

Contraceptive Sterilization: Introducing A Couple Perspective to Examine Sociodemographic Differences in Use

CONTEXT: Most studies of contraceptive use have relied solely on the woman's perspective, but because men's attitudes and preferences are also important, analytic approaches based on couples should also be explored.

METHODS: Data from the 2006–2010 and 2011–2013 rounds of the National Survey of Family Growth yielded a sample of 4,591 men and women who were married or cohabiting with an opposite-sex partner and who had completed their intended childbearing. Respondents' reports of both their own and their partners' characteristics and behaviors were employed in two sets of analyses examining educational and racial and ethnic differences in contraceptive use: an individualistic approach (using multinomial logistic regression) and a couple approach (using multinomial logistic diagonal reference models).

RESULTS: In the full model using the individualistic approach, respondents with less than a high school education were less likely than those with at least a college degree to rely on male sterilization (odds ratios, 0.1–0.2) or a reversible method (0.4–0.5), as opposed to female sterilization. Parallel analyses limited to couples in which partners had the same educational levels (i.e., educationally homogamous couples) showed an even greater difference between those with the least and those with the most schooling (0.03 for male sterilization and 0.2 for a reversible method). When race and ethnicity, which had a much higher level of homogamy, were examined, the approaches yielded more similar results.

CONCLUSIONS: Research on contraceptive use can benefit from a couple approach, particularly when focusing on partners' characteristics for which homogamy is relatively low.

Perspectives on Sexual and Reproductive Health, 2017, 49(3):173–180, doi:10.1363/psrh.12033

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Research on contraceptive use has traditionally relied on the woman's perspective.^{1,2} Key surveys, such as the National Survey of Family Growth (NSFG), did not even include male respondents before 2002. Interest in the role of men has grown because of the importance of condom use in disease prevention, and because of high levels of teenage pregnancy and nonmarital childbearing.³ However, studies that include the perspectives of both partners remain scarce—even in research focused exclusively on partnered women or men.*⁴

At the heart of the individualistic approach to examining contraceptive use is the view that women—who are the ones at risk of pregnancy, and who control most contraceptive methods—are the main actors and the more reliable reporters. Yet several studies have questioned this view. Grady and colleagues found that both partners' ratings of different contraceptive methods were significantly related to a couple's method choice² and that most men believed that both partners should share equal responsibility in contraceptive decision making.⁵ Bertotti⁶ and Forste and colleagues⁷ reported that the male partner's characteristics were more strongly associated with sterilization decisions than were the female partner's characteristics.

The individualistic approach to examining contraceptive use also hinges on the assumption of homogamy.^{8,9} Given

individuals' general tendency to marry persons who are comparable in status (homogamy), or who belong to the same group as defined by some important feature (endogamy),¹⁰ most couples are assumed to have similar characteristics. Such similarity could present statistical challenges (e.g., collinearity), but it would also reduce the need to include both partners. The homogamy† assumption does not necessarily hold for all characteristics and groups. For example, only 55% of women who married for the first time in 1988–1995 had partners with a similar education level,¹¹ and among U.S.-born men who married in 2007–2008, the proportions who wed partners of the same race or ethnicity were 80% for blacks and 94% for whites, but only 48% for Hispanics.¹²

Because the individualistic approach estimates use patterns for all individuals combined—those in homogamous and those in heterogamous couples—it is sensitive to the

*Exceptions are studies that examined the independent association between couple composition and contraceptive use—e.g., Bertotti AM, Gendered divisions of fertility work: socioeconomic predictors of female versus male sterilization, *Journal of Marriage and Family*, 2013, 75(1):13–25.

