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ADVANCES IN MEASUREMENT AND DESIGN IN HEALTH DISPARITIES RESEARCH

Race/Ethnicity Differences in the Validity of Self-Reported Drug Use: Results from a Household Survey

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ABSTRACT *Data were analyzed from a multistage probability household survey of over 600 adults, ages 18–40 from the city of Chicago conducted during 2001–2002. The survey employed audio computer-assisted self-interviews to obtain information about drug use. To investigate race/ethnicity differences in reporting validity, drug test results were compared with self-reports of past month drug use for cocaine, marijuana, and a combined indicator of both substances. The main indicators of validity were self-report sensitivity and concordance. Possible theoretical models accounting for potential cultural differences in reporting validity were discussed. Survey variables reflecting these potential explanations were examined as potential mediators of race/ethnicity differences in validity and as direct correlates of validity. Socioeconomic status was identified as one potential mediator. With this exception, race/ethnicity differences suggesting lower levels of marijuana and cocaine concordance for African Americans as compared with Whites were sustained after controlling for potential mediators. Methodological implications for epidemiological and health disparities research are discussed.*

KEYWORDS *Drug abuse, Race/ethnicity, Survey research, Validity.*

INTRODUCTION

A growing body of research raises questions about the validity of self-reported drug use in social surveys.[1–5] Of particular importance for researchers on health disparities in substance abuse problems and treatment is the likely possibility that reporting validity in surveys often varies by race/ethnicity. Thus far, the evidence for race/ethnicity variation in substance abuse reporting validity has been suggestive but not conclusive.[6,7]

Studies Informative on Race/Ethnicity Validity Differences

Most of the research examining race differences in reporting validity have focused on indirect evidence. Specifically, they have focused on one particular phenomenon,

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sometimes referred to as "recanting," or the denial of previously disclosed "lifetime" use of substances among those who participated in multiple waves of surveys. Most studies evaluating this phenomenon have yielded results that suggest that African American respondents, and, to a lesser extent, Hispanic respondents are more likely to recant than White respondents.[8–14] These studies fall short in convincingly demonstrating validity differences because recanting is really evidence of reliability (or consistency), a necessary but not sufficient precondition for validity.

There have been a small number of "true" validity studies in which survey reports of illicit drug use were compared with biological criteria, and the results of those comparisons were contrasted across race/ethnicity subgroups. These studies compare race/ethnicity subgroup differences with respect to "underreporting" (or self-report "sensitivity"). Consistent with the recanting literature, Johnson and Bowman[6] suggest that these studies have generally shown that in adult samples, African American, and, again, to a lesser extent, Hispanic respondents tend to underreport illicit substance abuse compared with White respondents. In many of these studies, the criterion test, urinalysis, was compared with self-reports provided by criminal justice samples or samples of self-identified drug users (i.e., drug users in treatment). Data from Fendrich et al.[3] suggest that these findings may be sustained in general population samples when other biological criteria (hair samples) are used.

Theoretical Perspectives on Validity Differences in Surveys

Johnson and Bowman[6] provided a comprehensive review of the literature that suggested consistent "cultural differences" in substance use reporting validity. In their review, multiple studies suggested that African American and Hispanic respondents were characterized by less valid (or reliable) survey reports than White respondents. Accordingly, Johnson and Bowman[6] offered four theoretical explanations for this phenomenon which are briefly summarized below.

The "cultural deficit" model focuses on two processes that may be associated with ethnic minority status, namely, "culture of poverty" and education.[15,16] Regarding the former, Johnson and Bowman[6] note that "the basic notion is that low income African-Americans are locked in a cycle of poverty primarily because they have a poverty of culture." Misleading survey reports regarding substance abuse behavior (i.e., substance use underreporting on surveys) are viewed as an outgrowth of culturally divergent values and norms. Alternatively, the educational deficit perspective of the cultural deficit model suggests that inadequate formal education and relatively low literacy levels (due to poor quality schools) may result in a preponderance of survey errors and inconsistency among African American respondents. Note that this latter perspective suggests that underreporting is inadvertent, not intentional. Nevertheless, both perspectives of this model point to socioeconomic status (SES) as a single key variable potentially mediating race/ethnicity effects. The cultural deficit model suggests that race/ethnicity differences are accounted for by SES. If race/ethnicity differences in validity are found, they will diminish to the extent that SES is controlled for in the statistical analysis.

