emotional stress. In 2008, only 13% of American counties had facilities that offered abortion services, covering 65% of women of reproductive age (Jones and Kooistra 2011). Once they have found an abortion provider, women face additional stressors associated with state restrictive abortion policies.

Women may experience stress related to their abortion in part due to the coercive actions of providers (Turell, Armsworth, and Gaa 1990). State restrictive policies include mandatory counseling that may or may not inaccurately represent the extent of negative physical and psychological consequences of abortion. Policies requiring mandatory involvement of parents of patients seeking abortion services under the age of 18 existed in 34 states in 2006 (Boonstra et al. 2006). Both of these policies may have a coercive effect on women that impact their mental health after experiencing an abortion, as their self-efficacy is reduced. Feeling like they have no sense of control increases stress for women, which could contribute to distress (Pearlin 1981; Turner and Lloyd 1999).

Social context has not been included in research regarding abortion compared to intended/unintended birth and mental health. If women are discouraged from obtaining

abortions by restrictive policies, they may experience more distress following the birth from an unintended pregnancy. Restrictive laws not only discourage women, but can also be used to prevent women from receiving an abortion that is her legal right. Making two trips to a provider due to a waiting period of over 18 hours (required in 23 states in 2006) may be impossible for women who need to attend their job or school, is incarcerated, is poor, or lives miles away from an abortion provider (Flavin 2009). Women's ability to choose the outcome of their pregnancy is then lost; feelings of powerlessness and stress are determinants of distress and depression for women (Barber, Axinn, and Thornton 1999; Nolen-Hoeksema 2001).

Women who have unintended births experience negative mental health outcomes in the forms of lower life satisfaction and more depressive symptoms than the general population of women in the United States (Gipson, Koenig, and Hindin 2008; Barber, Axinn, and Thornton 1999). There are possible individual reasons for these associations. Higher levels of education, employment status, and higher levels of income are all correlated with higher levels of life satisfaction and happiness (Barber, Axinn, and Thornton 1999; Frey and Stutzer 2001; Greene and Yoon 2004; Shields, Price, and Wooden 2009). Women who have unintended births are more likely to have low levels of education, possibly because women who are more highly educated more frequently choose to end their pregnancy through an abortion (Musick 2002; Williams 1991). This could explain a selection effect for women who have unintended births; they are more distressed because they possess characteristics that contribute to higher rates of distress.

The Present Study

Based on literature regarding stigmatization, stress, and state context, I have created the following hypotheses that will be tested in this study:

1. The association between abortion status and distress will vary between states.
2. There is a direct association between abortion status and distress; women who have had an abortion will have higher distress than women who have had intended pregnancies.
3. Guided by stigma frameworks, adjusting for state legal context should explain (eliminate) the association between abortion status and distress.
4. There will be a stronger association between abortion and depressive symptoms among women in states with more restrictive policies than among women in states with less restrictive policies regarding abortion.

Data and Sample

National Survey of Fertility Barriers (NSFB)

I use data from the first wave of the National Survey of Fertility Barriers (NSFB). This data set is a nationally representative telephone survey of women aged 24-45 and a subset of their partners. It was conducted between September 2004 and December 2007. The survey was completed with a probability sample of 4,787 women and 932 of their partners. I will use a subsample consisting only of women who have been pregnant and have never experienced a stillbirth or miscarriage. The study design included oversamples of high minority census tracts, women without children, and women with infertility; therefore I include design weights in my analysis. The survey included a “planned missing” design to maximize the number of concepts and still keep the overall

time of the survey reasonable. Planned missing values are handled by taking the mean of the available items to create scales. Any additional missing values are deleted using listwise deletion prior to the analysis ($n = 107$). Women who have experienced a stillbirth or miscarriage have significantly higher scores on depression scales than women who have not experienced the unintentional termination of a pregnancy (Thapar and Thapar 1992). This would suggest that there is a difference in experience and factors for depressive symptoms that are beyond the scope of this research. After removing women who have never been pregnant, who have experienced a miscarriage or stillbirth, or did not respond to all of the variables included in the models in my research, the analytical sample has 3,047 women between the ages of 25 and 45.

State-level data was provided by the Guttmacher Institute (Boonstra 2006). Each state has between zero and seven restrictive policies regarding abortion that the Guttmacher Institute compiled. These values were assigned to each state code, which was in turn merged with each individual respondent using their state code. In this way, individual respondents were aggregated into groups based on their state of residence.

Measurement

Distress

Distress was measured using the ten items from the Center for Epidemiological Studies Depression Scale (CES-D) that had the least gender bias (Radloff 1977).

