Material Hardship and Effective Contraceptive Use during the Transition to Adulthood

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March 7, 2019

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DRAFT – DO NOT CIRCULATE

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Abstract:
Decades of research have attempted to understand the paradox of stubbornly high unintended pregnancy rates and increasing access and efficacy of modern contraceptive methods. Much of this research has focused on the socioeconomic disparities of unintended pregnancies incidence, finding that disadvantaged women tend to use contraception less effectively. The following study builds upon this research to examine how material hardship, in particular, is associated with less consistent contraceptive use. Using the Relationship Dynamics and Social Life (RDSL) data, a longitudinal study, I find lower levels of contraceptive use and less consistent use of contraception among women experiencing material hardship, relative to those with none. I also investigate the extent to which this association is explained by access issues, cognitive burden, and lower behavioral control among women experiencing hardship. I find that these mediators do significantly explain the relationship between hardship and contraception, suggesting hardship creates mental and resource constraints that impede effective implementation of contraceptive plans. However, net of these mediators, material hardship remains associated with less effective contraceptive use among young women, indicating that women experiencing hardship are at greater risk of unintended pregnancies.

Introduction

Nearly half of pregnancies (45%) are unintended, but this rate increases significantly for low-income women (Finer and Zolna 2016). For women living below the poverty line, almost 65% of pregnancies are unintended, meaning that a far disproportionate number of these women and their children face the negative consequences of unintended pregnancy (Finer and Zolna 2016). Declines in rates of unintended pregnancies have been tied to increasingly effective forms of contraception and greater access through recent healthcare and Medicaid expansions, yet a striking number of socioeconomically disadvantaged women still find themselves pregnant without planning to (Gipson, Koenig, and Hindin 2008; Musick et al. 2009). Persistent high rates of unintended pregnancy suggest the existence of important barriers, whether structural or individual-level, to low-income women's use of contraception. Effective contraception is key to explaining unintended pregnancy, as most contraception requires some degree of *consistency* and *forward-planning* in order to successfully prevent pregnancy; but, research has found less effective contraception behaviors among disadvantaged women (Dehlendorf et al. 2010; Frost and Darroch 2008; Kost et al. 2008; Wu et al. 2008).

While economic disadvantage is most often conceived of as and measured by income level, scholars have more recently attempted to expand our understanding of poverty to focus on the insecurity, instability, and uncertainty that most directly affect people's daily lives. These researchers have begun to shift towards more directly incorporating the problem of insecurity into their measures by focusing on *material hardship*. Material hardship operationalizes the idea of poverty as "unmet needs," by measuring the extent to which families are unable to secure basic necessities like housing, utilities, food, and healthcare (Mayer and Jencks 1989). Widening the focus beyond income allows researchers to see how varying economic and family contexts

can result in similar constraints on daily life, even at different levels of absolute income. Research has shown an imperfect relationship between material hardship of this kind and basic income level, indicating that material hardship may represent an important but under-examined attribute of poverty (Iceland and Baurman 2007). Indeed, material hardship better captures the *lived* experience of poverty by capturing the ways in which people often have to forgo one necessity in order to pay for another (Citro and Micheal 1995; Heflin, Sandberg, and Rafail 2009; Mayer and Jencks 1989; Sen 1999).

Contraception is a particularly important outcome for examining the effects of material hardship, because it is a decision and action that must be made consistently over and over again, otherwise it will be ineffective. New research on scarcity mindset, cognitive burden, and self-efficacy finds that poverty can harm individuals' abilities to follow through on plans and evaluate long term risks, which are particularly important to behaviors like contraceptive use (England 2016; Mani et al. 2013; Shah, Mullainathan, and Shafir 2012). Mani and colleagues (2013) suggest that the gap between income and subjective needs, which leads to making trade-offs between expenses, reduces individuals' immediate cognitive capacity, harming rational decision-making and risk-evaluation abilities. This literature suggests that material hardships may lead to a scarcity mindset which causes women to focus on immediate necessities rather than long-term plans like contraception and avoiding pregnancy. However, most research on contraception focuses on either use at last intercourse or "usual" use (Jones, Mosher, and Daniels 2013; Martinez, Copen, and Abma 2011), which may miss how behaviors that change over time, like contraceptive use, are affected by instability associated with poverty. Contraceptive behaviors help us understand the ways in which poverty can make the daily requirements of ordinary life much more challenging.

Uniting this perspective on poverty as material hardship with measures of contraception that closely capture use and consistency of contraception, this article asks: *How does material hardship affect young women's contraceptive behaviors?* To answer this question, I use data from the Relationship Dynamics and Social Life (RDSL) study, which collected weekly information about young women's sexual activity and contraceptive behaviors for over two years. This unique dataset allows for the creation of weekly measures of contraceptive use, including method type and consistency, to capture the dynamic nature of contraceptive behaviors. I focus on young women, because contraception is particularly important at this life stage when unintended pregnancy can fundamentally change women's transitions into adulthood.

