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A Self-Administered Short Michigan Alcoholism Screening Test (SMAST)[1]

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SUMMARY. *The Michigan Alcoholism Screening Test and a shortened 13-item version can reliably be used as self-administered questionnaires.*

THE Michigan Alcoholism Screening Test (MAST) was devised to provide a consistent, quantifiable, structured interview instrument to detect alcoholism (1). Originally consisting of 25 questions administered in 10 to 15 minutes, it is now used as a screening device in many treatment and research programs (e.g., 2–6). In this report we explore the reliability and validity of the MAST as a self-administered questionnaire. In addition, a Short Michigan Alcoholism Screening Test (SMAST) is introduced with a report on its reliability and validity.

Part I: The Self-Administered MAST

METHOD

The MAST was included in a self-administered questionnaire used in a research project investigating the role of social and psychological factors in traffic accidents. The wording of several questions was modified slightly from the original and question 7 eliminated, resulting in the 24-question MAST shown in Table 1.

Subjects

A total of 501 male drivers over age 20 completed the questionnaire: 102 drivers after routinely renewing their driver licenses (another 102

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declined, usually pleading lack of time for the 1-hour questionnaire) and 171 drivers who had been sent to the Ann Arbor Driver Safety School by the courts following conviction for 1 or more moving traffic violations. We also obtained data from two groups of alcoholics: 129 drivers undergoing inpatient treatment for alcoholism at Brighton Hospital in Livingston County and 99 outpatients in a rehabilitation program at the Washtenaw County Council on Alcoholism. The questionnaire was mandatory in the latter 3 groups.

Data analysis disclosed similarity in the demographic characteristics of the license-office and safety-school samples and some similarity in the two samples of alcoholics: The mean age of the license-renewing sample was 31.8 years, of the safety-school drivers, 29.5, of the hospitalized alcoholics, 47.6, and of the outpatient alcoholics, 37.6. The mean education level of the respective groups was 3, 2 and 1 year of college and 12th grade of school, and mean income was $9750, $9500, $12,500 and $9500. The data from the first two samples (group G) were then combined as were the data from the two groups of alcoholics (group A).

RESULTS

The percentage of respondents who gave an answer indicating alcoholism to each MAST question appears in Table 1. The percent-

TABLE 1.—*Revised Michigan Alcoholism Screening Test and Percentage of Respondents Giving Answers Indicating Alcoholism*

	Group G[a]			Group A[a]		
	I	*II*	*I & II*	*III*	*IV*	*III & IV*
1. Do you feel you are a normal drinker? (By normal we mean you drink less than or as much as most other people.) (No, 2 points)[b]	15	13	14	92	49	73
2. Have you ever awakened the morning after some drinking the night before and found that you could not remember a part of the evening? (Yes, 2 points)	19	30	26	92	73	78
3. Does your wife, husband, a parent, or other near relative ever worry or complain about your drinking? (Yes, 1 point)	8	19	15	98	78	90
4. Can you stop drinking without a struggle after one or two drinks? (No, 2 points)	7	8	8	81	41	64
5. Do you ever feel guilty about your drinking? (Yes, 1 point)	11	18	15	95	68	83
6. Do friends or relatives think you are a normal drinker? (No. 2 points)	8	14	12	88	51	72
7. Are you able to stop drinking when you want to? (No, 2 points)	1	4	3	83	33	61
8. Have you ever attended a meeting of Alcoholics Anonymous? (Yes, 5 points)	5	6	6	85	36	64
9. Have you ever gotten into physical fights when drinking? (Yes, 1 point)	8	25	19	33	53	42

[Continued on following page]