Respondents were prepped with the statement, “Now we have some questions about how you're feeling about life these days. I am going to list some of the ways you may have felt or behaved in the last two weeks. Please indicate whether you feel this way (1) rarely or

never, (2) some of the time, (3) quite a bit of the time, or (4) all the time.” Questions were adapted from the Center for Epidemiological Studies Depression Scale (CES-D) and included “I was bothered by things that usually don't bother me,” “I had trouble keeping my mind on what I was doing,” “I felt depressed,” “I felt that everything I did was an effort,” “I felt fearful,” and “My sleep was restless” (Radloff 1977). Two of the items (“I was happy” and “I felt hopeful about the future”) were reverse coded. In the analysis, I use the mean of these ten items, giving respondents a score between 1 and 4 ($\alpha=0.795$). This score was then logged in order to account for skewness of the distress scores. The unlogged CES-D measure had a skewness of 1.123; logged CES-D has a skewness of only 0.358. The appendix contains final model results that were found using an untransformed CES-D scale; significant findings were the same between the models regardless of dependent variable transformation.

Pregnancy Intention and Outcome

Abortion experience is created from one question, “Did the pregnancy end in a live birth, a still birth, a miscarriage, or an abortion?” for each pregnancy (up to 10 pregnancies were recorded) with the options “(1) Live birth, (2) Still birth, (3) Miscarriage, (4) Abortion, (5) still currently pregnant, (6) twins, (7) three or more, (8) other, (88) don't know, (99) refused to answer”. A new variable was created to indicate only women who had been pregnant and had an abortion (score of 1). Those who responded with (4) abortion for any of the 10 pregnancies is included in this variable and not included in the variable below for women with unintended births. It is important to keep in mind that social desirability may cause women to under-report experiences of

abortion, decreasing the mean of the abortion variable and possibly biasing the effect of abortion on mental health due to measurement error.

Unintended birth is constructed from two questions about pregnancy outcomes and intention on the NSFB. For each of up to 10 pregnancies, respondents were asked “Did the pregnancy end in a live birth, a still birth, a miscarriage, or an abortion?” with the options “(1) Live birth, (2) Still birth, (3) Miscarriage, (4) Abortion, (5) still currently pregnant, (6) twins, (7) three or more, (8) other, (88) don’t know, (99) refused to answer”. Respondents were included in the sample if they indicated a live birth with options 1, 6 or 7. From there, the sample was split into two groups, those who had an unintended birth (coded 1) and those who had a live birth that was not unintended (coded 0). The question read “When you got pregnant this time, were you trying to get pregnant, trying not to get pregnant, or were you okay either way?” with options “(1) Trying to get pregnant, (2) Trying not to get pregnant, (3) Okay either way, (4) it just happened, (8) don’t know, and (9) refused.” Respondents were given a value of 1 if they answered with option 2 (trying not to get pregnant) and 0 if they responded trying to, okay, it just happened, don’t know, or refused. Time order poses an issue in the analysis. I do not include the time of the woman’s abortion or unintended birth (whether it was yesterday or 30 years ago), restricting me from making causal statements regarding pregnancy experience and distress.

State Legal Context

State legal context indicates the intensity of the prohibitive policies of a state for a woman to receive an abortion. Abortion is legal in the United States, but states may create their own policies that make it more difficult for women to access abortion

providers and for medical professionals to perform abortions. I constructed a legal restrictiveness scale by summing the presence of each of the following items: requires a licensed physician to perform the abortion procedure; public funding of abortion is only covered in cases of rape, incest, or maternal endangerment; individual doctors can refuse to perform abortion; institutions can refuse to perform abortion; mandatory waiting period of at least 18 hours; requires mandatory counseling; and parental involvement: both notice and consent for service (Boonstra 2006). The laws concerning parental involvement may not currently apply to women in the sample (ages 25-45), they could have applied at the time that the women had the abortion and they indicate attitudes toward access to abortion and women's reproductive autonomy. Each item was coded with a 0 if the state did not have the restrictive policy and a 1 if it did. The scale ranges from 0 to 7 ($\alpha=0.777$). States with a lower score possess fewer barriers and thus less hostile climates towards abortion than states with higher scores.

An identifying variable *state residence* is used to group women based on the state they resided in when given the survey. *State residence* is then linked to *state legal context* during the analyses in order to determine if women in states with differing scores in *state legal context* experience differing associations between *pregnancy intention and outcome* and *distress*, according to methods described by Raudenbush and Bryk (2002).

Individual Characteristics

The next set of variables measures characteristics associated with distress and the likelihood of having an abortion in prior research. The first set of measures contains personal characteristics. *Age* is limited to 25 to 45 years old by the survey. *Race/ethnicity* is determined by respondent's responses to the question "What race do you consider

yourself to be?” It has been transformed into 7 indicator variables: White, Black, Hispanic, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, or other race. Those who selected more than one race are placed in the group that they selected following the order specified above. *Relationship status* is captured in six indicator variables: married, widowed, separated, divorced, cohabiting, in a lesbian partnership, and never married. *Previous mental health problem* is an indicator variable based on the question “Have you ever had mental health problems or a psychological illness?” This is controlled for because across all methods and samples, a previous history of depression or other mental illness is the only consistent predictor of mental health problems following abortion (Major et al. 2000; Steinberg and Finer 2010; Munk-Olsen et al. 2011). *Religiosity* is measured with a scale constructed by taking the means of 4 questions: 1) “How often do you attend religious services,” 2) “About how often do you pray,” 3) “How close do you feel to God most of the time,” and 4) “In general, how much would you say your religious beliefs influence your daily life?” The response categories differ, thus the values were standardized before the scale was created by averaging values to the items ($\alpha=0.758$). The variable was created so that higher scores indicate more personal dedication to religion. *Importance of parenthood* is created by averaging the responses for 5 questions ($\alpha=0.877$). Four items have a Likert response scale ranging from strongly agree to strongly disagree. They read “Having children is important to my feeling complete as a woman,” “I always thought I’d be a parent,” “I think my life will be or is more fulfilling with children,” and “It is important for me to have children.” The fifth question reads “How important is each of the following in your life...raising

children?” The responses to the fifth question are in a scale from very important to not important.

