

# Scale Construction and Item Analysis

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## Scale Creation

The original intent in developing the DrInC was to assemble a universe of items that would provide a comprehensive sampling of possible alcohol problems. Seeking to create a pure measure of consequences, questions were intentionally excluded about help-seeking (e.g., going to treatment or self-help meetings) and items referring to pathological drinking practices but not negative consequences (e.g., rapid drinking, intoxication per se). To reflect the DSM distinction between adverse consequences (alcohol abuse) and alcohol dependence, items commonly viewed as reflecting dependence symptoms (e.g., inability to stop or cut down, craving, tolerance, withdrawal signs, relief drinking) were also excluded. Special efforts were made to include items that might be concerns and experiences for problem-drinking women (e.g., effects on appearance, parenting, weight, emotions).

A set of 40 such items was generated by the senior author to reflect consequences commonly encountered in clinical practice. This list was circulated to colleagues at various clinical research sites to elicit comments and suggestions for additional items. A final set of 45 items was thus derived.

One initial intent was to query the lifetime occurrence of this universe of problems. Because the instrument was also intended to reflect changes in alcohol problems over time, a separate inquiry was included regarding the past 3 months (an arbitrary and adjustable window). In the interest of measurement sensitivity, it was decided to employ Likert scales for reporting the recent intensity of problems, beyond the binary yes/no report of lifetime occurrence. It became apparent, however, that different alternatives for reporting intensity would be needed, depending on the content of the questions. Some items lent themselves readily to a reporting of frequency (How often has this happened to you?). Other problems were more aptly assessed by extent (e.g., My marriage or love relationship has been harmed by my drinking). Still others were initially treated as binary occurrence/nonoccurrence items based on their typically low frequency in a 3-month period (e.g., lost marriage or job, accident, injury, arrest).

The baseline (pretreatment) assessment version of the DrInC therefore contains two scales consisting of separate responses to the same items: (1) a Lifetime Consequences scale consisting of binary reports of the presence or absence of each problem ever and (2) a Recent Consequences scale reflecting the intensity of recent problems over the past 3 months. These two scales were originally combined as a single questionnaire but were subsequently separated into two versions of the instrument to improve clarity. Furthermore, scoring of the Recent Consequences scale proved problematic in an early version because different numbers of Likert scale points had been used for frequency items (6-point scales), extent items (4-point scales), and occurrence items (binary). The Recent Consequences scale was therefore revised after initial testing to contain consistent 4-point Likert scales for all items. Thus, the present version the Lifetime Consequences scale consists of binary (0 or 1) responses, whereas the Recent Consequences scale reports Likert scale responses (0-3) for each of the same items during the 3-month assessment window.

Because all 45 items report the occurrence of alcohol problems, they are scored in the same face-valid positive direction. This creates some risk of a response bias (e.g., denying the occurrence of all items). For this reason, five reverse-scaled control items were inserted, which many frequent or heavy drinkers would be expected to endorse, at least to some extent (e.g., "I have enjoyed the taste of beer, wine, or spirits."). Although these control items are not included when calculating problem scores, consistent zero responses to these questions suggest a negative or inattentive response set.

## Norming Sample

The DrInC was administered as part of a much larger intake assessment battery collected at clinical sites located in Albuquerque, NM, Buffalo, NY, Farmington, CT, Milwaukee, WI, West Haven, CT, Charleston, SC, Houston, TX, Providence, RI, and Seattle, WA. The first five of these sites were outpatient alcohol treatment settings, whereas the latter were inpatient facilities (Project MATCH Research Group 1993). The samples were pooled to provide a population of 1,728 cases that reflected a broad range of problem severity. Other instruments used in analyses included a demographic questionnaire, the AUI (Alcohol Use Inventory, Horn et al. 1987), the AUDIT (Alcohol Use Disorders Identification Test, Saunders and Aasland 1987), the ASI (Addiction Severity Index, McLellan et al. 1990), the PFI (Psychosocial Functioning Inventory, Feragne et al. 1983), and the alcohol and drug abuse/dependence sections of the Structured Clinical Interview for DSM-III-R (Spitzer et al. 1990). The order of administration of self-report questionnaires was rotated to counterbalance for order effects.