†For brevity, the term "homogamy" is used throughout the text to refer to either homogamy or endogamy, and the term "heterogamy" to refer to either heterogamy or exogamy.

degree and patterning of sociodemographic heterogamy; in the absence of high levels of sociodemographic homogeneity, it may not be the best way to examine differences in contraceptive use. Additional understanding of contraceptive use can be gained by relying on a couple perspective and estimates of use patterns for individuals in homogamous couples only. After all, if both partners independently shape a couple's contraceptive behavior, the contraceptive use of individuals in heterogamous couples will not be representative of any one sociodemographic group, but will reflect the sociodemographic groups of both partners. Adjusting for the other partner's characteristics (e.g., in standard regression models) is unlikely to resolve the issue, because estimates will still partly reflect the contraceptive use of individuals in heterogamous couples.

This study seeks to demonstrate how the standard individualistic approach can lead to the underestimation of differences in contraceptive use (i.e., a heterogamy bias), by comparing a couple approach with an individualistic approach for examining sociodemographic differences in contraceptive sterilization. Sterilization is an ideal choice for this comparison because the method is typically initiated by married or cohabiting men and women—94% of male procedures and 83% of female procedures occur within the context of a coresidential partnership.¹³ The study focuses on two key sociodemographic correlates of reliance on sterilization: education and race or ethnicity. Research since the mid-20th century has shown that less educated women and minority women tend to rely more on female sterilization, and less on male sterilization, than do women with high levels of education and white women, respectively.^{14–16} Moreover, examining these two correlates allows an exploration of the heterogamy bias for one characteristic that has a relatively low level of homogeneity (education) and one that has a relatively high level (race and ethnicity).

METHODS

Data and Sample

Data for this study were drawn from the female and male samples of the 2006–2010 and 2011–2013 rounds of the NSFG. The surveys oversampled teenagers, blacks and Hispanics; when properly weighted, the data are representative of the U.S. civilian noninstitutionalized population aged 15–44. Face-to-face interviews were held with 12,279 women and 10,403 men in the earlier round, and with 5,601 women and 4,815 men in the later one. Response rates were 78% and 73% for women, and 75% and 72% for men, respectively.^{17,18}

Because questions regarding sterilization of respondents' partners were limited to respondents in coresidential partnerships, the overall sample included only individuals aged 18–44 who were married or cohabiting with an opposite-sex partner. Sterilization is generally considered a permanent method, so the analysis was further limited to respondents who indicated that they and their current coresidential partner had completed their intended

childbearing and were using a contraceptive method. More specifically, respondents were included if they indicated that they and their partner did not intend to have a child (or another child), that the female partner was not pregnant, and that the couple were using a reversible method or that either partner had obtained a sterilization for contraceptive reasons during the current coresidential relationship, regardless of later reversal. The last restriction was based on the month and year of sterilization and the period of cohabitation or marriage. Male respondents did not provide information on the date of female sterilization procedures, but if a male indicated that he had relied on female sterilization at first sex with the current partner, the couple were omitted. Males were also not asked about the reason for their partners' tubal ligation; hence it was impossible to ascertain that all female procedures reported by males were performed for contraceptive reasons. The overall sample also excluded respondents who said that they or their partners were physically unable to have a child for reasons other than surgical sterilization (e.g., accident, illness, menopause).

The data provide information on 4,591 couples, as reported by 3,096 females and 1,495 males. All analyses and descriptive statistics were adjusted for the NSFG's complex sample design.

Measures

The dependent variable in this study is contraceptive use: female sterilization, male sterilization or any reversible method (including traditional ones). First, respondents who had had, or whose partner had had, a sterilization operation for contraceptive reasons during the course of the current coresidential relationship were identified; the small number of respondents in couples in which both partners had had an operation were omitted. Next, for respondents in couples in which neither partner had had a sterilization operation, reports of contraceptive method used at last sex in the past three months were considered.