Socioeconomic characteristics are captured in three measures. *Years of education* ranges from “(0) no schooling” to “(22) 6 years of grad school”, including earning a GED as 12 years of education. The question reads, “how many years of schooling have you completed?” It has been group mean-centered. *Economic hardship* is a scale ranging from values 1 to 4 with a lower score signifying less economic hardship ($\alpha=0.789$). It is constructed from the means of three items: “During the last 12 months, how often did it happen that you had trouble paying the bills?,” “During the last 12 months, how often did it happen that you did not have enough money to buy food, clothes, or other things your household needed?” and “During the last 12 months, how often did it happen that you did not have enough money to pay for medical care?”. Response choices were (1) Never (2) Not very often (3) Fairly often (4) Very often (8) Don’t know (9) Refused. Respondents who said that they did not know or refused to all of the items were dropped from the analysis. *Employment status* is captured in 4 indicator variables, full time employment, part time employment, unemployed, and those who are otherwise employed, either retired, in school, keeping house or disabled.

Analytic Strategy

I use Hierarchical Linear Model (HLM) 6.0 software for statistical analysis. Individual women are aggregated into groups based on a shared state of residence. Women within each state has the same value for their state residence variable; hierarchical linear modeling provides a way to account for the interdependence of women

within states as well as correlated error structures that would violate the assumptions of OLS (Luke 2004). My primary goal is to appropriately assess if women's distress scores differ by pregnancy outcome history. I also want to know if the association between pregnancy outcome and distress depends upon the number of state laws restricting abortion. The cross-level effects for state context and individual women's pregnancy intention and outcome are modeled effectively using hierarchical linear modeling, one of the reasons for its use in this research (Luke 2004; Raudenbush and Bryk 2002).

The first model is unconditional (containing no individual or contextual predictors), and was run in order to assess the intraclass correlation coefficient (ICC). A high ICC gives support for another one of the reasons for the use of hierarchical linear models, empirical evidence (Luke 2004). I use the ICC to answer the question in Hypothesis 1 - does distress differ significantly between states? Model 2 includes pregnancy intention and outcome, unadjusted and without state-level factors in order to test Hypothesis 2 - is there a difference in distress simply because of the outcome of a pregnancy? I use Model 3 to answer the question - do women's levels of distress differ depending on the intention and outcome of their pregnancy - adjusted for other individual characteristics? Model 3 includes all individual characteristics in order to assess if the association between pregnancy intent/outcome and distress is spurious. As described in the literature review, because women are not randomly assigned to pregnancy intention/outcome categories, it is important to assess selection effects. The fourth model includes cross-level interactions that address the primary focus of this research. Including the number of laws restricting abortion in a state provides a way to

assess if the relationship between women's pregnancy intention and outcome and distress depends upon state context. Model 4 provides results to Hypotheses 3, 4, and 5.

Following conventions in multilevel modeling research, I provide a mixed model equation for Model 4, the interaction model. Error terms for the intercepts (U_{0j}) and level-1 (pregnancy intention and outcome) allow me to report on the variance at the individual and state levels.

$$\begin{aligned} \text{LogCESD}_{ij} = & \gamma_{00} + \gamma_{01} * (\text{State Context}_j) + \gamma_{10} * (\text{Abortion}_{ij}) + \\ & \gamma_{11} * (\text{State Context}_j * \text{Abortion}_{ij}) + \gamma_{20} * (\text{Unintended Birth}_{ij}) + \\ & \gamma_{21} * (\text{State Context}_j * \text{Unintended Birth}_{ij}) + \\ & \gamma_{30-230} * (\text{Individual Characteristics}_{ij}) + U_{0j} + U_{1j} + U_{2j} + e_{ij} \end{aligned}$$

Results

Descriptive Results

Table 1a presents descriptive statistics for continuous individual level variables. I detail differences using one-way analysis of variance (ANOVA). Consistent with my expectations, women who have an abortion have mean distress that is significantly higher than those of women who have intended births. The average distress for women who have had an unintended birth is also significantly different than that of women who have had an intended birth. Women who have had an abortion, however, do not have significantly different distress than women who have had an unintended birth. The mean ages of women in the survey tell a similar story; the mean age for women who have had an abortion are significantly higher than that of women who have had intended births but not significantly different than the mean age of women who have had an unintended

birth. Because religiosity is measured using standardized scores, “0” indicates average religiosity. Therefore positive scores indicate higher than average and negative scores indicate lower than average religiosity. Religiosity scores are highest among women who have had an unintended birth and lowest among women who have had an abortion. All three groups are significantly different than the others ($p < .05$). Women who have had an unintended birth have higher importance of motherhood scores than women who have had an abortion or an intended birth. Women who have had an abortion or an intended birth have similar and higher average education than women who have had an unintended birth. Women who have had an unintended birth have more economic hardship than women who have had an abortion or an intended birth, and women who have had an abortion have higher economic hardship than women who have had an intended birth. These results indicate that women who have had abortions differ from women who have had intended births on all of these variables, but are similar to women who have had unintended births on all characteristics but religiosity and economic hardship.

