

TECHNICAL PAPERS ON HEALTH AND BEHAVIOR MEASUREMENT

TECHNICAL PAPER 15

Assessing Consistency of Responses to Questions on Cocaine Use

Elissa B.G. Adair, S. Gail Craddock, Heather G. Miller, and Charles F. Turner

Reference Citation

Adair, E.B.G., S.G. Craddock, H.G. Miller, and C.F. Turner. (1995)
Assessing consistency of responses to questions on cocaine use. *Addiction*
90:1497-1502.

RESEARCH REPORT

Assessing consistency of responses to questions on cocaine use

ELISSA B. G. ADAIR, S. GAIL CRADDOCK,
HEATHER G. MILLER & CHARLES F. TURNER

Research Triangle Institute, 6101 Executive Blvd. Suite 365, Rockville, MD 20852-3909, USA

Abstract

This study examines consistency of self-reported responses to items within the questionnaire of a multi-site, prospective study of drug abuse treatment in the United States (DATOS). The analyses use data from 2842 interviewer-administered intake interviews. Questions that were logically related are paired and responses compared. The questions cover three topics: (1) age at which different types of cocaine was used, (2) reports on most recent use and (3) frequency of cocaine use during period of "heaviest" use. Responses are coded as consistent, inconsistent, or as survey administration error. The latter is related to interviewer errors such as erroneous skip pattern, out-of-range responses, "don't know" responses, missing data, or illegible responses. Contrary to expectations inconsistent responses were relatively rare in this study, with fewer than 5% (0.5-4.6%) of respondents reporting inconsistent answers for pairs of logically related questions. A careful review of responses also found few survey administration errors (0.2-1.3%).

Introduction

The reliability and validity of retrospective self-reports of sensitive or illegal behaviors, including drug use, are of considerable interest to the research community (Ball, 1967; Stephens, 1972; Cox & Longwell, 1974; Bonito, Nurco & Shaffer, 1976; Bradburn *et al.*, 1978; Bale, 1979; Rouse, Kozel & Richards, 1985; Catania *et al.*, 1990). Confirmatory data are not always available (Amsel *et al.*, 1976), and self-reports continue to be the primary source of data for estimating drug use prevalence (Hser, 1993), evaluating drug treatment services (Hubbard *et al.*, 1989) and projecting future trends (Chaiken, 1990). Findings from these studies and others suggest that drug users generally provide truthful and accurate information (Ball, 1967; Cox &

Longwell, 1974; Pompei & Schreiner, 1979; Hubbard, Marsden & Allison, 1984; Turner & Hubbard, in press), but self-reports are not infallible.

While several studies have looked at the veracity of self-reports, less attention has been paid to the difficulties encountered by respondents who are trying to report their behaviors as accurately as possible. It is widely recognized that questionnaire construction, wording of questions, conceptual ambiguity, frames of reference and categories of response can affect survey validity and reliability (Sudman & Bradburn, 1974; Cannell, Marquis & Laurent, 1977; Oksenberg & Cannell, 1977; Bradburn *et al.*, 1979; Turner & Martin, 1984; Groves, 1989). Surveys of drug use often ask for complex information, such as

the average times per month a respondent drank alcohol during the past year. In this case, an inaccurate estimate may be due to faulty calculation, poor understanding of the time period specified, or misinterpretation of the word "average" rather than a conscious effort to distort the response. Similarly, subjects may not be able to remember events that occurred in the past (Lemmens, Knibbe & Tan, 1988); the ability to report past events can also be affected by the effect of drug or alcohol abuse on memory and cognitive skills (Hartocollis & Johnson, 1956; Luria *et al.*, 1967; Hull, 1981; Peterson, Rothfleisch, and Zelazo, 1990).

Research findings are inconclusive and even contradictory about ways to improve the quality of retrospective data on drug and alcohol use (Hilton, 1989) and point to the need to evaluate the cognitive difficulty of questionnaires used to elicit self-report data from drug or alcohol users. The present study uses basic indicators, including consistency of respondents' responses and interviewers' errors, to assess data quality from a national evaluation of drug treatment.

Drug Abuse Treatment Outcome Study (DATOS) and sample characteristics

DATOS is an ongoing, multi-site prospective study of drug abuse treatment effectiveness that began in November 1991. Study sites are in the United States and include traditional, publicly funded outpatient methadone, residential and outpatient drug-free treatment modalities as well as new strategies, such as private chemical dependency programs that provide rehabilitation services. Clients are interviewed at intake and at regular intervals thereafter. The present study uses data from intake interviews only. The overall response rate is 85% (5% refusals, 10% not recruited). Response rates vary by treatment modality, ranging from 59.3% for short-term inpatient programs to 97.0% for methadone programs.