The primary independent variables were educational attainment and race and ethnicity. Educational attainment was categorized as less than high school, high school, some college, or a college degree or higher. Race and ethnicity was categorized as white, Hispanic, black or other (indicating any other response or multiracial background). Other sociodemographic measures included, because of their known associations with sterilization,¹⁵ were the respondent's and partner's ages (18–29, 30–34, 35–39 or 40–44), parity, number of children fathered (0–1, 2, or 3 or more) and union histories (whether married previously), as well as the respondent's union status (married or cohabiting) and current religious affiliation (Protestant, Catholic, none or other). For female respondents, the study included age at last birth (younger than 25, 25–29, 30–34, or 35 or older), and for male respondents, partner's age at last birth. If a respondent had no biological children with the current partner, the woman's age at the start of the partnership was noted, rather than the woman's age at last birth, because

this was the youngest age at which the couple could have considered sterilization.

Analysis

The analysis was conducted in two steps. First, chi-square tests were performed to identify bivariate associations between contraceptive use and the primary independent variables. The potential importance of adopting a couple approach was explored by comparing associations in the full sample with those in two subsamples (using t tests): individuals in educationally homogamous couples and individuals in racially and ethnically homogamous couples.

Second, multivariate analyses were conducted to examine variation in contraceptive use by education and by race and ethnicity. Estimates using a standard analysis technique, multinomial logistic regression, were compared with those using a specialized dyadic analysis technique, multinomial logistic diagonal reference models. The latter models estimate the likelihood of an individual's belonging in each category of the dependent variable in a way that is comparable to the approach in multinomial logistic regression, but applies only to individuals in homogamous couples. Thus, comparing estimates from these models with ones from multinomial logistic regression models shows how patterns of contraceptive use among individuals in homogamous couples differ from those among individuals in homogamous and heterogamous couples combined.

Diagonal reference models were designed by Sobel¹⁹ to study the role of social mobility. The technique is uniquely suited to examining how couples' sociodemographic composition matters to differences in contraceptive use, as it adheres to the theoretical idea that individuals in homogamous unions represent the core of their group. More specifically, diagonal reference models estimate the value of the dependent variable for individuals in each type of homogamous couple (e.g., for each type of educationally homogamous couple). The value of the dependent variable for individuals in heterogamous couples is expected to lie between the values as estimated for the two corresponding homogamous couples. The relative impact of these diagonal referents, and thus of the characteristics of the female and male partners, is estimated by means of a salience parameter with a value between 0 and 1. Covariates, such as control variables, can be added to the baseline model, meaning that the extended diagonal reference models combine the advantages of log-linear models (analyzing nonlinear and interaction effects) with the flexibility of multivariate regression (incorporating multiple control variables).²⁰ The multinomial logistic transformation of the diagonal reference models was used because the dependent variable, contraceptive use status, has three categories. (Model formulas of multinomial logistic diagonal reference models are described elsewhere.²¹)

Wald tests were conducted to identify variables that were associated with contraceptive use in the multivariate models. All multinomial logistic regressions were estimated using Stata 12. The diagonal reference models were

estimated using newly written code (*svygnm* in the *logmult* package²²) that allows for the use of complex survey data—such as the NSFG data—when employing the *gnm* command in R (*gnm* package²³).

Sensitivity Analysis

Five sets of sensitivity analyses were performed. First, the sample was limited to respondents aged 25–44. Second, all cases of tubal ligations and vasectomies, regardless of contraceptive intent, were included in both the female and the male samples. Third, respondents who had had a sterilization operation (or whose partner had had one), but had not had sex in the past three months, were excluded. Fourth, couples in which either partner was of “other” racial or ethnic background were excluded. Finally, average marginal effects were estimated to ascertain that results were not sensitive to the degree of unobserved heterogeneity in the models.²⁴ None of these sensitivity analyses yielded conclusions that were different from those derived from the main analyses. (Results are available on request.)

RESULTS

Descriptive and Bivariate

The majority of respondents were 30 or older, had two or more children, and were married (Appendix Table 1, Supporting Information). The proportion of couples who were educationally homogamous (52%) was smaller than the proportion who were racially or ethnically homogamous (86%; Appendix Table 2, Supporting Information).