There are also several categorical individual characteristics that could explain the difference in distress by abortion status. I use chi-square tests to assess the associations between categorical variables and pregnancy intention and outcome status. A higher percentage of White women have had an intended birth than women in other race/ethnicity groups; a lower percentage of Black women have had an intended birth than any other group. A higher percentage of Black women have an unintended birth, and women within the other race category have the lowest percentage of unintended birth compared to other race/ethnicity groups. Hispanic women have the lowest percentage of abortion, but the percentage of Black women who report an abortion is two times that of

Hispanic women. A higher percentage of women who are in a lesbian partnership have an intended birth compared to the other relationship statuses; they also have the lowest percentage of unintended birth. Women who are separated from their partners have the highest percentage of unintended birth. Widowed women report the highest percentage of abortion compared to any other group of women based on relationship status, and women in lesbian partnerships have the second highest percentage. The lowest percentage of abortion is found among cohabiting women. Full time employees have the highest percentage of intended births and second highest percentage for women who have had an abortion. Women who are in the Employed Other category (or “otherwise employed”), which includes retirement, disability, in school, or keeping house, have the highest percentage for an unintended birth and lowest percentage for abortion. The proportion of women who are unemployed and have had an abortion is two times the proportion of women who are otherwise employed and had an abortion. There is a higher percentage of women who have had an abortion or unintended birth who have also reported a previous mental health problem than women with no reported problem. Women without a previous mental health problem have a higher percentage of intended birth than women with a reported previous mental health problem. The trends described above are consistent with previous research on the demographic characteristics of women in different pregnancy intention categories (Musick 2002; Williams, 1991).

Multilevel Regression Results

Hypothesis 1: The association between abortion status and distress will vary between states.

As is customary with MLM analysis, I first assessed the proportion of variance in distress within and between states. Table 2a summarizes the variance components for the three models in table 2b. The proportion of total variance that occurs between states, the ICC, is $(.004)/(.004+.074) = 0.051$, or 5.1% (Luke 2004). Although only a small percentage of the variance in distress scores is between states, the variance is significant. Model 1 in tables 2a and 2b summarizes the association between abortion status and distress. Consistent with hypothesis 1, the variance component for the coefficient for abortion is significant. The association between abortion status and distress is stronger in some states than other states. Therefore we should further examine state context for abortion. This model also shows that the average distress is .47 for women in the forty-eight contiguous states who have had an intended birth (the comparison group). The scale ranges from 0.00-1.36. The coefficient for women who have had an abortion is .11 higher. I calculated the plausible value range using the variance components and found that this value ranges from -.086 to .306, indicating a substantial range of values between states. Model 1 also shows that the coefficients for having had an abortion or an unintended birth are similar, and a test of the difference in coefficients shows that they are not significantly different from each other. In this baseline unadjusted model, women who have had abortions have higher average distress compared to women who have had intended births, but not compared to women who have had unintended births. Next I assess if this association persists when I adjust for characteristics associated with both abortion status and distress.

Model 2 in Table 2 illustrates those women who have had an abortion *or* an unintended birth have, on average, significantly higher distress than women who have

had an intended birth. Thus, the experience of an abortion does not explain the gap in distress for women within states. This finding is similar to results from the ANOVA in Table 1a, in which I found that the distress for women who have had an abortion is not significantly different than the distress for women who have had an unintended birth. Women who have had an abortion have average distress that is 11% higher than women who have had an intended birth; the average for women who have had an unintended birth is 8% higher than the average for women with an intended birth. The estimate for the variance of the slope for abortion is .01, and it is statistically significant ($p < 0.001$), indicating that the association between abortion status and distress differs between states. The same is true for women who have an unintended birth, but the variance is very small (.0003). On average, women who have abortions experience more distress than women who have had intended births but they do not differ from women who have had unintended births.

Hypothesis 2: There is a direct association between abortion status and distress; women who have had an abortion will have higher distress than women who have had intended pregnancies.

The average distress score for women who have had an abortion has been cut in half when individual characteristics are added into the analyses (Model 2 in Table 2b); the individual characteristics have narrowed the gap in distress between women who have had an abortion and those who have had an intended birth. The significance of the association between distress and abortion persists, even when we test for spurious explanations in Model 2. There is not a direct association between abortion status and distress, as individual characteristics account for some of the relationship.