The final DATOS questionnaire is a careful compilation of standardized measures used in the field of drug abuse treatment (Horton, 1993). At the outset of this study, it was decided that making comparisons to existing datasets was important. The wording of questions from existing datasets often differed. Rather than selecting one question as representative of the topic, the

DATOS instrument includes different versions of related questions. This preserves the ability to compare DATOS findings to those of previous research while also providing a unique opportunity to compare response consistency to logically related items within the DATOS questionnaire. The items assessed for response consistency fall into three general categories: age of first use, extent of use during the period of greatest use, and use in the last 12 months. Respondents were asked about their use of cocaine in different forms, such as "crack" or "speedball". Thus it is also possible to assess whether or not alternative forms of cocaine were consistently included under the general rubric of "cocaine" use.

This report focuses only on DATOS items related to cocaine use. To avoid problems introduced by variant question wordings, our analyses use only those data derived from the final version of the DATOS intake questionnaire ($n = 2842$). There are no substantial differences between the 2842 clients included in this study and the entire DATOS sample of 10 010. Respondents were recruited from four treatment categories: residential (26%), short-term in-patient (32%), methadone (16%), and out-patient (27%). The sample is diverse. Approximately two-thirds are male, and the majority are in their twenties (37%) and thirties (54%). Thirty-six per cent of clients left school prior to high school graduation, but 38% reported receiving a high school diploma. Thirty-six per cent of clients are white, and 49% are African American. Twelve per cent classified themselves as Hispanic. The majority of clients (79%) have some prior history of incarceration, and 25% were requested by the criminal justice system to enter treatment. The predominant drug problem reported at intake was cocaine use; 33% reported "crack" cocaine as their primary drug problem, and 18% reported cocaine without specifying the form. Fewer subjects reported problems with heroin (18%) and alcohol (12%).

Results

In this study, similar items in the DATOS questionnaire are paired. Each pair is screened for respondents' refusal or "don't know" responses as well as survey administration errors, which include non-adherence to skip patterns, out of range and illegible responses. Only a small

Table 1. Consistency of responses to questions on age at first use of cocaine and other different types of cocaine use or non-use

Category of response	Age at first daily use (Qn. 1a)		Age at first regular use (Qn. 1b)		Age quit use (Qn. 1c)		Age of first "crack use" (Qn. 1d)		Age of first "speedball" use (Qn. 1e)	
	n	%	n	%	n	%	n	%	n	%
Consistent	2787	98.1	2756	97.0	2788	98.1	2751	96.8	2742	96.5
Inconsistent	30	1.1	52	1.8	15	0.5	59	2.1	72	2.5
Survey administration errors*	25	0.9	34	1.2	39	1.3	32	1.1	28	1.0

*Errors include interviewer's non-adherence to skip patterns, out of reasonable range responses, "don't knows", missing data, illegible responses or inapplicable questions. Approximately half of the errors included in this category appear to be due to interviewer's non-adherence to skip patterns.

Table 2. Consistency of response to questions on recent use of cocaine

Category of response	Use 12 months before admission (Qn. 2) vs. last regular use (Qn. 2a)		Use 12 months before admission (Qn. 2) vs. most recent use (Qn. 2b)		Most recent use (Qn. 2b) vs. recent "crack" use (Qn. 2c)		Most recent use (Qn. 2b) vs. recent "speedball" use (Qn. 2d)	
	n	%	n	%	n	%	n	%
Consistent	2684	94.4	2719	95.7	2791	98.2	2795	98.3
Inconsistent	130	4.6	99	3.5	30	1.1	33	1.2
Survey administration errors*	28	0.9	24	0.9	21	0.7	14	0.5

*Errors include interviewer's non-adherence to skip patterns, out of reasonable range responses, "don't knows", missing data, illegible responses or inapplicable questions. Approximately half of the errors included in this category appear to be due to interviewer's non-adherence to skip patterns.

Table 3. Consistency of responses to questions asking about frequency or number of times consumed cocaine

Category of response	Number of times in life used cocaine vs. number of weeks consumed at least once a week		Frequency consumed at heaviest use vs. frequency consumed during last time used		Frequency consumed at heaviest use vs. frequency consumed during last time used "crack"		Frequency consumed at heaviest use vs. frequency consumed during last time used "speedball"	
	n	%	n	%	n	%	n	%
Consistent	2679	95.1	2730	96.1	2756	97.0	2789	98.1
Inconsistent	109	3.9	93	3.3	71	2.5	48	1.7
Survey administration errors*	29	1.0	19	0.7	15	0.5	5	0.2

*Errors include interviewer's non-adherence to skip patterns, out of reasonable range responses, "don't knows", missing data, illegible responses or inapplicable questions. Approximately half of the errors included in this category appear to be due to interviewer's non-adherence to skip patterns.

proportion of responses (fewer than 1.5%) were excluded from consistency analyses due to survey administration errors (see Tables 1, 2 and 3.)

