

Bowling Green State University
The Center for Family and Demographic Research

<http://www.bgsu.edu/organizations/cfdr>

Phone: (419) 372-7279 cfdr@bgsu.edu

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RACE-ETHNIC DIFFERENCES IN SEXUAL HEALTH KNOWLEDGE

Karen Benjamin Guzzo
Bowling Green State University

Sarah R. Hayford
Arizona State University

Despite extensive research examining the correlates of unintended fertility, it remains a puzzle as to why racial and ethnic minorities are more likely to experience an unintended birth than non-Hispanic whites. In this paper, we focus on whether minorities have lower sexual literacy, using a unique new dataset of unmarried young adults aged 18-29, the 2009 Survey of Unmarried Young Adults' Contraceptive Knowledge and Practices, to examine a number of beliefs regarding sexual behavior, fatalism regarding fertility, and contraceptive side effects. At the bivariate level, foreign-born Hispanics hold more erroneous beliefs about the risk of pregnancy than other groups, whereas non-Hispanic blacks are more likely to believe in contraceptive side effects than non-Hispanic whites. Both foreign-born Hispanics and non-Hispanic blacks are more likely to hold a fatalistic view towards birth control. Race-ethnic differences are largely attenuated in multivariate models, with self-reported infertility a major mediator. However, non-Hispanic blacks remain more likely than non-Hispanic whites to believe there is a high chance of serious health consequences such as cancer from hormonal contraceptives, even controlling for sources of health information, sexual and fertility experiences, and sociodemographic characteristics. These differences may contribute to race-ethnic variation in contraceptive use and, ultimately, unintended fertility.

Levels of unintended fertility remain high in the United States despite public health efforts to lower rates, and there are wide disparities in unintended birth rates by socioeconomic and demographic characteristics (Finer and Zolna 2011; U.S. Dept of Health and Human Services 2000, 2009). In particular, unintended fertility is more common among non-Hispanic blacks and Hispanics than among non-Hispanic white and Asian women (Chandra et al. 2005; Finer and Zolna 2011; Guzman, Wildsmith, Manlove, and Franzetta 2010). Although these differences are longstanding, their causes are not well understood.

Race-ethnic variation in the extent of accurate knowledge about sexual and reproductive health as well as health attitudes toward sex and sexuality – what can be considered an individual’s “sexual literacy” (Reinisch and Beasley 1990) – may be an important factor in unintended fertility disparities, yet few studies have examined differences across race-ethnic groups using nationally representative and cross-sectional data. Instead, many studies have been largely qualitative and included only specific sub-groups. Our research builds on prior work by examining race-ethnic variation in three components of sexual literacy – accurate knowledge about pregnancy risk, general belief in contraceptive efficacy in the presence of fatalistic views about fertility, and perceptions of side effects – in a nationally representative sample of unmarried young men and women. We focus on these three components because if people underestimate the risk of getting pregnant, do not believe that their contraceptive actions will actually affect the chances of pregnancy, and over-estimate the side effects of contraception, the chances that an individual will use contraception, particularly effective contraception, are low. Moreover, we further extend the literature by examining potential explanatory factors for variation in sexual literacy – sources of health knowledge, sexual beliefs and experiences, and socioeconomic factors.

Reproductive and contraceptive beliefs

At the most basic level, to avoid getting pregnant, one must accurately understand the reproductive process. Similarly, motivation and ability to contracept effectively requires knowledge of contraceptive methods. Unfortunately, it appears that misinformation about sexual practices and contraception is widespread in the United States (The Henry J. Kaiser Family Foundation 2003; Clark, Baldwin, and Tanner 2007; Schragger and Hoffman 2007). For instance, in a recent content analysis of emails to a reproductive health website, Wynn, Foster, and Trussell (2009) found that more than a quarter of questions sent in reflected misconceptions around sexual and reproductive health processes. These misunderstandings limit the ability to prevent pregnancy.

Even if individuals understand how pregnancy occurs, they are unlikely to use contraception if they believe that birth control is ineffective or inappropriate. Qualitative research from a range of settings in the United States has identified a persistent stream of fatalism in American attitudes toward childbearing (e.g., Bledsoe 1996; Rainwater 1960; Sawhill, Thomas, Monea 2010). This fertility fatalism includes beliefs such as the idea that it is unnatural to plan births, that childbearing takes place when it is “the right time” or “in God’s plan,” and that efforts to control fertility will be fruitless. These attitudes may be linked to larger perceptions of low self-efficacy or inability to plan for the future; perceptions of birth control specifically may be influenced by religious teachings on birth control. Furthermore, given high levels of unintended fertility, many men and women know someone with an unplanned birth, but may not know whether the person was using contraception consistently or correctly. These experiences may add to the interpretation that it is futile to try to control childbearing.

Finally, when deciding to use contraception and which type of contraception to use, individuals are likely to weigh the costs and benefits of contraception. Costs can include direct financial costs, social costs associated with stigma or possible relationship conflict, and the possibility of side effects. The most effective contraceptives tend to be hormonal methods. However, they can carry side effects, such as weight gain, nausea, and mood changes. Most of these side effects are quite minor, but the existence of side effects may be sufficient to discourage women from using these methods, especially if women over-estimate the risk and severity of effects. Among women who have had an abortion, concerns over contraceptive side effects are often cited as a reason for discontinuation and non-use (Jones, Darroch, and Henshaw 2002). There are widespread misperceptions regarding the safety, efficacy, and health effects of contraception, which affect method choice, adherence, and discontinuation (Sihvo, Hemminki, and Kosunen 1998; Clark 2001). Long-acting reversible contraceptives (LARCs), such as intrauterine devices (IUDs) and hormonal implants, are especially likely to be misunderstood (Spies et al. 2010).