TABLE 1. Percentage distribution of men and women aged 18–44 who are married or living with an opposite-sex partner, have completed their intended childbearing and are using contraceptives, by method, according to partner- and couple-level measures of educational attainment, National Survey of Family Growth, 2006–2013

Education	N	Female sterilization	Male sterilization	Reversible method	Total
OVERALL SAMPLE					
All	4,591	31.2	22.1	46.7	100.0
Female partner					
<high school	528	54.5	3.7	41.8	100.0
High school	1,143	41.5	16.7	41.8	100.0
Some college	1,362	29.6	22.3	48.2	100.0
≥college	1,559	17.1	32.1	50.8	100.0
$\chi^2(6)=413.4, p=.000$					
Male partner					
<high school	704	54.0	6.1	39.9	100.0
High school	1,202	36.6	19.2	44.3	100.0
Some college	1,244	31.1	20.8	48.1	100.0
≥college	1,440	15.6	33.2	50.9	100.0
$\chi^2(6)=425.1, p=.000$					
EDUCATIONALLY HOMOGENEOUS COUPLES					
All	2,304	29.7	24.1	46.2	100.0
<high school	294	59.8	1.4*	38.8	100.0
High school	509	43.1	17.4	39.5	100.0
Some college	533	31.1	20.0	48.9	100.0
≥college	967	12.8*	36.8**	50.4	100.0
$\chi^2(6)=368.2, p=.000$					

*Significantly different from percentage for the overall sample at $p < .05$. **Significantly different from percentage for the overall sample at $p < .01$. Note: Because of weighting and rounding, Ns may not sum to their respective totals, and percentages may not sum to 100.0.

TABLE 2. Percentage distribution of men and women aged 18–44 who are married or living with an opposite-sex partner, have completed their intended childbearing and are using contraceptives, by method, according to partner- and couple-level measures of race and ethnicity

Race/ethnicity	N	Female sterilization	Male sterilization	Reversible method	Total
OVERALL SAMPLE					
All	4,591	31.2	22.1	46.7	100.0
Female partner					
White	3,096	26.2	28.4	45.4	100.0
Hispanic	852	45.4	8.3	46.3	100.0
Black	337	46.0	6.8	47.3	100.0
Other	306	25.5	13.7	60.8	100.0
$\chi^2(6)=294.8, p=.000$					
Male partner					
White	3,025	25.3	28.6	46.1	100.0
Hispanic	875	45.1	7.8	47.1	100.0
Black	408	44.2	10.2	45.6	100.0
Other	284	32.4	13.6	54.0	100.0
$\chi^2(6)=288.8, p=.000$					
RACIALLY/ETHNICALLY HOMOGENEOUS COUPLES					
All	3,917	31.7	22.3	46.0	100.0
White	2,747	25.6	29.1	45.3	100.0
Hispanic	693	49.9**	5.7*	44.4	100.0
Black	307	46.2	6.8	47.0	100.0
Other	171	29.1	7.6*	63.4	100.0
$\chi^2(6)=330.0, p=.000$					

*Significantly different from percentage for the overall sample at $p < .05$. **Significantly different from percentage for the overall sample at $p < .01$. Note: Because of weighting and rounding, Ns may not sum to their respective totals, and percentages may not sum to 100.0.

The level of racial and ethnic homogamy was 90% and 92% among white women and men, respectively; 92% and 76% among black women and men, respectively; and 82% and 80% among Hispanic women and men, respectively.

Thirty-one percent of couples relied on female sterilization, 22% on male sterilization and 47% on a reversible method (Table 1). Bivariate analysis showed that female respondents' educational attainment was positively associated with reliance on male sterilization or a reversible method, and negatively associated with reliance on female sterilization: Four percent of women with less than a high school education and 32% with at least a college degree relied on male sterilization, while 42% and 51%, respectively, used reversible methods. In contrast, 55% of women with less than a high school education and 17% with at least a college degree relied on female sterilization. Patterns were similar for male respondents' education, but differences tended to be somewhat larger when the sample was limited to respondents in educationally homogamous couples.