A second model potentially accounting for survey reporting differences is labeled the "cultural conflict model."[17] This model posits that race/ethnicity differences in underreporting reflect a divergence in values between African American and White respondents, especially with regard to privacy[18] and collectivism.[19] In support of this perspective, Johnson and Bowman[6] point out that research has suggested that African Americans have expressed more concerns about privacy and confidentiality

in research than others. This model suggests that if race/ethnicity differences in substance abuse reporting validity exist, they may diminish in statistical models that control for respondent perceptions of privacy and question threat.

A third model explored by Johnson and Bowman[6] may be labeled the "mainstream conformity" model.[20,21] This model assumes that underreporting by any particular race/ethnicity subgroup reflects conformity to what is perceived to be mainstream cultural expectations, norms, or standards. This model suggests that subgroups who underreport do so because of an elevated "socially desirable" response set. Strong concerns by African Americans that illicit drug use violates mainstream standards lead to relatively high levels of underreporting of this behavior. This theory posits that if race differences in underreporting occur they will diminish if analyses control for a measure of socially desirable response set.

The fourth potentially viable model is the "cultural distrust model." This model suggests that underreporting is a consequence of perceived and real discrimination and the resulting mistrust of the government, researchers, and those collecting survey data.[22] As Johnson and Bowman[6] point out, there is considerable empirical support for the notion that trust in research varies by race.[23] The model posits that trust or distrust varies according to perceived discrimination. To the extent that there is perceived discrimination, there will be mistrust, and consequently, underreporting of drug use. This model hypothesizes that if differential underreporting by race occurs, it will diminish to the extent that perceived discrimination is controlled for in the statistical analysis.

This article explores race differences in the validity of survey reports of two illicit substances, cocaine and marijuana. By using data from a household survey that incorporated both surveys and drug tests, we examine and compare rates of underreporting of recent drug use for four race/ethnicity subgroups. After identifying differences in reporting validity, we examine the viability of alternative theoretical explanations and discuss implications for health disparities research.

METHODS

Design and Sample

Data used for this study came from a survey of English-speaking adults who resided in the city of Chicago. The study was originally designed to examine the feasibility and use of biological testing within the context of a household drug abuse survey. The survey was conducted from June, 2001, through January, 2002. Residents between the ages of 18 and 40 were randomly selected to participate in a household drug-use survey by using a multistage area probability design.[24] At stage 1, census tracts in Chicago were randomly selected. At stage 2, one block was randomly selected from within each sampled tract. At stage 3, every household on the sampled block was screened for eligibility. At stage 4, one 18- to 40-year-old adult was selected at random from within each eligible household.[25] Interviews were administered in the home by trained interviewers from the University of Illinois at Chicago Survey Research Laboratory. The design and procedures for this study were approved and monitored by the University of Illinois at Chicago Institutional Review Board.

A total of 627 interviews were completed. Response rates were estimated by using several definitions published by the American Association of Public Opinion Research.[26] Specifically, we employed alternative definitions that varied in regards to

the final dispositioning of households with unknown eligibility. American Association of Public Opinion Research's response rate formula 5 includes in the denominator all housing units with known eligibility. For this survey, that response rate is estimated to be 62.4%. Alternatively, American Association of Public Opinion Research's response rate formula 3 employs a more conservative approach, one which adds also to the denominator a proportion of housing units with unknown eligibility that would likely have been found to be eligible had a household member been successfully contacted. According to this definition, the response rate is estimated to be 40.1%.

Race/ethnicity, a key explanatory variable used in this analyses, was derived from responses to a single, seven-category question: "With what racial or ethnic group do you identify yourself?" Of the respondents, 40% were classified as African American, 18% as Hispanic, 32% as White, and 9% as "other." This last group included American Indian or Alaskan Natives (0.5%), Asian/Pacific Islanders (4.5%), multiracial subjects (2.2%), and those specifying "something else" (1.9%). Thirty-nine percent of the sample were male. With respect to age distribution, 39% of the sample were between the ages of 18 and 25, 26% were 26–30, and 35% were between the ages of 31 and 40.