I find that, net of several other measures of socioeconomic status and income, experiencing material hardship is associated with *decreased use* of any contraception, reliance on *less effective methods*, and *less consistent use* of contraception across multiple consistency measures. I find that cognitive burden, behavioral control, and access to contraception all partially explain the association between hardship and lower contraceptive consistency. These findings lead to three main contributions from this study. First, my study suggests that material hardship plays an important role in shaping behaviors that require consistency and forward-planning. I find that material hardship is associated with lower contraceptive use and less consistent contraception, which exposes disadvantaged women to greater risk of unintended pregnancy. Second, I show how this relationship might operate through cognitive burden, suggesting that the challenges of material hardship make it more difficult for women to make and follow through on contraceptive plans. Finally, I extend prior work on determinants of contraceptive behaviors and the effects of material hardship to suggest that material hardship may be importantly related to contraceptive consistency because of the way hardship, beyond

poverty level, impacts women's abilities to engage in long-term planning. This study brings together the literatures of material hardship, cognitive burden, and determinants of contraception to suggest that hardship, via cognitive burden and access, may help explain lower contraceptive efficacy among disadvantaged women.

Background

Use of contraception has increased dramatically among U.S. women in the past several decades, and young women and adolescents have particularly increased their use of contraception (Finer and Zolna 2016; Kavanaugh and Jerman 2018). In addition, more and more women are using the most effective forms of contraception and contraceptive failures have declined (Kavanaugh and Jerman 2018; Sundaram et al. 2017). So, why do we see such high rates of unintended pregnancies when contraceptives are quite widely available, used more frequently, and increasingly effective? Scholars have pointed to inconsistency as a factor; despite fairly widespread contraceptive use, 40% of unintended pregnancies occur to women using contraception inconsistently or incorrectly (Sonfield, Hassted, and Gold 2014). Recent research has also tied inconsistent contraceptive use with socioeconomic disadvantage, finding that low-income and less-educated women are at greater risk for less effective birth control practices, which may to some extent explain higher rates of unintended pregnancy (Boonstra et al. 2006; Frost and Darroch 2007; Frost et al. 2008; Frost et al. 2007; England 2008).

At a basic level, consistent contraceptive use requires three main components: first, an intention to use contraception and/or avoid pregnancy, second, uninterrupted access to effective contraception methods, and finally, the ability to follow through on the intention to use contraception by using contraception during every sexual encounter (Ajzen 1991; Ajzen and

Klobas 2013; Suvivuo, Tossavainen, and Kontula 2009). While there is no existing research on the effects of material hardship on contraceptive use, theories on the effects of hardship and cognitive burden do suggest how access constraints and lower contraceptive behavioral control may be more common among women experiencing hardship. I outline these hypotheses in the subsequent sections. However, there is no clear mechanism from prior literature that would suggest how or why women experiencing utility shutoffs, eviction, or food insecurity might have different intentions or attitudes towards contraception. Therefore, I hypothesize that women experiencing hardship do not differ in their attitudes towards contraception and pregnancy from women not experiencing hardship. I show support for this hypothesis in supplementary analyses.

Figure 1 provides a conceptual model illustrating the relationships connecting material hardship to contraceptive behaviors through access and contraceptive behavioral control. This model and the literature discussed in the next sections lead to my primary hypothesis: *material hardship is associated with less effective contraceptive behaviors.*

Access to Contraception

Women's ability to consistently afford and obtain contraceptive methods offers perhaps the most direct connection between material hardship and contraceptive behaviors. Material hardship captures the consequences of lacking sufficient resources to cover all one's daily necessities. Therefore, individuals experiencing hardship are likely facing difficult choices on what they can go without, what they can afford, and what they absolutely need (Desmond 2012; Finnigan and Meagher 2019; Heflin and Butler 2013). Whether contraception is a want or a need may depend on the woman, the context of her life, and the other demands on her resources, but constraints to access ultimately can significantly impede a woman's decision to contracept.

While contraception costs are declining and the birth control pill is free for many women, there still exist considerable barriers to access of all forms of contraception. Low-income women are particularly likely to be uninsured (Dehlendorf et al. 2010), and there is a large unmet need for publicly-funded contraceptive services (Frost, Frohwirth, & Zolna 2014). A lack of insurance creates a significant barrier to receiving adequate healthcare, but, even among the insured, issues including transportation to the doctor, needing to take time off work to make an appointment, and continual trips to the pharmacy for prescription renewals can create significant barriers, especially for women already facing the overwhelming time and bureaucratic demands of living in poverty (Desmond 2017; Shaefer and Edin 2013). Even the most passive form of contraception, the long-lasting IUD, generally demands women attend at least two doctor's appointments and have the resources to cover the co-pay. And, even condoms, a relatively low-barrier and low-cost contraceptive option, still requires enough money to cover the expense and the trip to the pharmacy or store when they are needed. These factors likely combine to create barriers to contraceptive access for low-income young women.

However, research on the extent to which lack of access to contraception leads to unintended pregnancy has been mixed. Quantitative research on the Affordable Care Act insurance mandate found that increased access through insurance is associated with a clear increase in contraceptive use, and survey research on unintended pregnancies has found that women do cite access issues as a contributing factor to becoming pregnant without planning to (Biggs, Karasek, and Foster 2012; Mulligan 2015a; Nettleman et al. 2007). On the other hand, qualitative work has indicated that lack of access is rarely cited as a reason for contraceptive failures (Borrero et al. 2015). However, given the particular challenges associated with material hardship and the inability to meet all one's needs, I hypothesize that: *material hardship is*

associated with decreased access to contraception and access explains part of the association between hardship and contraceptive behaviors.

