Self-Reported Drug Use: Results of Selected Empirical Investigations of Validity

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ABSTRACT

This chapter reviews the literature on factors related to quality of self-report data on drug use and discusses two series of empirical studies investigating the quality of those data. One set of analyses examined the quality of the longitudinal retrospective self-report from narcotics addicts, including validity of recent narcotics use, reliability of various measures, stability of relationships among these measures, and pattern reliability among latent constructs. Results contribute strongly to confidence in the validity of the relationships among these data derived from addicts' self-report. The second set of analyses focused on validity of self-reported drug use among high-risk groups, including samples from sexually transmitted disease (STD) clinics, hospital emergency rooms (ERs), and jails. Results suggest that the accuracy of self-report of recent drug use varies by the sample sources, drug types, and subject characteristics. Targeting these high-risk groups may improve prevalence estimation. The chapter concludes that empirical validation of self-report is always necessary to enhance the utility of collected self-report data and provide means of controlling for potential biases.

INTRODUCTION

Surveys on drug use usually are conducted to establish estimates of prevalence rates or to improve the understanding of the relationships between drug use and related measures (e.g., antecedents, consequences, or intervention effects). Most general surveys rely on self-report or self-rating by participating subjects. But serious doubts have been cast on the truthfulness of data collected by self-report on sensitive topics related to stigmatized behaviors such as use of illicit drugs. Confidence in these data depends on their demonstrated validity and reliability, which must be empirically established. A related question pertains to the generalizability of results of general surveys, particularly when participation bias (e.g., nonresponse or

noncoverage) is known to be serious among groups at high risk for drug use. Therefore, reporting accuracy and sampling adequacy are among the most important concerns in the investigation of the quality of data on self-reported drug use.

This chapter presents several studies that address some of the issues involved in the investigation of reliability and validity of self-reported drug use. The first series of investigations illustrate several analytic approaches to examining the quality of longitudinal, retrospective self-reports from narcotics addicts, particularly when longer term external objective criteria are not available, as is often the case in such studies. Also described is an investigation that illustrates how prevalence estimation of drug use can be improved by targeting high-risk populations and examining the validity of their self-report to identify adjustment factors. Although these studies are of distinct natures and purposes, each offers some methodological approaches to improve the accuracy of data based on self-report. To provide background for the two studies, a brief literature review including substantive findings is presented, followed by a general discussion of analytical approaches that have been used in the empirical testing of validity of self-report data.

BACKGROUND

Findings from the Literature

Overall, the literature suggests that there is a high degree of variability in the validity of self-reported data according to differences in methodo-logical and research context variables (Magura et al. 1987; Maisto et al. 1990). The validity of self-reported drug use may vary widely as a result of survey conditions, types of drug used, types of measure (e.g., frequency or amount), and characteristics of the sample population. There is an extensive body of research on the effects of data-collection methods (modes, interviewers) on respondent cooperation (Bradburn and Sudman 1988), but only recently has this research begun to focus on the assessment of drug use or other highly sensitive behaviors (Turner et al. 1992; Harrison 1995). This chapter, however, focuses on the types of error or bias that are attributable mainly to respondents themselves as opposed to external factors such as questionnaire construction or interview setting.

Generally speaking, respondent-based reporting errors may include memory failures, concealment of the less desirable aspects of one's

life, and overreporting or exaggeration (Cooper et al. 1980; Sobell and Sobell 1981). Memory failures are usually considered unintentional errors and can be a cause of underreporting or overreporting. Such errors are less serious with salient or frequently recurring events (Linton 1986; Loftus and Marburger 1983; Tversky and Kahneman 1974). Concealment and overreporting are often related to the social desirability of the recalled behavior (Edwards 1957; Harrell 1985).

Errors attributed to memory failures, concealment, or exaggeration may also be time related. The degree of these errors, when considered together, may depend on the nature of recalled events and on temporal proximity to the time of reporting (Garrison et al. 1987; Hser et al. 1992*b*). Recall failures become more likely to occur as the event becomes distant in time. A concealment (or, occasionally, an exaggeration) of less desirable behaviors is more likely when the event is closer in time to the interview (Hser et al. 1992*b*; O'Malley et al. 1983).

Most studies on self-report of drug use have focused primarily on reliability (e.g., test-retest or internal consistency), especially when external criteria were absent. In general, most studies showed a relatively high level of reporting reliability regarding drug use (e.g., coefficients ranged between 0.80 and 0.95) (Hser et al. 1992*b*). Several methods of objective corroboration (e.g., comparison of data with official records, peer reports) have been applied to assess the validity of self-report. Urinalysis has been the most common method for validating self-reported recent use of drugs. Among the studies that examined validity using urinalysis, 25 percent to 72 percent of subjects whose urine tested positive for drugs denied current or recent use (Maisto et al. 1990; McNagny and Parker 1992).