Race/ethnicity and sexual literacy

A number of studies have documented that non-Hispanic blacks and Latino often hold negative attitudes toward contraception and misunderstand the reproductive process. Qualitative research involving Latino and non-Hispanic black teenagers aged 14-19 noted “an enormous amount of erroneous information circulating among these participants, their peers, and others in their environment” regarding contraception (Aarons and Jenkins 2002, p. 17). Misconceptions regarding hormonal contraceptives included an elevated risk of cancer and permanent sterility, among more minor side effects such as irregular bleeding, weight gain, nausea, hair loss, and varicose veins (Aarons and Jenkins 2002; Gilliam et al. 2009). Even condoms are often viewed

with suspicion regarding efficacy, and concerns over negotiating condom use are common (Aaron and Jenkins 2002; Gilliam et al. 2009). Though it is easy to attribute misinformation to the young age of participants in the qualitative studies above, other work suggests that even minority adult women hold misinformation (Gilliam et al 2004; Venkat et al. 2008). Moreover, there is variation in knowledge across the components of sexual literacy, with different race-ethnic groups weighing different aspects differently (Dehlendorf et al. 2010; Venkat et al. 2008). Non-Hispanic blacks seem to be especially concerned about side effects, which may arise in part from a general suspicion about medical institutions (Thorborn and Bogart 2005).

However, drawing firm conclusions from the research listed above is problematic for several reasons. One, the majority of the research uses small, qualitative samples, limiting the generalizability of the findings. Two, much of the work on contraceptive beliefs and attitudes focuses on young teenagers (often as part of work on creating sexual education programs), but unintended birth rates are highest among women aged 18-19 and 20-24, followed by women 25-29. Young adults 20-29 are more likely to be sexually active than teenagers, yet we know little about the reproductive health and contraception knowledge of this age group. Further, many of the studies focus on women, but men are vital partners in contraceptive use and decision-making (Grady et al. 2010), so information on men's sexual literacy is also important. Finally, the biggest drawback to existing literature is that it cannot truly inform the work attempting to explain aggregate race-ethnic differences in unintended fertility because it does not contain comparable information on non-Hispanic whites or Asians. That is, while it seems clear that there is misinformation among minority communities, it is not clear that misinformation is any prevalent than among non-Hispanic whites or Asians. The disproportionate focus on low-income and urban populations further undermines the ability to determine the causes of race-ethnic

variation in unintended fertility because it is not clear whether differences in knowledge are actually issues of socioeconomic status rather than race/ethnicity.

Influences on sexual health knowledge

Diffusion models of social learning and social influence on fertility behaviors suggest that individuals learn from, and tap into, their social networks, health and school officials, and the mass media to gain information (Montgomery and Casterline 1996). Individuals then use this information to make decisions, weighing the opinions of some sources more heavily than others, forming a process of “sexual socialization” (Shtarkshall, Santelli, and Hirsch 2007). Because of residential segregation, socioeconomic stratification, and past and present racial discrimination in the United States, both access to different sources of information and evaluations of the relevance of these sources are likely to vary by race-ethnicity. Formal sexual education in schools may be a source of information, but the rise in abstinence-only education in the United States over the past decade means that many individuals are receiving little or no information on contraception, sometimes even receiving erroneous information (Santelli et al. 2006; Gusrang and Cheng 2010). Further, non-Hispanic blacks and Hispanics are less likely to receive formal sexual education than non-Hispanic whites (Abma et al. 2004). Not surprisingly, then, other sources of information are also important. Research suggests that minorities tend to rely heavily on their social networks for health information (Dehlendorf et al. 2010). Friends, mothers, and partners tend to be key sources of contraceptive information among non-Hispanics blacks and Hispanics (Blackstock, Mba-Jonas, and Sacajiu 2010; Yee and Simon 2010). Primary care physicians are also often utilized as sources of information (Blackstock, Mba-Jones, and Sacajiu 2010), but many people do not have a primary care physician. Furthermore, distrust of, and discomfort around, the medical establishment is often greater among minorities (The Henry J.

Kaiser Family Foundation 2003; Thorman and Bogart 2005; Dovidio et al. 2007) and may lead individuals to discount information from those sources. Media sources, including television and the internet, are also common sources of reproductive health information for young adults. The use of multiple sources creates the potential for conflicting information, requiring individuals to weigh their sources of information. The opinions and experiences of close family members and friends are especially influential, as “women may be more likely to closely identify with social network members’ family planning experiences as they may reflect women’s own needs and preferences (Blackstock et al. 2010, p. 138). Friends’, mother’s, and sisters’ opinions are sometimes considered more valuable than clinicians’ recommendations because individuals feel as if they are getting first-hand experience about contraception rather than abstract, impersonal information (Yee and Simon 2010). Additional influences may stem from family and friends’ more general beliefs about the acceptability of reproductive behavior, such as family support for nonmarital childbearing, friends’ experiences of unplanned pregnancies, and friends’ belief regarding the importance of birth control. Religiosity may also play a role, as many religions discourage nonmarital sexual activity and perhaps discussion of sexual behaviors and contraception as well.