Ability to Follow Through on Contraceptive Intentions

While women across the socioeconomic spectrum often fail to effectively and consistently implement a birth control plan, research suggests that contraceptive failures, either inconsistent or incorrect use of contraception, are more common among less educated and lower-income women (Frost and Darroch 2008; Kost et al. 2008; Sundaram et al. 2017). Ross and Mirowsky's (2007; 2013) theory of sense of personal control suggests that behavioral control may be impaired by socioeconomic disadvantage, which leads individuals to feel powerless to shape and control their lives. Researchers have applied this idea of lack of personal control to the realm of contraception, terming "contraceptive self-efficacy" and tying this concept to why some women who don't desire pregnancy use contraceptives inconsistently or not at all (England 2016; Longmore et al. 2003; Reed et al. 2014). Efficacy refers to the ability to follow through on plans and intentions; for birth control, efficacy generally involves the ability to take an oral contraceptive every day, regularly fill a prescription, make clinic appointments, or make sure a condom is used every sexual encounter. Scholars have argued that socioeconomic status and social structures influence self-efficacy such that disadvantaged groups tend to exhibit less efficacy (England 2016; Longmore et al. 2003), which has been supported by research that has linked low contraceptive self-efficacy with less consistent use (Edin et al. 2007; England et al. 2016; Longmore et al. 2003). These findings support qualitative observations that women in distressed economic conditions tend to struggle with effective implementation of a birth control plan (Edin and Kefalas 2005; Reed et al. 2014).

Non-hormonal contraception (e.g., condoms, withdrawal, spermicide) also requires self-control and assertiveness in negotiating one's relationship with a sexual partner. Women must extend their decision to use contraception to their partner's behavior and sometimes overcome partner's resistance to condoms or other coital-specific methods. Research has found an increased willingness to have unprotected sex among racially and socioeconomically marginalized groups, which suggests that disadvantaged women may have less ability to negotiate these situations with partners (Biggs et al. 2012; Foster et al. 2012).

In addition, the growing literature on cognitive burden suggests that living in poverty, even for a short period, can cause changes in the way people think, make decisions, and evaluate risk (Mani et al. 2013; Wijnberg and Reding 1999; Wood 2003). Shah and colleagues (2012) describe this phenomenon as "scarcity mindset," which prompts individuals to focus attention on short term problems to the neglect of long term goals and plans. These studies reveal how cognitive burdens of poverty can harm individuals' abilities to follow through on plans for the future when consumed by immediate needs, such as material hardship. Therefore, hardship may harm young women's contraceptive control both by impairing the self-efficacy needed to act on contraceptive intentions and by imposing a scarcity mindset which causes women to focus on immediate hardships, rather than longer-term contraceptive needs. These literatures lead me to my final hypothesis: *material hardship is associated with greater cognitive burden and decreases in behavioral control, which in turn explains part of the association between hardship and contraceptive consistency.*

Data & Methods

Relationship Dynamics & Social Life Study

To answer my research questions, I use data from the Relationship Dynamics and Social Life Study (RDSL), a longitudinal, weekly survey that uses a random sample of 1,003 18- and 19-year-old women from a county in Michigan. Respondents were selected from state identification card and driver's license records. The research team conducted face-to-face baseline interview between March 2008 and July 2009. After the baseline survey, 99% of respondents (992) were enrolled in the longitudinal follow-up study and followed for the next 2.5 years through weekly surveys on relationships, sex, and contraceptive use over the internet or phone. Ninety-three percent of the sample responded to the baseline interview and more than 72% of women interviewed at baseline remained in the study for at least 1.5 years. Respondents also completed a supplemental survey on poverty and socioeconomic status (hereafter Poverty Supplement) between May and June 2009. The supplement had a 65% response rate (582 of 895 enrolled respondents), or about half the total RDSL sample (58%).

Sample: This study uses measures of material hardship from the Poverty Supplement and restricts analysis to only those women who completed the supplementary survey. The sample is also restricted to focus on women at risk of unintended pregnancy: women who are sexually active and who report no desire for pregnancy[1]. Of the 584 women who responded to the Poverty Supplement, 437 women were at risk of unintended pregnancy at some point in the following survey weeks. These 437 women comprise the overall sample for this study, but some models are also restricted based on method type; women who never used a given method are not included in those method-specific analyses. Overall, these 437 women contributed 22,523 weekly surveys to the analysis.

[1] Each week women were asked whether they had any vaginal intercourse and to rate how much they wanted to become pregnant in the next month or avoid becoming pregnant on a scale of zero to five. The sample includes only weeks in which women were both sexually active and reported having zero desire for pregnancy and the strongest desire to avoid pregnancy (the strongest anti-natal response).

