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Quality of Alcohol Use Histories Collected at Intake to Substance User Treatment

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ABSTRACT

Many survey questions on alcohol require complex cognitive tasks, such as long-term recall, shifting reference periods, and numeric calculation. Moreover, alcohol-related impairment is known to affect cognitive ability. To assess the quality of data on self-reported alcohol use, internal consistency analyses were conducted as part of a comprehensive multisite prospective study of drug user treatment outcome undertaken in 11 cities throughout the United States (DATOS). Contrary to expectation, analyses found high levels of internal consistency. For questions on age of initiation of different types of alcohol use, over 99% of respondents ($N = 2,842$) reported consistent answers for each pair of logically related questions. Reports of being drunk and of quantity of alcohol consumed were similarly consistent.

Key words. Alcohol; Drug user treatment; Self-reports; Consistency; Reliability; Measurement

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INTRODUCTION

Questionnaire measurements of impairment due to drug use, delivery of drug user treatment services, and treatment outcomes underlie both national estimates of the need for drug user treatment and also large-scale research efforts to assess the effectiveness of that treatment. National studies of drug user treatment processes and outcomes, such as the Treatment Outcome Prospective Study (TOPS) (Hubbard et al., 1989), have used extensive pre- and posttreatment questionnaires to measure clients' use of drugs, functional impairments, and posttreatment status. Attempts to gauge the need for treatment rely upon similar questionnaire measurements. Thus, for example, the Institute of Medicine has used questionnaire measurements of functional impairments derived from the 1988 National Household Survey of Drug Abuse to conclude that "1.5 million Americans (0.7 percent of the population) can be categorized as having a clear need for drug treatment," and that another 3.1 million had a "probable need" for drug user treatment (Gerstein and Harwood, 1990, pp. 81-82).

Given the centrality of such questionnaire measurements to important research endeavors, there is a substantial basis for concern about the quality of such measurements. Research on the reliability and validity of survey data has demonstrated that the response task inherent in the questionnaire is a major factor influencing the quality of the survey measurements (see, for example, Bradburn et al., 1979; Schuman and Presser, 1981; Turner and Martin, 1981, 1985; Turner et al., 1992). Many researchers, for example, ask for information involving matters to which respondents may not have direct and immediate access—for example, the average number of times per month or week a respondent drank alcohol over the past year. A mistaken estimate in this case may not be the result of "distortion"—either conscious or unconscious—but may simply be due to the relative unavailability to immediate memory of the information that has been requested.

In addition to such concerns about the memory and cognitive demands *inherent* in the commonly used questionnaires, there is reason to be concerned about the effects of histories of drug or alcohol use upon the ability of persons in treatment to complete even straightforward memory and cognitive coding tasks involving events that may have occurred some time ago. Many studies with "normal" populations have demonstrated declines in the recall of events with elapsed time (Cannell et al., 1977; Madow, 1967; Mooney, 1962; Neter, 1970). The salience of the event has been shown to have a strong mediating effect on the relationship between recall period and reporting (Neter and Waksberg, 1964), although the relationships have not always been consistently demonstrated (Sudman and Bradburn, 1974; Maynes, 1968). Research in cognitive science and neuropsychology has also indicated that alcohol and

other drug use can have selective effects on cognitive functioning (Peterson et al., 1990; Shimamura, 1989). Of particular importance to the types of data we will discuss are the evidence that such impairments may impinge on the ability of people to keep track of events in time (Peterson et al., 1990).

All of these concerns are reflected in our own interest in assessing the quality of data collected at intake in major national evaluations of drug user treatment. An extensive set of measures of alcohol and drug use are included in the most recent national evaluation: the Drug Abuse Treatment Outcome Study (DATOS). The focus and design of this research are briefly described below.

DRUG ABUSE TREATMENT OUTCOME STUDY (DATOS)

DATOS is a comprehensive multisite study of drug user treatment that will provide information to help answer many basic questions currently confronting the drug user treatment field, such as:

- What types of drug users enter different types of drug user treatment?
- What types of treatment services and therapies are provided for particular types of clients?
- What outcomes are achieved by different types of clients in different types of treatment programs?

The DATOS research is being conducted for the National Institute on Drug Abuse by the Research Triangle Institute (RTI).

DATOS Data Collection

DATOS is a comprehensive multisite prospective study of drug user treatment effectiveness. A population of 10,010 DATOS clients have been interviewed at entry to treatment in a sample of 120 drug user treatment programs. These programs include traditional publicly funded outpatient methadone, residential, and outpatient drug-free modalities and new types such as private chemical dependency programs that provide rehabilitation services for clients with drug use problems.