Individuals’ own sexual and fertility experiences also inform their beliefs about reproductive health and contraception. Many individuals believe themselves to be infertile but do not base this on formal medical diagnosis (Polis & Zabin 2012); instead, this often stems from simply having never gotten pregnant or impregnated someone in the past (Edin et al. 2007). For those who have been told by a health care professional that they will be unable to have children, this may inhibit a sense of mastery about one’s reproductive health actions – that certain outcomes just happen or are meant to be. Along similar lines, individuals who have been

pregnant (or gotten someone pregnant) have had more firsthand experience with the reproductive process and have received medical care, so they may have fewer misperceptions. Sexual experiences may also matter; individuals who have never had sex may be relatively ignorant of the reproductive process and contraception, while those who entered into sex at early ages may have lower sexual literacy, if an early age is indicative of a poor understanding of sexual risks, or they may have higher sexual literacy if a longer period of sexual experience increases sexual literacy. Those in a current sexual union are at the highest risk of pregnancy; as such, they may have given more consideration and investigation into the reproductive process and contraception. Certainly, race-ethnic differences in age at first sex, support for nonmarital childbearing, and having had friends with unplanned pregnancies is well-documented.

Finally, socioeconomic status shapes access to sexual health knowledge. Less educated individuals are less likely to have extremely knowledgeable social contacts and are less able to seek out external sources of information. To the extent that race-ethnic minorities in the United States are disproportionately disadvantaged, with lower levels of education, they may be less educated about overall health issues and processes. Similarly, there is differential access to health care based on insurance status. Individuals without health insurance may be unable to afford health care service, and although there has been significant expansion of the Medicaid program, there remain a number of gaps in providing adequate family planning services for this population as well (Gold 2007).

Data and methods

This analysis uses newly available data collected by The National Campaign to Prevent Teen Pregnancy in collaboration with the Guttmacher Institute, the 2009 Survey of Unmarried Young Adults' Contraceptive Knowledge and Practices (the "Fog Zone" survey; see Kaye,

Suellentrop, and Sloup 2009). When weighted to account for the survey design, the data are a nationally representative probability-based sample of unmarried young adults aged 18-29 in 2009. The sample includes 897 women and 903 men for a total of 1,800 respondents.

Our dependent variables in this analysis are three measures of sexual socialization: pregnancy risk knowledge, fertility fatalism, and contraceptive side effects. Looking first at pregnancy risk knowledge, we analyze five questions: (correct answers to these questions are in *italics*)

- 1) During a woman's monthly cycle, are there certain days when she is more likely to become pregnant? *Yes/No*
- 2) After giving birth, a woman can get pregnant before her first period. *True/False*
- 3) Douching after sex can prevent pregnancy. *True/False*
- 4) A woman who is breastfeeding cannot get pregnant. *True/False*
- 5) Pregnancy is much less likely to occur if a couple has sex standing up. *True/False*

We summed incorrect responses to create a numeric indicator, ranging from 0-5, of how many pregnancy risk misconceptions the respondent reported. 195 respondents did not give valid answers to one or more of these questions (answering "don't know" or "refused"), reducing the sample size to 1605.

A general attitude toward contraceptive efficacy is measured by the response to the statement, "It doesn't matter whether you use birth control or no; when it is your time to get pregnant, it will happen," measured on a five-category scale of strongly agree to strongly disagree. We dichotomized this variable into strongly agree/agree or not. Four respondents are excluded due to an invalid response, bringing the sample size to 1601.

Contraceptive side effects are measured with the responses to four questions, all answered on a scale of 1 (not likely) to 4 (extremely likely):

- 1) How likely is it that the birth control pill or other hormonal methods would cause weight gain?
- 2) How likely is it that the birth control pill or other hormonal methods would reduce sexual desire?
- 3) How likely is it that using the birth control pill or other hormonal methods for many years would cause a serious health problem, like cancer?
- 4) How likely is it that the birth control pill or other hormonal methods would cause severe mood swings?

For the contraceptive side effects question, we recoded these dichotomously to examine the proportion who reported it was quite or extremely likely to experience the side effect. In exploratory analyses, we tested different approaches to combining these variables, but found that they displayed different distributions; we analyze each measure separately. An additional 92 cases did not have valid responses for these questions (only individuals who were responded affirmatively to earlier questions regarding awareness of hormonal methods were asked these questions). This produces a sample size of 1,509 men and women with valid answers across all three measures.

The key independent variable is race/ethnicity/nativity, categorized as non-Hispanic white, non-Hispanic black, foreign-born Hispanic, native-born Hispanic, or Asian/other. All models control for age and gender, basic sociodemographic characteristics that vary significantly by race-ethnicity in the sample (not shown).

Full models control for variables that influence reproductive health knowledge and attitudes. We include direct sources of information about reproductive health: whether the respondent ever had sexual education, whether the respondent had ever visited a doctor or clinic for sexual health services, and the respondent's most trusted and most common sources of information. Possible sources of information provided in the survey include friends, partner, family, teachers, internet, books/ magazines/pamphlets, or TV/radio. We explored several ways of characterizing sources of information; based on the results of these analyses, we created two dichotomous measures: whether the respondent reported that the source they trusted most for "accurate information regarding contraception and birth control" was a doctor/nurse or not, and whether the source from which they "received the most information in the past 12 months" was either friends, current/past partner, or siblings/other relatives or not. These dichotomous variables represent the accuracy of information and the degree of influence of the source of information.

Additional explanatory variables include measures of socioeconomic status, measured as education (less than high school, high school, some college, college or more), employment status (not working or in school, in school, working and in school, working), and insurance status (Medicaid, private, uninsured). The respondents' own sexual behaviors and attitudes are also covariates. These include whether the respondent is currently in a sexual union, age at first sex (less than 15, 15-17, 18 or older, or never had sex), has children or been pregnant/impregnated someone, believes self to be infertile, and family and friends' attitudes toward sex and pregnancy (family does not approve of nonmarital childbearing, friends have had unplanned pregnancies, and friends believe birth control is important) as well as religiosity (never attends services, attends a few times year/1-3 times a month, attends weekly or more).