Few studies have investigated sample characteristics that are correlated with the degree of validity, and results are generally inconsistent from one study to another. For example, some studies (McElrath 1994) found self-reports of drug use to be more valid with samples drawn from community settings than with samples of arrestees; others found that subjects recruited from treatment samples would overreport or underreport drug use depending on the perceived consequences as to whether and how reporting of use might affect their treatment status (e.g., Sherman and Bigelow 1992).

In terms of types of drugs, several studies based on treatment samples have found that the most accurate self-reports were for use of heroin

and other opiates (Magura et al. 1987). However, a review of literature conducted by Maisto and colleagues (1990) concluded that no drug or drug class emerged as associated overall with self-reports of higher reliability and accuracy.

In summary, the literature shows some evidence that drug abusers' self-reports are generally reliable and accurate, but the studies are more strikingly marked by findings of wide variations in accuracy and in the samples and procedures used to obtain them. The empirical evaluation of drug abusers' self-reports of drug use is still in its beginning stages (Maisto et al. 1990) and needs several methodological improvements.

Analytical Approaches

There are several approaches to studying reliability and validity of self-reported data, and each has attendant criteria for empirical evaluation. This section provides a brief overview of common analytical approaches and others that have been used in studies reported later in this chapter. With data available at two points in time, two techniques used to assess reliability are measurements observing differences in means between data obtained at two points in time and test-retest correlations. Differences in means indicate a shift in the distribution of responses that is systematic across respondents. Test-retest correlations are determined from the relative position of a response by a given individual within the two distributions of responses. In this sense, such correlations measure reporting consistency between the two response distributions.

An alternate, complementary approach to the study of the reliability of self-report data extends the concept of test-retest correlation of individual measures to the level of the consistency of the relationships among multiple measures. For example, the stability of the relationship between level of narcotics use and level of drug dealing for a defined period reported at one interview can be compared with that obtained from a later interview. This concept, here termed "pattern reliability," examines the degree of association between two correlation matrices of a set of variables measured at different time points.

A simple test of pattern reliability among the variables examines the consistency in the correlational patterns observed at the two interviews. For example, the correlation coefficient of the two intervariable correlational patterns obtained at two time points

provides an assessment of the stability of relationships among a set of common measures across time. An analytically more sophisticated application would involve confirmatory factor analysis (CFA).

The application of CFA provides a more rigorous testing of the consistency of relationships among measures obtained by self-report. Besides test-retest correlations, when multiple measures of a similar construct are available, internal consistency among these measures can also be used as a reliability measure. The test-retest reliability for individual measures can be further extended to that for relationships among multiple measures obtained at different occasions. In this assessment of pattern reliability, theoretically based relationships, which may reflect internal consistency among multiple measures of a latent construct, are of particular interest.

Pattern reliability can be considered as the consistency of theoretically hypothesized relationships among variables measured at separate occasions. This conceptualization can then be empirically evaluated using CFA (Chou et al., in press). The CFA approach allows simultaneous consideration of internal consistency and test-retest reliability. Investigation of pattern reliability formulated in CFA models involves testing the consistency of measurement and structural models across occasions. Empirical evaluation of pattern reliability can be performed through testing of hypotheses on equality constraints in the specified models. Consequently, investigations of pattern reliability about data provide information for construct validity and construct consistency.

Regardless of the analytic approach, establishing reliability is only a prerequisite to the process of validating data derived from self-report. Reliability is considered a necessary condition of validity but is not sufficient by itself to establish validity. Establishing validity often requires objective information with which self-report data can be corroborated. In the study of drug use, objective data useful for corroboration may include urinalyses results, observational reports, and official records (e.g., earnings, treatment enrollment case files, and criminal justice system histories). The analytical approach of most early studies on validity pertains to percent agreement between self-report and criterion (urinalysis is the most commonly used corroboration for determining accuracy). The computations of kappa and intraclass correlation (ICC) take chance agreement into account. However, these statistics may have biased findings when base rates of an event are extremely low (Spitznagel and Helzer 1985).

The studies described in this chapter illustrate analytical approaches that address some of the empirical issues involved in assessing drug use based on self-report data. Because the primary goal of these original data collections was to obtain accurate self-report of behavior, the studies incorporated procedures that have been suggested to improve the quality of data. For example, confidentiality, anonymity, and privacy during data collection by trained interviewers, with subjects informed in advance of the interview that researchers had access to corroborative information, have all been adopted as effective strategies to improve the quality of self-report. In this last respect, official criminal records were used as memory aids to help respondents recall other life events; therefore, these criminal records cannot be used as independent criteria to validate the self-report data.