The DATOS questionnaire included several questions concerning age of initiation of cocaine use, including age at first use of "crack" cocaine or cocaine used in combination with heroin ("speedball"). These questions provide an opportunity to compare reports about age of initiation for different forms of cocaine. Answers to each of the following questions were compared to those for Question 1: About how old were you the first time you used cocaine?

- 1a. How old were you the first time you used cocaine daily?
- 1b. How old were you when you started using cocaine regularly (at least once a week)?
- 1c. How old were you at that time? [longest time went without using cocaine]
- 1d. How old were you when you first used the form of cocaine known as "crack"?
- 1e. How old were you when you first used heroin and cocaine together ("speedball")?

Responses are considered inconsistent if the age at first use is greater than ages reported for other periods of use (Questions 1a–1e). Results shown in Table 1 indicate very high levels of consistency in comparisons of reports of age at first use of cocaine. The proportion of inconsistent responses for each pair of questions ranges from 0.5% to 2.5%. Overall, 93.2% of subjects provided complete data with no inconsistencies among items related to age at first use. The questions on different forms of cocaine use ("crack" and "speedball") have slightly higher rates of inconsistency (2.1–2.5%) than those for cocaine (0.5–1.8%).

Additional analyses compare responses to questions concerning recent cocaine use. The questionnaire used two different time periods to define recent use: (1) in the month prior to admission, and (2) in the past 12 months. Because questionnaires were administered at intake, the date of interview and date of admission were roughly equivalent. Responses for similar time periods to the following questions were compared to those from Question 2: On average, how often did you use cocaine in the 12 months prior to admission to this program?

- 2a. When was the last time you used cocaine regularly?
- 2b. When was the most recent time you used cocaine regularly in any form?

Responses are considered inconsistent if the respondent reported regular or last use in the past 12 months (2a, 2b) and no use in the 12 months prior to admission (2). Then, responses to question 2b were compared to the following questions on different forms of cocaine:

- 2c. When was the most recent time you used "crack"?
- 2d. When was the most recent time you used heroin and cocaine together?

Responses are considered inconsistent if most recent use of "crack" or "speedball" (2c, 2d) is not equivalent to most recent use of cocaine in any form (2b). Comparisons of these two periods of retrospective reporting found few inconsistencies. As presented in Table 2, the proportion of inconsistent reports on cocaine use range from 3.5%–4.6% for each pair of questions, with over 90% of respondents providing consistent data for items related to the last 12 months of use. Fewer inconsistencies (1.1–1.2%) were found in comparisons of questions related to different forms of cocaine.

The next set of analyses (Table 3) look at consistency in reports of frequency of cocaine use during the period of heaviest use. The first column of Table 3 compares the number of times cocaine was ever used to the number of weeks it was used at least once. Responses are considered inconsistent if the number of weeks cocaine was used exceeds the number of times cocaine was ever used. Overall, reports are very consistent, with only 3.9% of paired responses being inconsistent. The second column in Table 3 compares frequency at heaviest use to frequency at most recent use. Responses were coded as inconsistent if frequency at recent use was greater than frequency at heaviest use; very few (3.3%) responses were inconsistent. Again, additional comparisons were made concerning different forms of cocaine used, in this case for the period of heaviest use. Inconsistent reports for cocaine vs. "crack" or "speedball" were slightly higher for periods of heaviest use (2.5% and 1.7%, respectively) than for recent periods of use as indicated in Table 2 (1.1% and 1.2%, respectively). Overall, there were very few incon-

sistencies with respect to different forms of cocaine use. Virtually all respondents who reported using cocaine or "crack" also responded to specific questions on cocaine use. Only three respondents (0.1%) who identified "crack" as their problem drug did not complete questions on "crack" use.

As a final step in these analyses, a composite measure of logical inconsistencies was created by summing the number of inconsistencies of nine items in four areas of response: age at first use, frequency of use, last time used and consistency of reports on "crack" and cocaine use. Only 9% of subjects had one logical inconsistency in responses; 14% had one or more. The socio-demographic characteristics of respondents with one or more logically inconsistent responses were compared to those with no inconsistent responses. There were no statistically significant differences between these two groups with respect to age, gender or education.