All individuals included in the sample were seeking treatment for alcohol problems. Sample subjects were required to (1) be at least 18

years of age, (2) meet DSM-III-R criteria for alcohol abuse or dependence, with active drinking during the past 3 months and alcohol as the primary drug of abuse, (3) have at least a 6th grade reading level to allow comprehension of questionnaires, and (4) have no legal stipulations that would interfere with study participation. Subjects were excluded if they met DSM-III-R dependence criteria for cocaine, stimulants, opiates, or sedative/hypnotics; had used illicit drugs intravenously during the prior 6 months; or were judged to be of current danger to self or others, acutely psychotic or organically impaired, or unlikely to be locatable for followup (e.g., no residence). The study included outpatient and aftercare arms. In the aftercare arm, clients had completed at least 7 days of residential or partial hospitalization rehabilitation treatment prior to testing.

## Statistical Properties

Data entry for questionnaires was performed at the item level, with independent verification by a second coder and resolution of discrepancies with reference to original hardcopy questionnaires. When clients did not respond to one or more items of the DrInC, the following procedures were used. If a client indicated that a particular item had occurred during the past 3 months but gave no response in the lifetime occurrence ("Ever") column, a "Yes" response was logically inferred and entered for lifetime occurrence. Similarly, if a client answered "No" to lifetime occurrence but gave no response regarding the past 3 months, a "No" response was logically inferred for the recent period.

Other items were left blank apparently because they were not applicable (e.g., "My ability to be a good parent has been harmed by my drinking"). One reasonable option would be to score such omitted items as negative (0) responses, a procedure used in clinical applications. For psychometric purposes, however, listwise deletion was used to remove all cases with incomplete questionnaires, except where "Yes - Lifetime" or "No - Recent Consequences" responses were imputed as described above. This left a total of 1,389 cases (80 percent) for analysis. The demographic characteristics of this sample, separated by outpatient and inpatient sites, are reported in table 2.

A "Not Applicable" column was considered to allow subjects an alternative to leaving items blank when they do not apply. This would be likely to alter the psychometric characteristics of the instrument, however, and could result in subjects' choosing this designation for a larger number of items than would be omitted in its absence. Instead, the instructions now specify that respondents should circle the "No" option — zero (0) — for all items that do not apply to them.

## Subscales of the DrInC

The five control items, which do not query alcohol problems, were eliminated from initial statistical analyses. DrInC responses from this and several other studies were subjected to factor analysis, but the

**Table 2. Study 1 sample characteristics: Project MATCH intake sample with complete DrInC data (N = 1,389)**

Client characteristics	Sample		
	Outpatient N (%)	Inpatient N (%)	Combined N (%)
Gender			
Male	567 (72.6)	480 (78.9)	1,047 (75.4)
Female	214 (27.4)	128 (21.1)	342 (24.6)
Ethnicity			
White	653 (83.6)	505 (83.1)	1,158 (83.4)
Black	42 (5.4)	78 (12.8)	120 (8.6)
Hispanic	69 (8.8)	17 (2.8)	86 (6.2)
Other	17 (2.2)	8 (1.3)	25 (1.8)
Age: Mean (SD)	38.93 (10.72)	41.23 (11.05)	39.93 (10.92)
Total SDU*	788.99 (613.92)	1333.16 (1069.40)	1027.18 (885.92)
Percent days abstinent**	34 (30)	28 (30)	31 (30)

\* Number of standard drink units for most recent 90 days of drinking.

\*\* Abstinent days during past 90 days of drinking.

resulting factors did not provide clinically useful groupings of items, and the factor structure was unstable across populations and timepoints. To enhance clinical interpretability, therefore, the 45 problem items were grouped into 5 a priori content domains based on consensus classifications among six staff at the Albuquerque site. These groupings are shown in table 3, with item numbers reflecting their position in the overall DrInC. These subscales can be scored within both Lifetime and Recent Consequences versions. Internal consistency coefficients (Cronbach) and distributional characteristics were then calculated for these content subscales as well as for the overall Lifetime Consequences and Recent Consequences scales.

The *Physical Consequences* subscale (8 items) contains items that reflect adverse physical states resulting from excessive drinking. Included are both acute and chronic effects of overdrinking. The items query hangovers, sleeping problems, and sickness; harm to health, appearance, eating habits, and sexuality; and injury while drinking.