The drug portion of the survey was administered on laptop computers by using audio computer-assisted self-interview technology. Following a format paralleling what was formerly known as the National Household Survey on Drug Abuse, respondents were asked about their lifetime and most recent use of tobacco, alcohol, marijuana, cocaine (any form), crack, heroin, hallucinogens, inhalants, stimulants, tranquilizers, sedatives, and pain relievers. An additional module probed about the use of "club drugs." This article focuses on responses regarding recent (past month) use of two illicit substances: any form of cocaine use and marijuana.

Following the drug-use module, respondents were asked to provide self-reported responses on several measures (including demographics, perceived discrimination, perceived interview privacy, and social desirability). In addition, at the conclusion of the survey, interviewers administered a debriefing module designed to assess respondent reaction to specific survey questions and procedures (see below).

Immediately following the completion of the questions about drug use, respondents were asked to participate in any (or all) of three different drug tests presented in random order: hair, saliva, and urine. Specific details about test administration are described elsewhere.[4,27] Note that subjects were not informed about the drug test portion of the study until after they completed the drug-use survey questions. Illicit drugs screened for included cocaine, heroin (opiates), marijuana, and amphetamines. All test samples were analyzed by US Drug Testing of Des Plaines, Illinois. Tests initially screened positive were confirmed via gas chromatography/mass spectrometry methods.

Taking into account findings from this study about differential participation in hair testing by race/ethnicity and gender[27] as well as concerns about potential racial bias in hair testing,[28] this study focuses only on urine and oral fluid test results. Accordingly, our sample consists of the subgroup of 450 participants who provided *both* oral fluid and urine specimens of sufficient quantity for screening and confirmation of both marijuana and cocaine. Compared with the rest of the sample (n = 177), African Americans, females, and those of lower SES were overrepresented in the subgroup employed in this study.

Theory-Based Explanatory Variables

SES This variable is related to the cultural deficit model. As described in detail elsewhere,[4,27] this measure is derived from a scale constructed from combining three individual measures assessed in the survey: employment status (a three-category measure gauging whether a respondent was "not employed," "employed part time," or "employed full time"), income (a five-category measure of household income, ranging from $10,000 or less to $80,000 or more), and education (a four-category variable ranging from "less than high-school graduate" to "college graduate or higher"). These three-component items were summed to construct an additive measure. For data analytic purposes, this measure was subdivided into "low," "medium," and "high" values based on the observed frequency distribution of the scores. SES values were imputed for 5% of the sample who left the income question blank, based on their education and occupational status.

Perceived Privacy and Question Threat These variables are related to the cultural conflict model. It was predicted that because minority respondents are more concerned about privacy, they would be more sensitive to perceived privacy incursions. Accordingly, minority respondents would rate their interviews as being less private than Whites and, in turn, controlling for this variable would diminish the magnitude of the race–validity association. Similarly, it was expected that minority respondents would perceive drug-related questions to be more threatening and that such perceptions would mediate observed validity differences. With respect to privacy perceptions, respondents were asked, "How private do you think your answers were?" Question threat was assessed from responses to the following two questions administered by the interviewers: (1) "How threatening do you think most people would consider the drug-related questions in this survey to be?" and (2) "How threatening did you consider the drug-related questions in this survey to be?" (Privacy and question threat items were rated on a seven-point scale.)

Social Desirability This variable specifically relates to the third explanatory framework, the mainstream conformity model. A 10-item version of the Crowne Marlowe "need for approval" scale was employed.[29] A sample question included on this scale is "I'm always willing to admit it when I make a mistake." The Cronbach's α coefficient for this measure in this sample was .61, indicating acceptable levels of internal consistency reliability. High scores on this scale indicate an elevated socially desirable response set (or higher levels of social desirability).

Discrimination This variable specifically relates to the last explanatory framework, the cultural distrust model. We employed a four-item scale adapted from Kessler et al.[30] Specifically, subjects were asked, using a Likert-type response format, how often on a day-to-day basis they experienced the following types of discrimination: "people act as if you are inferior; people act as if you are not smart; people act as if they are afraid of you; you are treated with less courtesy than others." The Cronbach's α coefficient for this measure in this sample was .64, indicating an acceptable level of internal consistency reliability. High scores on this scale indicate higher levels of perceived discrimination.