Logistic regression is used to analyze the dichotomous dependent variables (“birth control doesn’t matter when it’s your time” and the side effects measures), and we use Poisson regression to analyze the number of pregnancy risk misconceptions (which could range from 0-5) because this measure was sharply skewed toward 0 (results using OLS regression were substantively similar). We show two sets of models – a baseline model which includes only race/ethnicity, age, and gender, and a full model with sources of information, sexual/family beliefs and behaviors, and socioeconomic characteristics. We also estimated models adding these groups of covariates separately but, for brevity’s sake, do not present these models; we briefly discuss results where appropriate.

Results

Descriptive Results

Table 1 displays the descriptive results for the analytical sample. The sample is about 61% non-Hispanic white, 16% non-Hispanic black, 6% foreign-born Hispanic, 10% native-born Hispanic, and 6% Asian/other. A fourth of the sample is 18-19 years old, and a third of the sample is 25-29, with the rest being 20-24 years old. Just under half of the sample is female. However, both the age and gender distribution vary significantly across race-ethnic groups (not shown). There is socioeconomic variation in the sample. Just under a fifth of the sample have less than a high school education, and a similar proportion have a college degree or more. Thirteen percent of the analytical sample is neither working nor enrolled in school. About a quarter are uninsured, with slightly more than half having private insurance and slightly more than a fifth having Medicaid.

- Table 1 here -

Turning to sexual and family beliefs and behaviors, the majority of the analytical sample has had sex, with the modal age at first sex occurring between ages 15-17. Just over half are currently in a sexual relationship, and 29% have been pregnant/impregnated someone. Fifteen percent believe themselves to be infertile. 42% report that their family does not approve of nonmarital childbearing. The majority (85%) report that their friends think birth control is important even though a substantial minority (36%) have friends who have had an unplanned pregnancy. Attendance at religious service is fairly common – the majority of sample attend services with some frequency, with 43% attending weekly or more. The last few rows of Table 1 show information on sources of sexual information. 80% of the sample had a class on sex education at some point. About 60% had seen a doctor for sexual health reasons. Just under a third of the sample (30.6%) named a non-health care professional as their most trusted source for accurate information on contraception and birth control, and a fourth of the sample (25.8%) reported that they got most of their information in the past year from friends, a current/past partner, or siblings or other relatives.

The weighted bivariate distribution of the dependent variables by race/ethnicity is shown in Table 2, with the overall distribution indicated in the first row. Two things are readily apparent from this table. One, there is a fair amount of reproductive misinformation, disbelief in contraceptive efficacy, and concern about side effects among unmarried young adults. For instance, 40% believe that birth control does not matter because when it is “your time” to get pregnancy, it will happen. The average number of pregnancy risk misconceptions is .7. In disaggregated analyses, inaccurate beliefs about pregnancy following childbirth are most common, with one-fourth believing that a woman cannot get pregnant before her first period. Over 40% believe that hormonal birth control can cause weight gain and severe mood swings.

About 15% believe that hormonal methods reduce sexual desire, while 20% believe they can lead to cancer.

- Table 2 here -

Two, there appear to be substantial differences by race/ethnicity in reproductive health knowledge and beliefs about contraceptive side effects. Foreign-born Hispanics report a significantly higher average number of pregnancy risk misperceptions than any other race-ethnic group. A significantly lower proportion of non-Hispanic whites (34%) believe that birth control does not matter when it is “your time” to get pregnant compared to non-Hispanic blacks (51%) and foreign-born Hispanics (53%). Looking at the side effects, a significantly higher proportion of native-born Hispanics (51%) report that weight gain is quite or extremely likely compared to non-Hispanic whites (39%), and a significantly higher proportion of non-Hispanic blacks (23%) than non-Hispanic whites (13%) believe that reduced sexual desire is quite or extremely likely with hormonal birth control. Further, more non-Hispanic blacks (26%) believe that it is likely that hormonal birth control causes serious health problems like cancer than non-Hispanic whites (18%). At the bivariate level, there are no statistically significant differences across race/ethnicity in beliefs about severe mood swings.

Multivariate Results

We turn to regression models to more fully parse out race-ethnic differences in misperceptions and beliefs. Table 3 displays the unconditional results, with controls only for age and gender (the distribution of which differ across race-ethnic groups in the full sample). In the first model examining pregnancy risk misperceptions (Model 1), foreign-born Hispanics are significantly more likely than any other race-ethnic group to hold erroneous beliefs about the risk of pregnancy, but there are no other differences between whites and other race-ethnic groups. This is not the case, however, for the general indicator of birth control effectiveness shown in

Model 2. Non-Hispanic blacks, foreign-born Hispanics, and Asian/others are more likely to believe that birth control does not matter because when it's "your time" to get pregnant, it will happen. The difference is particularly strong for non-Hispanic blacks and foreign-born Hispanics, who are twice as likely to believe this than non-Hispanic whites; differences between individuals in the Asian/other category and non-Hispanic whites are somewhat smaller and only marginally statistically significant (OR=1.74, p=0.057). Looking at side effects (Model 3-6), non-Hispanic blacks are generally more likely than whites to believe that hormonal contraceptives cause problems. Compared to non-Hispanic whites, non-Hispanic blacks are twice as likely to believe that hormonal contraceptives reduce sexual desire and roughly one and a half times as likely to believe they cause severe mood swings and can cause serious health problems, like cancer. As seen in Model 3, native-born Hispanics are more likely than non-Hispanic whites to think that weight gain is quite or extremely likely to occur, by about 66%. Overall, these results do suggest that there are race-ethnic differences in factors that may affect contraceptive use, though these vary across groups, with foreign-born Hispanics having a less accurate understanding of the reproductive process and non-Hispanic blacks believing in greater chances of adverse side effects. An overall fatalism about birth control seems more common across race-ethnic minority groups than among non-Hispanic whites. As would be expected, women report a lower average number of pregnancy misperceptions than men; they are also less likely to believe that hormonal contraceptives cause severe mood swings. Teenagers are about twice as likely as individuals in their early twenties to have a more fatalistic view towards birth control.