	Group G[a]			Group A[a]		
	I	*II*	*I & II*	*III*	*IV*	*III & IV*
10. Has drinking ever created problems between you and your wife, husband, a parent, or other near relative? (Yes, 2 points)	8	19	15	91	71	83
11. Has your wife, husband, a parent, or other near relative ever gone to anyone for help about your drinking? (Yes, 2 points)	0	3	2	74	31	55
12. Have you ever lost friends or girl friends because of your drinking? (Yes, 2 points)	1	7	5	57	35	47
13. Have you ever gotten into trouble at work because of your drinking? (Yes, 2 points)	1	5	3	57	33	47
14. Have you ever lost a job because of drinking? (Yes, 2 points)	1	1	1	25	16	21
15. Have you ever neglected your obligations, your family, or your work for two or more days in a row because you were drinking? (Yes, 2 points)	1	5	4	69	33	54
16. Do you drink before noon fairly often? (Yes, 1 point)	0	5	3	74	24	53
17. Have you ever been told you have liver trouble? Cirrhosis? (Yes, 2 points)	2	1	1	44	8	29
18. After heavy drinking have you ever had delirium tremens (DTS) or severe shaking, or heard voices or seen things that weren't really there? (Yes, 2 points)	2	2	2	42	15	30
19. Have you ever gone to anyone for help about your drinking? (Yes, 5 points)	2	3	3	93	37	69
20. Have you ever been in a hospital because of drinking? (Yes, 5 points)	0	2	1	82	8	50
21. Have you ever been a patient in a psychiatric hospital or on a psychiatric ward of a general hospital where drinking was part of the problem that resulted in hospitalization? (Yes, 2 points)	0	2	2	30	6	20
22. Have you ever been seen at a psychiatric or mental health clinic or gone to any doctor, social worker, or clergyman for help with any emotional problem, where drinking was part of the problem? (Yes, 2 points)	1	5	3	63	18	43
23. Have you ever been arrested for drunken driving, driving while intoxicated, or driving under the influence of alcoholic beverages? (Yes, 2 points)	4	16	12	29	84	53
24. Have you ever been arrested, even for a few hours, because of other drunken behavior? (Yes, 2 points)	0	12	8	36	56	44

[a] Group G = License-office (I) and safety-school (II) drivers. Group A = Hospitalized (III) and outpatient (IV) alcoholics.

[b] The alcoholism-indicating responses are in parentheses, with the weighted scores.

ages are somewhat higher among the drivers from the safety school than those from the license office. Since the safety-school group is comprised of drivers sent by the courts because of serious traffic violations and accidents, above average responses are not unexpected (6). Similarly, the percentages are higher among the hospitalized than the outpatient alcoholics. Evidently the alcoholics

from the hospital, who are considerably older, are in a more advanced stage of alcoholism than those in the Washtenaw program. The difference in responses may also reflect less ambivalence in the former group about accepting the fact that they are alcoholics.

The percentage of responses indicating alcoholism for each item is several times greater among group A than among group G. These percentages are quite similar to those obtained by Selzer (1) using a structured interview instead of the present self-administered questionnaire. The only substantial differences between the two studies are in items 5 and 16. In Selzer's original study the percentages of positive responses to the above two items by alcoholics and nonalcoholics, respectively, were 91 versus 6 and 85 versus 22. These differences are probably due to changes in the wording of these items. Thus, it appears that the MAST can be used as a self-administered questionnaire as well as a structured interview.

Reliability and Validity

The reliability of the MAST in terms of its internal consistency was determined by coefficient alpha, which provides an upper estimate of the stability of the test score with repeated administrations (7). Separate computations for groups G and A yielded coefficients of .83 and .87, respectively, and .95 for the entire sample. This high an internal consistency coefficient for a 24-item test may be viewed as excellent. By a conservative estimate group G contains no more than 15% alcoholics and group A contains no less than 90% alcoholics. We therefore used these groups as criterion groups to determine the validity of the MAST. A product-moment correlation coefficient—as well as Goodman's (8) gamma—was computed between the total MAST score and the criterion-group membership score. The MAST scores were calculated by adding up the points assigned to each item for which the subject gave a response indicating alcoholism (Table 1); those in group G were scored 1 and those in group A were scored 2. This computation yielded a validity coefficient of $r = .79$ (gamma $= .95$), indicating that the alcoholics scored higher than the others.

For a more rigorous assessment of validity we repeated the computation using as more certain criterion groups only the license-office drivers and the hospitalized alcoholics. The license-office sample certainly contained an even smaller proportion of alcoholics

than group G. Using these groups the computations yielded $r = .90$ (gamma = .99).

Although the above validity coefficients are high it is important to determine to what extent they are mediated or affected by other variables. Since even coefficients of this magnitude do not guarantee perfect classification, it is particularly important to determine whether the correlation is mediated by age: that is, whether subjects in group A score higher because they are older than the subjects in group G. The correlation between the MAST scores and age was computed separately for groups G and A, resulting in $r = .02$ and .20, respectively ($p < .01$). Although the latter correlation is significant it is too weak to explain the robust validity coefficient of the MAST. As a further check, computations of the validity coefficients controlling for age yielded $r = .72$ using groups G and A as criterion groups and $r = .88$ using the license-office drivers and Brighton Hospital alcoholics as purer criterion groups. In both cases the coefficients remained about the same as those obtained without controlling for age.