The eight items of the *Intrapersonal Consequences* subscale query subjective perceptions that may not be readily observable by others. These include feeling bad, unhappy or guilty because of drinking; experiencing a personality change for the worse; and interference with personal growth, spiritual/moral life, interests and activities, and having the kind of life one wants.

**Table 3. Subscales of the DrInC and percentage item endorsements for females and males**

(Item)	F %	M %	Subscale	(Item)	F %	M %	Subscale
<b>Physical consequences</b>				<b>Interpersonal consequences (cont.)</b>			
(1)	96.2	96.0	I have had a hangover after drinking.	(17)	91.5	92.6	While drinking, I have said or done embarrassing things.
(8)	75.4	63.4	After drinking, I have had trouble with sleeping, staying asleep, or nightmares.	(21)	83.9	87.7	While drinking, I have said harsh or cruel things to someone.
(11)	81.6	79.8	I have been sick and vomited after drinking.	(27)	74.0	88.2	My marriage or love relationship has been harmed by my drinking.
(13)	78.1	82.8	Because of my drinking, I have not eaten properly.	(30)	86.3	88.2	My family has been hurt by my drinking.
(24)	75.4	79.7	My physical health has been harmed by my drinking.	(31)	68.4	76.0	A friendship or close relationship has been damaged by my drinking.
(29)	77.2	75.5	My physical appearance has been harmed by my drinking.	(39)	66.7	75.7	My drinking has damaged my social life, popularity, or reputation.
(33)	51.2	67.9	My sex life has suffered because of my drinking.	(43)	34.2	51.8	I have lost a marriage or a close love relationship because of my drinking.
(48)	55.3	59.4	While drinking or intoxicated, I have been physically hurt, injured, or burned.	(46)	40.1	48.5	I have lost a friend because of my drinking.
Mean	73.8	75.6		Mean	69.2	76.2	
<b>Intrapersonal consequences</b>				<b>Impulse control consequences</b>			
(2)	97.7	96.6	I have felt bad about myself because of my drinking.	(9)	77.5	92.5	I have driven a motor vehicle after having three or more drinks.
(12)	97.1	96.1	I have been unhappy because of my drinking.	(10)	32.5	31.4	My drinking has caused me to use other drugs more.
(16)	96.2	94.1	I have felt guilty or ashamed because of my drinking.	(19)	77.5	88.8	I have taken foolish risks when I have been drinking.
(18)	85.4	83.8	When drinking, my personality has changed for the worse.	(22)	82.5	88.6	When drinking, I have done impulsive things that I regretted later.
(34)	74.3	80.4	I have lost interest in activities and hobbies because of my drinking.	(23)	42.4	50.5	I have gotten into a physical fight while drinking.
(36)	69.3	75.9	My spiritual or moral life has been harmed by my drinking.	(28)	68.7	74.0	I have smoked more when I am drinking.
(37)	85.1	89.6	Because of my drinking, I have not had the kind of life that I want.	(32)	52.6	43.7	I have been overweight because of my drinking.
(38)	85.7	88.5	My drinking has gotten in the way of my growth as a person.	(41)	32.2	53.0	I have been arrested for driving under the influence of alcohol.
Mean	86.4	88.1		(42)	21.6	40.7	I have had trouble with the law (other than driving while intoxicated) because of my drinking.
<b>Social responsibility consequences</b>				(47)	36.5	52.7	I have had an accident while drinking or intoxicated.
(3)	60.2	68.4	I have missed days of work or school because of my drinking.	(49)	20.8	30.0	While drinking or intoxicated, I have injured someone else.
(6)	67.0	72.6	The quality of my work has suffered because of my drinking.	(50)	57.3	68.1	I have broken things or damaged property while drinking or intoxicated.
(14)	83.3	85.3	I have failed to do what is expected of me because of my drinking.	Mean	50.2	59.5	
(20)	60.2	79.2	I have gotten into trouble because of drinking.	<b>Control (reverse-scored validity) items</b>			
(26)	56.7	79.5	I have had money problems because of my drinking.	(5)	94.1	95.9	I have enjoyed the taste of beer, wine, or liquor.
(40)	71.3	87.9	I have spent too much or lost a lot of money because of my drinking.	(15)	95.6	95.0	Drinking has helped me to relax.
(44)	26.6	41.5	I have been suspended/fired from or left a job or school because of my drinking.	(25)	29.8	30.8	Drinking has helped me to have a more positive outlook on life.
Mean	60.6	73.5		(35)	72.1	71.7	When drinking, my social life has been more enjoyable.
<b>Interpersonal consequences</b>				(45)	30.1	33.5	I drank alcohol normally, without any problems.
(4)	93.3	95.7	My family or friends have worried or complained about my drinking.	Mean	64.4	65.4	
(7)	54.4	57.9	My ability to be a good parent has been harmed by my drinking.				