We can then see that certain characteristics are significantly associated with the levels of distress for women. Mental health status is significantly associated with distress, consistent with previous research. Women who are divorced, widowed, separated, or cohabiting have higher levels of distress than women who are heterosexually married. Women who are in a lesbian partnership have 25% less distress than women who are in a heterosexual marriage. Women with prior mental health problems have on average 13% higher distress scores than women with no prior mental health problems. Higher economic hardship is also associated with higher distress scores. For each additional year in education, above the average, distress decreases by 1%. Women who are retired, disabled, in school, or retired (Otherwise Employed) have significantly higher levels of distress on average.

Hypothesis 3: Guided by stigma frameworks, adjusting for state legal context should explain (eliminate) the association between abortion status and distress.

Because number of abortion laws is grand mean centered, the intercept in Model 4 is the average distress for women who have had intended births, have a value of zero on all of the control variables, and live in states with the average number of laws. In this model the coefficient for abortion status is the same as the model without state legal context. Therefore state legal context does not explain the association between abortion status and distress. Interestingly, the average distress for women who have an unintended birth increased when state legal context is taken into consideration. Without contextual factors, women who have had an unintended birth have a 5% increase in distress

compared to women with an intended birth. After adding in state legal context, the increase is 6%.

Hypothesis 4: There will be a stronger association between abortion and depressive symptoms among women in states with more restrictive policies than among women in states with less restrictive policies regarding abortion.

Contrary to expectations, state restrictive policies do not significantly modify the relationship between abortion and distress, as can be seen in Model 4 in Table 2b. The relationship between having an unintended birth and distress is modified by state legal context, however. As figure 1 illustrates, in states with more restrictive policies regarding abortion, the negative effect of an unintended birth on distress decreases. For each additional law, the gap between distress scores for women who have had an unintended birth compared to an intended birth narrows by approximately 2%. The pattern is very similar for women who have had abortions, but the p-value does not reach the conventional .05 level.

Discussion

I hypothesized that women who have had abortions in states with more legal restrictions would have higher distress because of stigma, or that they would have higher distress due to the stress of overcoming barriers to obtain an abortion. Contrary to my hypothesis, state legal context does not modify the association between abortion and distress. Therefore the association between abortion status and distress is partially accounted for by individual characteristics but is not significantly modified by the state legal context. The findings for unintended births suggest that state legal context do

influence the association between unintended birth and distress. As the presumable alternative to an abortion, this is interesting.

Women who have had an abortion or an unintended birth are similar in distress and age. Consistent with prior research, they differ in years of education and economic hardship; women who have an abortion are more educated and have better financial situations than women who have an unintended birth (Musick 2002; Williams, 1991). State legal context only modifies the association between unintended pregnancy and distress, not abortion status and distress. It is possible that state context does matter, but that the particular measure (number of legal restrictions) is an insufficient measure. The context may be misspecified in this preliminary exploration of state-level factors modifying the relationship between individual women's mental health outcomes and their pregnancy intention and outcomes.

I hypothesized that having an abortion would be more stressful in states that put more restrictions on accessing abortion services; this stress would be reflected in elevated distress in women compared to those who have abortions in states with fewer restrictions. Teachman and Crowder (2002) suggest that contextual factors in multilevel models would be "ideally defined...by the set of social contexts with which the individual interacts on a regular basis" (p. 281). Women who have not attempted to access these services may not be aware of the restrictiveness of their state compared to others. The feeling of stigmatization following an abortion may be based on media images that are accessible nationwide, but may come to women's awareness frequently through television or the internet. Laws may at times be used as indicators of shared cultural values in family research, but in this case the culture may not rely on those with whom

women come into physical contact with (Cook and Dickens 2003). A specific measure for perceived stigma would be helpful for future research.

The variance component for between state variation (Table 2a) does not change substantively when state context is added. Therefore, state context may not explain between state variation due to the operationalization of state context as lack of access to abortion services. Another plausible explanation for the lack of substantial variation explained by state context could be that the distress experienced by women who have an unintended birth or abortion is not caused by stress represented by restrictive policies but the stigma of these experiences that is prevalent at a national level.

Scope Limitations

Pregnancies that end in abortion are assumed to be unintended, though recent research has found that up to 8 percent of aborted pregnancies were intended (Finer and Henshaw 2006). This finding raises important questions about the meaning of the term “intended”, but those questions are beyond the scope of this project. In the current study respondents were asked about pregnancy outcomes and were asked their current state of residence. It is likely, however, that some of the women have had abortions in states different from where they live now. The rate of interstate mobility in the United States was between 2% and 5% in the years between 2004 and 2009 (Ihrke, Faber, and Koerber 2011); it is probably more likely that women received an abortion outside of the state of residence indicated in the NSFB because they sought abortion services in nonresident states. It is unknown if women experienced depressive symptoms prior to their pregnancy

experience, or if they recently developed depressive symptoms even though their pregnancy experience was not recent, preventing me from making causal inferences.