Whites were the most likely to rely on male sterilization. Some 28% of white women did so, compared with 7–14% of Hispanic, black and other women (Table 2). Hispanic and black women were more likely to rely on female sterilization (45% and 46%, respectively) than were whites and women of other background (26% for both). Again, patterns were similar when male respondents' race and ethnicity were examined. When the sample was limited to racially or ethnically homogamous couples, significant differences were seen for Hispanics. However, little changed

in the estimates for whites or blacks, probably because of their somewhat higher levels of racial homogamy in the overall sample.

Multivariate

•**Education.** Both the multinomial logistic regression analyses and the multinomial logistic diagonal reference models showed a positive association between education and reliance on male sterilization or a reversible method, as opposed to female sterilization. Regardless of whether the female's characteristics were entered (Table 3, model 1) or the male's were (model 2), the multinomial logistic regression analysis found that respondents with less than a high school education were less likely than those with at least a college degree to rely on male sterilization (odds ratios, 0.08–0.09) or a reversible method (0.2–0.3), rather than female sterilization. For both genders, the differentials decreased steadily with increasing levels of education. After adjustment for both partners' education (model 3), the educational differentials were reduced. In the full model, respondents with less than a high school education or a high school education were less likely than those with at least a college degree to rely on male sterilization (0.1–0.5) or a reversible method (0.4–0.5), as opposed to female sterilization. Similar differentials were found for males with some college education (0.5 and 0.6, respectively); the differentials for their female counterparts were no longer significant.

For respondents in educationally homogamous couples, the diagonal reference models revealed larger differentials and a steeper education gradient (Table 4, model 3) than the standard multinomial logistic regression analyses that included both partners' educational levels. Compared with individuals in homogamous partnerships who had at least a college degree, respondents with less than a high school education who had a partner with a similar education were less likely to rely on male sterilization (odds ratio, 0.03) or a reversible method (0.2), as opposed to female sterilization. Differentials were significant at each education level, and were larger than those found in the multinomial logistic regression models. Overall, these results confirm that the individualistic approach is sensitive to the degree and patterning of sociodemographic heterogamy, and that use of a couple approach and estimates for educationally homogamous partners only reveals larger differentials.

•**Race and ethnicity.** Multinomial logistic regression analyses found that female respondents who were Hispanic, black, or of other racial or ethnic background were less likely than white females to rely on male sterilization, as opposed to female sterilization (odds ratios, 0.4, 0.2 and 0.5, respectively—Table 3, model 1). In addition, black females were less likely than white females to rely on a reversible method (0.7), rather than female sterilization. Furthermore, male respondents who were nonwhite had reduced odds of relying on male sterilization, as opposed to female sterilization (0.3–0.4—model 2). Adjustment for both partners' race and ethnicity (model 3) eliminated the observed differentials in nearly all cases: Black females

TABLE 3. Odds ratios (and 95% confidence intervals) from multinomial logistic regression analyses assessing associations between individual-level measures of educational attainment and race or ethnicity and couples' reliance on male sterilization or a reversible contraceptive method, as opposed to female sterilization