The DATOS sample design focused upon 11 cities, thus allowing a concentration of resources and a minimization of confounding by city-specific drug use patterns or particular state or local laws and regulations for treatment. The initial sample of 120 clinical treatment units included 35 methadone clinics, 22 long-term residential (therapeutic community) facilities, 45 outpatient, and 18 short-term inpatient (chemical dependency) units. Table 1 shows the number of sampled and implemented treatment modalities in each of the 11 cities in

Table 1.
Number of DATOS Clinical Treatment Units, by Modality and City

City	Treatment modality sampled (Implemented)			
	Methadone	Long-term residential	Outpatient	Short-term Inpatient
Chicago	2 (2)	1 (1)	4 (2)	2 (2)
Houston	2 (1)	1 (0)	4 (2)	3 (1)
Miami	2 (2)	2 (2)	5 (4)	1 (1)
Minneapolis	1 (1)	2 (1)	3 (3)	1 (1)
New Orleans	2 (0)	1 (1)	2 (2)	2 (2)
Newark, NJ	1 (0)	4 (4)	4 (4)	1 (1)
New York	16 (15)	4 (3)	6 (2)	1 (1)
Phoenix	3 (1)	2 (2)	4 (3)	2 (1)
Pittsburgh	2 (2)	1 (1)	3 (3)	2 (2)
Portland, OR	2 (2)	2 (2)	7 (2)	1 (1)
San Jose	2 (2)	2 (2)	3 (1)	2 (1)
Total	35 (28)	22 (19)	45 (28)	18 (14)

which DATOS is being conducted. Each DATOS unit consisted of a unit with a clinical staff and director providing a single modality of treatment to a specified client population in one physical location. The first stratification of the program/clinical unit sample was based largely on organizational structure (e.g., public vs private). A second dimension to be verified by a more intensive treatment process study is therapeutic orientation (e.g., therapeutic community, twelve step, or mental health).

Samples of clients entering treatment were interviewed at intake at each site, and after the first week in treatment, comprehensive assessments of dependence, mental health, physical health, and social functioning data were collected from clients using a set of standard instruments developed by a consortium of experts in the assessment and diagnosis of individuals who were dependent on drugs. The intent was to provide diagnostic profiles on clients. After 1, 3, 6, and 12 months in treatment or aftercare, clients were interviewed about the treatment they received and their knowledge and attitudes toward dependence and recovery. A research interviewer employed by the DATOS research project was assigned to each program for specified days during the duration of the intake and in-treatment data collection phase of the project to conduct the intake and in-treatment interviews and to collect data about the nature and the costs of treatment. A sample of 4,500 clients will be interviewed at 12 months following treatment termination. This follow-up interviewing was initiated in November 1993 and is scheduled to be completed by March 1995.

Characteristics of the DATOS Interviewing Staff

The initial interviews for DATOS used for this analysis were conducted by a staff of 107 professional interviewers. The DATOS staff was hired, trained, and supervised by a staff of survey supervisors based at the Research Triangle Institute (RTI). The training included 7 days of formal instruction and practice at RTI and 3 days of home study and onsite practice interviews. The characteristics of the interviewing staff reflected that of RTI's national staff of interviewers. The average age of interviewers is approximately 50, most (80%) have some college experience, and staff typically have 4 to 5 years experience in survey interviewing on a variety of topics including household surveys of alcohol and drug use. Most of the interviewers for DATOS were recruited from the RTI National Interviewers File. Many had experience on the National Household Survey of Alcohol and Drug Abuse (1988). In selected cities, one or two interviewers were hired who had prior experience working on research studies in drug user treatment programs.

DATOS Instruments

The DATOS questionnaire was a careful compilation of a range of standardized measures used in the field of drug user treatment such as the ASI, the DSM-III, and TOPS (see Horton, 1993), and in other fields such as health, mental health, and employment. The final composition of the measures was reviewed and recommended by a panel of experts representing each field. The order of questions was as follows: the first sections were on demographics, education, and current admission to treatment; the next sections collected current and prior drug use histories by type of drug, with those who had never used the drug skipping over that section; then problem drugs were identified and occasions of overdose; the next sections were devoted to treatment history, mental health status, illegal involvement, and employment/support status, respectively; and the final sections asked about income and expenditures and drug and alcohol dependence. The drugs asked about included: marijuana, cocaine, heroin, narcotics, sedatives, stimulants, hallucinogens, and inhalants.

In order to maintain consistency with existing data sets, questions were asked in standard ways so that data could be compared to prior and current research. The standardized measures used in DATOS have been repeatedly assessed for validity and reliability (Rounsaville et al., 1993; Hubbard et al., 1989). The standard and additional questions were pretested extensively with clients in the various treatment modalities in order to verify cross-modality relevance and to ensure that clients could understand and respond to the questions as written. When pretesting indicated major difficulties in a few sections, the question wording or response format was simplified.

DATOS data collection activities began during late November 1991 in five cities: Miami, Minneapolis, New Orleans, Pittsburgh, and San Jose. During the early summer of 1992, four additional cities were added to the study. This phase included Chicago, Houston, Phoenix, and Portland. In August of the same year, programs in the New York City and Newark area were added to finalize the full complement of cities in the DATOS program.

DATOS intake interviewing was concluded in the fall of 1993. Data were collected from 99 of the 120 sampled treatment programs in 11 cities. As shown in Table 1, these programs covered the four major treatment modalities: long-term residential, outpatient nonmethadone, methadone, and short-term inpatient. As of September 1993, data collection efforts had yielded interviews with 10,010 clients admitted to treatment since the onset of DATOS in November 1991, more than 8,755 clinical interviews, and 10,836 in-treatment interviews. The data from these intake and subsequent posttreatment interviews will be used to examine the contribution of type of treatment, client characteristics, and posttreatment variables to the prediction of multiple treatment outcomes. Analyses of the costs and benefits of treatment will also be conducted for each type of program.