Measures

Contraceptive Behaviors: The main set of dependent variables consists of five summary measures of contraceptive use and consistency of use from the weekly survey data. Conceptually, I divide these five measures into three sets: first, are women using any contraception? Second, if women are using contraception, what method type are they using? And finally, are women using contraception consistently? To capture any contraceptive use, I examine proportion of weeks in which respondents used any type of contraception (i.e., condoms, withdrawal, birth control pills, IUD, etc.). The second variable is the proportion of contraceptive-use weeks in which respondents used doctor-prescribed hormonal methods (i.e., pills, IUD, patch).

For capturing consistency of contraception, I use three measures to examine the consistency with which women are using contraception. The first summary variable is the proportion of coital-specific (e.g., condom, spermicide, withdrawal) contraceptive use weeks where respondents *consistently* used contraception, defined as using the method for every instance of sexual intercourse in the week[2]. This measure gets at a woman's ability to consistently use a method that requires active decision-making at the time of sexual intercourse every time. The second measure of consistency is the number of times respondents switched from one contraceptive method to a *less effective* method (e.g., hormonal birth control pills to condom). Method switches can indicate issues with accessing contraception and may leave women at greater risk of unintended pregnancy when switching. The final measure of

[2] This measure only includes weeks in which a coital-specific method was the woman's *most effective* form of contraception, i.e., if a woman was using both the pill and condoms, she was not included in this analysis. A sensitivity analysis including only condom-use weeks was conducted and showed substantively similar results, but the sample size decreased considerably.

consistency is the number of gaps in contraceptive use, i.e., periods of non-use. To construct these contraceptive use variables, I use all the study weeks following the administration of the Poverty Supplement survey for sexually-active women with no desire to become pregnant. The analytic sample for these variables changes across models based on whether a woman ever used contraception or a given contraceptive method.

Material Hardship: My main independent variable captures experiences of material hardship during the past year. The RDSL Poverty Supplement asks a set of nine questions, adapted from the Survey of Income and Program Participation, that capture various forms of material hardship. Of the 437 respondents, all completed some or all of the material hardship items; and respondents who did not complete the full set (<1%) had the mean ('no') imputed for missing items. Table 1 summarizes the questions and descriptive statistics[3].

Table 1: Material Hardship Measures (n = 437)

In the past twelve months…	Yes	No
You or anyone in household pawned or sold personal belongings?	27.3%	72.7%
Sometimes or often didn't have enough to eat?	27.0%	73.0%
Had telephone disconnected due to unpaid bills?	23.9%	76.2%
Received food or shelter from private charities?	12.6%	87.4%
Had gas or electric shut off due to unpaid bills?	7.3%	92.7%
You or anyone in household filed for personal bankruptcy?	6.2%	93.8%
Been evicted for not paying rent or mortgage?	6.2%	93.8%
Been homeless?	4.1%	95.9%

These nine measures were combined into a scale to capture the number of material hardships experienced by each respondent. Table 2 provides the frequency distribution of the scale. The scale was used to create three binary measures—no hardships, one hardship, and two or more material hardships—to create similarly sized groups.

[3] See Appendix Table 1 for the distributions of the dependent variables and Appendix Table 2 for the descriptive statistics of the full sample.

Table 2: Material Hardship Scale (n=437)

Hardships	Frequency	Number of Respondents
0	45.80%	200
1	23.10%	101
2+	31.10%	136

I also include an additional measure of hardship based on insurance status. I include a measure for insurance, represented as *uninsured*, to capture the unique effects of this barrier to healthcare. A lack of insurance can create significant hardship given the importance of insurance to the structure of healthcare in the U.S., both by putting women at risk of being unable to meet important healthcare needs and forcing women to cover necessary medical costs at the expense of other essentials (Hall, Dalton, and Johnson 2014; Heflin and Butler 2013; Mulligan 2015b; Raiz 2006)[4]. However, given the qualitatively different effects of being uninsured, I separate insurance from other aspects of hardship[5].

Mediators: I examine how the relationship between material hardship and contraception may be mediated by *constrained access* to contraception and by *cognitive burden* which impedes women's ability to follow through on contraceptive behaviors.

First, access to contraception is captured by two measures: women were asked to provide their level of agreement with two statements (strongly disagree, disagree, agree, or strongly agree): "You can't afford to pay for birth control," and "It is easy for you to get birth control," which was reverse coded to match the direction of the affordability question. Both questions are coded so higher numbers indicate less ability to afford or access contraception, values range from 1 to 3 (with strongly agree and agree collapsed due to small cell sizes).

[4] The survey also included a common measure of unmet medical needs (have you needed to see doctor or dentist but could not afford to go in the past 12 months) but this measure was a weaker predictor of contraceptive behaviors and was excluded in favor of the insurance measure.

[5] The study was conducted before the implementation of the Affordable Care Act and Medicaid expansion, implications of these policy changes are discussed in the disccusion.