ASSESSING THE QUALITY OF SELF-REPORT DATA FROM RETROSPECTIVE LONGITUDINAL SURVEYS

Examinations of the initiation, progression, and course of addiction history, often termed "natural history studies," typically rely on self-report surveys as the primary source of data. In such studies as in other surveys, it is difficult if not impossible to obtain adequate and objective information or to identify criteria that establish validity. For example, surveys often query respondents regarding the frequency of a behavior or the quantity of a substance they have consumed, but the accuracy of responses to such quantitative questions can be affected by many psychological processes or interviewing factors (Bradburn et al. 1987). Validation of responses is particularly difficult if the relevant topic is personal and sensitive or if the recalled events happened in the distant past, as in the case of recall of illicit drug use or criminal involvement during a person's life. Careful scrutiny of the reliability and validity of data obtained from drug-using populations is needed to support the utility of the collected data as well as to understand contributing factors that may affect the quality of data. A series of studies (Anglin et al. 1993; Chou et al., in press; Hser et al. 1992*b*) was conducted to examine the reliability of behaviors reported by a sample of narcotics addicts for the same period of time, but recalled at two widely separated interviews.

Methods

The data used were collected at two face-to-face interviews conducted 10 years apart with the sample group of narcotics addicts (N = 323). The first interview was conducted during 1974-75, over 10 years after

the sample had been admitted to treatment. The interview collected information retrospectively on the individual addiction career starting from 1 year before first narcotics use until the time of interview (a period of approxi-mately 15 years on average). The second interview was completed in 1985-86 and obtained the same self-report data for the period from January 1, 1970, to the time of the second interview. There is an over-lapping period of 4 to 5 years in both interviews, from January 1, 1970, to the first interview date in 1974 or 1975. Similar interview instruments and procedures were used on both occasions, and recalled information was elicited on the same set of multiple measures. Urine specimens were also collected at both interviews and used to validate self-report of recent (past 7 days) drug use. (See Hser et al. 1992*b* for a detailed description of subject characteristics, interview procedures, and instruments.)

Analyses and Results

Four sets of analyses were conducted. The first examined the congruence between urinalysis results and self-reported current drug use at each interview point. The second investigated item reliability (reliability of individual variables) measured by test-retest correlations (consistency) and mean level differences (discrepancy). The third set examined the pattern reliability, or consistency of relationship patterns, among all 46 of the selected self-report variables. The fourth examined pattern reliability between narcotics use and property crime using CFA.

Validity of Recent Drug Use. Urinalyses conducted at both interviews provided a limited validity check on recent self-reported narcotics use. At the first interview, among the 97 subjects who tested positive for opiates, 38 (or 39.2 percent) failed to report recent use. At the second interview, 14 (13 percent) of the 105 subjects who tested positive failed to report recent use. The rates of congruence between self-reported current opiate use and urinalyses results among those who provided a urine specimen was 73.6 percent at the first interview and 85.8 percent at the second.

At least two factors may have contributed to the marked difference. A higher proportion (54.9 percent) of the respondents were under some type of legal supervision at the first interview than at the second (28.9 percent), and the perception of possible adverse consequences resulting from divulging recent use may have contributed to under- reporting. Also, subjects were more confident in

the study's intent and staff by the time of the second interview and were more likely to be truthful.

Item Reliability. Overall, behaviors such as narcotics use (including narcotics abstinence and daily use) and employment were recalled with test-retest correlations of at least 0.6. However, less-than-daily narcotics use was recalled less consistently (0.27). Differences between the means of the reported levels at the two interviews were significant for all measures of narcotics use and in general, use levels were reported at a lower level in the first interview (Hser et al. 1992*b*).

Stability of Relationships Among Measures. A correlation matrix containing the intervariable correlation coefficients among 46 variables[1] was constructed for each interview. A single correlation coefficient between the two matrices can be calculated using all the corresponding elements in the lower triangle of the two intervariable correlation matrices (N = 46 * 45/2 or 1,035). Correlation coefficients were obtained from the total overlap period and for each of its constituent 4 years.

For the total of 46 variables for the total overlap period, the absolute difference of the correlation coefficients ranged from 0.06 to 0.07, and the correlation coefficients ranged between 0.84 and 0.90. The absolute difference between the two within-interview correlation coefficients indicated that they remained similar across the 4 years. The correlation coefficients between the two interviews, on the other hand, increased with the reliability of the constituent variables. These results imply, as would be expected, that the correlational pattern among variables becomes more stable when the constituent variables are more reliable. In addition, as opposed to test-retest of individual items, pattern reliability did not decrease with proximity to first interview. Apparently, despite underreporting tendencies, the subjects maintained internal consistency each time they reported on their behaviors (Anglin et al. 1993).

Pattern Reliability: A Confirmatory Assessment of Construct Validity and Consistency. An example of a pattern reliability assessment has been conducted to study the relationships of narcotics use and property crime behaviors (Chou et al., in press). Figure 1 presents a model supporting the pattern reliability and related coefficients. The findings can be summarized as follows. First, the measures used for constructs of narcotics use or property crime yielded substantial factor loadings on their respective constructs in all

models evaluated. This internal consistency among measures is evidence of construct validity through the application of CFA techniques. Second, evaluation of a series of models and comparisons among them showed that constructs reflected by repeatedly measured variables were time dependent. Third, although relevant measures taken at separate occasions cannot support one single construct, construct consistency was demonstrated by the invariance of measurement and structural models as supported by the model presented in figure 1.