The *Social Responsibility Consequences* subscale (7 items), in contrast, taps role-fulfillment repercussions that are observable by others. These include work/school problems (missing days, poor quality of work, being fired or suspended), financial indiscretion, getting into trouble, and failing to meet expectations.

The subscale for *Interpersonal Consequences* (10 items) focuses on the impact of drinking on the respondent's relationships. Adverse consequences here include damage to or the loss of a friendship or love relationship, impairment of parenting and harm to family, concern about drinking from family or friends, damage to reputation, and cruel or embarrassing actions while drinking.

Questions that did not readily fit into one of the above categories were grouped into a fifth subscale that was given the provisional title of *Impulse Control Consequences*, a reasonable but imperfect description of the content of these 12 items. These include the following sequelae of overdrinking: exacerbation of other substance use (smoking, drug use, overeating), impulsive actions and risk-taking, physical fights, driving and accidents after drinking, arrests and trouble with the law, and inflicting injury on others or damage to property.

## Gender Differences

Gender differences of 10 percent or more were noted on 14 of the 45 problem items. Women exceeded men by this margin on only one item (8): sleeping problems after drinking. Men were more likely to report lifetime occurrence of drinking-related sexual problems (item 33) and of harm to marital/love relationships (27, 42). Males reported more consequences on four of seven Social Responsibility items: getting into trouble (20), money problems (26, 40), and job loss (44). Six items of the Impulse Control subscale also reflected such gender differences, with males reporting more driving after drinking (9, 41), risk-taking (19), trouble with the law (42), accidents (47), and damage to property (50). It should be noted that many such consequences may show gender differences even when drinking is not involved. Two of the control items (5, 15) showed high endorsement rates, as expected, and one (35) a reasonably high rate. Two other control items (25, 45), however, showed low endorsement rates, questioning their utility in detecting carelessness or response biases.

## Subscale Characteristics

Distributional characteristics and internal consistency coefficients (Cronbach) are shown in table 4A for the five content subscales as well as for the total (45 item) DrInC score, both for the past 3 months (Recent Consequences) and for Lifetime Consequences. Coefficients are reported separately for outpatient and inpatient samples and for the combined sample. Subscale coefficients generally fall within the range (.70-.80) specified by Horn et al. (1987) to be optimal for balancing scale fidelity and breadth of measurement. Outpatient and

**Table 4A. Characteristics of recent and lifetime DrInC total scales and subscales (N = 1,389)**

DrInC Subscale	Skewness		Kurtosis		Cronbach $\alpha$	
	Recent	Life	Recent	Life	Recent	Life
<b>Physical</b>						
Combined	.28	-.82	-.52	.12	.74	.61
Inpatient	.08	-.88	-.49	.15	.73	.60
Outpatient	.41	-.76	-.44	.03	.72	.62
<b>Social</b>						
Combined	.28	-.83	-.71	-.19	.80	.75
Inpatient	.06	-1.15	-.67	.65	.78	.76
Outpatient	.55	-.63	-.30	-.51	.78	.74
<b>Intrapersonal</b>						
Combined	-.31	-1.98	-.81	4.37	.86	.72
Inpatient	-.70	-2.48	-.22	6.69	.85	.76
Outpatient	-.06	-1.68	-.86	3.24	.86	.68
<b>Impulse Control</b>						
Combined	.86	-.25	.81	-.62	.70	.74
Inpatient	.69	-.31	.49	-.61	.72	.75
Outpatient	.97	-.21	1.16	-.62	.67	.74
<b>Interpersonal</b>						
Combined	.31	-1.03	-.75	.54	.85	.77
Inpatient	.06	-1.22	-.81	1.03	.84	.76
Outpatient	.48	-.91	-.54	.31	.84	.77
<b>Total consequences</b>						
Combined	.25	-.83	-.51	.31	.94	.91
Inpatient	-.02	-1.01	-.46	.72	.93	.91
Outpatient	.44	-.73	-.23	.15	.93	.90

inpatient coefficients were comparable, indicating that the DrInC is equally reliable in these populations. Table 4B provides mean subscale scores for inpatient, outpatient, and combined samples. As would be expected, inpatients attained significantly higher scores on the full scale and all subscales (except impulse control), for both Lifetime and Recent Consequences.