Assessment of Data Quality

While DATOS will collect a wide array of clinical and other data that does not rely upon respondents self-reports, there are many aspects of clients' histories and treatment experiences that can only be obtained by interviewing the clients themselves. Because of the role such data will play in DATOS and other treatment research, we have undertaken a research program that focuses attention on two interrelated questions about the quality of these self report data:

- Does the complexity of the memory and cognitive tasks imposed by commonly-used treatment-outcome questionnaires lead to inaccurate response?
- To what extent, if any, can these inaccuracies be diminished by redesigning survey instruments to take better account of the cognitive and memory demands made by these instruments?

The overall goal of the proposed research effort is to better understand the frailties of current measurement efforts so as to improve the reliability and validity of outcome measurements used in treatment research. Potential lack of reliability and validity of self-reported data has previously been cited as a reason to question conclusions that have been drawn in past research on treatment effectiveness for alcoholics (Saxe et al., 1983; Emrick and Hansen, 1983; Midanik, 1982; Pendery et al., 1982; Sobell and Sobell, 1978; Maisto and O'Farrell, 1985; Watson, 1985).

The particular research questions we have chosen and our initial approach to their study build upon advances in the application of cognitive research strategies to survey design (see, for example, Bradburn et al., 1987; Tourangeau, 1984; Turner et al., 1992; Forsyth et al., 1992; Hubbard, 1992; Turner and Martin, 1985) and a growing body of methodological research on the measurement of drug use and other sensitive behaviors and on the interplay of survey methods research and the evaluation of program outcomes (see, for example, Turner et al., 1992; Hubbard et al., 1990; Turner et al., 1989, Ch. 2,3, and 5; Miller et al., 1990: Ch. 6; Coyle et al., 1991).

The proposed research has two phases. In Phase I, a series of studies will appraise the quality of the survey instruments presently used in the DATOS research effort. In Phase II, we will use the appraisal results from Phase I to develop alternative instruments and test their quality by an experimental comparison administering the original and alternative survey instruments to a sample of DATOS clients.

ANALYSIS

In our first series of studies, secondary analyses of extant DATOS data are being conducted to identify DATOS questions that produce high level of logically inconsistent data. Such gross indicators of data quality will be used to further target items that may benefit by revision. Such secondary analyses provide a relatively inexpensive method of identifying problematic questions.

When we previously conducted parallel research on the National Household Survey of Drug Abuse (1988), we identified numerous problematic item characteristics, including:

- Frequent use of vague or ambiguous terminology
- Items that ask implicit, hidden questions
- Item reference periods that are difficult to define and have little personal relevance or meaning
- Ambiguous or vaguely defined response categories

Any of these item characteristics may make it difficult for respondents to give accurate survey responses. Analysis of the patterns of missing and inconsistent data in that same survey yielded results that reinforced, in many instances, the conclusions of our cognitive assessment. Items identified as problematic in the cognitive appraisal frequently had high levels of missing or inconsistent data.

Our preliminary review of the DATOS instruments indicates that they share many characteristics in common with the instrument used in the National Household Survey of Drug Abuse (1988). This suggests that there may be substantial room for improving the quality of the DATOS instrumentation.

Sample

The DATOS data collection has used three versions of the intake questionnaire. These incorporate revisions designed to improve the accuracy of measurements and to reduce operational difficulties in questionnaire administration. The first revision of the intake questionnaire was adopted in June 1992. A second revision was made in October 1992, and it was largely restricted to changes in questionnaire layout. The October 1992 revision was phased into data collection at the DATOS sites during the period October to December 1992.

For the methodological analyses to be reported here, we have restricted our analysis to questionnaires completed after December 31, 1992. Thus all of our analyses reported in this paper reflect data obtained from a single instrument. While we believe that many revisions made to the DATOS questionnaire are unlikely to have had an effect upon the responses obtained, our methodological purposes are best served by eliminating concerns about variability in details of the format and wording of the questions which were asked. The 2,842 DATOS clients included in this analysis completed intake interviews during the period January to August 1993. The sample of treatment clients selected for this analysis is large and diverse and drawn from each of the four major types of treatment programs: 442 from methadone, 744 from long-term residential, 901 from short-term inpatient, and 755 from outpatient treatment programs. As Table 2 shows, approximately two-thirds of clients were male and the majority of respondents were in their 20s (34%) and 30s (47%). Forty-five percent of clients left school prior to high school graduation; 27% reported some postsecondary education. The clients were racially and ethnically diverse: 44% of the clients were White, and 51% were African-American. Twelve percent (see Note 1) classified themselves as Hispanic.

The majority of clients (63%) had some prior history of incarceration, and 25% entered treatment as a result of a suggestion or requirement by some element of the criminal justice system. The predominant problem drug (see Note 2) reported at intake was cocaine; 33% reported crack cocaine as their primary drug problem and 18% reported other types of cocaine use as their primary drug problem. The next most common problem drugs were heroin (18%) and alcohol (12%).