Measure	Model 1		Model 2		Model 3	
	Male sterilization	Reversible method	Male sterilization	Reversible method	Male sterilization	Reversible method
FEMALE						
Education						
<high school	0.08 (0.04–0.14)*	0.34 (0.22–0.53)*	na	na	0.14 (0.07–0.29)*	0.54 (0.32–0.91)*
High school	0.30 (0.20–0.45)*	0.37 (0.26–0.52)*	na	na	0.46 (0.30–0.70)*	0.51 (0.34–0.76)*
Some college	0.54 (0.37–0.78)*	0.64 (0.46–0.88)*	na	na	0.72 (0.49–1.05)	0.80 (0.56–1.15)
≥college (ref)	1.00	1.00	na	na	1.00	1.00
<i>F</i> (6, 145)	12.83***				5.62***	
Race/ethnicity						
White (ref)	1.00	1.00	na	na	1.00	1.00
Hispanic	0.37 (0.23–0.60)*	0.90 (0.61–1.31)	na	na	0.72 (0.38–1.36)	0.91 (0.58–1.43)
Black	0.15 (0.09–0.25)*	0.71 (0.51–0.98)*	na	na	0.17 (0.07–0.43)*	1.03 (0.53–1.99)
Other	0.51 (0.27–0.97)*	1.32 (0.82–2.12)	na	na	0.79 (0.40–1.57)	1.61 (0.97–2.67)
<i>F</i> (6, 145)	12.82***				3.87**	
MALE						
Education						
<high school	na	na	0.09 (0.05–0.17)*	0.21 (0.14–0.31)*	0.19 (0.10–0.35)*	0.36 (0.21–0.60)*
High school	na	na	0.30 (0.18–0.48)*	0.33 (0.23–0.49)*	0.48 (0.29–0.78)*	0.51 (0.33–0.79)*
Some college	na	na	0.35 (0.21–0.57)*	0.43 (0.30–0.62)*	0.45 (0.28–0.74)*	0.55 (0.36–0.84)*
≥college (ref)	na	na	1.00	1.00	1.00	1.00
<i>F</i> (6, 145)			13.66***		5.93***	
Race/ethnicity						
White (ref)	na	na	1.00	1.00	1.00	1.00
Hispanic	na	na	0.29 (0.18–0.46)*	0.86 (0.62–1.19)	0.49 (0.25–0.96)*	1.15 (0.73–1.83)
Black	na	na	0.27 (0.16–0.45)*	0.79 (0.59–1.05)	0.89 (0.36–2.22)	0.70 (0.36–1.35)
Other	na	na	0.39 (0.20–0.75)*	0.84 (0.56–1.24)	0.51 (0.25–1.05)	0.74 (0.45–1.22)
<i>F</i> (6, 145)			9.03***		2.16	

* $p < .05$. ** $p < .01$. *** $p < .001$. Notes: All models controlled for union status, religious affiliation and women's age at last birth. In addition, model 1 controlled for women's age, parity and union history; model 2 for men's age, number of children fathered and union history; and model 3 for all of these variables. ref=reference group. na=not applicable.

TABLE 4. Odds ratios (and 95% confidence intervals) from multinomial logistic diagonal reference models assessing associations between measures of homogamous couples' educational attainment and race or ethnicity and their reliance on male sterilization or a reversible contraceptive method, as opposed to female sterilization

Measure	Model 1		Model 2		Model 3	
	Male sterilization	Reversible method	Male sterilization	Reversible method	Male sterilization	Reversible method
Education						
<high school	0.03 (0.01–0.06)*	0.20 (0.09–0.30)*	0.03 (0.01–0.05)*	0.13 (0.06–0.21)*	0.03 (0.01–0.05)*	0.19 (0.09–0.29)*
High school	0.23 (0.09–0.37)*	0.26 (0.13–0.39)*	0.20 (0.08–0.32)*	0.21 (0.11–0.31)*	0.22 (0.08–0.36)*	0.26 (0.13–0.39)*
Some college	0.34 (0.11–0.57)*	0.46 (0.23–0.69)*	0.29 (0.10–0.49)*	0.36 (0.19–0.53)*	0.33 (0.10–0.56)*	0.45 (0.22–0.68)*
≥college (ref)	1.00	1.00	1.00	1.00	1.00	1.00
<i>Saliency parameter</i>	0.52 (0.29–0.74)		0.52 (0.34–0.69)		0.52 (0.31–0.73)	
Race/ethnicity						
White (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Hispanic	0.28 (0.12–0.44)*	0.92 (0.51–1.33)	0.25 (0.12–0.38)*	0.81 (0.51–1.10)	0.36 (0.15–0.56)*	1.05 (0.62–1.48)
Black	0.16 (0.07–0.25)*	0.67 (0.41–0.93)*	0.18 (0.08–0.29)*	0.79 (0.52–1.05)	0.17 (0.07–0.27)*	0.71 (0.42–1.01)
Other	0.36 (0.08–0.65)*	1.18 (0.37–1.98)	0.35 (0.08–0.62)*	1.02 (0.41–1.64)	0.41 (0.09–0.73)*	1.24 (0.42–2.07)
<i>Saliency parameter</i>	0.55 (–0.31 to 1.41)		0.55 (–0.29 to 1.40)		0.58 (–0.83 to 1.99)	