Subscales should not only be internally consistent but should yield scores relatively independent of one another. To examine this issue, an analytic strategy suggested by Horn et al. (1987) was used in which scores from each individual subscale are regressed onto those for the remaining subscales. The resulting squared multiple correlations indicate the extent to which a particular subscale score can be predicted by an optimal linear combination of the other subscale scores. High coefficients ( $>.70$ ) would be undesirable in this circumstance, suggest-

**Table 4B. DrInC mean (SD) scale scores (N = 1,389)**

	Total	Physical	Social	Intrap.	Interp.	Impulse
<b>Recent consequences</b>						
Combined	51.97 (23.29)	9.42 (4.92)	7.98 (4.77)	14.38 (6.04)	12.10 (6.93)	8.65 (5.16)
Inpatient	59.82 (23.04)	10.92 (4.94)	9.73 (4.66)	16.10 (5.78)	14.14 (6.98)	9.69 (5.44)
Outpatient	45.85 (21.60)	8.25 (4.58)	6.61 (4.39)	13.05 (5.91)	10.51 (6.46)	7.84 (4.77)
t statistic*	-.11.61	-10.38	-12.77	-9.65	-10.03	-6.72
p value	.001	.001	.001	.001	.001	.001
<b>Lifetime consequences</b>						
Combined	32.26 (8.18)	6.01 (1.74)	5.03 (1.88)	7.01 (1.48)	7.45 (2.28)	6.87 (2.74)
Inpatient	33.57 (7.98)	6.26 (1.63)	5.43 (1.76)	7.21 (1.44)	7.83 (2.16)	6.98 (2.76)
Outpatient	31.25 (8.20)	5.81 (1.80)	4.72 (1.92)	6.86 (1.49)	7.16 (2.32)	6.77 (2.72)
t statistic*	-5.28	-4.78	-7.15	-4.35	-5.53	-1.40
p value	.001	.001	.001	.001	.001	.16

\* Independent t-tests contrast inpatient and outpatient groups; p values are unadjusted for multiple contrasts.

ing substantial overlap of subscale content. The variance overlap coefficients ( $r^2$ ) (table 5) generally indicated that the DrInC subscales tap different consequence domains.

**Table 5. Examination of scale independence: Squared multiple correlations of scale scores regressed on the four remaining scales**

DrInC scales	Outpatient sample (N = 781)		Inpatient sample (N = 608)		Combined sample (N = 1,389)	
	Recent	Life	Recent	Life	Recent	Life
Physical	.55	.41	.50	.44	.56	.42
Social responsibility	.62	.52	.61	.52	.64	.53
Intrapersonal	.60	.46	.56	.47	.61	.48
Impulse Control	.49	.44	.47	.49	.48	.45
Interpersonal	.60	.53	.61	.55	.62	.55



## Convergence With Other Measures

Problem scores should be positively but not highly correlated with measures of alcohol consumption and dependence. To parallel the recent assessment windows of other instruments, consequence scores for the past 3 months were used (table 6). DrInC subscale scores were found to be modestly related to alcohol consumption. The strongest convergence with other measures of consequences or dependence was between specific DrInC subscales and other scales measuring similar consequence subtypes (e.g.,  $r = .64$  between DrInC Social Responsibility and AUI Social Role Maladaptation).

**Table 6. Correlations among recent consequences and selected criterion variables ( $N = 1,389$ )**

Criterion	Recent consequences					Total
	Phys	Soc	Intrap.	Impulse	Interp.	
<b>AUI Consequence Scales</b>						
Loss of Control	.43	.47	.44	.45	.48	.54
Role Maladaptation	.40	.64	.37	.40	.47	.55
Delirium	.49	.44	.39	.30	.33	.46
Hangover	.56	.47	.37	.33	.37	.51
Marital Problems	.06	.05	.13	.16	.28	.18
<b>Psychological scales</b>						
BECK (Total)	.25	.20	.24	.17	.24	.26
ASI (Psych.sev)	.20	.19	.25	.19	.23	.26
<b>Social consequences</b>						
PFI (Social Behavior)	.39	.45	.47	.39	.52	.54
<b>Alcohol consumption*</b>						
Total standard drinks	.41	.41	.32	.30	.31	.40
% Heavy days	.33	.26	.27	.16	.21	.29

\* Alcohol consumption variables measured as most recent 90 days of drinking at baseline. Heavy drinking = 6 or more standard drinks per day. One standard drink = .5 oz (15 ml) ethanol.