Taken together, these findings suggest that the correlational relationships within each of the two sets of repeated measures can be adequately represented by similar models using CFA. It is important for researchers who are interested in substantive issues of behavior to be assured that structural patterns among self-report data such as narcotics use and property crime measures (e.g., factor loadings) and their relationships (e.g., factor correlations) are consistent when measurement errors are separated from the true measures, regardless of when the measures were taken. Results of these analyses contribute strongly to confidence in the validity of the relationships among these self-reported data.

Discussion

Considering the 10-year separation of the two interviews, the test-retest reliability of many drug use variables was reasonably good. The absolute difference level showed systematic discrepancies, however, increasing with proximity to the interview. The distortions seem to have less impact on the reliability of the relational patterns among sets of variables. The pattern reliability of self-reported data from these narcotics addicts is actually quite impressive. The correlation coefficients of the intervariable relationships ranged as high as 0.86 and 0.90. These analyses suggest that although the absolute levels or rates obtained through retrospective self-report may not be as accurate as one would desire, their relative levels (e.g., the relationships among variables) are quite valid, if appropriate interview procedures are conducted. Furthermore, the results of the CFAs based on selected measures of theoretical interests and reasonable reliability (e.g., narcotics use and crime) further demonstrate the utility of the data and the appropriateness of the analytical approaches. Using these model-testing procedures, examination of pattern reliability offers an alternative means of assessing validity of self-report data.