- Table 3 here -

The race-ethnic differences in misperceptions, overall fatalism about birth control, and side effects may result from differences in socioeconomic status, sexual/fertility experiences and

beliefs, or sources of information. To examine whether these factors explain race-ethnic variation, we ran multivariate models, as shown in Table 4. We ran a series of models, adding in socioeconomic characteristics, sexual/fertility experiences and beliefs, and source of information separately before putting them all in the same model, but for the sake of brevity, we show only the full model and discuss the results from intermediate models when appropriate. Model 1 displays the results predicting pregnancy misperceptions with a full set of covariates. In contrast to the unconditional model, foreign-born Hispanics no longer significantly differ from whites or other race-ethnic groups. Significant differences between foreign-born Hispanics disappear when accounting for socioeconomic characteristics, namely insurance status (not shown). Foreign-born Hispanics are more likely to be uninsured, and uninsured individuals hold more inaccurate beliefs regarding the reproductive process. Looking at the other covariates, women have fewer inaccurate beliefs, as do those with some college education. People who are still in school and those who never attend religious services report a greater number of pregnancy risk misperceptions. Sources of information matter somewhat; individuals who say their most trusted source of information is someone other than a health care professional have more misperceptions. However, intermediate models containing only baseline variables and sources of information show that information sources do not mediate race-ethnic differences.

- Table 4 here -

In Model 2, looking at the measure of pregnancy fatalism and contraceptive use, race-ethnicity is no longer a significant predictor. The lack of significance is due largely to the inclusion of sexual/fertility experiences and beliefs, with socioeconomic characteristics also reducing the association between race-ethnicity and birth control fatalism belief. In particular, believing oneself to be infertile is a strong predictor of believing that birth control does not

matter in preventing a pregnancy when it is “your time.” Unmarried young men and women who characterize themselves as infertile are about 85% more likely to think that there is a “time” for people to get pregnant. Religiosity also matters, with individuals who attend religious services more frequently also about 85% more likely to agree with this statement relative to those who attend services a few times a month. Having friends who think birth control is important is marginally significant, reducing the likelihood of believing that birth control does not matter by about one-third relative to those who do not have friends who think birth control is important. In the model with just race-ethnic variables and socioeconomic status, being on Medicaid is statistically significant (increasingly the likelihood of believing that birth control does not matter) and reduces, but does not eliminate, the statistical significance of race-ethnicity; however, it is not significant in the full model presented in Table 4. Teenagers are about 72% more likely to agree with this statement. However, sources of reproductive health information are not significant in either the partial model (not shown) or the full model.

Looking now at the side effects models, Models 3-6, race-ethnic differences are largely explained by the covariates, with the exception of believing that hormonal contraceptives are quite or extremely likely to cause serious health problems such as cancer. Model 3 examines beliefs regarding weight gain, and native-born Hispanics are no longer more likely to agree with this statement more than non-Hispanic whites, largely due to sexual/fertility experiences and beliefs. Individuals who began having sex before age 15 and those who believe themselves to be infertile are significantly more likely to believe that hormonal contraceptives cause weight gain. Socioeconomic characteristics and sources of information are not significant in the full model. Non-Hispanic blacks are more likely to believe that hormonal contraceptives reduce sexual desire in the unconditional model (Model 4), but race-ethnicity is insignificant in the full model,

again largely due to the inclusion of the measure of perceived infertility. Individuals who believe themselves to be infertile are over twice as likely to believe that reduced sexual desire is quite or extremely likely when using hormonal contraception. Education also matters, with those who have less than a high school degree over twice as likely to believe the hormonal contraceptives reduce sexual desire.

In Model 5, examining belief in severe mood swings, non-Hispanic blacks are no longer statistically different than non-Hispanic whites, with perceived infertility again an important predictor. Believing oneself to be infertile increases the odds of believing in severe mood swings when using hormonal contraception by about 50%; although this difference is only marginally significant in the full model ($p=0.058$), this measure is statistically significant at conventional levels in the partial model with only race/ethnicity and sexual/fertility experiences and beliefs. Race-ethnic differences are not statistically significant in intermediate models containing measures of sex and fertility experience. In intermediate models containing measures of socioeconomic characteristics, not shown, being uninsured also positively and significantly predicts belief in mood swings and reduces the non-Hispanic black coefficient to insignificance, though insurance status is not significant in the full model. In the full model, one measure of sources of information is statistically significant and works in the expected direction – individuals who have seen a health care professional for sexual health reasons are about 40% less likely to believe severe mood swings are a likely side effect of hormonal contraceptives. Interestingly, though, this measure is not significant in the model with only race/ethnicity and sources of information (and non-Hispanics blacks remain more likely to believe in mood swings); this factor largely seems to work through insurance status (not shown).