## Uniqueness of Subscales

Given that each DrInC subscale contains a substantial amount of variance unaccounted for by the remaining subscales, the next step was to determine whether unaccounted scale variance is random or unique in measuring scale domains and whether the correlations shown in table 6 reflect common or unique scale variance. Thus, partial correlations were computed between subscale scores residualized on the remaining subscales and unadjusted criterion variables (table 7). With these corrections, the pattern of content convergence remains (e.g., DrInC Interpersonal subscale with AUI Marital Problems; DrInC Physical subscale with AUI Hangover; DrInC Social Responsibility with AUI Role Maladaptation).

**Table 7. Partial correlations among recent consequences and selected criterion variables (N = 1,389)**

Criterion	Recent consequences				
	Physical	Social	Intrap.	Impulse	Interp.
<b>AUI Consequence Scales</b>					
Loss of Control	.04	.05	.05	.11	.07
Role Maladaptation	-.02	.28	-.07	.00	.05
Delirium	.16	.09	.02	-.01	-.02
Hangover	.22	.08	.03	-.03	-.02
Marital Problems	-.04	-.11	.00	-.03	.18
<b>Psychological Scales</b>					
BECK (Total)	.06	.04	.04	.00	.00
ASI (Psych.sev)	.01	-.02	.07	.04	.03
<b>Social Consequences</b>					
PFI (Social Behavior)	.01	.03	.08	.04	.13
<b>Alcohol Consumption*</b>					
Total standard drinks (90 days)	.12	.16	.01	.03	-.02
% Heavy days	.12	.02	.04	-.02	-.02

## Test-Retest Reliability

To evaluate the reliability and validity of key instruments used in Project MATCH, interviewers from all nine sites participated in a study conducted at the University of New Mexico Center on Alcoholism, Substance Abuse, and Addictions (CASAA). The 82 subjects included a mixture of clients presenting for alcoholism treatment at CASAA, clients presenting for inpatient alcoholism treatment or outpatient medical care at the Veterans Affairs Medical Center in Albuquerque, outpatients previously treated for alcohol problems in CASAA clinical trials and in a study of brief intervention (Agostinelli et al., in press), and University of New Mexico students who were heavy drinkers recruited via posted announcements and solicitations to fraternities. Subjects from the latter three sources were included only if they were determined to have been drinking heavily during the prior month (80 or more standard drinks per month). Again, this range of subjects was chosen to provide a high degree of variability in problem severity.

Each subject was tested twice, by different interviewers, in sessions spaced 2 days apart. The DrInC was administered as part of a small set of self-report paper and pencil questionnaires, with order of administration again rotated to control for order effects. As in Study 1, incomplete DrInC questionnaires resulted in listwise case deletion from analyses, providing a final sample of 60. Characteristics of the Study 2 sample used for analyses are reported in table 8.

**Table 8. Study 2: DrInC test-retest sample (N = 60)**

Continuous measures	Mean	SD
Age	30.57	10.92
Years of education	14.00	2.62
# Alcohol drinks, typical day	11.03	17.50
Days since last drink	11.53	25.70
Number of previous alcohol treatments	1.67	4.59
Categorical measures	N	Percent
Gender		
Male	46	76.7
Female	14	23.3
Ethnicity		
Anglo	32	53.3
Hispanic	12	20.0
Black	2	3.3
Native American	4	6.7
Other	1	1.7
Recruitment site*		
Prior trials	16	26.7
VA inpatient	13	21.7
VA medical	5	8.3
CASAA Clinic	13	21.7
UNM heavy drinkers	12	20.0
Brief Intervention	9	15.0
Employment past 3 years		
Full-time	13	21.7
Part-time	32	53.3
Unemployed	5	8.3
Retired	3	5.0
Student	7	11.7
Current marital status		
Never married	32	53.3
Married	9	15.0
Separated	3	5.0
Divorced	15	25.0
Cohabiting	1	1.7
Past psychiatric treatment		
Yes	7	11.7
No	53	88.3