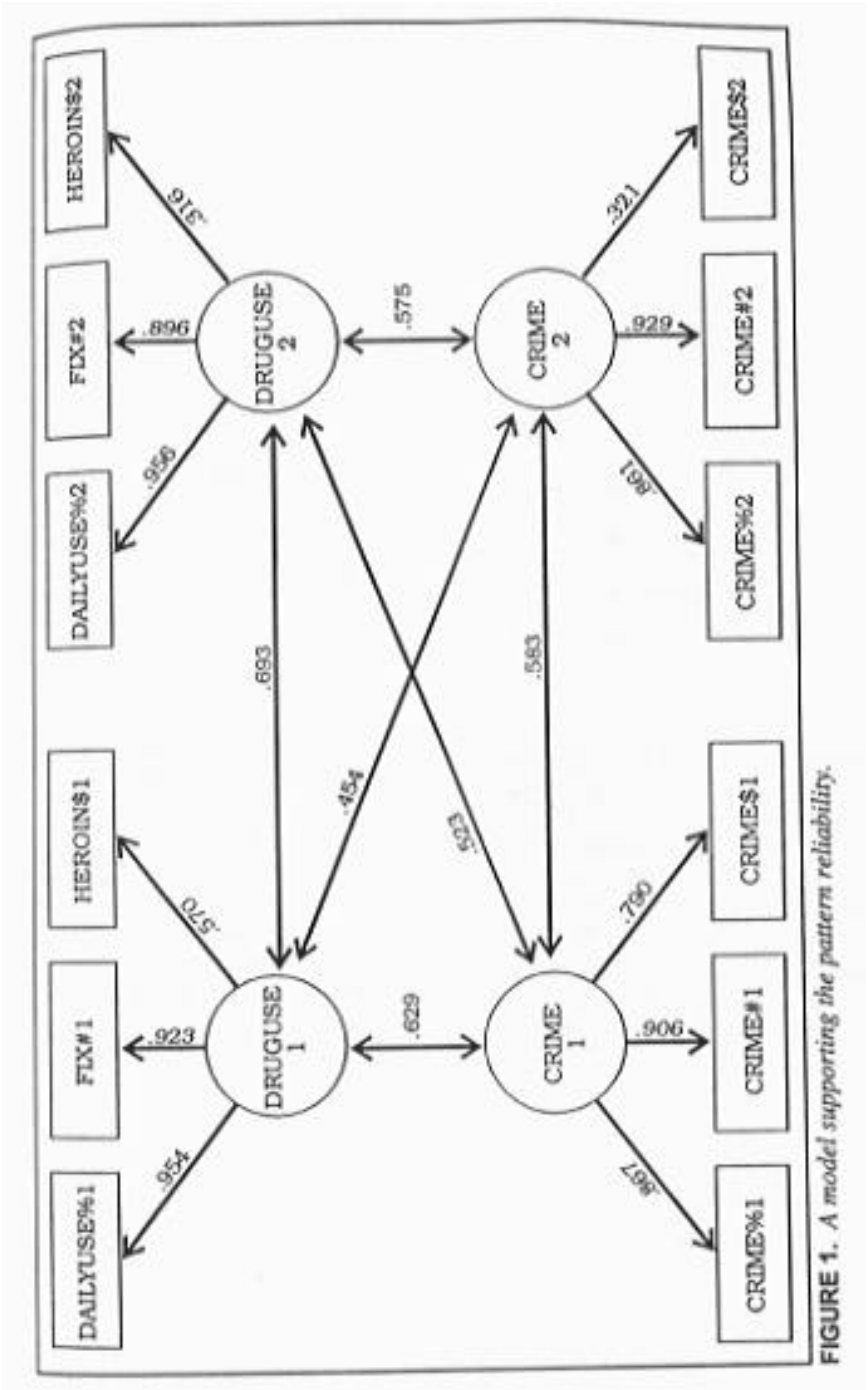

FIGURE 1. *A model supporting the pattern reliability.*

TARGETING HIGH-RISK GROUPS TO IMPROVE PREVALENCE ESTIMATION

Several issues arise when self-reported drug use data collected by general surveys are used as a sole basis for prevalence estimation. First, many general population surveys on drug use do not adequately cover certain populations (e.g., homeless, institutionalized). These populations are likely to have a high level of drug use. Second, data from self-report on such a sensitive topic are often inaccurate due to reporting bias and error. The cost to improve sampling design and reporting accuracy in these large-scale studies can be prohibitively high. Alternatively, researchers have developed statistical models that use complementary data focusing on high-risk populations that are not adequately surveyed to improve the accuracy of estimates for overall drug-using populations (Hser and Anglin 1993; Hser et al. 1992*a*). In addition, smaller scale studies that can provide adjustment factors and suggest ways to improve accuracy of self-report may prove to be more cost efficient in providing improved prevalence estimation results.

Based on practical application and through review of previous efforts, Hser and Anglin (1993) identified several prominent quantitative procedures for making prevalence estimations, including synthetic estimation and capture-recapture models. In addition, there is a need for improved data, particularly regarding the undersurveyed populations at high risk of being drug users as well as the linkages among these populations. A study is currently being conducted by the author to survey drug use among several important high-risk populations. Some preliminary results are reported in this section to illustrate the investigation of validity of self-reported drug use in these population samples. Findings suggest ways to improve accuracy of estimates produced by surveys based on self-report.

Methods

Face-to-face interviews were conducted with a total of 3,493 subjects screened from patients at STD clinics (N = 1,134), patients visiting ERs (N = 680), and arrestees (N = 1,679). (Table 1 describes background characteristics of the sample.) Interview procedures and questionnaires were similar across sources, which are all located in Los Angeles County. Recruitment procedures did not follow a random sampling procedure and were slightly modified to accommodate constraints of a particular setting or subjects' clinical needs. Subjects were surveyed regarding recent use of illicit drugs and drug use history,

along with many other health questions. To assess the overlap of populations from the three different sources, all subjects were also asked whether they had been arrested or had visited STD clinics or emergency rooms in the past year. Urinalysis results were used to corroborate the validity of self-report of recent drug use. (See Hser et al. (submitted) for a detailed description of subject recruitment and interview procedures.)

TABLE 1. *Background characteristics.*

	STD (N = 1,134)	ER (N = 680)	Jail (N = 1,679)
Age (%)			
18-14	40.4	20.0	32.4
25-39	48.0	41.8	55.9
40+	11.6	38.2	11.7
Mean	28.9	36.8	29.6
Standard deviation	(9.2)	(13.1)	(8.3)
Female (%)	39.9	35.0	35.1
Ethnicity (%)			
White	6.3	13.4	20.4
Hispanic	33.1	51.2	41.3
African American	58.6	30.6	36.1
Other	2.0	4.9	2.3

Analyses and Results

Three sets of analyses were conducted. The first compared self-report data on use of several drugs with results of urinalyses. Using urine- testing results as the accuracy criteria, two rates of inaccurate self-report (denial among users and denial among self-reported nonusers) were calculated. The second analysis examined correlates of these measures of inaccuracy using logistic regression analyses, and the third investigated the degree of overlap among the three study samples.

Validity of Recent Drug Use. Urinalyses were conducted and results compared to self-report among those who provided urine specimens. Table 2 shows results of recent drug use in several categories by self-report and by urinalysis. As expected, illicit drug use is quite high in the study samples, most notably among the arrestees (52.5 percent positive for cocaine, 68.9 percent positive for any drug). In general, the rates of negative urinalyses among those reporting recent use are negligibly low.

For all types of drugs, self-reports are based on use in the 3 days before the interview. Because marijuana can stay in the body much longer, self-reported use in past 30 days is also included (Ellis et al. 1985; Mieczkowski 1990). Except for marijuana use in the past 30 days, use levels for all drugs were higher by urinalysis than by self-report.

TABLE 2a. *Percents self-report versus urinalyses.*

STD clients (N = 1,061)				
	Self-reported use in past 3 days	Positive	Denial among users*	Denial among negative self-report**
Marijuana (3 days)	17.8	18.9	33.0	7.6
Marijuana (30 days)	30.6	18.9	13.0	3.5
Cocaine	3.4	10.0	68.9	7.1
Opiates	0.5	0.9	60.0	0.6
Amphetamines	0.4	0.3	66.7	0.2
PCP	0.5	1.4	73.3	1.0
Benzodiazepine	0.7	1.3	71.4	0.9
Any drug less marijuana	5.2	13.7	71.7	10.3
Any drug	20.7	28.1	21.8	9.5

KEY:* = percent reported no use among urine positive; ** = percent of positive urine among those reported no use of the respective drug.