Second, I use three measures to capture how women experiencing hardship may be less able to enact the behaviors necessary to follow-through on a contraceptive plan. I examine experiences with cognitive burden with a measure assessing how much women are worrying about meeting their expenses. Women were asked, "On a scale from 1 to 7, how often do you worry that you will not have enough money to pay for things?" The lowest two categories, representing the least worry about expenses, were collapsed together due to small cell sizes. Next, I examine indicators of behavioral control by creating two indices measuring different aspects of control, summarized in Chart 1. The first index is Control over Sex, which combines five measures of women's ability to control use of contraception and their partner's behaviors *during* sex (Cronbach's alpha = .63). The second index is Control over Personal Life, which combines four measures of women's ability to handle personal problems and challenges (Cronbach's alpha = .72). The items included in each index and the range of values for each index are summarized in Chart 1. Each index was validated through exploratory, polychoric factor analysis and all indices are scaled such that a higher value indicates greater control.

Chart 1: Measures for each Behavioral Control Index

Index	Measures
Control over Sex (range: 0 to 10)	1. Imagine that you were with a partner who wanted to have sexual intercourse but you did not. What are the chances that you could stop your partner from having sex with you? 2. If you decided to have sex, what are the chances that you could get your partner to withdraw or "pull out" before ejaculating or coming? 3. If you decided to have sex, what are the chances that you could get your partner to use a condom? 4. Imagine being with a partner and you both want to have sexual intercourse, but you have no birth control available. What are the chances that you could stop yourself once you were highly aroused or turned on?

Control over Personal Life (range: 1 to 5)	1. In the last month, how often have you felt that you were unable to control the important things in your life? Would you say never, almost never, sometimes, fairly often, or very often? 2. In the last month, how often have you felt confident about your ability to handle your personal problems? 3. In the last month, how often have you felt that things were going your way? 4. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

These measures within each behavioral control index were asked quarterly (four times a year), but at different times in the study. For this analysis, I use each respondent's first answer to these questions after they completed the Poverty Supplement and I forward fill missing responses from the previous time the respondent received a question. Therefore, for a small proportion of respondents (less than 5% on all questions) the attitudes questions were answered before the Poverty Supplement. Figure 2 shows the conceptual model connecting these pathways to contraceptive behaviors along with each set of variable constructs.

[Figure 2]

Controls: I control for a set of demographic variables, measured at baseline, that predict sexual activity and contraceptive behavior and have been used in analyses using the RDSL dataset (Barber, Yarger, and Gatny 2015; Kusunoki et al. 2016). Race is represented by a dichotomous variable of whether the respondent identifies as African American, with all other racial and ethnic groups collapsed into the zero category. Family and childhood disadvantage are measured with four dichotomous measures: the respondent's mother was under the age of 20 at first birth, the respondent's mother's educational attainment was less than a high school diploma or equivalent, the respondent did not grow up with two parents, and the respondent's family ever received public assistance during her childhood. The measures are summed to form a childhood disadvantage index, with the top two categories (the most disadvantaged women) collapsed due

to small cell sizes. Religious importance and high school GPA control for family background and achievement.

Second, I control for sexual histories that likely impact future sex and contraceptive use. The adolescent risky sex index is a sum of four dichotomous variables: whether the respondent first had sex at 16 or younger, whether the respondent had had two or more sexual partners before the study began, whether the respondent ever had sex without any contraceptive, and whether the respondent had any pregnancies prior to the study.

Third, I add additional controls beyond childhood disadvantage to further control for socioeconomic status and income level and isolate the impact of material hardship, net of SES.] I include a measure for current SES, separated by women's level of independence from their parents. Given this unique age range, respondents have varied relationships with their families and levels of personal responsibility. Therefore, I include a dummy variable for women who are fully responsible for themselves, about 30% of the sample[6]. Then, I divided the group of women who are not independent by their parents' income level. I include a second dummy variable for women not responsible for themselves and who report their parents as having very low incomes (less than $15,000), about 14% of the sample. These two groups are compared to the reference category of women who are not responsible for themselves and who report their parents as earning more than $15,000 per year, about 57% of the sample. I also use three dichotomous measures from the baseline survey: whether respondents were receiving any type of public assistance, were employed, and were enrolled in school at baseline (around 18-19 years old).

[6] Alternative model specifications divided this independent group by personal income or by whether the woman was living with her family at the time of the poverty supplement, but the results remained consistent and most of the women (87%) reported personal incomes below the 2008 federal poverty line.

Finally, for the contraceptive behavior models, I also include controls for pregnancy desire and relationships. I include a dummy variable indicating whether women *ever* reported a strong desire for pregnancy in the weekly journals. I also include a measure for the proportion of journal weeks the respondent was in a relationship. These controls seek to account for the ways in which longer term pregnancy desires may affect behaviors in anti-natal weeks and how contraceptive use can change over longer term relationships (Kusunoki and Upchurch 2011; Weitzman et al. 2017).

Analytic Strategy: I estimated a series of multiple ordinary least squared (OLS) or negative binomial regressions for each outcome variable. I use a negative binomial regression model for the two count variables, number of contraceptive switches and number of contraceptive gaps, to account for over-dispersion. Each model includes the dummy variables for one material hardship and two or more hardships, as well as SES, demographic, and family background controls. The negative binomial regression models also include an exposure variable for the number of journals submitted by each respondent to account for observation bias. I also calculate predicted probabilities, holding all controls at their means, to provide meaningful interpretations of differences in contraceptive behavior by hardship status. For the mediation analyses, I use structural equation modeling with the *sem* command in Stata and bootstrapping to evaluate the significance of the indirect effects through the mediator variables (Gunzler et al. 2013).