The tendency to deny "bad" (i.e., socially undesirable) characteristics about oneself, including behavior and feelings indicating alcoholism may also affect validity. In light of articles describing the denial mechanisms and camouflage employed by alcoholics (9), we investigated the possibility of substantial denial in MAST responses. To assess the extent to which subjects deny characteristics implied by MAST responses indicating alcoholism, we determined the correlation between MAST scores and scores on a Deny–Bad subscale of the Crowne–Marlowe Social Desirability Scale (10). This subscale had been included in our comprehensive questionnaire and was developed to measure the denial of socially undesirable characteristics in a variety of test situations. The correlations for groups G and A were −.11 and −.18 ($p < .01$), respectively. These are much lower than correlations for the same samples between the Deny–Bad scale and scales measuring aggressive and paranoid tendencies which ranged from −.50 to −.65. Hence, although the correlations between the Deny–Bad scale and the MAST scores were significant they are relatively weak, indicating that the effect of denial on the MAST responses is negligible. Moreover, when the Deny–Bad tendency was statistically controlled for, the validity coefficients remained exactly the same. Thus it can be concluded that any tendency to deny undesirable characteristics does

not materially affect the validity of the MAST as a screening instrument.

The distribution of MAST scores in all four samples appears in Table 2. In the present study, the license-office and Brighton Hospital samples were drawn in much the same way as the control and hospitalized alcoholic samples in Selzer's study (1). The distribution of scores of the hospitalized alcoholics in the two studies is identical: 99% scored 5+. Similarly, 94% of the outpatients from the Washtenaw Council alcoholism program scored 5 or more points. However, 19% of the license-office subjects scored 5 or more while only 5% of Selzer's original control group (1) scored that high. When we repeated the administration of the MAST in the license office as a structured interview with 100 new male subjects, 17% scored 5 or more points. The lower percentage in Selzer's control group was probably due to his procedure which deliberately eliminated all obvious alcoholics from the control group (1).

Since it is unreasonable to assume a 17–19% rate of alcoholism in the Washtenaw County male driver population, the 5-point cut-off score indicating alcoholism should be examined. The MAST, however, is a screening rather than a fully diagnostic instrument and a high number of false positives may be the price of an effective screening procedure. On the other hand, those wishing to reduce the number of false positives can use the following scoring format: 0–4 points for a nonalcoholic score, 5–6 points suggestive of alcoholism (except for a positive response to questions 8, 19 or 20 which are diagnostic), and 7 or more points as indicating alcoholism. (The original and more sensitive system would remain 0–3, 4, and 5 or more points for the nonalcoholic, suggestive and alcoholic ranges.)

Our findings demonstrate that a self-administered MAST ques-

TABLE 2.—*Percentage Distribution of MAST Scores in Four Groups of Male Drivers*

	GROUP	G[a]		GROUP	A[a]	
Score	*I*	*II*	*I & II*	*III*	*IV*	*III & IV*
0–2	74	57	63	0	4	2
3–4	7	14	12	0	2	1
5–6	12	9	10	1	3	2
7–8	3	5	4	0	8	4
9+	4	15	11	99	83	91

[a] See footnote [a], Table 1.

tionnaire has substantial reliability and validity with the scores relatively unaffected by age and the denial of socially undesirable characteristics. This is not to say that an occasional alcoholic determined to avoid detection cannot wend his way successfully through the test without disclosing his alcoholism (1).

Part II: The Short Michigan Alcoholism Screening Test (SMAST)

Pokorny et al. (11) recently offered a brief version of the MAST using 10 of the original 25 items. Although the results indicated their "Brief MAST" was nearly as effective as the complete instrument, they were based on a relatively restricted, small sample of alcoholics who were compared with emotionally ill inpatients at a Veterans Administration Hospital. We pursued the Pokorny group's approach in a systematic attempt to produce and validate a short self-administered version of the MAST.

In constructing the SMAST we aimed at producing an effective, shorter, self-administered and more easily scored version of the original 25-item MAST. The data obtained from the populations described above were ideally suited for our purpose because of their demonstrated reliability and validity.

METHOD

A stepwise regression procedure was employed to select only those MAST items that significantly improved the prediction of the dependent variable, which was alcoholic or nonalcoholic. A set of 12 items was selected by this statistical procedure using groups G and A as criterion groups. An additional question (item 23) was added because of its case-finding importance and appearance in public driving records. The final set of 13 items constitutes the SMAST and is shown in Chart 1.