Discussion

While there were numerous opportunities to provide contradictory responses to similar questions in DATOS, the level of consistency was higher than expected, with fewer than 5% of respondents reporting inconsistent answers for each pair of logically related questions. These findings suggest that respondents were able to describe their drug use in a number of different ways in a very consistent manner.

Recent assessment of the National Household Survey on Drug Abuse (NHSDA) of 1988 found much higher levels of inconsistent reporting and item non-response than is reported in this study (Turner, Lessler & Gfroerer, 1992). For instance, a comparison of NHSDA questions on cocaine use in the past 30 days found that, of the 805 respondents who reported using cocaine more than a month ago, 22.7% of responses to similar questions on use during this time period were logically inconsistent (Cox *et al.*, 1992: tables 5-6). In the same survey, an analysis of 15 questions on cocaine use found 13.7% of respondents failed to answer one or more of these questions; non-response rates for individual cocaine questions ranged from 0.7% to 8.2% (unweighted percentages calculated from Witt *et al.*, 1992: tables 4-1 and 4-9).

Given the similarity of many of the survey questions asked by DATOS and NHSDA, dif-

ferences in response consistency and item non-response were unexpected. One might expect that the population served by drug treatment centres to be less adept at responding to survey questions than national probability samples (for reasons of education or drug-related impairment). However, this study found response consistency in the drug treatment population to be greater than that obtained in the NHSDA survey of the general population (Cox *et al.*, 1992). There may be several reasons for such relatively high levels of consistency in the DATOS sample. First, the interviewers may have edited out inconsistency during the interview process. (The DATOS questionnaire is completed by the survey interviewer while the NHSDA questionnaire is completed by the respondent.) Secondly, clients of drug abuse treatment centres may be more conscious of their cocaine use than respondents to national surveys. Finally, it is possible that respondents to the DATOS interview had more extensive experience communicating about their drug use to a variety of health care workers and other service providers and could thus relate a more consistent description of their drug use. In closing, we would also remind readers that the present study is based on a sample of clients of drug treatment programs in the United States, and our results may not necessarily generalize to other populations.

Acknowledgments

The research reported in this article benefited greatly from conversations with staff of the Research Triangle Institute, particularly Robert Hubbard, Tim Smith, Barbara Forsyth and Pat Flynn. Descriptions of the DATOS project are adapted from the grant proposal, an internal report published by RTI on 18 June 1993 entitled "Drug Abuse Treatment Outcome Study (DATOS): Background, Status and Plans", and conversations with the principal investigators. This research was supported by grant P50 DA06990-02 from the United States National Institute on Drug Abuse.

References

- AMSEL, Z., MANDELL, W., MATTHIAS, L., MASON, C. & HOECHERMAN, I. (1976) Reliability and validity of self-reported illegal activities and drug use collected from narcotic addicts, *International Journal of the Addictions*, 11, 325-336.