Two discrepancy measures can be calculated by contrasting the same group of subjects who provided discrepant reporting (those whose

TABLE 2b. *Percents self-report versus urinalyses.*

ER clients (N = 482)				
	Self-reported use in past 3 days	Positive	Denial among users*	Denial among negative self-report**
Marijuana (3 days)	8.7	8.3	35.0	3.2
Marijuana (30 days)	15.3	8.3	22.5	2.2
Cocaine	6.8	12.2	50.8	6.7
Opiates	1.9	8.9	83.7	7.6
Amphetamines	0.6	1.2	100.0	1.3
PCP	0.6	2.3	81.8	1.9
Benzodiazepine	0.8	3.7	88.9	3.3
Any drug less marijuana	9.3	27.6	68.4	20.8
Any drug	15.8	32.4	42.3	18.4

KEY:* = percent reported no use among urine positive; ** = percent of positive urine among those reported no use of the respective drug.

self-reported drug use disagreed with urinalysis results) with the other two groups whose urine results were either positive or negative but were consistent with their self-reports. The most common discrepancy measure used in validity studies has been the rate of subjects who failed to admit their use but were tested positive. This denial among users is the percentage of those testing positive for the drug who claimed no recent usage. Relatively high rates of denial were observed in the study samples, although the appearance can be exaggerated in drugs (such as amphetamines) whose base use rate is low.

Another discrepancy measure that can be used as a correction of underreporting is denial among self-reported nonusers. This rate is calculated as the percentage of positive urine results among those who reported no recent use of the respective drug. For example, among arrestees, of those who did not admit recent use of cocaine, as many as

TABLE 2c. *Percents self-report versus urinalyses.*

Jail clients (N = 1,666)				
	Self-reported use in past 3 days	Positive	Denial among users*	Denial among negative self-report**
Marijuana (3 days)	19.0	19.4	43.0	10.3
Marijuana (30 days)	34.1	19.4	22.6	6.6
Cocaine	33.7	52.5	38.1	30.1
Opiates	10.2	11.1	25.9	3.2
Amphetamines	5.2	7.7	46.9	3.8
PCP	1.6	2.9	66.7	2.0
Benzodiazepine	1.6	6.2	86.4	5.4
Any drug less marijuana	41.6	62.1	35.0	37.2
Any drug	50.0	68.9	56.4	34.6

KEY:* = percent reported no use among urine positive; ** = percent of positive urine among those reported no use of the respective drug.

30.1 percent were using according to urinalysis. This denial rate, reflecting actual prevalence rates among those who deny use by self-report, can be extrapolated to adjust upward the survey results that are based entirely on self-report for similar populations.

It should be noted that the numerators for the two denial rates were the same groups of people, but the denominators were two different contrast groups. Both measures are important for improving the prevalence estimation of drug use based on self-report. The rate of denial among users indicates the likelihood of denying use among those users identified by urine testing. The rate of denial among self-reported nonusers suggests the degree of underreporting among respondents who did not admit drug use, which can be extrapolated to improve prevalence estimates based on self-reported data from similar populations where urine analysis is not available. In addition, correlates of these two measures can be different and each may provide some useful information.

Correlates of Reporting Accuracy. Logistic regression was performed to examine factors related to inaccurate self-report measured as denial among users and denial among self-reported nonusers (tables 3 and 4 respectively). For each of these two outcome measures, separate regression analyses were conducted for three drugs (cocaine/crack, opiates, and marijuana) with high

prevalence in the study samples. For the analysis on denial among users, each analysis included subjects who tested positive for the particular drug, with the dichotomous dependent variable coded 0 for accurate self-report of use and 1 for inaccurate self- report. Similarly, for the analysis of denial among self-reported nonusers, each analysis included subjects who reported no use of the particular drug, with the dichotomous dependent variable coded 0 for negative urine results (accurate self-report) and 1 for positive urine (inaccurate self-report).

The regression results on denial among users indicate that the type of interview site or sample source was an influence on validity of self-report. Compared to STD samples, subjects in jails were significantly less likely to lie about cocaine use and significantly more likely to lie about marijuana. Males were significantly less likely than females to lie about marijuana use, while persons 40 years of age or older were significantly more likely to lie regarding use of this drug than their younger counterparts. Subjects acknowledging past drug dependence were far less likely to be dishonest regarding current drug use. The stigma attached to use of cocaine/crack and opiates (the latter is not statistically significant) may lead to dishonesty in the more mainstream samples such as the STD clients. The social acceptability of marijuana use among young people may account for their more accurate reporting relative to older people.