\* 1 missing value

An alternate followup form of the DrInC, omitting lifetime consequences, was inadvertently substituted during retesting, thus precluding test-retest comparisons for Lifetime scales. Further, for the past 3-month period, the older version used at retest had a 6-point Likert scale for 40 of the 50 items, rather than the 4-point scale used in the current (pretest) version. This difference was corrected by recoding retest responses from a 6-point to a 4-point scale. The anchor responses (e.g., "never" and "almost daily") were identical on both forms and required no recoding. For intermediate responses, the two pairs of adjacent categories on the 6-point scale (e.g., "just once or twice" and "once or twice a month") were each combined into the corresponding response category from the 4-point scale (e.g., "once or twice a month").

Test-retest means, standard deviations and Pearson correlations for total current problems and for the five subscales in Study 2 were calculated (table 9). To provide a lower-bound estimate of instrument stability, intraclass correlations were also computed. Despite the above-noted recoding, excellent stability in measurement was found for both the total scale and the subscales, with five of the six test-retest Pearson correlations exceeding .90. With the exception of the Impulse Control subscale, means were significantly lower at retest, and all subscales produced less dispersion (lower standard deviations) at second administration. Both of these phenomena may have resulted from the retest recoding described above. It is also noteworthy that between the two DrInC administrations, subjects had answered many other interview questions about their drinking, which could have affected the second report. As expected, intraclass correlations, correcting for between-subject variance, were somewhat lower than Pearson coefficients but were also generally high.

Because of the error in instrumentation in Study 2, a further test-retest evaluation (Study 3) was conducted with inpatients at the Substance Abuse Treatment Unit of the Albuquerque VA Medical Center. The 30 subjects (27 males) were ethnically diverse (13 Anglo, 9 Native American, 6 Hispanic, and 1 African American) and reported an average age of 43.5, with 13 years of education. Most were divorced or separated (63 percent) and had had prior treatment for alcohol problems (87 percent; average of 2.3 previous treatment

**Table 9. Study 2: Summary statistics for DrInC test-retest administration (N = 60)**

3-month DrInC scales	Test Mean (SD)	Retest Mean (SD)	Paired t-test* (p value)	Test-retest correlation	
				Pearson	Intraclass
Total consequences	33.70 (33.59)	28.58 (26.76)	3.08 (.003)	.93	.89
Physical	5.58 (6.45)	4.37 (5.18)	3.56 (.001)	.92	.86
Social responsibility	4.60 (5.99)	4.00 (5.05)	2.03 (.050)	.93	.90
Intrapersonal	6.55 (8.66)	5.17 (6.96)	3.96 (.001)	.96	.92
Impulse control	5.57 (6.26)	4.77 (5.08)	1.62 (.111)	.79	.70
Interpersonal	6.23 (8.34)	5.05 (6.43)	2.49 (.020)	.91	.85

\* df for paired t-tests = 59

\*\* Reliability coefficient computed as: variance of interest / variance of interest + residual

occasions). Average drinking prior to treatment was 22 standard drinks per day (SD = 13.9), and problem severity was generally high.

An average of 33.9 days had elapsed between the date of the last drink and the date of testing. Subjects completed the DrInC questionnaire only on two occasions during their inpatient stay, with 2 days between testing in all cases.

The Lifetime subscales (available in Study 3 but not Study 2) showed even higher test-retest stability than Recent Consequences, with the exception of the Physical Consequences subscale (table 10). The stability of Recent Consequences subscales in Study 3 was similar to that in Study 2, except for somewhat lower values for the Intrapersonal Consequences subscale.

**Table 10. Study 3: Summary statistics for DrInC test-retest administration (N = 30)**

DrInC scales	Lifetime		Recent	
	Pearson r	ICC	Pearson r	ICC
Total consequences	.94	.93	.89	.88
Physical consequences	.77	.75	.93	.92
Social responsibility consequences	.88	.82	.83	.83
Intrapersonal consequences	.75	.75	.70	.69
Interpersonal consequences	.87	.80	.86	.85
Impulse control consequences	.83	.82	.79	.77