The majority of clients (55%) had one or more prior treatments for drug use problems and 16% had prior treatment for alcohol use problems. One-third of the clients in this sample had been discharged from another program within 1 to 2 years prior to the admission to the DATOS program. At least one episode of overdosing on drugs was reported by one of every five clients. Other factors that may affect data quality could include mental health and social stability. Twenty-one percent of the sample reported attempting suicide at one time in their life, 11% were receiving medication for mental health problems

Table 2.**Selected Social, Demographic, and Drug Use Characteristics of Sample^a**

Characteristic	Percent
Social and Demographic Characteristics	
Gender:	
Male	67
Female	33
Age:	
Under 20	2
21-29	34
30-39	47
40-49	15
50+	2
Marital status:	
Married	19
Cohabiting	13
Legally separated	7
Divorced	14
Widowed	1
Never married	46
Living with one or more family members at admission ^b	65
Race:	
White	44
Black	51
American Indian	1
Asian	<1
Other	3
Hispanic origin	12
Education:	
0 to 8 Years	6
9 to 11 Years	39
12 Years	29
13 to 15 Years	21
20+ Years	6
Employment Characteristics	
Employment status at admission:	
Employed	26
Looking for work	12
Not in labor force	62
Main occupation in year prior to admission:	
No full-time job of 1+ week duration	50
Professional, technical, managerial worker	7
Clerical or sales worker	8
Crafts worker	7
Operatives (including manufacturing and transport)	6
Nonfarm laborer	9
Service worker	12
Other	9

(continued)

Table 2. *Continued*

Characteristic	Percent
Involvement with Criminal Justice System	
Ever served time in prison ^c	63
Current admission to drug treatment required or suggested by criminal justice system	25
Drug Use Characteristics	
Primary problem drug at current admission:	
None reported	7
Alcohol	12
Cocaine, any form	18
Crack cocaine	33
Heroin	18
Heroin and cocaine	3
Other drugs	9
Ever overdosed on drugs	22
Drug Treatment Characteristics	
Prior treatment for alcohol use	16
Prior treatments for drug use: ^d	
No prior treatment	45
28-day or short-term in-patient	25
Long-term residential treatment	18
Methadone treatment	12
Outpatient treatment	19
Short-term detoxification	22
Other (e.g., Halfway House)	6
Year of last discharge from drug treatment 1990-1993	43
Age at first treatment for drug use: ^e	
13 to 19	8
20 to 24	19
25 to 29	27
30 to 34	23
35+	24
Psychiatric Characteristics	
Ever attempted suicide	21
Currently medicated for psychiatric problems	11
Ever hospitalized for psychiatric problems	12
Base N ^f	2,842

^aThese tabulations characterize the sample of 2,842 DATOS clients included in the analyses reported in this article, i.e., clients admitted from January 1, 1993, to August 31, 1993. All of these clients were administered an identical revised version of the original DATOS intake instrument.

Table 2. *Continued*

^b"Family members" include: parent, step- or foster parent, child, spouse, or nonmarital partner.

^cIncludes time spent in jail, prison, or juvenile detention home.

^dPercents do not sum to 100 because some respondents had received two or more different types of treatment prior to the current admission: 25% reported two or more types; 10% reported three or more types.

^eAge at first treatment for drug use or, if no prior treatment for drug use, age at intake into current treatment program.

^fNote that the base *N* of 2,842 includes all cases in the sample. The tabulations in this table exclude between 3 and 203 cases in which data are missing on the characteristic being tabulated.

at the time of admission to the DATOS program, and 12% had been hospitalized for mental health problems. A number of clients were also functioning in the community prior to treatment. Thirty-eight percent were employed or actively looking for work in a variety of occupations. One-third of the clients were married or living as married and two-thirds reported living with one or more family members at the time they were admitted to the DATOS program.

The size and diversity of the sample of DATOS clients included in this analysis suggest that the results can be used to guide similar studies. The characteristics of the TOPS sample mirrored that of the national population of drug user treatment clients (Hubbard et al., 1989), and it is anticipated that comparison of DATOS sample with the national population of clients will show a similar consistency.

Questionnaire Measurements

The DATOS intake questionnaire consists of 10 sections which collect data on demographic and background characteristics of clients, their education and training, the circumstances of their admission to treatment, alcohol and tobacco use, illicit drug use, mental health status, involvement with the criminal justice system, employment, income and expenditures, and symptoms of drug or alcohol dependence (see Note 3).

This article assesses the quality of the reporting of alcohol use in the intake questionnaire. The alcohol use questions appear together as the third section of the questionnaire—prior to questions on illicit drugs. The alcohol questions are preceded by 17 questions asking about basic demographic characteristics (age, race, ethnicity, place of residence, etc.) and 11 questions which ask about the clients' education and their experiences in school and training programs.

The alcohol section of the questionnaire includes 18 questions (plus subquestions). These include a number of questions that ask about the timing, frequency, and quantity of alcohol intake during various time periods, such as first time of use, use in last 12 months, and period of maximum use. Questions are also asked about clients' prior history of treatment for alcohol problems (see Note 4).

Analysis Strategy

In this article we assess the internal consistency of client responses to questions about their history of alcohol use. While the DATOS intake questionnaire does not ask duplicate questions of clients, there are elements of redundant information which are, of necessity, collected. This redundancy can be used to methodological advantage since it often imposes implicit logical constraints on the patterns of response that are legitimate. So, for example, respondents who report that they have never used alcohol in response to DATOS Question 2 cannot *logically* report that there was a period in their life when they drank at least five drinks a day for 2 weeks (DATOS Q. 4). Somewhat more subtly, respondents who report that at age 15 they drank 18 or more drinks in one day would strain our credulity if they reported that the first time they had been drunk was later than age 15.