The regression results on denial among self-reported nonusers indicate that, for example, the following subject characteristics were significantly correlated with positive urine results among subjects who reported no recent cocaine use: female, ethnic minority (African American and Hispanic), jail sample, older ages, multiple arrests in the past year, currently not in treatment, and past dependence. These factors should be considered to refine the adjustment factors of underreporting.

TABLE 3. *Logistic regression for denial (among users by urine testing).*

Predictors	Cocaine/crack N = 1,040		Opiates N = 238		Marijuana N = 563	
		Odds ratio		Odds ratio		Odds ratio
Gender						
Female						
Male	-0.1535	0.8577	0.2744	1.3158	-0.6989**	0.4971
Race						
White						
African American	0.1374	1.1473	0.8258	2.2836	0.4970	1.6437
Hispanic	0.1205	1.1281	-0.6810	0.5061	0.4586	1.5819
Other	0.0417	1.0426	1.5750	4.8305	0.2325	1.2618
Source						
STD (N = 1,061)						
ER (N = 482)	-0.7736*	0.4613	0.4813	1.6182	0.8164	2.2624
Jail (N = 1,666)	-1.5033**	0.2224	-1.7564	0.1727	0.8606*	2.3646
Age						
18-24						
25-39	-0.2809	0.7551	0.1163	1.1233	0.2628	1.3005
40+	-0.1043	0.9010	-0.2120	0.8090	1.6349**	5.1288
Sex partners/past year						
0						
1	0.2016	1.2234	-0.2676	0.7653	0.8538	2.3487
2	-0.2360	0.7898	0.3369	1.4006	0.4269	1.5326
3-10	-0.3350	0.7154	0.9982	2.7133	0.5039	1.6552
11+	-1.0667**	0.3442	0.4476	1.5645	0.5736	1.7747
Arrests/past year						
0						
1	0.4853	1.6247	0.3018	1.3523	0.1498	1.1616
2	0.5090	1.6636	-0.2078	0.8124	0.2911	1.3379
3+	0.1423	1.1529	-1.3089	0.2701	0.1587	1.1720
Currently in treatment						
No						
Yes	-0.8965	0.4808	-2.0502	0.1287	-0.0462	0.9549
Ever dependent						
No						
Yes	-1.4399**	0.2370	-3.2343**	0.0394	-1.4521**	0.2341

KEY: * = $p < 0.05$; ** = $p < 0.01$.

TABLE 4. *Logistic regression for denial (among self-reported nonusers).*

Predictors	Cocaine/crack N = 2,579		Opiates N = 3,025		Marijuana N = 2,224	
		Odds ratio		Odds ratio		Odds ratio
Gender						
Female						
Male	-0.3493**	0.7052	-0.2213	0.8015	0.1464	1.1577
Race						
White						
African American	1.6230**	5.0683	-0.6007	0.5484	0.4620	1.5872
Hispanic	0.9511**	2.5886	0.0543	1.0558	-0.5279	0.5899
Other	0.3747	1.4546	-0.6706	0.5114	-0.3639	0.6950
Source						
STD (N = 1,061)						
ER (N = 482)	0.1922	1.2120		11.6695	0.0127	1.0128
Jail (N = 1,666)	1.5598**	4.7581	1.0438*	2.8399	0.2036	1.2258
Age						
18-24						
25-39	1.0317**	2.8057	0.5034	1.6543		0.6177
40+	0.9313**	2.5377	0.8748	2.3985	-0.6233	0.5362
Sex partners/past year						
0						
1	0.0405	1.0413	-0.7054*	0.4939	1.1517	3.1637
2	0.0082	1.0082	-0.1096	0.8962	0.9338	2.5442
3-10	0.3603	1.4338	-0.0125	0.9876	1.0094	2.7439
11+	0.2563	1.2921	-0.3552	0.7010	0.9425	2.5663
Arrests/past year						
0						
1	0.4492	1.5670	0.7712*	2.1623	0.7717	2.1635
2	1.0089**	2.7426	0.8347	2.3040	1.1175*	3.0572
3+	1.0430**	2.8377	0.7038	2.0213	0.9416	2.5642
Currently in treatment						
No						
Yes	-1.6635*	0.1895	-1.4345	0.2382	-0.8047	0.4472
Ever dependent						
No						
Yes	0.5632**	1.7630	0.4232	1.5268	-0.7257*	0.4840

KEY: * = $p < 0.05$; ** = $p < 0.01$.

Overlap of Drug Users from High-Risk Groups. The degree of overlap of drug users identified from the three sources can be assessed by their reported appearance in the other two sources. With cocaine users as an example, the percentages of reported involvement with hospital ERs, STD clinics, and arrest in past year from each sample are presented in table 5. The results indicate that many cocaine users identified from jails represent significant proportions of users who also utilized hospital ERs and STD clinics. Likewise, a high number of cocaine-using patients who utilized an ER or STD clinic also reported at least one arrest in the past year (39.0 percent and 29.1 percent respectively). About 21.7 percent of STD patients reported at least one visit to an ER in the past year, while only 1.9 percent of ER patients reported an STD clinic visit.