Validity Outcomes When self-reports are compared with drug tests, many different measures can be constructed as operational definitions of validity. These indices are designed to summarize the extent to which self-reports overlap with drug test findings. On an aggregate level, one index, "concordance" is typically the percentage of total responses indicating an identical classification on behavior. Another commonly used validity indicator, "sensitivity," assumes that one measure is a "criterion" and limits between measure comparisons to those cases in which the criterion measure indicates a positive test outcome. As described below, both sensitivity and a *variant* of concordance were used as the two main indicators of validity in the analyses.

Concordance For the purposes of this analysis, a dichotomous variable was constructed that classified a subject as either providing a self-report of illicit drug use that was concordant with the combined classification provided by the two drug tests (urine and saliva) or discordant with the combined classification provided by the two drug tests. A concordant response was one that involved either of the following: a subject tested positive for a substance by either test or reported use of that substance within the past month or a subject tested negative for a substance by either test or reported no use of that substance within the past month. A subject was classified as providing a discordant self-report if he or she tested positive for a substance and reported no past month use. Because urine and saliva tests are not perfectly sensitive and have limited and varying time frames for detecting use,[28] a subject was eliminated from analyses if his or her urine and saliva test were negative for a substance but their self-report indicated past month use of that substance (i.e., if the subject "overreported" his/her substance use). Finally, in multivariate analyses of validity, measures of concordance at the individual subject level (coded "0" for nonconcordant responses and "1" for concordant responses) serve as the operational definition of validity.

There were three measures of concordance: cocaine, marijuana, and combined. Cocaine and marijuana concordance were computed as self-reported past month use of the drug versus drug test results. The combined concordance measure was computed as follows: If a subject was discordant for either marijuana or cocaine, he or she was classified as discordant; if a subject was eliminated in the computation of concordance for either marijuana or cocaine, he or she was eliminated from the combined measure; and all other subjects were counted as concordant on the combined measure.

Sensitivity Three measures of self-report sensitivity were examined. Self-report sensitivity is the proportion of those testing positive for a substance by either the oral fluid or urine test who disclose past month use of that substance. Thus, the higher the sensitivity level, the lower the underreporting. Sensitivity was looked at for any form of past month cocaine use, marijuana use, and for use of either of the two substances.

RESULTS

Overall concordance rates were relatively high, ranging from 87 to 100% for marijuana, 90–95% for cocaine, and 81–95% for the combined measure. In each instance, the concordance rates were nominally lower for African Americans than for any other subgroup. Two-group comparisons confirmed these findings, with

African Americans, compared with all others, showing significantly lower rates of cocaine concordance ($\chi^2_1 = 9.54$, $P < .01$), marijuana concordance ($\chi^2_1 = 10.6$, $P < .01$), and combined concordance ($\chi^2 = 23.6$, $P < .001$) (Table 1).

Sensitivity rates also show considerable variability by race/ethnicity. Overall χ^2 tests of significance suggested significant variation across race/ethnicity groups for all three sensitivity measures. With one exception, within each sensitivity measure comparison, African Americans had nominally lower rates than every other group. The one exception is the "other" group for cocaine, where only two subjects tested positive for this substance, and neither of the two reported past month use. Two-group comparisons confirmed these findings, with African Americans, when compared with all others, showing marginally significant lower rates of cocaine sensitivity ($\chi^2 = 3.28$, $P < .10$) and significantly lower rates of marijuana sensitivity ($\chi^2 = 8.86$, $P < .01$) and combined sensitivity ($\chi^2 = 7.78$, $P < .01$).

In examining the association between each of the potential mediators and race/ethnicity, analyses suggested significant associations between all but one of the mediators (perceived privacy) and the main independent variable. A significant χ^2 value for the association between race/ethnicity and SES category was reflected in the fact that 44% of the African Americans fell into the "low" group, compared with 27% of the Hispanics, 8% of the Whites, and 11% of the others. Focusing on the upper SES group, only 7% of the African Americans were rated as being in the "high" SES group, compared with 20% of the Hispanics, 59% of the Whites, and 26% of the "other."