Such constraints on the patterns of legitimate reporting provide us with a useful device for assessing the quality of client reporting on the DATOS intake instrument. A similar procedure has been successfully used to help diagnose measurement problems in the National Household Survey on Drug Abuse (1988) (see, for example, Cox et al., 1992; Turner et al., 1992). It should be recognized, of course, that this procedure cannot provide a full accounting of the errors and biases that affect the quality of our data. Nonetheless, for behaviors which are not amenable to external verification—such as a clients' history of substance use—these analytic procedures provide a nonintrusive method of gauging the errors in our data and identifying questionnaire items and topics that are most in need of remediation.

In this article we focus upon the quality of reporting of alcohol use; subsequent publications will report on the quality of reporting of the use of illicit drugs and the consequences of substance use. We have chosen to begin our analysis of DATOS data quality with the alcohol histories for several reasons. Most importantly,

- Alcohol is the most widely used problem drug. Over 90% of clients in the DATOS database report some period during which they regularly drank alcohol (see Note 5). It is thus possible to obtain a measure of data quality

for almost all DATOS clients by analysis of their responses to the alcohol questions.

- The large number of alcohol users among DATOS clients facilitates many of the analyses of interest to us, e.g., assessments of the quality of reporting by extent of alcohol intake.
- Coming as they do in an early section of the DATOS intake history, the alcohol questions should be at least subject to fatigue or other factors that may affect response to later sections of the DATOS questionnaire.

RESULTS

Reporting of Age at Initiation

Table 3 presents results of an initial series of six analyses designed to assess the internal consistency of clients' reporting of their alcohol use prior to enrollment in treatment. Our first analysis compared the ages clients reported for their very first use of alcohol (more than a sip) to the age they reported as the first time they drank alcohol at least one time a month for 6 months. The relevant questions from the DATOS intake questionnaire were:

D1. Now, I'd like to ask you about your use of alcoholic beverages, including beer, wine, and hard liquor, such as whiskey and mixed drinks. How old were you when you first had more than a sip of alcohol?

D1a. How old were you when you first had any beer, wine or other alcohol at least once a month for a period of 6 months or more?

Overall, about one-half (49%) of clients reported that their first use of alcohol occurred before age 14, and the vast majority of (94%) of clients reported having their first drink by age 18 (see Note 6). Overall reports of drinking "once a month" show an expected increase in age—although its magnitude is rather less than some would expect. Slightly more than half (52%) of respondents reported drinking once a month by age 15, and 88% reported drinking once a month by age 20.

This pattern of results for the univariate marginals does not necessarily imply consistent (or inconsistent) reporting of ages for each type of drinking. The relevant analysis is presented in the first two columns of Table 3. It will be seen from this tabulation that over 99% of clients reported ages that were consistent; that is, the age reported for beginning drinking "once a month" was greater than or equal to the age reported for first drinking. Of the 22 (of 2,864) respondents reporting inconsistent ages, the majority (12 of 24) gave ages that were discrepant by 1 or 2 years. [The analysis also revealed a small number (2) of undetected keying errors.]

Table 3.
Inconsistent Responses to Questions about Age of Initiation of Different Types of Alcohol Use

Responses	Age Comparison 1		Age Comparison 2		Age Comparison 3		Age Comparison 4		Age Comparison 5		Age Comparison 6	
	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Consistent	2,820	99.23	2,822	99.30	2,836	99.79	422	99.29	419	99.52	2,196	94.98
Inconsistent	22	0.77	20	0.70	6	0.21	3	0.71	2	0.47	116	5.02
Keying errors	2	0.07	7	0.25	1	0.04	3	0.71	1	0.24	5	0.22
Error 1 year	8	0.28	4	0.14	1	0.04	0	0.00	0	0.00	40	1.73
Error 2 years	5	0.18	1	0.04	2	0.07	0	0.00	0	0.00	20	0.87
Error 3 years	2	0.07	0	0.00	1	0.04	0	0.00	0	0.00	15	0.65
Error 4 years	1	0.04	0	0.00	0	0.00	0	0.00	0	0.00	5	0.22
Error 5+ years	4	0.14	8	0.28	1	0.04	0	0.00	1	0.24	31	1.34
Total	2,864	100.00	2,842		2,842		425		421		2,312	

Our second comparison assessed the consistency of reporting of age at first drinking to the age reported when the client had the most to drink in a single day. The relevant DATOS questions are D1 from above and:

D2. How old were you when you first had as much as ___ drinks in one day? (Number of drinks is *maximum* number of drinks consumed in one day, as reported in an immediately prior question.)

Here again, the univariate distributions (not shown) evidence an appropriate relationship. Approximately half (51%) of respondents reported having their maximum daily intake of alcohol before their 20th birthday. This compares appropriately to the reports that roughly one-half of respondents had their first drink before age 14. Comparison of individual reports are shown in the second set of columns in Table 3. We again find a very high rate of consistent reporting. Again, over 99% of clients report an age for their maximum daily intake which is equal to or greater than the age they reported for taking their first drink.

Table 3 includes two further comparisons (Nos. 3 and 4) of the consistency of reporting of ages at initiation of different types of alcohol use to reporting of age at first use of alcohol. These comparisons use responses to the two following questions:

D3 and D3a. Has there ever been a couple of months or more when at least 1 day a week you drank 5 or more drinks, bottles of beer, or glasses of wine? How old were you when you first drank that much?