One major limitation to research on unintended pregnancies, including this paper, is the retrospective nature of the women's explanation of pregnancy intention. Researchers do not agree on the possible effects this may have. Santelli et al. (2003) claimed that impressions of intention become more positive over time as women receive positive affection from the baby or guilt over claiming a child was unwanted. Other research proposes that women may claim a pregnancy was unintended if the child does not live up to the woman's expectations (Gipson, Koenig, and Hindin, 2008). A review of the literature found that the measures of intendedness in most studies are not biased (Joyce, Kaestner, and Korenman, 2002). Unfortunately, the measurement of intendedness in the majority of surveys is limited to intended and unintended. Greater understanding would be gained if women were questioned further about their pregnancy intentions, or intentions were described as a range of feelings on a continuum (Gipson, Koenig, and Hindin 2008). Another drawback is the assumption of conscious decisions about pregnancy for every sexual experience for women. Research does not support this assumption (Santelli et al. 2003).

Because abortion is stigmatized in the United States, it is difficult to get accurate information on women's abortion histories (Lessler, Weeks, and O'Reily 1994). Concerns that women who have had an abortion will not report them because of fear of judgment make it more difficult to find an association between abortion experiences and subsequent life outcomes (Turell, Armsworth, and Gaa 1990). Women who have had an abortion likely feel it is not socially acceptable to admit to it, or honestly describe

positive or neutral feelings following the procedure due to political or moral issues (Adler et al. 1990).

Conclusion

Using state restrictive laws regarding reproduction and hierarchical linear modeling, I examined the relationship between abortion history and distress – comparing women who have had abortions to women who have had intended or unintended births. I began this paper focusing on state restrictive laws regarding abortion as state context, abortion experience, and distress; unintended and intended childbirth were comparison categories. I found the association between abortion and distress is not modified by state context. . There was an unexpected finding regarding women who have unintended births; the association between women who have had an unintended birth and distress is modified by the restrictive state contexts in a way opposite to my expectation.

Women who have had an unintended birth in states with more restrictive policies experience less distress than women who have had an unintended birth in states with fewer policies. This could still be explained with a stigma framework. Women in a social context that view abortion as a violation of social mores may feel affirmed in their choices while women who have had an abortion are stigmatized.

It is clear that further research is necessary to fully understand the mechanisms that create and modify the associations between pregnancy intention and outcome and distress. Distress is simply one individual-level outcome that may represent a fraction of a woman's well-being following a pregnancy or abortion. Further research should include more measures such as self-rated health, life satisfaction, or perceived happiness. My

analyses suggest that there are differences in contexts that impact women's distress; further research would include more state context measures to try to capture these differences and their meaning for women.

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Table 1a: Descriptive Statistics for Continuous Individual Variables in Analyses

	Intended Birth		Unintended Birth		Abortion	
	<i>n</i> =2139		<i>n</i> =555		<i>n</i> =353	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
CES-D						
(logged)	.46 ^a	.27	.55 ^b	.28	.53 ^b	.30
CES-D	1.64 ^a	.47	1.80 ^b	.52	1.78 ^b	.55
<i>Individual Characteristics</i>						
Age	34.44 ^a	6.03	35.12 ^b	5.97	36.05 ^b	5.94
Religiosity	-.09 ^a	.87	.13 ^b	.74	-.25 ^c	.96
Importance of Parenthood	3.12 ^a	.77	3.31 ^{a,b}	.61	3.04 ^b	.75
<i>Socioeconomic Characteristics</i>						
Years of Education	15.16 ^a	2.91	13.64 ^b	2.48	15.07 ^a	2.52
Economic Hardship	1.47 ^a	.69	1.79 ^b	.85	1.66 ^c	.82

Note: values with different letters differ significantly, using a Bonferroni post hoc test with $p < .05$.

Table 1b: Descriptive Statistics for Categorical Individual Variables in Analyses

	Intended Birth <i>n</i> =2139	Unintended Birth <i>n</i> =555	Abortion <i>n</i> =353	Row Total
	Percentage	Percentage	Percentage	
<i>Race/Ethnicity***</i>				
White	75.93	14.14	9.93	100.00
Black	53.60	27.91	18.49	100.00
Hispanic	67.28	23.52	9.20	100.00
Other Race	75.00	13.02	11.98	100.00
<i>Relationship Status***</i>				
Married	73.23	18.17	8.60	100.00
Divorced	57.54	23.51	18.95	100.00
Widowed	63.16	15.79	21.05	100.00
Separated	47.52	33.66	18.81	100.00
Never Married	70.38	14.40	15.22	100.00
Lesbian Partnership	80.00	0.00	20.00	100.00
Cohabiting	75.61	17.07	7.32	100.00
<i>Employment Status***</i>				
Employed Full Time	71.80	15.94	12.26	100.00
Employed Part Time	71.36	16.58	12.06	100.00
Unemployed	61.82	20.00	18.18	100.00
Employed Other	66.45	24.26	9.29	100.00
<i>Previous Mental Health ***</i>				
No Reported Problem	71.21	18.06	10.72	100.00
Reported Problem	64.27	19.10	16.63	100.00

Note: Other Race includes Asian, Native Hawaiian or Pacific Islander, American Indian or Alaska Native, and those who selected "other" on the survey. * $p < .05$ ** $p < .01$ *** $p < .001$

Table 2a : Variance Components from HLM Analyses

Random Effects	Model 1	Model 2	Model 3
Intercept	.00 *** (.06)	.00 *** (.04)	.00 *** (.04)
Abortion Slope	.01 *** (.11)	.01 ** (.09)	.01 ** (.08)
Unintended Birth Slope	.00 *** (.02)	.00 *** (.07)	.00 *** (.06)
Level-1	.07 (.27)	.06 (.25)	.06 (.25)

Note: This table shows variance components and standard deviations in parentheses.