Race/ethnicity subgroup comparisons for the five continuous measures using one-way ANOVA suggested significant associations with social desirability (Crowne Marlowe scale), discrimination, and self-rated question threat. The overall significant ANOVA was followed up by evaluating post hoc pairwise *t* tests, with Bonferroni corrections (setting $\alpha = .008$ for an experiment-wise significance level of .05). Comparisons with respect to the Crowne Marlowe suggested significant differences between African Americans and White respondents and between African Americans and other respondents. Post hoc follow-up *t* tests (with Bonferroni corrections) on the discrimination measure suggested only one significant pairwise comparison: Those in the "other" group reported significantly higher levels of discrimination compared with Whites. The between-group differences in self-rated *question threat* were quite small, and there were no significant post hoc pairwise contrasts.

Bivariate analyses investigating the association between the mediators and the three main validity measures indicated that SES was significantly associated with cocaine ($\chi^2_2 = 18.66$, $P < .001$), marijuana ($\chi^2_2 = 9.17$, $P < .001$) and combined concordance ($\chi^2_2 = 20.64$, $P < .001$). All three comparisons suggested a linear association between SES group and concordance. Those in the lowest SES group showed the least concordance, and those in the highest SES group showed the most. The discrimination scale showed a significant association with cocaine concordance, with discordant respondents reporting higher levels of discrimination than concordant respondents ($t_{440} = 2.11$, $P < .05$). Privacy ratings were associated with marijuana concordance, with discordant respondents reporting lower levels of perceived privacy than concordant respondents ($t_{422} = 2.60$, $P < .01$). There were no other theory-based mediators significantly associated with the combined concordance measure.

Logistic Regression Models

The individual race effects on cocaine concordance for each of the contrasts as well as the impact of mediators on these effects were examined. When no

TABLE 1. Thirty-Day Self-Report vs. Drug Test Comparisons by Race/Ethnicity

	Self-report/drug test concordance						Self-report sensitivity					
	Cocaine*		Marijuana†		Combined†		Cocaine*		Marijuana†		Combined†	
Race	Concordance (%)	Ratio agreed/total	Concordance (%)	Ratio agreed/total	Concordance (%)	Ratio agreed/total	Sensitivity (%)	Ratio SR+/T+	Sensitivity (%)	Ratio SR+/T+	Sensitivity (%)	Ratio SR+/T+
African American	90	182/202	87	167/191	81	154/191	9	2/22	59	35/59	51	36/71
Hispanic	95	83/87	96	81/84	92	77/84	50	4/8	79	11/14	65	11/17
White	99	117/118	100	109/109	99	107/108	67	2/3	100	8/8	91	10/11
Other	95	36/38	100	37/37	95	35/37	0	0/2	100	8/8	89	8/9

SR+, Self-report indicates past month drug use; T+, urine or saliva test indicates drug use.
*$P < .05$ by χ^2_3.
†$P < .01$ χ^2_3.

mediators were present, only a single contrast reached statistical significance, the contrast between Whites and African Americans. The results showed that relative to African Americans, Whites had significantly larger odds of providing concordant responses; the point estimate for the odds ratio exceeds a value of 15. This large and significant effect is diminished by the entry of a single mediating variable in the model, SES. With the addition of SES, the odds ratio contrasting Whites with African Americans is reduced to a nonsignificant point estimate value.

A full model was estimated for cocaine concordance effects. Consistent with previously discussed results, the White versus African American race dummy contrast became nonsignificant. Indeed, only a single variable, the contrast between low and high SES, was significant in the full model predicting cocaine concordance. The model suggested that those in the lower SES category had significantly reduced odds of cocaine concordance compared with those in the higher SES category [point estimate = 0.09, 95% confidence interval (95% CI) = 0.01–0.81].

In the examination of race and potential mediating effects on marijuana concordance, it was not possible to construct three separate race effect dummy variables for models predicting marijuana concordance because of collinearity problems. Accordingly, and consistent with the initial bivariate findings, a single dummy variable was constructed that contrasted Hispanics, Whites, and others with African Americans. Without a single mediating variable entered, the odds ratios are highly significant, indicating that compared with African Americans, all others had nearly 10 times the odds of providing concordant responses (point estimate = 9.99, 95% CI = 2.91–34.30). Adding potential mediating variables has little impact on the overall significance of race effects; the odds ratios remain large and highly significant regardless of the specific mediating variable included (Table 3).