D4 and D4a. Has there ever been a period of 2 weeks when *every day* you were drinking at least 5 drinks—that could include beers, glasses of wine, or drinks containing any kind of alcohol? How old were you when you first had a period of 2 straight weeks when you drank at least that much?

For both questions D3 and D3a the rates of consistent reporting are again extremely high (99.3 and 99.5%, respectively). Comparison No. 5 in Table 3 compares reports of ages at first time and last time the client drank five or more drinks daily for two straight weeks (Question D4) (see Note 7). Again we find that the consistency of these reports of alcohol use exceeds 99%.

Reports of Being Drunk

Each of the foregoing comparisons involve questions that are asked in a very brief time span at the beginning of the questionnaire. Allowing for subquestions, all questions in these comparisons occur within a sequence of 11 questions about alcohol use. It is possible that inconsistencies in these reports

may have been apparent to interviewers. Our final comparison involves the reporting of a discrepancy that *may* have been less glaring.

In addition to asking about their maximum alcohol consumption in one day, all clients were asked whether they ever had been "drunk," and if so at what age. The questions asked were:

D5 and D5a. Have you ever been drunk? How old were you when you first got drunk?

For clients who do report that they have been drunk, it is possible to ask whether their reporting of this admittedly subjective experience may be inferred to be consistent with the age at which the respondent reported their maximum intake of alcohol in one day. Although the inference does admit to argument, one might plausibly infer that, if clients were ever drunk, it should have occurred on (or before) the time they had the most they had ever drunk in one day.

The final columns of Table 3 report the result of this comparison. It will be seen that this comparison does, in fact, yield somewhat lower levels of (inferred) consistency in reporting. Thus we find that approximately 5% of clients report that the first time they were drunk occurred at an age *after* the age at which they reported their maximum daily intake of alcohol. Table 3 indicates, however, that the majority of the inconsistencies (60 of 116) involve reporting of an age at first drunk that was only one or two years later than the age of maximum daily intake.

Since it is conceivable that some of these inferred inconsistencies could be due to the vagaries of clients' experiences, we undertook frequency analyses of these results. The most obvious refinement of this analysis is to stratify the number of drinks that the respondent reported imbibing on the day of their maximum intake. Clearly, for some lower levels of alcohol intake, it is plausible that the timing of the drinks or the level of prior physiologic accommodation of the client may have caused the client to have their maximum daily intake without becoming drunk. Conversely, for some relatively high levels of alcohol intake, it is much less plausible—regardless of timing or physiologic accommodation—that the client did not become drunk.

As a rough basis for this inference, Table 4 tabulates the proportion of clients who report *never being drunk* by the maximum number of drinks they report taking in one day. It will be seen from this table that roughly 20% of clients who report drinking a maximum of three to four drinks in one day report that they never have been drunk. It is thus plausible that inconsistencies could quite readily happen at this level of intake; thus four drinks on one day might not result in self-perceived drunkenness while three drinks on another day might do so. Conversely, precious few of those clients (<1%) who re-

Table 4.
*Percent of Respondents Reporting Never Being
 Drunk by Maximum Intake of Alcohol in One Day*

Maximum drinks in one day	<i>N</i>	Percent never drunk
0	9	66.67
1	67	43.28
2	75	49.33
3	99	21.21
4	141	17.73
5	51	7.84
6 to 8	312	5.77
9 to 11	146	1.37
12 to 17	441	3.40
18 to 23	369	1.63
24 to 35	639	0.78
36 to 47	166	0.60
48+	222	0.45

port a maximum daily intake of 24 or more drinks report that they have never been drunk. At an intermediate level—a maximum daily intake of 12 drinks—roughly 3% of clients report never being drunk.

Using these figures as a rough guide, Table 5 breaks down our inferred inconsistencies for those clients whose maximum daily intake was reported as: 24+ drinks, 12+ drinks, 6+ drinks, and any amount. It will be seen that the level of observed discrepancies in the reporting of ages tracks the intake amounts in the expected manner. Thus only 2.2% of respondents reporting an intake of 24+ drinks are inconsistent in their reporting of ages of first drunk and of maximum daily intake. This percentage rises to 3.1% for 12+ drinks, 4.5% for 6+ drinks, and 5.0% for respondents reporting any level of maximum daily intake.

This analysis still leaves an inferred rate of inconsistency (2.2%) that is twice that observed in other comparisons. Nonetheless, the import of this analysis is that the rate of inconsistent reporting is still remarkably low.

Consistency of Reporting Quantity

In addition to the initial question (D2) asking respondents to report the maximum number of drinks they had consumed on any one day, respondents were asked other questions about intake that can be checked for consistency.

Table 5.
Consistency of Responses to Questions about Age When First Drunk and Age at Maximum Alcohol Intake by Amount of Maximum Intake

Responses	All respondents		6+ Drinks		12+ Drinks		24+ Drinks	
	<i>N</i>	Percent	<i>N</i>	Percent	<i>N</i>	Percent	<i>N</i>	Percent
Consistent	2,196	94.98	2,142	95.50	1,749	96.90	996	97.84
Inconsistent	116	5.02	101	4.50	56	3.10	22	2.16
Keying errors	5	0.22	5	0.22	4	0.22	1	0.10
Error 1 year	40	1.73	34	1.52	20	1.11	8	0.79
Error 2 years	20	0.87	17	0.76	7	0.39	5	0.49
Error 3 years	15	0.65	15	0.67	11	0.61	3	0.29
Error 4 years	5	0.22	5	0.22	1	0.06	0	0.00
Error 5+ years	31	1.34	25	1.11	13	0.72	5	0.49
Total	2,312		2,243		1,805		1,018	

Near the end of the alcohol section of the intake questionnaire, respondents were asked:

D8a. On days when you drank alcohol in the last year, about how many drinks did you usually have in a single day? (See Note 8.)