The only measure for which race-ethnicity differences are not entirely accounted for by the covariates is the belief that serious health problems such as cancer are quite/extremely likely side effects of hormonal contraceptives. In the unconditional model (Model 6), non-Hispanic blacks were about two-thirds more likely to believe in serious health problems than whites; in the full model, the magnitude of the difference is largely unchanged, though the significance is reduced somewhat, becoming marginally significant at $p=0.057$. As can be seen in the full model in Table 4, none of the socioeconomic characteristics, sexual/fertility experiences and beliefs, or sources of information account for the higher likelihood among non-Hispanic blacks. In the intermediate models, having had a past pregnancy is statistically significant, reducing the likelihood of believing in serious health problems by about 40%, but it did not mediate differences between non-Hispanic blacks and non-Hispanic whites and is not statistically different from zero in the full model.

In sum, there is race-ethnic variation in pregnancy risk misconceptions, overall fatalism about birth control, and beliefs about side effects, but race-ethnic groups differ across these measures. Further, for most of these factors, race-ethnic differences can be explained by perceived infertility and, to a lesser extent, insurance status. However, the belief that hormonal contraceptives can cause serious health problems like cancer remains more prevalent among non-Hispanic blacks than non-Hispanic whites despite controlling for a number of factors. Sources of health care information were only weakly associated with misperceptions and beliefs and did not explain race-ethnic differences.

Discussion

Unintended fertility is considered a public health concern in the United States, and the stark disparities in rates of unintended fertility across race-ethnic groups may further exacerbate

overall differences in health and well-being. Research has yet to discover the underlying causes of either overall unintended fertility or of race-ethnic differences, though qualitative work on disadvantaged groups and teenagers points to possible explanations. One such explanation is that minority groups may lack sexual literacy; that is, they do not accurately understand the reproductive process, hold more fatalistic views about birth control effectiveness, and more strongly believe in serious side effects. However, it is not clear from prior work, which often failed to include a racially diverse sample, whether sexual literacy does, in fact, vary across race-ethnic groups. Further, if there are differences in knowledge and beliefs, the factors behind such differences have not been identified. Our study examined misperceptions and contraceptive beliefs in a diverse sample of unmarried adults aged 18-30, paying special attention to factors that may contribute to differences, namely socioeconomic differences, sexual experiences and beliefs, and sources of sexual health and contraceptive information.

Our results show that at the bivariate/unconditional level, minority groups do have lower sexual literacy, although there are differences across the components of sexual literacy. Foreign-born Hispanics report more pregnancy risk misperceptions than any other race-ethnic group. Non-Hispanic blacks are more likely than whites to report a high chance of reduced sexual desire, severe mood swings, and serious health problems such as cancer from hormonal contraceptives. Non-Hispanic blacks, foreign-born Hispanics, and, to a lesser extent, Asians and members of “other” race-ethnic groups, are more likely than non-Hispanic whites to believe that birth control use is irrelevant when it is one’s “time” to get pregnant.

Most of these differences, however, disappear in multivariate models. We had hypothesized that these differences in sexual literacy would be attributable, at least in part, to differences in sources of sexual health knowledge. However, this was not the case. While race-

ethnic differences were not statistically different from zero in most of our full models, sources of health knowledge were rarely significantly associated with the dependent variables, and in the two instances in which sources did predict sexual health knowledge, they did not mediate race-ethnic differences. Instead, we found that socioeconomic factors, namely insurance status, were associated with pregnancy misperceptions, with uninsured individuals holding more misperceptions, and the greater proportion of foreign-born Hispanics with erroneous beliefs about the risk of pregnancy was largely due to the higher proportion of uninsured foreign-born Hispanics. Those whose most trusted source of information was a non-health care professional, though, did report more misperceptions.

For fatalism about birth control and beliefs about the side effects of hormonal contraception, race-ethnic differences were largely explained by differences in perceived infertility. The importance of this measure is surprising. Although only 15% of the sample thought they were unable to get pregnant, those who did were significantly more likely to believe there was a high chance of weight gain, reduced sexual desire, and mood swings when using hormonal contraceptives. They were also much more likely to agree with the fatalistic statement regarding birth control and conception. Because race-ethnic minorities are significantly more likely to report themselves as infertile (Polis and Zabin 2012), incorporating this measure in models attenuates race-ethnic differences. Clearly, this measure taps into attitudes toward contraception and pregnancy. On the one hand, individuals who have been told they cannot have children by a health care professional (especially in a sample of young, unmarried individuals) may have accepted that certain things – like having children – are out of their control. On the other hand, those who are basing their perception of infertility on their own experiences of having unprotected sex but not getting pregnant or having a relative with fertility issues may

simply believe that when things are meant to be, they will happen. Along those same lines, if this measure taps into a sense of “things will happen as they are meant to happen,” they may feel as if interfering or trying to change fate by taking contraceptives may bring risks because such interference is *not* meant to be.

Although most race-ethnic differences in beliefs were attenuated in the full models, we were unable to account for the greater belief that hormonal contraceptives can cause serious health problems such as cancer among non-Hispanic blacks relative to non-Hispanic whites. The evidence on a link between oral contraceptives, in particular, and cancer is mixed – the pill protects against uterine and endometrial cancer, but it is less clear how breast cancer risk is affected. While some large-scale studies find no evidence of a breast cancer-pill link (e.g., Marchbank et al. 2002), another study of non-Hispanic blacks found a statistically significant but slight increase in a rare but aggressive form of breast cancer (Rosenberg et al. 2010). Thus, non-Hispanic black women may be drastically overestimating the risks of cancer when using contraception, but their fears are not necessarily unfounded. The combination of a generalized medical distrust and specific distrust about sexual and reproductive health medical interventions may lead non-Hispanic blacks to be more skeptical about hormonal contraception in ways that affect their contraceptive use (Thorburn and Bogart 2005).