* $p < .05$. Notes: Models controlled for variables noted in Table 3. In addition, analyses by level of education controlled for females' (model 1) or males' (model 2) race and ethnicity, or for both (model 3); analyses by race and ethnicity controlled for females' (model 1) or males' (model 2) level of education, or for both (model 3). ref=reference group.

retained a reduced likelihood of relying on male sterilization rather than female sterilization (0.2). One reason that model 3 showed a drop-off in significant findings is likely the high proportion of racially and ethnically homogamous couples in the overall sample, which made it hard to estimate unique associations with partners' racial or ethnic backgrounds (i.e., collinearity increases the variance of the regression coefficients).*

The estimates from diagonal reference models for respondents in racially or ethnically homogamous couples

*Collinearity between independent variables inflates the variance of their coefficient and may make coefficients unstable. For example, the variance inflation factor for race and ethnicity in model 3 (Table 3) has a maximum value of 3.66, which means that the standard error is up to 1.9 times as large as it would be if that variable were uncorrelated with all of the other independent variables in the model.

revealed more pronounced differentials than the estimates from the full multinomial logistic regression models. Respondents in homogamous partnerships who were Hispanic, black, or of other racial or ethnic background were less likely than respondents in homogamous partnerships who were white to rely on male sterilization, as opposed to female sterilization (odds ratios, 0.4, 0.2 and 0.4, respectively—Table 4, model 3). However, these estimates tend to fall between those from the multinomial logistic regression models that included only one partner's race or ethnicity (Table 3, models 1 and 2), illustrating that the degree of heterogamy is key in determining how individualistic and couple approaches can lead to different estimates.

•**Partners' relative contributions.** The salience parameters in the diagonal reference models revealed the relative importance of the characteristics of female and male partners. The salience parameter in each education model (0.52) suggests that both partners' education levels were of about equal importance in determining couples' contraceptive use. The salience parameters in the race and ethnicity models have similar values to those in the education models, but also have very wide confidence intervals—likely because of the high degree of racial and ethnic homogamy in the sample. Therefore, the models for race and ethnicity do not allow for firm conclusions regarding the relative importance of the female and male partners' racial or ethnic background.

DISCUSSION

This study shows how a couple approach can provide an alternative viewpoint on contraceptive use patterns. Results confirm that the standard individualistic approach can lead to the underestimation of differentials in contraceptive use by educational attainment and, to a lesser extent, race and ethnicity (i.e., a heterogamy bias).

However, the couple approach should not necessarily replace the individualistic approach; instead, it can provide a fuller understanding of sociodemographic differentials in contraceptive use. In fact, when sociodemographic homogamy is high, the couple approach generates results that are similar to those derived from an individualistic analysis; in such cases, it would be inadvisable to rely on an individualistic analysis that includes both partners' characteristics, because such an approach may lead to problems with collinearity. Future research should be mindful of these issues, and of the limitations of both the individualistic and the couple approaches for examining contraceptive use patterns. In addition, future studies could expand the couple approach to analyze samples that include single individuals; diagonal reference models do not readily allow for the inclusion of single individuals, though recent studies²⁵ have explored ways to deal with asymmetry in the categories of the variables that are at the core of this technique. Because of data limitations, the current study was limited to respondents who were married or cohabiting.