Results

In the following sections, I present results to examine the experiences of women facing material hardship. First, I compare women experiencing zero, one, or two or more hardships

across a variety of measures to show the correlation between hardship and other forms of disadvantage. Then I present results from a set of models that seek to identify the association between material hardship and contraceptive behaviors. Finally, I examine the mediator variables, access, cognitive burden, and behavioral control, to explore how material hardship might influence effective contraception through these mechanisms.

Sample Descriptive Statistics

Table 3 presents sample characteristics with independent samples t-tests (HS GPA) and chi-square tests (all other variables) of significant differences between the material hardship groups. Table 3 shows that, overall, women with two or more material hardships tend to be more disadvantaged than women with one or no hardships. In particular, women who experienced two or more hardships experienced more disadvantage as children, such that more than half received public assistance as a child and over 40% were born to a mother who was 20 or younger at first birth. Only a quarter of women without hardship experienced these childhood disadvantages, and women experiencing one hardship were statistically indistinguishable from women without hardship. Women experiencing two or more hardships were also more likely than the other groups to be receiving public assistance at baseline. Women experiencing multiple hardships also had riskier sexual experiences during adolescence. About 60% of these women were 16 or younger at first sex and nearly 70% had two or more partners at baseline. In addition, women with two or more hardships were more likely to be African American (34%), compared to 23% of women with no hardship. Overall, these sample characteristics indicate that women

experiencing hardship are more disadvantaged during childhood and adolescence, but on some measures, women with one hardship are indistinguishable from women with none.

[Table 3]

Contraceptive Behaviors

Table 4 presents multiple OLS and negative binomial regression models of material hardship predicting contraceptive behaviors and consistency. Model 1 predicts proportion of journal weeks with *any* contraceptive use. Model 2 restricts the sample to only those women who ever used contraceptives (n=424) and predicts the proportion of weeks they used hormonal, doctor-prescribed methods (e.g., the pill, IUD, contraceptive shot) rather than coital-specific methods. Models 3 through 5 then examine consistency of use among contraceptive users. Model 3 predicts whether women using coital-specific methods used their method every time they had sexual intercourse in the week, which is restricted to only women who ever used coital-specific methods as their best contraceptive method (n=322). Models 4 and 5 predict the number of contraceptive gaps and switches among contraceptive users (n=424). Overall, Table 4 shows that hardship, both material and lack of insurance, is associated with less contraceptive use, less reliance on more effective, hormonal-methods, and greater inconsistency of contraceptive use.

In Model 1, women experiencing two or more hardship use contraception in about 6% fewer sexually active weeks compared to women without hardships. Women without hardship have quite consistent contraceptive coverage, using contraception about 93% of sex weeks on average. In contrast, women experiencing two or more hardships use contraception about 87% of weeks; while these women are still using contraception most weeks, over the course of a year, this would still expose them to nearly 7 weeks of unprotected intercourse. Women experiencing

just one hardship are not statistically significantly different from women without hardship. Focusing on only doctor-prescribed, hormonal methods in Model 2, insurance status is the strongest predictor of hormonal contraceptive use, with uninsured women using hormonal methods an average of 21% fewer weeks than women with insurance. Women with insurance use doctor-prescribed methods in about 55% of their contraceptive use weeks, but women without insurance coverage only use these more effective methods in about 34% of their contraceptive use weeks.

In Model 3, percent of coital-specific method weeks with consistent use gets at women's ability to prevent pregnancy every time they engage in sexual intercourse when doing so requires an active decision (as opposed to the more passive decision of using the pill or IUD). The results show that both experiencing two or more hardships is associated with an average of 16% fewer weeks of consistent coital-specific method use, compared to women with no hardship experiences. Women without hardship experiences consistently use coital-specific contraceptive methods in 71% of weeks where that is their best contraceptive method; in contrast, women with two or more hardships consistently use coital-specific methods in only 54% of weeks. This indicates that in nearly half of weeks in which women with hardships are using coital-specific methods, they are failing to contraception every time they have sex.

Insurance status is also associated with coital-specific consistency; women without insurance actually have an average of 11% more weeks with consistent use than women with insurance, which indicates that insured women who are not using hormonal methods are less likely to use coital-specific methods consistently, compared to women without health insurance. This finding may result from a variety of factors, including insured women having greater security in access to healthcare and thus less incentive to avoid pregnancy, or insured women

practicing less consistent contraception when they are between hormonal methods. This finding is also supported by work from Frost and Darroch (2008), who find that women without insurance are more likely to use contraception consistently.