Limitations

Our study has several limitations. First, although we discuss factors that have been suggested as an explanation for high rates of unintended fertility among race-ethnic minorities (Dehlendorf et al. 2010), we did not directly link them to contraceptive use and fertility behaviors. Second, there are other factors, both psychosocial (such as motivation to avoid a pregnancy) and structural (such as health care access), that likely play a role as well, and we do not include those factors in

the current analyses. Third, although we have a rich set of explanatory variables, these variables are not perfect and are certainly not complete. For instance, the infertility measure may tap into different domains (such as current infertility versus future infertility), and it does not include characteristics that may be associated with perceived infertility, such as STD history, sexual abuse, and so on (Polis and Zabin 2012). Similarly, we do not know if individuals based their view on side effects from personal experience (either by themselves or their partners) or whether their responses represent a more general viewpoint. Finally, our sources of information measures may not adequately capture what is learned from these sources or the accuracy of the information.

Conclusion

High rates of unintended pregnancy in the United States, especially among non-Hispanic blacks and Hispanics, continue to be a public health concern. Our analysis suggests that there are, indeed, differences in sexual literacy across race-ethnic groups, but not in a uniform manner. Foreign-born Hispanics seem to misunderstand much about the reproductive process, whereas non-Hispanic blacks are more likely to believe that the risk of side effects – including cancer – is high when using hormonal contraceptives. Some of these differences can be explained by insurance status, suggesting that increased insurance coverage would have a general impact on improving sexual health knowledge. Perceptions of infertility are also highly associated with sexual literacy, suggesting that infertility may affect individuals' sense of control over their sexual and reproductive health (among those with medically diagnosed infertility) or may simply be part and parcel of an overall lack of sexual literacy. Further research is needed to understand how these attitudes are associated with contraceptive use and behavior as well as how perceptions of infertility reflect, and affect, individuals' sexual experiences.

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Table 1. Descriptive Statistics for the Analytical Sample

Race/ethnicity		
	Non-Hispanic white	61.4%
	Non-Hispanic black	16.1%
	Foreign-born Hispanic	5.7%
	Native-born Hispanic	10.4%
	Asian/other	6.3%
Age		
	18-19	26.4%
	20-24	41.7%
	25-29	31.9%
Female		
		46.4%
<i>Socioeconomic characteristics</i>		
Education		
	Less than high school	18.6%
	High school/GED	26.5%
	Some college	36.7%
	College or more	18.2%
Employment & enrollment		
	Not working or in school	13.0%
	In school	25.8%
	Working and in school	18.3%
	Working	43.0%
Insurance		
	Medicaid	22.0%
	Private insurance	53.9%
	Uninsured	24.1%
<i>Sexual/family beliefs and behaviors</i>		
Age at first sex		
	Before 15	18.1%
	15-17	42.3%
	18 or later	26.0%
	Never had sex	13.7%
Currently in a sexual relationship		
		56.8%
Ever been pregnant		
		28.9%
Believes self to be infertile		
		15.4%
Family does not approve of nonmarital childbearing		
		41.9%
Friends think birth control is important		
		85.2%
Friends have had unplanned pregnancies		
		35.6%
Religiosity		
	Never attends services	34.8%
	Attends monthly/few times a month	41.7%
	Attends weekly or more	43.4%
<i>Sources of information</i>		
Had sexual education class		
		81.1%
Has seen a doctor for sexual health reasons		
		60.9%
Most trusted source is a not a health care professional		
		30.6%
Gets most of information from peers/siblings/partner		
		25.8%
N		1425

Table 2. Bivariate Associations between Race-Ethnicity and Pregnancy and Contraceptive Beliefs									
	Average number of misperceptions regarding pregnancy (range 0-5)	Believes birth control use does not matter; when it is your time to get pregnant, it will happen	Side Effects						
			Weight gain	Reduced sexual desire	Severe mood swings	Serious health problems, like cancer			
Full analytical sample	0.70	39.4%	42.6%	14.7%	44.7%	19.7%			
Race/ethnicity									
Non-Hispanic white	0.67 ^c	33.6% ^{b,c}	39.4% ^d	12.5% ^b	41.4%	17.7% ^b			
Non-Hispanic black	0.58 ^c	51.3% ^a	47.9%	23.4% ^a	50.7%	26.3% ^a			
Foreign-born Hispanic	1.21 ^{a,b,d}	53.3% ^a	49.6%	11.5%	49.0%	24.3%			
Native-born Hispanic	0.74 ^c	44.1%	51.4% ^a	16.3%	50.8%	18.8%			
Asian/other	0.73	45.0%	38.7%	14.7%	46.7%	19.4%			
Chi-square significance tests:									
^a Differs from non-Hispanic whites at $p \leq .05$									
^b Differs from non-Hispanic blacks at $p \leq .05$									
^c Differs from foreign-born Hispanics at $p \leq .05$									
^d Differs from native-born Hispanics at $p \leq .05$									
^e Differs from Asian/others at $p \leq .05$									

Table 3. Unconditional Models Predicting Pregnancy Risk Misperceptions and Beliefs about Contraception (with controls for age and gender)