TABLE 2. Impact of moderators on race effects: cocaine concordance logistic regressions (N = 419)

	Race group contrast					
	Hispanic vs. African American		White vs. African American		Other vs. African American	
Mediator entered*	OR†	95% CI	OR	95% CI	OR	95% CI
None	2.37	0.77–7.27	15.52	2.03–118.67§	2.36	0.51–11.04
Socioeconomic status	1.72	0.55–5.39	5.44	0.64–45.99	1.09	0.22–5.46
Social desirability	2.37	0.77–7.33	15.53	2.00–120.28§	2.37	0.50–11.19
Discrimination	2.33	0.75–7.19	14.08	1.83–108.30‡	2.66	0.56–12.67
Perceived privacy	2.32	0.75–7.12	15.24	1.83–108.30§	2.34	0.50–10.90
Question threat for others	2.34	0.76–7.19	15.00	1.95–115.27§	2.27	0.48–10.67
Question threat for you	2.79	0.88–8.89	15.18	1.98–116.24§	2.53	0.53–12.03

*All models control for respondent age and sex in addition to race.

†Adjusted odds ratios contrasting African American with other respondents on cocaine concordance outcomes.

‡$P < .05$.

§$P < .01$ for race contrasts.

TABLE 3. Impact of moderators on race effects: marijuana concordance logistic regressions (N = 397)

	Race group contrast	
	White, Hispanic, Other vs. African American	
Mediator entered*	OR†	95% CI
None	9.99	2.91–34.30^
Socioeconomic status	7.66	2.14–27.41§
Social desirability	9.63	2.76–35.57^
Discrimination	9.91	2.89–33.99^
Perceived privacy‡	9.68	2.81–33.36^
Question threat for others	10.51	3.04–36.27^
Question threat for you	9.9	2.88–34.09^

*All models control for respondent age and sex in addition to race.

†Adjusted odds ratios contrasting African American with other respondents on marijuana concordance outcomes.

‡The perceived privacy measure was significantly associated with higher levels of marijuana concordance; $P < .05$.

§$P < .01$ for race contrasts.

^$P < .001$.

The lack of mediating effects is corroborated in the full model in which race effects maintain significance even when every mediating variable is entered simultaneously. The odds of concordance for all others compared with African Americans are still highly elevated and significant in the full model (point estimate 8.06, 95% CI = 2.20–29.45). Indeed, race effects are considerably more marked than any of the mediating effects. Only a single mediating variable reaches statistical significance. Consistent with the bivariate findings, those reporting that their interview was more private had significantly elevated odds for providing concordant marijuana reports (point estimate = 1.29, 95% CI = 1.06–1.57).

Analysis of the mediation effects for the combined concordance measure suggests that without mediating effects entered, compared with African Americans, Hispanics have two and one-half times the odds of providing concordant responses (point estimate = 2.51, 95% CI = 1.06–5.94) and Whites have over 25 times the odds of providing concordant responses (point estimate = 25.24, 95% CI = 3.39–187.91). However, consistent with previous findings for cocaine, the race effects are mediated by SES for both Hispanic and White respondents. The mediating effects result in a nonsignificant coefficient for the Hispanic contrast and a coefficient reduced in significance (from 0.01 to 0.05) for the White contrast. None of the other mediating variables have any impact in the prediction of combined concordance. Finally, although the odds for the contrast between others and African Americans are elevated, the nonmediated model predicting combined concordance does not reach statistical significance. With the entry of one mediator (*question threat* for you), the odds actually reach statistical significance, suggesting that relative to African Americans, others have over four and one-half times the odds of providing concordant responses (point estimate = 4.62, 95% CI = 1.02–20.88) (Table 4).