For the remaining consistency measures in Models 4 and 5, hardship is significantly associated with more switches to worse contraceptive methods; experiencing two or more material hardships is associated with an average of 1.4 times as many contraceptive method switches ($e^{.34}$=1.4) compared to women without hardship. Holding all other variables at their means, these differences translate to women without hardship switching contraceptive methods about 0.9 times, compared to 1.2 method switches for women experiencing two or more hardships. Both one and two or more material hardships are also associated with greater gaps in contraceptive use; experiencing one hardship is associated with an average of 1.87 times as many gaps and two or more hardships is associated with an average of 1.84 times as many gaps than women who have not experienced material hardship[7]. Holding the other variables at their means, these differences translate to women without hardship having only about 0.24 weeks of contraceptive gaps, compared to 0.44 weeks of contraceptive gaps for women experiencing two or more hardships.

[Table 4]

Mediation Models

Table 5 presents results from the multiple OLS and negative binomial regression models of the material hardship measures and mediators on contraceptive behaviors and consistency. The first model for each outcome is the same model from Table 4 (controls included but not

[7] Coefficients on one and two hardships are not statistically significantly different from each other.

shown), and the second model for each outcome includes the 5 potential mediators (controls included but not shown). I find that, overall, access, cognitive burden, and behavioral control do mediate some of the association between hardship and contraceptive use. While these results suggest the importance of these mechanisms in contraceptive behaviors, these mediators do not fully explain away the relationship between hardship and contraception.

First in Models 1 and 1a, measures of cognitive burden and behavioral control, specifically worrying about money and control over sex significantly explain some of the association between hardship and any contraceptive use. However, while statistically significant, the substantive change in the association is rather small. Even accounting for these indicators of cognitive burden, women experiencing two or more hardships still have 5% fewer weeks with any contraceptive use (just a 1% change), compared to women with none.

Second, in Models 2 and 2a, contraceptive access, specifically ease of access, significantly mediates the relationship between insurance status and percent of weeks with hormonal contraceptive methods, indicating that at least part of the relationship between insurance and contraception operates through access issues. The inclusion of access explains away over a third of the relationship between lack of insurance and lower hormonal-method use.

Next in Models 3 and 3a, control over sex and inability to afford contraception together significantly explain the association between two or more hardships and lower coital-specific method consistency. This finding speaks to the importance of behavioral control in situations that require continual commitment to a contraceptive plan and the challenges associated with ensuring that both you and your partner are adhering to contraceptive use. In addition, while condoms are generally regarded as inexpensive, the mediation relationship with feeling unable to afford contraception may indicate that even a small expense can pose a barrier to contraception.

Models 4 and 4a show that being unable to afford contraception has a marginally significant association with greater contraceptive switches and the relationship between hardship and switches does weaken with the inclusion of this mediator. However, none of these mediators significantly explain the effect on hardship, which may indicate that switches are motivated by other mechanisms. Finally, control over personal life significantly mediates (at the $p<.1$ level) the relationship between two or more hardships and gaps in contraceptive use, as shown in Models 5 and 5a. However, none of the mediators significantly explain away the relationship between one hardship and gaps, which only weakens by a small amount.

Together, these findings indicate that access to contraception and cognitive burden are important barriers to contraceptive use and consistency. Cognitive burden seems to be particularly related to any contraceptive use and consistency of coital-specific methods, which indicates that women experiencing these issues related to hardship and poverty are more likely to experience unprotected sex. In addition, access to contraception shows associations to both hormonal methods and, to a lesser extent, coital-specific methods; these findings indicate that access may be an underestimated barrier to contraceptive use, even despite efforts to expand the reach of reproductive health services and availability of contraceptives.

[Table 5]

Supplemental Analyses

As discussed in the Literature Review, I hypothesize that material hardship is only correlated with women's access to contraception and ability to enact a contraceptive plan, rather than women's intentions to use contraception. In Supplement Table 1, I show that women experiencing material hardship do not differ in several attitudes around contraceptive use and pregnancy. First, in Model 1 and 2, women with hardships are no more or less likely to desire to

use contraception and are no more likely to see contraception as inconvenient[8]. Second, in Models 3 and 4, women experiencing hardship were no more or less likely to say that "getting pregnant at this time in your life is one of the worst things that could happen to you" or "It wouldn't be all that bad if you got pregnant at this time of your life." Finally, Model 5, which only includes a subsample of women who received this question, shows that material hardship is not significantly related to whether women agreed that "Pregnancy is something that should be planned." Together, these non-significant results support the hypotheses that hardship is not related to whether women *want to* use contraception, but rather, material hardship makes it more difficult for women to access contraception and follow through on a birth control plan.

As a second supplementary analysis, I also confirm the association between material hardship and consistent contraception in a nationally representative dataset to further support my findings from the RDSL sample. The longitudinal and contraception-focused nature of the RDSL study makes it the ideal choice for studying this type of behavior that can be inconsistent and changing over time. However, the RDSL sample remains limited in generalizability as it is only representative of one Michigan county. As such, in Supplementary Table 2, I provide a comparable analysis using the National Longitudinal Study of Adolescent Health, using Wave III of the survey and focusing only on women ages 18 to 22 (Harris and Udry 2018). AddHealth is more limited in measures of contraceptive behaviors and most comparable measure for contraceptive consistency is a retrospective report of the frequency with which the respondent used contraception in the past year. Women were asked on how many occasions of vaginal intercourse did they use some form of pregnancy prevention or birth control, from none to all on

[8] This measure is a scaled composed of two questions where women were asked to rate their agreement with the following: "In general, birth control is too much of a hassle to use." And "It takes too much planning ahead of time to have birth control on hand when you're going to have sex."

a scale of 0 to 4. In addition, AddHealth has a more limited subset of material hardship measures; as such, I examine the association between *any* hardship experiences and consistent contraception[9]. Along with comparable controls to the RDSL sample, this analysis in Supplement Table 2 indicates that women experiencing hardship report using contraception less frequently in the past year than do women without hardship (a difference of 0.26 on a scale from 0 to 4). This finding confirms the general pattern found in the RDSL sample.