* $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed tests)

Table 2b: Multilevel Linear Regression Model of Logged Distress on Pregnancy Intention and State Context: Abortion, Unintended Birth, and Intended Birth Compared

Fixed Effects	NSFB 2004-2007 (n=3,047)							
	Model 1		Model 2		Model 3		Model 4	
For Intercept (Comparison Group is Intended Live Birth)								
Average log CES-D in States with 0 restrictions	0.47 ***	(0.01)	0.42 ***	(0.01)	0.47 ***	(0.01)	0.42 ***	(0.01)
State Legal Context					0.00	(0.01)	0.00	(0.00)
For Abortion Slope								
Had an Abortion	0.11 ***	(0.03)	0.06 *	(0.03)	0.11 ***	(0.03)	0.06 *	(0.02)
X State Legal Context					-0.00	(0.02)	-0.02	(0.01)
For Unintended Slope								
Had an Unintended Birth	0.08 ***	(0.01)	0.05 **	(0.02)	0.08 ***	(0.01)	0.06 **	(0.02)
X State Legal Context					-0.01	(0.01)	-0.02 **	(0.01)
<i>Individual Characteristics</i>								
Age			0.00	(0.00)			0.00	(0.00)
Race/Ethnicity (Compared to White)								
Black			0.00	(0.02)			0.01	(0.02)
Hispanic			-0.02	(0.02)			-0.02	(0.02)
Other Race			0.01	(0.03)			0.01	(0.03)
Relationship Status (Compared to Heterosexually Married)								
Divorced			0.06 **	(0.02)			0.06 **	(0.02)
Widowed			0.15 *	(0.07)			0.14	(0.08)
Separated			0.10 *	(0.04)			0.10 *	(0.04)
Never Married			0.02	(0.01)			0.02	(0.02)
Lesbian Partnership			-0.25 **	(0.09)			-0.24 **	(0.09)
Cohabiting			0.13 ***	(0.03)			0.13 ***	(0.03)
Previous Mental Health Problem			0.14 ***	(0.02)			0.14 ***	(0.02)

Religiosity	-0.02	(0.01)	-0.02	(0.01)
Importance of Parenthood	0.00	(0.01)	0.00	(0.01)
<i>Socioeconomic Characteristics</i>				
Years of Education	-0.01 *	(0.00)	-0.01 *	(0.00)
Economic Hardship	0.09 ***	(0.01)	0.09 ***	(0.01)
Employment Status (Compared to Employed Full Time)				
Employed Part Time	0.00	(0.02)	0.01	(0.02)
Unemployed	0.07	(0.05)	0.07	(0.05)
Employed Other	0.05 ***	(0.01)	0.06 ***	(0.01)

Note: This table shows coefficients with standard errors in parentheses. Analyses run with full maximum likelihood. Age, Religiosity, Importance of Parenthood, Years of Education and Economic Hardship are group mean centered (Luke 2004). State Legal Context is a count of restrictive laws regarding reproduction provided by the Guttmacher Institute (Boonstra 2006).

*p<.05 **p<.01 ***p<.001 (two-tailed tests)

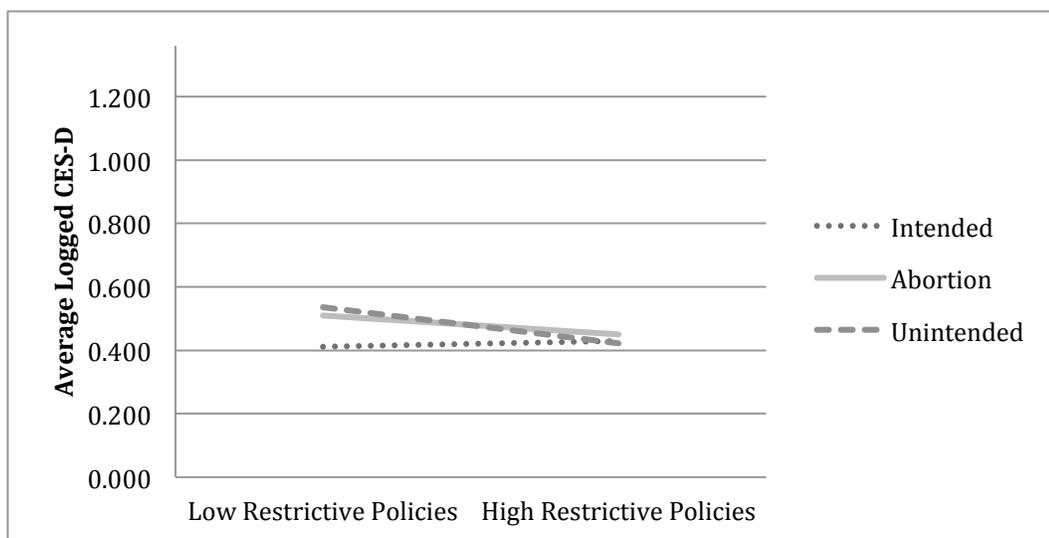


Figure 1: Average Logged CES-D by State Restrictive Policy Counts and Pregnancy Intention/Outcome