The full model predicting combined concordance left two variables significant as predictors: The contrast for Whites versus African Americans (point

TABLE 4. Impact of moderators on race effects: combined concordance logistic regressions (N = 396)

	Race group contrast					
	Hispanic vs. African American		White vs. African American		Other vs. African American	
Mediator entered*	OR†	95% CI	OR	95% CI	OR	95% CI
None	2.51	1.06–5.94‡	25.24	3.39–187.91§	4.32	0.97–19.31
Socioeconomic status	2.05	0.85–4.93	13.75	1.76–107.68‡	3.03	0.66–13.93
Social desirability	2.45	1.03–5.87‡	24.54	3.27–183.99§	4.18	0.92–18.92
Discrimination	2.51	1.06–5.94‡	25.02	3.36–186.42§	4.43	0.98–19.99
Perceived privacy	2.41	1.01–5.72‡	24.72	3.32–184.18§	4.25	0.95–18.97
Question threat for others	2.51	1.06–5.97‡	25.4	3.41–189.46§	4.36	0.97–19.60
Question threat for you	2.83	1.17–6.89‡	25.38	3.41–189.15§	4.62	1.02–20.88‡

*All models control for respondent age and sex in addition to race.

†Adjusted odds ratios contrasting African American with other respondents on combined concordance outcomes.

‡$P < .05$.

§$P < .01$ for race contrasts.

estimate = 15.10, 95% CI = 1.91–119.27) and the contrast for low versus high SES (point estimate = 0.21, 95% CI = 0.04–0.98). Consistent with earlier models and findings, Whites had significantly increased odds of combined concordance compared with African Americans. Additionally, those in the lowest SES group had significantly decreased odds of combined concordance compared with those in the highest SES group. No other mediating variables were significant in this full model.

DISCUSSION

Summary and Implications

This study provides evidence that compared with other groups, African Americans may provide less valid information on drug-use surveys. The findings suggest that African American respondents had significantly lower concordance rates. These bivariate findings were generally sustained in a multivariate context. Specific theories of mediation were empirically evaluated. Mediation was found in one model (cocaine) for one variable (SES), which may suggest some limited support for the cultural deficit model. Nevertheless, the finding that SES was not a consistent mediator of underreporting for both cocaine and marijuana undermines support for this particular theory. In general, none of the theories of mediation received strong support from this evaluation.

Overall, the results replicate and extend a growing body of research suggesting that African Americans underreport substance use on surveys. At the same time, they emphasize a need for research that seeks to understand the causes of this phenomenon. It may be particularly difficult to ascertain the causes of systematic survey error by one particular subgroup by using the same survey techniques. Alternative methods such as in-depth qualitative interviews and focus groups discussions—methods which avoid the use of potentially biased survey responses—may be required to understand findings that have been observed across multiple survey contexts.

Although the term "underreporting" has been used to describe the survey behavior examined here, it is not suggested that responses necessarily reflect intentional distortions. It is acknowledged, however, that most of the theoretical models posited here assume that the race/ethnicity differences are motivated by an unwillingness to disclose sensitive information. Nevertheless, future research and theory development need to consider the possibility that cultural variations in the interpretation of survey questions may account for race/ethnicity differences in reporting validity found in this and other studies. The in-depth methods suggested above may be optimal to examine the role of this phenomenon.

Limitations

There are several limitations to this study. First, only two illicit substances, marijuana and cocaine, are examined. African Americans underreported on use of both of these substances when drug testing was compared with their self-report. It is not known whether this finding would hold for other substances that were not examined here such as heroin and methamphetamine. It should be noted that previous work conducted with these same data suggests that the findings may be extended beyond these specific substances; for example, when cotinine testing results were compared with self-reported recent tobacco use, it was found that African Americans also underreported.[31]

The relatively low base rate of discordant responses in these data potentially limited the power to detect mediation effects. Discordant responses for marijuana and cocaine were less than 10% of the total respondents in the subgroup analyzed. In addition, the study had a relatively small proportion of subjects in the Hispanic and "other" race subgroups. Sample size limitations are also reflected in the finding of very large CIs around many of the parameter estimates, even those that were highly significant. We view these analyses as preliminary data to inform a study that systematically samples in such a way as to ensure a higher level of variation in both the outcome and independent variables.