TABLE 5. *Degree of overlap of drug users from the three sources (percents).*

	STD	ER	Jail
STD[1]	-----	1.9	50.8
ER[2]	21.7	-----	30.5
Jail[3]	29.1	39.0	-----
Other two	7.5	1.9	9.6

KEY:1 = At least one visit to STD clinic in past year; 2 = at least one visit to hospital ER in past year; 3 = at least one arrest in past year.

Discussion

The subjects examined in these analyses are from source populations at high risk of being drug users. The collection of urine specimens provides a further opportunity for estimating the degree of underreporting.

The logistic regression analysis shed light on specific factors to be considered in improving the prevalence estimation. The analysis of denial among self-reported nonusers suggested that, using cocaine as an example, upward adjustments of prevalence estimates should be different for gender (higher for female), race (higher for African Americans and Hispanics, as opposed to whites), recruitment source (higher for jail than other sources), arrests (higher for people with more arrests), treatment (lower for people currently in treatment), and past dependence. Groups identified to be associated with higher

prevalence rates were generally consistent with those found in other surveys (with the exception of females). The rate of positive urine for cocaine was 34.8 percent among females and 31.0 percent among males. Similarly, urine-positive rate among self-reported nonusers for females was 17.8 percent and for males, 16.4 percent. On the other hand, contrary to findings from many other studies, the current analysis on denial among users indicates that drug users recruited from jails were not necessarily more likely than users recruited from STD clinics to lie about their use. For example, among those who had a positive urine result for cocaine, subjects from jails and ERs were less likely to lie about their cocaine use than those recruited from STD clinics; no differences were detected among recruitment sources for reports of opiate use. Curiously, compared to the STD sample, the jail sample showed a higher likelihood of denying marijuana use. This interaction between sample sources and drug type seems to suggest that while all samples underreport somewhat for all drugs, relative to the jail sample, underreporting among the STD sample is more serious for cocaine and less serious for marijuana.

The obvious limitation of the study is that the subjects were not obtained as a probability sample. However, the analyses are initial steps for the identification of empirical issues that need to be considered and analytic approaches that can be adopted to address issues of validity. Prevalence estimation based on self-report can be improved by making adjustments according to identified influencing factors. In addition, focusing on high-risk populations and taking into consideration the overlap and divergence of such groups can empirically improve the prevalence estimates that rely on single sources.

CONCLUDING COMMENTS

Despite advances in other ways to measure drug use, self-report remains the most efficient way to assess the various dimensions of drug use (e.g., quantity and frequency for a given substance over periods of time that can span from the past few days or weeks to a lifetime history of use). Therefore, rather than asking whether or not they are accurate, a more productive approach is to inquire about the determinants of the accuracy of self-report data and then devise ways to improve accuracy of estimates based on self-report.

This chapter addressed two types of empirical questions often encountered when considering self-report data on drug use and

suggested analytical approaches to address these issues. The first set of analytical approaches can be utilized when external objective criteria, particularly those of a longer term nature, are unavailable. In the absence of dependable objective measures, alternative methods of confirmation may have to be sought. Although purely statistical techniques cannot be taken as a fully satisfactory corroborative solution, the CFA procedures described have served as a valuable means of supporting confidence in the validity and reliability of the self-report data obtained. Given the cognitive limitation and other potential sources of response bias that are unlikely to be totally eliminated in self-report, methodologies such as CFA, which uses multiple measures to control measurement errors, should be considered for application in analyzing substantive issues of human behavior.

The second approach to improve prevalence estimation relies on enhanced data collection from targeted populations known to be at high risk of being drug users, then measuring their overlaps. Overall, compared to the survey results of general populations, the drug use prevalence rates are relatively high in all three samples. This type of small-scale study that targets high-risk populations and collects more objective measures can suggest appropriate rates of upward adjustments to be applied to estimates that are wholly reliant on self-report. Furthermore, findings of correlates of reporting accuracy can suggest control variables necessary for refining the adjustment rates.

Quality of self-report data can be a product of a variety of factors ranging from data collection procedures to subject characteristics. Although improvements have been made in methodologies for collecting self-reported drug use data over the past decade, more systematic methodological investigations in the context of measuring drug use are needed. Finally, even for survey studies that have followed all appropriate procedures to ensure the collection of the best possible quality of data, empirical validation of self-report data is always necessary to enhance the utility of these data and to suggest means of controlling for potential biases.

NOTE

1. These 46 variables include various measures of narcotics use (e.g., abstinence, daily use, number of fixes per month); nonnarcotics use; marijuana use; alcohol use; drug dealing; various property crimes (e.g., forgery, theft, robbery) in terms of numbers of crime days per month, percentage of time; legal supervision status (probation, parole, with or without urine testing); employment; welfare; and other similar variables.

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