RESULTS

The most discriminatory scoring method for the SMAST was one where each alcoholism-indicating response was given 1 point. (A scoring method based on a variable number of points for each question was less effective.) The distribution of SMAST scores in the four samples is shown in Table 3.

Reliability and Validity of the SMAST

Separate computations of the SMAST reliability coefficient alpha for group G, group A and the groups combined yielded coefficients

CHART 1.—*Short Michigan Alcoholism Screening Test*

1. Do you feel you are a normal drinker? (By normal we mean you drink *less than* or *as much as* most other people.) (No)[a]
2. Does your wife, husband, a parent, or other near relative ever worry or complain about your drinking? (Yes)
3. Do you ever feel guilty about your drinking? (Yes)
4. Do friends or relatives think you are a normal drinker? (No)
5. Are you able to stop drinking when you want to? (No)
6. Have you ever attended a meeting of Alcoholics Anonymous? (Yes)
7. Has drinking ever created problems between you and your wife, husband, a parent, or other near relative? (Yes)
8. Have you ever gotten into trouble at work because of drinking? (Yes)
9. Have you ever neglected your obligations, your family, or your work for two or more days in a row because you were drinking? (Yes)
10. Have you ever gone to anyone for help about your drinking? (Yes)
11. Have you ever been in a hospital because of drinking? (Yes)
12. Have you ever been arrested for drunken driving, driving while intoxicated, or driving under the influence of alcoholic beverages? (Yes)
13. Have you ever been arrested, even for a few hours, because of other drunken behavior? (Yes)

[a] Alcoholism-indicating responses in parentheses.

of .76, .78 and .93, respectively, only slightly lower than those obtained for the MAST (.83, .87 and .95, respectively). Thus the reliability of the 13-item SMAST is almost as high as that of the 24-item self-administered MAST.

A product-moment correlation between the SMAST and the MAST yielded $r = .93$, .90 and .97 for groups G and A separately and for the entire sample. On the basis of these correlations it would be justified to suggest that for most purposes the SMAST will do as well as the MAST as a screening test for alcoholism.

To examine the validity of the SMAST, its score was correlated with the criterion-group (alcoholic versus nonalcoholic). A product-

TABLE 3.—*Percentage Distribution of SMAST Scores in Four Groups of Male Drivers*

	GROUP G[a]			GROUP A[a]		
Score	*I*	*II*	*I & II*	*III*	*IV*	*III & IV*
0	65	50	55	0	1	0
1	21	18	20	0	7	3
2	7	14	11	1	4	3
3	3	7	5	0	10	4
4	2	3	3	0	7	4
5–13	2	8	6	99	71	86

[a] See footnote [a], Table 1.

moment correlation of .83 (gamma = .95) was obtained with group G and group A as the criterion groups and .94 (gamma = .99) with the license-office drivers and Brighton Hospital alcoholics as criterion groups. These validity coefficients are slightly better than those reported above for the MAST.

We also examined the possible effect of denial on the SMAST responses and found it to be negligible. The correlations between the SMAST and the Deny–Bad scale were −.12 and −.20 ($p < .01$) for groups G and A, respectively, and −.18 ($p < .01$) for the combined groups. These correlations were weak and did not affect the above validity coefficients when the denial tendency was statistically controlled for. Similarly, the age of the respondents did not affect the validity coefficients when age was statistically controlled for.

In conclusion, tests for reliability and validity suggest that the SMAST may be as effective as the MAST in screening for alcoholism. Where time and questionnaire space are at a premium, the SMAST may be substituted for the MAST.

Discussion

The distribution of SMAST scores is similar to the distribution of MAST scores (Table 3). The percentage of subjects scoring 0–1, 2 and 3–13 on the SMAST is almost the same (less than 5% difference) as the percentage of subjects scoring 0–4, 5–6 and 7–24 on the MAST. Consequently, we suggest that subjects scoring 0–1 on the SMAST be considered nonalcoholics, 2 points possibly alcoholics, and those with 3 or more points alcoholics. Those questions considered diagnostic on the MAST would remain so on the SMAST (SMAST questions 6, 10, 11).

The scoring norms would thus assure finding a high proportion of alcoholics. However, the screening may include many "false positives" as well. For a screening instrument such as the MAST or SMAST, such norms are more appropriate than those that may offer maximum correct classification (12). It follows then that in applying these norms for the determination of alcoholism it is important for the clinician or researcher to remember that the MAST and SMAST are screening devices rather than final diagnostic instruments. In keeping with this, alcoholism-indicating responses which pertain exclusively to the past obviously do not necessarily indicate current alcohol problems.

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