Discussion

Consistency of contraception is crucial to effective prevention of pregnancy. Methods differ in the degree to which women must make active decisions and plan for pregnancy prevention, but all types of birth control require at least some degree of forward-planning. My study finds that material hardship is importantly associated with contraceptive consistency, such that women experiencing hardships are less likely to use any contraception, less likely to use the most effective methods, and are more likely to use methods inconsistently, even after accounting for several indicators of current and childhood socioeconomic status.

Together, these contraceptive behaviors may put women experiencing hardship at a higher risk of unintended pregnancy through greater exposure to unprotected sex and methods that are less likely to be effective or used correctly. While experiencing just one hardship was associated with some decreases in effective contraception, overall women with only one hardship were similar to women with none, perhaps speaking to the importance of accumulation of stressors. I also find support for my conceptual model suggesting that the relationship between

[9] The AddHealth survey asks about lack of phone service, missed or underpayment of rent/mortgage, missed or underpayment of utility bill, and utility shutoff in the past 12 months, as well as current homelessness. These measures were combined to create a dummy variable indicating whether a respondent said yes to any of these items.

material hardship and less effective contraception may be to some extent explained by these women's lower access to contraception, greater cognitive burden, and lower behavioral control.

These findings lead to three main contributions from this study. First, I build upon prior research finding lower contraceptive consistency and greater unintended pregnancy rates among disadvantaged populations (Frost and Darroch 2008; Kost et al. 2008; Littlejohn 2012). I find that material hardship, beyond SES, affects contraceptive consistency and may expose women to greater risks of unintended pregnancy. This relationship leads me to my second theoretical contribution; I suggest that material hardship, which measures the unmet needs and insecurities of poverty, may harm individuals' ability to engage in behaviors that require consistency and forward-planning, like contraception. Finally, I add to prior work on contraceptive efficacy, particularly research from England (2016) and Musick et al. (2009), by demonstrating how cognitive burden and diminished behavioral control may be a mechanism through which hardship is linked to worse contraception. In addition, I find that access issues also mediate this relationship between hardship and contraception, indicating the continued need for reproductive health services (Nelson and Kakaiya 2016; Potter et al. 2014).

These mediation findings also suggest opportunities for intervention by demonstrating that even the perception of difficulty and unaffordability of contraception is associated with decreased use. While these findings may change as healthcare access has recently expanded, continued debates over contraceptive coverage and the many states in which reproductive care is severely curtailed suggest that access likely remains an important factor for many women's control over their reproductive health. It is also important to note that even net of these mediators, material hardships remained a significant predictor of contraceptive use, indicating that these mediators do not account for the entire relationship between hardship and

contraception. As with many outcomes of concern to sociologists, there may be a limit to the progress we can make by focusing on the mechanisms by which disadvantage affects outcomes, rather than addressing the foundational issue of poverty (Link and Phelan 1995).

Limitations. In addition to the limited generalizability of the RDSL sample discussed in the Supplemental Analyses, I do not attempt to prove a causal account of material hardship and contraception. I do, however, include a robust set of demographic, family background, and adolescent controls and measure material hardship before contraceptive behaviors. With these extensive controls and the longitudinal nature of the study, these results are at minimum strongly suggestive of an important association between hardship and contraception. In addition, given that these measures of hardship ask about experiences in the prior year, estimates of the effect of hardship may be underestimated if the negative impacts of hardship subside over time. As such, further research should examine the proximate impacts of material hardship on contraception.

Despite these limitations, the demonstrated connection between material hardship and women's contraceptive behaviors provide a basis for further research on the effects of economic insecurity on women's reproductive health. Research on contraceptive use and stubbornly high unintended pregnancy rates indicate that consistent contraception can be challenging for women across the socioeconomic spectrum. But, it is easy to imagine how, when faced with the urgent needs of unpaid bills and chaos caused by utility shutoffs, that maintaining a contraceptive plan can be easily forgotten in the shuffle. Contraception is also just one example of a behavior that requires an ongoing commitment and diligence, we can imagine that hardship may also be associated with less consistent school attendance and performance, care of other long-term health needs, or financial planning.

These findings matter in the context of a shrinking and inadequate social safety net and ongoing debates over restricting women's access to birth control and abortion. Access to social services helps low-income individuals avoid material hardship, but the U.S. welfare system fails to provide many families with sufficient support to meet their needs (Edin and Lein 1997; Heflin 2006). If women experiencing material hardship face greater risk of unintended pregnancy, then further limiting their access to financial support and contraception will only further increase high rates of unintended pregnancy among the disadvantaged.

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