Since both approaches can advance the understanding of differentials in contraceptive use, the decision of which to use ultimately depends on the analytic goal. A couple approach may be preferable if one is interested in, for example, understanding how contraceptive preferences vary across racial and ethnic groups. After all, the contraceptive use of individuals in racially or ethnically heterogamous couples is unlikely to be representative of any one racial or ethnic group, because both partners may influence the couple's method choice; that appears to be the case for individuals' education and potentially race or ethnicity. An individualistic approach may be preferable if one is interested in, for example, describing whether women with low or those with high levels of education are at increased risk of unintended pregnancy because they rely on less effective methods. In that case, the partner's characteristics and the potential for heterogamy bias will be part of the answer, rather than something that needs to be adjusted for.

Limitations

There are a number of limitations to this study. First, given the focus on sterilization, the sample was limited to respondents in couples who did not intend future childbearing. Yet childbearing intentions are often dynamic (hence, sterilization reversal), and couples are likely to vary in their level of agreement and certainty about intentions.²⁶ Future research could benefit from examining how such variation may affect sterilization differentials by education and race or ethnicity.

Second, like most research analyzing nationally representative data on contraceptive use, this study relied on a measure of education at the time of interview, rather than at the time of contraceptive decision making. Educational attainment is likely more stable among married and cohabiting individuals who have completed childbearing than in more general samples of contraceptive users. Nevertheless, future research could benefit from data collection efforts aimed at measuring individuals' characteristics at the time of contraceptive decision making.

Third, this study relied on a broad categorization of racial and ethnic background, and included an "other" category. Such a categorization is commonly used in research on contraceptive use, yet it has important limitations. Because this study distinguished among only three specific racial and ethnic groups, the racial and ethnic homogamy examined here should be interpreted in a broad sense. For example, the Hispanic category included individuals of Mexican, Puerto Rican and Cuban background, meaning that partners in "homogamous Hispanic" couples did not necessarily trace back to the same country. Moreover, it was impossible to examine patterns for the heterogeneous and small number of individuals in the "other" category. Nonetheless, sensitivity analyses that omitted couples in which either partner was in that category did not lead to substantively different conclusions.

Finally, the analysis was limited to couples who were using a contraceptive, because the relative number of non-users, as well as the relative importance of reasons for not using a contraceptive (e.g., cost, access), likely varies by education and race or ethnicity.^{27,28} Although the exclusion of nonusers facilitated the interpretation of findings, it also limited their generalizability.

Conclusions

A full understanding of patterns of contraceptive use has been hampered by the common practice of relying on the woman's perspective. This study illustrates one reason why research on contraceptive use can benefit from the adoption of a couple approach. Because the degree of heterogamy bias is positively associated with the degree of sociodemographic heterogamy, adopting a couple approach can be of particular value when focusing on characteristics for which homogamy is relatively low (e.g., education) or when analyzing changes in contraceptive use patterns over time. For example, educational homogamy in the United States has increased since the 1960s,¹¹ while racial and ethnic homogamy has decreased.²⁹ All else being equal, these changes would lead to an increase in the differentials in sterilization by education as estimated using the individualistic approach, and a decrease in the differentials by race and ethnicity. The changes would not, by themselves, affect the differentials as estimated using diagonal reference models. Future research should extend the use of the couple approach in analyzing data sets that include single individuals, and should consider which of the field's many important research questions would benefit from its adoption.

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Acknowledgments

The research presented here was supported by grant F32HD078037 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) of the National Institutes of Health. This project was supported in part by the California Center

for Population Research at the University of California, Los Angeles, which receives core support from NICHD grant R24-HD041022. The author thanks Milan Bouchet-Valat and Heather Turner for help with the estimation of the multinomial logistic diagonal reference models. The content is the responsibility solely of the author and does not necessarily represent the official views of the National Institutes of Health.

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