- BALE, R. N. (1979) The validity and reliability of self-reported data from heroin addicts: mailed questionnaires compared with face-to-face interviews, *International Journal of the Addictions*, 14, 993-1000.
- BALL, J. C. (1967) The reliability and validity of interview data obtained from 59 narcotic drug addicts, *American Journal of Sociology*, 72, 650-654.
- BONITO, A. N., NURCO, D. N. & SHAFFER, J. W. (1976) The veridicality of addicts' self-reports in social research, *International Journal of the Addictions*, 11, 719-724.
- BRADBURN, N. M., SUDMAN, S. & ASSOCIATES (1979) *Improving Interview Method and Questionnaire Design* (San Francisco, Jossey-Bass).
- BRADBURN, N., SUDMAN, S., BLAIR, E. & STOCKING, C. (1978) Question threat and response bias, *Public Opinion Quarterly*, 42, 221-234.
- CANNELL, C. F., MARQUIS, K. H. & LAURENT, A. (1977) A summary of studies of interviewing methodology, *Vital and Health Statistics*, Series 2, 69.
- CATANIA, J. A., GIBSON, D. R., CHITWOOD, D. D. & COATES, T. J. (1990) Methodological problems in AIDS behavioral research: Influences on measurement error and participation bias in studies of sexual behavior, *Psychological Bulletin*, 108, 339-362.
- CHAIKEN, J. (1990) Analyzing and improving the drug use forecasting (DUF) sampling plan. Progress Report to the National Institute of Justice.
- COX T. J. & LONGWELL, B. (1974) Reliability of interview data concerning current heroin use from heroin addicts on methadone, *International Journal of the Addictions*, 9, 161-165.
- COX, B. G., WITT, M. B., TRACARELLA, M. A. & PEREZ-MICHAEL, A. M. (1992) Inconsistent reporting of drug use in 1988, in: TURNER, C. F., LESSLER, J. T. & GFROERER, J. C. (Eds) *Survey Measurement of Drug Use*, pp. 109-153 (Washington, DC, US Department of Health and Human Services, DHHS Publication No. (ADM)92-1929).
- GROVES, R. (1989) *Survey Errors and Survey Costs* (New York, Wiley).
- HARTOCOLLIS, P. & JOHNSON, D. M. (1956) Differential effects of alcohol on verbal fluency, *Quarterly Journal of Studies of Alcohol*, 17, 183-189.
- HILTON, M. E. (1989) A comparison of a prospective diary and two summary recall techniques for recording alcohol consumption, *British Journal of Addiction*, 84, 1085-1092.
- HORTON, A. M. (1993) Future directions in the development of addiction assessment instruments, in: ROUNSAVILLE, B. J., TIMS, F. M., HORTON, A. M. & SOWDER, B. J. (Eds) *Diagnostic Source Book on Drug Abuse Research and Treatment*, pp. 87-92 (Washington, DC, US Department of Health and Human Services, NIH Publication No. 93-3508).
- HSER, Y. (1993) Data sources: problems and issues, *Journal of Drug Issues*, 23, 217-228.
- HUBBARD, R. L., MARSDEN, M. E. & ALLISON, M. (1984) *Reliability and Validity of TOPS Data* (Research Triangle Park, NC, Research Triangle Institute).
- HUBBARD, R. L., MARSDEN, M. E., RACHAL, J. V., HARWOOD, H. J., CAVANAUGH, E. R. & GINZBURG, H. M. (1989) *Drug Abuse Treatment. A National Study of Effectiveness* (Chapel Hill, University of North Carolina Press).
- HULL, J. G. (1981) A self-awareness model of the causes and effects of alcohol consumption, *Journal of Abnormal Psychology*, 90, 586-600.
- LEMMENS, P., KNIBBE, R. A. & TAN, F. (1988) Weekly recall and diary estimates of alcohol consumption in a general population survey, *Journal of Studies on Alcohol*, 49, 131-135.
- LURIA, A. R., HOMSKAYA, E. D., BLINKOV, S. M. & CRITCHLEY, M. (1967) Impaired selectivity of mental processes in association with a lesion of the frontal lobe, *Neuropsychologia*, 5, 105-117.
- OKSENBERG, L. & CANNELL C. F. (1977) Some factors underlying the validity of response in self report, *International Statistical Bulletin*, 48, 324-326.
- PETERSON, J. B., ROTHFLEISCH, J. & ZELAZO, P. D. (1990) Acute alcohol intoxication and cognitive functioning, *Journal of Studies on Alcohol*, 51, 114-122.
- POMPI, K. F. & SCHREINER, S. C. (1979) The reliability of biographical information obtained from court-stipulated clients newly admitted to treatment, *American Journal of Drug and Alcohol Abuse*, 6, 79-95.
- ROUSE, B. A., KOZEL, N. J. & RICHARDS, L. G. (Eds) (1985) *Self-Report Methods of Estimating Drug Use: Meeting Current Challenges to Validity* (Washington, DC, NIDA Research Monograph, No. 57, DHHS Publication No. ADM85-1402).
- STEPHENS, R. (1972) The truthfulness of addict respondents in research projects, *International Journal of the Addictions*, 7, 549-558.
- SUDMAN, S. & BRADBURN, N. (1974) *Response Effects in Surveys. A Review and a Synthesis* (New York, Academic Press).
- TURNER, C. F. & HUBBARD, R. L. (1995) Quality of alcohol use histories collected at intake to substance abuse treatment, *International Journal of the Addictions*, 30, pp. 963-989.
- TURNER, C. F. & MARTIN, E. (Eds) (1984) *Surveying Subjective Phenomena* (New York, Russell Sage).
- TURNER, C. F., LESSLER, J. T. & GFROERER, J. C. (1992) *Survey Measurement of Drug Use: Methodological Studies* (Washington, DC, US Department of Health and Human Services, DHHS Publication No. (ADM)92-1929).
- WITT, M., PANTULA, J., FOLSUM, R. & COX, B. (1992) Item nonresponse in 1988, in: TURNER, C. F., LESSLER, J. T. & GFROERER, J. C. (Eds) *Survey Measurement of Drug Use*, pp. 85-108 (Washington, DC, US Department of Health and Human Services, DHHS Publication No. (ADM)92-1929).