Appendix

Count of Women in States by Pregnancy Intention and Outcome

State	Intended Birth	Unintended Birth	Abortion	Total	State	Intended Birth	Unintended Birth	Abortion	Total
	<i>n=2139</i>	<i>n=555</i>	<i>n=353</i>			<i>n=2139</i>	<i>n=555</i>	<i>n=353</i>	
AL	37	13	4	54	NC	63	12	9	84
AR	15	9	0	24	ND	3	0	0	3
AZ	43	16	4	63	NE	14	8	1	23
CA	287	81	69	437	NH	8	0	1	9
CO	40	5	9	54	NJ	60	11	12	83
CT	23	2	3	28	NM	34	9	5	48
DC	18	2	5	25	NV	5	2	1	8
DE	4	2	0	6	NY	155	23	38	216
FL	85	13	19	117	OH	77	20	6	103
GA	71	26	9	106	OK	27	5	1	33
IA	18	3	6	27	OR	15	4	2	21
ID	8	1	0	9	PA	89	19	12	120
IL	69	18	19	106	RI	1	0	0	1
IN	28	7	4	39	SC	28	13	6	47
KS	15	2	1	18	SD	9	2	1	12
KY	30	11	1	42	TN	41	14	4	59
LA	41	20	2	63	TX	230	77	31	338
MA	32	1	5	38	UT	16	1	4	21
MD	60	12	18	90	VA	63	9	0	72
ME	8	0	3	11	VT	3	0	0	3
MI	51	25	18	94	WA	39	10	5	54
MN	51	8	2	61	WI	37	8	4	49
MO	44	12	5	61	WV	6	3	0	9
MS	30	13	4	47	WY	5	2	0	7
MT	3	1	0	4					

Multilevel Linear Regression Model of Distress on Pregnancy Intention and State Context: Abortion, Unintended Birth, and Intended Birth Compared

Fixed Effects	NSFB 2004-2007 (n=3,047)							
	Model 1		Model 2		Model 3		Model 4	
For Intercept (Comparison Group is Intended Live Birth)								
Average CES-D in States with 0 restrictions	1.67 ***	(0.02)	1.57 ***	(0.02)	1.67 ***	(0.02)	1.57 ***	(0.02)
State Legal Context					0.01	(0.01)	0.01	(0.01)
For Abortion Slope								
Had an Abortion	0.23 ***	(0.06)	0.12 *	(0.05)	0.22 ***	(0.06)	0.12 *	(0.05)
X State Legal Context					0.00	(0.04)	-0.02	(0.03)
For Unintended Slope								
Had an Unintended Birth	0.14 ***	(0.03)	0.10 **	(0.04)	0.15 ***	(0.03)	0.11 ***	(0.04)
X State Legal Context					-0.03	(0.01)	-0.05 ***	(0.02)
<i>Individual Characteristics</i>								
Age			0.00	(0.00)			0.00	(0.00)
Race/Ethnicity (Compared to White)								
Black			0.00	(0.04)			0.00	(0.04)
Hispanic			-0.04	(0.04)			-0.04	(0.04)
Other Race			0.00	(0.04)			0.00	(0.04)
Relationship Status (Compared to Heterosexually Married)								
Divorced			0.09 **	(0.04)			0.09 **	(0.04)
Widowed			0.31 *	(0.15)			0.29	(0.16)
Separated			0.19 *	(0.08)			0.19 *	(0.08)
Never Married			0.03	(0.03)			0.04	(0.03)
Lesbian Partnership			-0.39 **	(0.15)			-0.38 **	(0.15)
Cohabiting			0.24 ***	(0.07)			0.24 ***	(0.07)
Previous Mental Health Problem			0.27 ***	(0.04)			0.27 ***	(0.04)

Religiosity	-0.02	(0.02)	-0.03	(0.02)
Importance of Parenthood	0.00	(0.01)	0.00	(0.01)
<i>Socioeconomic Characteristics</i>				
Years of Education	-0.01 *	(0.00)	-0.01 **	(0.00)
Economic Hardship	0.18 ***	(0.02)	0.18 ***	(0.02)
Employment Status (Compared to Employed Full Time)				
Employed Part Time	0.00	(0.03)	0.00	(0.03)
Unemployed	0.13	(0.09)	0.13	(0.09)
Employed Other	0.11 ***	(0.02)	0.11 ***	(0.02)

Note: This table shows coefficients with standard errors in parentheses. Analyses run with full maximum likelihood. Age, Religiosity, Importance of Parenthood, Years of Education and Economic Hardship are group mean centered (Luke 2004). State Legal Context is a count of restrictive laws regarding reproduction provided by the Guttmacher Institute (Boonstra 2006).

*p<.05 **p<.01 ***p<.001 (two-tailed tests)