	Model 1. Number of Inaccurate Beliefs about Getting Pregnant (Poisson regression)			Model 2. Believe that BC doesn't matter when it's "your time" to get pregnant, you will (Logistic regression)	Side Effects (Logistic regression)				
					Model 3. Weight gain	Model 4. Reduced sexual desire	Model 5. Severe mood swings	Model 6. Serious health problems, like cancer	
	β	se		exp β	exp β	exp β	exp β	exp β	exp β
Race/ethnicity									
Non-Hispanic white	--			--	--	--	--	--	--
Non-Hispanic black	-0.05	0.14		2.06 ***	1.39	2.11 *	1.57 *	1.66 *	
Foreign-born Hispanic	0.56	0.18 **		2.42 **	1.51	0.94	1.36	1.69	
Native-born Hispanic	0.04	0.16		1.51	1.66 *	1.34	1.41	0.99	
Asian/other	0.09	0.17		1.74 ¥	0.97	1.24	1.22	1.11	
Age									
18-19	0.16	0.11		1.95 ***	0.92	1.32	0.94	1.31	
20-24	--			--	--	--	--	--	
25-29	-0.14	0.16		1.11	1.05	1.03	0.79	0.63	
Female	-0.55	0.13 ***		1.16	1.10	1.12	0.70 *	1.13	
Constant	-0.19	0.10		0.38 ***	0.21 ***	0.12 ***	0.90	0.21 ***	
N	1425								

¥p≤.06 *p≤.05 **p≤.01 ***p≤.001

Table 4. Models with Full Set of Controls Predicting Pregnancy Risk Misperceptions and Beliefs about Contraception

		Model 1. Number of Inaccurate Beliefs about Getting Pregnant (Poisson regression)		Model 2. Believe that BC doesn't matter when it's "your time" to get pregnant, you will (Logistic regression)	Side Effects (Logistic regression)			Model 6. Serious health problems, like cancer	
		β	se	exp β	Model 3. Weight gain exp β	Model 4. Reduced sexual desire exp β	Model 5. Severe mood swings exp β	exp β	
Race/ethnicity									
	Non-Hispanic white	--		--	--	--	--	--	
	Non-Hispanic black	-0.26	0.14	1.37	0.92	1.75	1.15	1.67 ¥	
	Foreign-born Hispanic	0.20	0.17	1.84	0.95	0.46	0.89	1.16	
	Native-born Hispanic	-0.12	0.15	1.09	1.18	1.05	1.16	0.91	
	Asian/other	-0.05	0.14	1.71	1.04	1.12	1.36	1.09	
Age									
	18-19	-0.01	0.11	1.72 *	0.74	1.07	0.91	1.31	
	20-24	--		--	--	--	--	--	
	25-29	-0.19	0.12	1.06	1.02	1.16	0.72	0.64	
Female		-0.48	0.12	***	0.96	1.30	1.15	0.88	1.37
<i>Socioeconomic characteristics</i>									
Education								1.30	
	Less than high school	0.16	0.12	1.01	0.97	2.24 *	1.27	--	
	High school/GED	--		--	--	--	--	1.09	
	Some college	-0.25	0.12	*	0.80	0.72	0.95	1.13	
	College or more	-0.10	0.18	0.66	0.88	1.10	1.01	1.13	
Employment & enrollment									
	Not working or in school	0.03	0.18	1.10	0.93	0.99	1.05	0.50	
	In school	0.32	0.18	**	1.19	1.18	0.91	0.72	
	Working and in school	0.12	0.14	1.01	1.30	0.98	1.02	0.96	
	Working	--		--	--	--	--	--	
Insurance									
	Medicaid	0.21	0.15	1.54 †	1.22	0.76	1.36	1.05	
	Private insurance	--		--	--	--	--	--	
	Uninsured	0.41	0.11	***	1.00	1.34	1.14	1.48	
<i>Sexual/family beliefs and behaviors</i>									
Age at first sex									
	Before 15	0.72	0.13	0.93	1.91 **	1.64	1.07	1.41	
	15-17	--		--	--	--	--	--	
	18 or later	0.25	0.12	*	1.10	0.84	0.92	1.03	
	Never had sex	-0.12	0.17	0.90	0.83	2.16	0.54	0.99	

Currently in a sexual relationship	-0.05	0.11		1.11	0.97	1.31	0.93	0.96		
Ever been pregnant	-0.05	0.14		1.28	1.07	0.75	0.92	0.66		
Believes self to be infertile	0.54	0.12	***	1.86	**	1.75 *	2.17 *	1.54 ¥	1.30	
Family does not approve of nonmarital childbearing	-0.17	0.09		1.08	0.83	1.32	0.96	0.91		
Friends think birth control is important	0.05	0.12		0.65	¥	0.88	0.99	0.85	1.07	
Friends have had unplanned pregnancies	-0.10	0.10		0.87	0.83	0.86	0.68	0.76		
Religiosity										
Never attends services	0.22	0.11	*	0.82	0.95	1.33	0.96	1.24		
Attends monthly/few times a month	--			--	--	--	--	--		
Attends weekly or more	0.11	0.11		1.83	**	1.02	1.49	1.27	1.03	
<i>Sources of information</i>										
Had sexual education class	-0.11	0.11		0.79	0.72	0.96	0.92	0.99		
Has seen a doctor for sexual health reasons	0.09	0.12		1.14	0.81	1.08	0.60 *	0.74		
Most trusted source not a health care professional	0.20	0.09	*	1.14	1.10	0.88	1.07	1.04		
Gets most information from peers/siblings/partner	0.19	0.10		1.06	1.20	1.08	1.27	0.72		
Constant	-0.47	0.22	*	0.55	1.14	0.08	***	1.58	0.25	**
N	1425									
¥p≤.06 *p≤.05 **p≤.01 ***p≤.001										