D10b. During that period when you were drinking the most, about how many drinks would you usually have in a single day? (Reference period refers to "period in your life when you drank more than you did during the 12 months before admission.")

Clearly, it would be logically inconsistent for respondents to report a larger quantity in response to either of these questions than they did in response to Question D2 (that asked about their maximum intake in one day). Table 6 provides the relevant tabulation; it compares the number of drinks reported in Question D2 to the larger of the responses to the above two questions. It will be seen from Table 6 that 5.6% of respondents reported a larger number of drinks in response to these questions than they did when asked about their maximum intake in one day. Surprisingly, these discrepancies appear to be uniformly distributed in size. Thus while 1.3% of respondents have reporting inconsistencies of one or two drinks, 1.3% have discrepancies of 12 to 23 drinks, and 0.7% have reporting discrepancies of 24 drinks or more.

Table 6.

Distribution of Inconsistencies in Reporting of Maximum Intake of Alcohol

Size of inconsistencies	Percent
Consistent	94.40
Inconsistent	5.60
1 Drink	0.60
2 Drinks	0.70
3 Drinks	0.50
4 Drinks	0.60
5 Drinks	0.10
6-8 Drinks	0.50
9-11 Drinks	0.50
12-17 Drinks	0.90
18-23 Drinks	0.40
24+ Drinks	0.70
Base N	2,835

Table 7.
*Revisions to Age at Maximum Daily Alcohol
 Consumption Engendered by Inconsistent
 Reporting*

Inconsistency in age	Percent
Consistent	23.39
Inconsistent	76.61
Size of inconsistency:	
10+ Years younger	26.61
6-9 Years younger	11.29
3-5 Years younger	13.71
1-2 Years younger	13.71
Identical	23.39
1-2 Years older	7.26
3+ Years older	4.03
Base N	124

This observed inconsistency in the quantities reported also has implications for conclusions that would be drawn about the age at maximum intake. Table 7 compares the age of maximum intake that was reported in response to Question 2a to that associated with the larger amount reported in response to subsequent Question 8a or 10b. It will be seen that the resultant changes are often quite substantial. For the 124 respondents whose reporting of maximum quantities were inconsistent, the associated age of maximum intake was by 10+ years younger for 27%, 3 to 9 years younger by 25%, and 3 years older for 4% of respondents.

CONCLUSIONS

When we commenced these analyses, we anticipated finding levels of reporting inconsistency that were at least as large as those found in our methodological analyses of the major national survey of drug use (the National Household Survey of Drug Abuse). Analyses of responding in the 1988 wave of that survey found internal inconsistencies in the reporting of *lifetime* alcohol use by 11.5% of NHSDA respondents. NHSDA reports of alcohol use *during the preceding year* were inconsistent in 12.7% of cases.

Our assessment of the DATOS questionnaire suggested that there would be no shortfall of potential pitfalls for respondents. The cognitive and memory

tasks required of respondents were frequently daunting. The reference periods shifted frequently, requiring respondents to recall and place in time:

- The time of their first drink.
- The time they first drank at least once a month for 6 months.
- The time of their maximum intake *in one day*.
- The first and last times they drank five or more drinks at least once a week for a "couple of months."
- The first time they drank five or more drinks *daily* for a period of 2 or more weeks.
- The first time they were drunk.
- The 12 months prior to admission to treatment.
- The time *prior to the 12-month period preceding admission to treatment* when they were drinking most heavily.

This wide variety of reference periods should, we believe, lack clear boundaries for many respondents. Similarly, the definition of the reference periods frequently required respondents to make compound judgments involving:

1. The quantity consumed (e.g., five or more drinks).
2. The frequency of consumption (e.g., one or more times every week).
3. The length of the time period for which this behavior was consistently maintained (e.g., for a period of two more weeks).

Respondents were required to make judgments not only as to whether such a time period ever existed but also to provide dates for the start and in some cases, the end of those reference periods. The cognitive difficulties of these judgments were, in our assessment, compounded by the vagueness of some terms (e.g., for a "couple of months") and the mental calculations requested (how many drinks would you *usually* have). The *potential* pitfalls of such measurements are well known (see, for example, Forsyth et al., 1992; Hubbard, 1992; Miller et al., 1990, Ch. 6).

To be frank, we were surprised by the results obtained in the preceding analyses. If we had the temerity to predict the levels of response consistency we would find in these analyses, it is doubtful that any member of our team would have predicted levels as high as those reported in Tables 3 to 7. The 99% consistency rates shown in Table 3 are, at first glance, remarkable, and they invite attempts to explain and, indeed, to discount their generalizability and implications. It might, of course, be the case that these very early questions invited particular care on the part of interviewers and/or respondents. Similarly, it may be that the patterns of inconsistent responses (e.g., reporting an earlier age at "first drunk" than at first intake of alcohol) were so obvious to interviewers that they were caught and corrected during the course of questioning.