These analyses examined mediators and not moderators. Future analyses may explore the extent to which race effects in underreporting may be *moderated* (intensified or diminished) as opposed to *mediated* by the presence of key variables such as those explored above. Additionally, the lack of any consistent finding of mediation may be a consequence of limitations in the list of selected variables. Other theories and other variables may prove to be significant in future analyses. A related limitation is that the examination of mediators did not strictly conform to established data analytic criteria[32] requiring associations with both predictor and dependent variables. Because of interest in the direct effects of the theory-based constructs on validity outcomes, mediators were included in regression models irrespective of initial bivariate findings.

Finally, an obvious limitation concerns the drug tests themselves: they are not perfectly accurate. Of particular, importance is the possibility of false positives, that is, the case where a test yields a positive result and a subject denies recent use of a substance. The fact that these findings held up across two different substances and the fact that two different drug tests were used as criteria undermine the conclusion that the results are solely a consequence of test limitations.

Note that those who potentially overreported drug use were eliminated in the analysis. Given the time limited and varying windows of detection for biological tests, the research team deemed it inappropriate to incorporate this type of inconsistency in a validity measure. Our main validity measure is one that essentially

contrasted underreporters with the rest of the sample. Accordingly, this study can be viewed as a systematic examination of characteristics associated with one important type of validity, underreporting. Nothing can be said about the characteristics associated with overreporting or exaggeration of substance involvement. On the other hand, it should be pointed out that this other type of inconsistency was relatively rare, especially for cocaine. Furthermore, a review of the survey literature[33] suggests that underreporting is a more salient concern when surveys incorporate "sensitive" questions.

Implications for Disparities Research

One major aspect of health disparities concerns unequal access to intervention services for those in need. Reducing disparities requires an accurate accounting of this phenomenon. Accordingly, epidemiological surveys play a critical role in documenting and identifying the extent of the problem. At present, much of the data we have to guide national policy is based on local and national population surveys. This study raises questions about the utility of such surveys for informing us about the extent of racial/ethnic differences regarding the use of substances and the related need for treatment services across groups.

Although these findings provide more data undermining the validity of self-report, they provide further support for the use of drug testing in epidemiological research. It should be pointed out that these comparative findings could not have been obtained in the absence of widespread cooperation with biological testing among the diverse members of the study sample. With over two thirds of the sample providing both urine and saliva tests, and over 90% providing at least one test (usually saliva), it is clear that this type of testing is quite feasible in community surveys.[27] Thus, although it may be necessary for further research to devise strategies for improving self-report, as an immediate step, epidemiological researchers in the area of health disparities should routinely request biological samples when conducting drug-use surveys.

Unfortunately, a drug test provides no data regarding the frequency or chronicity of drug use or the extent to which treatment resources are needed or have been previously used. Thus, because drug use and abuse history can only be obtained from "good" questions, surveys are indispensable tools for informing public policy. On the other hand, the general approach to survey administration may need to be reconceptualized. Perhaps, researchers need to begin thinking about more community collaborative approaches as part of the survey administration process. In general, government sponsored drug-use surveys tend to be highly centralized processes that are managed through universities or private subcontractor agencies. Those organizing and administering surveys may need to make an effort to link to agencies that are embedded in the community. These linkages can serve as a source for recruiting interviewers and as a means of facilitating knowledge about the social benefits of the knowledge generated by the survey process.

Failure to disclose sensitive information may be a rational response among subjects who may see little benefit to disclosure but potentially considerable personal cost. Survey researchers in the field of drug abuse need to do more to communicate the social benefits of accurate reporting. This may mean working directly alongside others who have both personal knowledge of the toll that untreated addiction has on minority communities and who have established the trust of members of those communities through their supportive roles. Health care providers, social service

agencies, and religious institutions may be viable partners to consider in this collaborative process. Future research might consider systematically evaluating whether the establishment of such collaborative arrangements results in more valid assessment of substance use.

Finally, we note that these findings have implications not only for the assessment of disparities, but also for the evaluation of efforts to ameliorate these disparities. Intervention and prevention efforts require systematic and periodic assessment of health conditions which are the target of these activities. Efforts to eliminate service disparities must be evaluated, but such efforts will be misinformed unless researchers address the underreporting of substance use by groups whose disparities are being targeted.

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