While such speculations provide plausible hypothesis for further analysis, they should not detract from our finding that—for whatever reason—the quality of these data as assessed by the internal consistency of response was quite high. The only instances of a decline in consistency (from 99 to 95%) for the reporting of temporal periods was for the reporting of age at first being drunk and the reporting age at maximum intake of alcohol in a single day. Even here, the apparent level of inconsistency admits to some ambiguity—since there is no logical necessity that the day of maximum intake necessarily results in inebriation, if intake were low. Indeed, when our analysis was refined, we found that for high levels of reported intake (e.g., 24 drinks), the level of reporting consistency (98%) approached that observed in our other analyses.

Reporting of the quantity of alcohol intake evidenced somewhat higher levels of inconsistent reporting. Thus approximately 5% of DATOS clients reported a lower quantity of intake as their *maximum* consumption in one day than they subsequently reported as their *average* intake in the 12 months preceding treatment or “during the period they were drinking the most.” While the precise reason for this elevated level of inconsistency is not known, we suspect it may be related to the calculations required to arrive at the number of “drinks” consumed. A showcard with alcohol equivalents was used to equate quantities of beer, wine, and hard liquor consumed. We suspect that tallying the “drink equivalents” for these various types of alcohol contributed to the slightly elevated level of inconsistent reporting. This suspicion would, we believe, merit further investigation in a small-scale study testing alternative measurement procedures for eliciting the types and quantities of alcohol drunk and for constructing a synthetic tally of “alcohol equivalent” units.

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NOTES

1. Persons of Hispanic origin could be of any racial identity.
2. Identified in response to the question: “During the 12 months before admission, what type of

- drug that you used caused you the most serious problems, such as problems with family, friends or the law; problems feeling dependent on the drug; or health or emotional problems?"
3. A final section of the DATOS intake questionnaire collects the interviewer's observations of the circumstances of the interview and the apparent level of client understanding of the questions.
 4. This section of the questionnaire also includes two questions that ask about use of tobacco. All of the alcohol questions in the section of the questionnaire preceded these final tobacco questions.
 5. Ninety-three percent report that there was a period of their life when, for 6 or more months, they drank at least once a month.
 6. The phrase "by age 18" is used to indicate *before or during their 18th year*. This terminology will be continued throughout this article.
 7. The question about last use was: When did you last have a period when you drank at least that much?
 8. Here as with Question 2 and Question 10b, a standard show card was used for converting different types of alcohol into a standard "drink."

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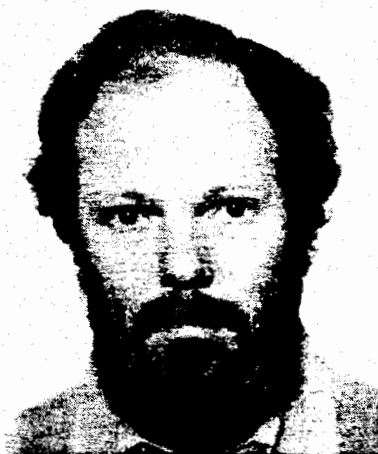
RESUMEN

Muchas de las preguntas que se hacen en una encuesta sobre la utilización del alcohol requieren una serie de tareas cognoscitivas muy complejas, tales como el recordar algo en una etapa del pasado, cambiar de un período de referencia a otro, y hacer una u otra calculación. Por otra parte, se reconocen las limitaciones relacionadas con el alcohol y su efecto en la habilidad cognoscitiva. Para evaluar la calidad sobre la utilización del alcohol que una persona fuera capaz de reportar por sí misma, se inició un análisis de la consistencia interna como parte de un estudio que se llevó a cabo en once ciudades a través del los estados unidos de ámerica (EE.UU.)--Drug Use Treatment Outcome Study [DATOS]. A lo contrario de lo esperado, este análisis descubrió que existe una alta consistencia interna. Para las preguntas concerniente a qué edad se comenzó a usar varios tipos de alcohol, más de 99 por ciento de los participantes en el estudio (N=2.942) dieron contestaciones consistentes cuando se compararon un par de preguntas lógicas y relacionadas una con la otra. Los análisis de las respuestas sobre estar emborrachado y cantidades de bebidas consumidas también reflejan ésta consistencia.

RÉSUMÉ

Nombreuses questions de sondage sur l'usage d'alcool exigent la performance des tâches cognitives complexes, telles que le rappel à long terme, le changement de période de référence et la calculation numérique. De plus il est établi que la consommation d'alcool affecte les capacités cognitives. Pour évaluer la qualité des rapports donnés par soi-même concernant l'usage d'alcool, des analyses de consistance interne étaient faites comme partie d'une étude prospective et comprehensive sur les résultats des programmes de traitement pour l'usage des drogues. Cette étude était menée dans onze villes qui se trouvent partout dans les Etats-Unis (DATOS). Au contraire des prévisions les analyses montrent une consistance interne prononcée. Pour les questions concernant l'âge de commencement de différents types d'usage d'alcool, plus de 99 pour cent des répondants (N=2.842) ont donné des réponses consistantes pour chaque paire de questions de rapports logiques. Les réponses concernant les occasions d'ivresse et la quantité d'alcool consommée montraient aussi de la consistance.

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