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The Five-Year Predictive Validity of Each of the Seven DSM-IV Items for Alcohol Dependence Among Alcoholics

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Background: Information about the prognostic implications of a DSM-IV diagnosis of alcohol dependence is important to both clinicians and researchers. In this regard, only limited data are available on the performance of specific diagnostic items.

Methods: This study reports data gathered with a structured, validated interview with 642 alcohol-dependent men and women from the Collaborative Study of the Genetics of Alcoholism (COGA). The goals were to evaluate the ability of each of the DSM-IV dependence items to predict the occurrence over the next 5 years of a broad pattern of 27 alcohol-related problems. For comparison, similar data are reported regarding the performance of abuse criteria for 516 additional subjects.

Results: The results revealed that dependence item 3 (use of alcohol in larger amounts) was the only criterion that did not relate significantly to outcome, and indicated that the dependence criteria related relatively similarly to different types of outcomes among alcoholics. No specific combination of diagnostic items stood out in predicting outcome but, rather, the span of items generally performed well.

Conclusions: These data support the potential usefulness of the DSM-IV dependence criteria.

Key Words: Alcohol Dependence, Evaluation, Prognosis.

ALMOST A DECADE has passed since the publication of the criteria for alcohol dependence in the *Fourth Diagnostic and Statistical Manual* of the American Psychiatric Association (DSM-IV; American Psychiatric Association, 1994). This diagnostic approach grew out of a series of different frameworks that had been discussed in the literature, and was produced in an effort to enhance the consistency between the categories used in the United States and those of the International Classification of Diseases (Babor and Dolinsky, 1988; Schuckit, 1994, 1998; World Health Organization, 1992). In the U.S., data from a field trial of more than 1000 subjects revealed two clusters of diagnostic items that might relate to different syndromes, which supports the potential usefulness of abuse and dependence (Cottler et al., 1995; Schuckit, 1998).

The clinical implications of the dependence criterion items has been evaluated several different ways (Feingold and Rounsaville, 1995; Hasin and Paykin, 1999a; Muthén et al., 1993a,b; Schuckit et al., 2000; Winters et al., 1999). Although not all studies agree (Caetano et al., 1999; Morgenstern et al., 1994), there is some evidence that the cluster of diagnostic components outlined for dependence in DSM-IV has a number of assets. First, the seven items for dependence and the four for abuse might have outlined relatively distinct conditions. Relatively short follow-ups of subjects who had entered treatment as well as individuals in the general population indicated that fewer than 10% of men and women with alcohol abuse went on to dependence over the next half decade (American Psychiatric Association, 1994; Hasin and Paykin, 1999b; Hasin et al., 1997a,b; Schuckit et al., 2001). Furthermore, a diagnosis of dependence was associated with a 70% or greater chance of continuation of relatively severe problems over time, whereas the same was true for less than a third of individuals with abuse. Each of the diagnoses, however, was related to a higher rate of difficulties than were seen in individuals who originally did not have evidence of an alcohol use disorder (Hasin et al., 1997a,b; Schuckit et al.,

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2000, 2001). Second, the diagnosis of dependence outlines a relatively predictable clinical course across diverse subgroups of subjects (Schuckit et al., 1995a, 1997, 2001). Thus, although the rates for some problems varied, the time sequence of alcohol-related problems was fairly similar in men versus women, among early-onset versus late-onset alcoholics, and even among individuals with the antisocial personality disorder (Schuckit et al., 1995a, 1998a). Of course, preexisting differences in sex roles or concomitant psychiatric disorders influenced the course of alcoholism, but similarities were still prominent.

Although the endorsement of any three of the seven DSM-IV dependence items has been shown to have validity overall, few data are available that compare the relative performance of different items. Most such studies have focused on the importance of physiological aspects of dependence, reporting that a history of tolerance or withdrawal, especially the latter, is associated with a more severe clinical course (Schuckit et al., 1998b, 1999, 2000, 2001). Regarding additional items, an earlier 5-year follow-up of subjects from the Collaborative Study on the Genetics of Alcoholism (COGA) evaluated how well each of the seven dependence items predicted a fairly narrow range of problems based on the occurrence of one or more of the 11 abuse or dependence problems among subjects with an alcohol use disorder (Schuckit et al., 2001). For the men and women combined, including those with abuse, dependence, and no diagnosis, on a univariate level all dependence items except item 6 (alcohol-related decreased activities) were significantly related to the occurrence in the subsequent 5 years of problems indicative of the 11 diagnostic items. However, when only the 298 subjects with dependence were considered, none of the original dependence items significantly predicted the relatively narrow range of future DSM-IV problems. Thus, the results indicated that when a narrow band of outcomes was considered, among dependent subjects no specific item performed well. Similarly, in a second study of more highly functional individuals, no specific DSM-IV dependence item predicted the experience of any of the 11 alcohol abuse or dependence-related criteria (Schuckit et al., 2000).

These two studies focused only on the rate of occurrence over the 5 years for the 11 DSM-IV abuse and dependence items, and, thus, results did not directly evaluate a broader range of difficulties that alcohol-dependent persons are likely to experience such as binges, morning drinking, the occurrence of medical problems, and involvement with treatment. The analyses presented here delve in greater detail into an expanded sample from the COGA dataset by broadening the number and types of outcome variables considered and limiting the data to subjects with alcohol dependence. The goal is to help clinicians and researchers understand more about how well the seven DSM-IV dependence items performed in predicting a broad array of future alcohol problems among dependent individuals, while searching for a specific combination of items that might have greater prognostic validity than others. For comparison, data also are offered regarding abuse.

METHODS

All individuals included in the current analysis gave informed consent to participate in the baseline and follow-up components of the COGA protocol. The original subjects, or probands, were identified through treatment at inpatient or outpatient programs affiliated with any of the six COGA centers across the United States (Schuckit et al., 1995a,b, 1997, 1998a, 1999, 2001). These men and women originally met criteria for DSM-III-R (American Psychiatric Association, 1987), as well as those of Feighner et al. (1972) for alcoholism. Comparison subjects were identified by using a variety of techniques that included random mailings, attendees at medical clinics, and driver's license records. For each proband and control, all available relatives were contacted and interviewed, and the data reported here incorporated all interviews for which reanalysis indicated the presence of DSM-IV alcohol dependence.

Evaluations were carried out at the time of entrance into the study by using the Semi-Structured Assessment for the Genetics of Alcoholism (SSAGA), which catalogs detailed information on the clinical course of alcohol-related life problems (Bucholz et al., 1994; Hesselbrock et al., 1999). In addition to DSM-IV criteria, data were gathered regarding a wide range of alcohol-related problems, with the ages of first and most recent occurrence noted. Approximately 5 years after the initial evaluation, about 75% of eligible subjects were interviewed successfully by using a follow-up research instrument similar to the original SSAGA. Those eligible for reinterview included original probands, appropriate controls, their spouses and their offspring age 7 to 25 years, as well as additional subjects who had been genotyped as part of the baseline evaluations.

Data were extracted from this interview regarding the 27 potential problems that might have occurred during follow-up, as presented in Table 1. Due to the structure of the follow-up SSAGA, no other interval data were available. These encompass a number of domains that relate to various types of difficulties experienced, and only those problems where the most recent event occurred during the interval since the prior interview were counted. Seven of these items reflect DSM-IV diagnostic criteria, but the span of potential difficulties is wider than the diagnosis alone.

The data reported on here focus on men and women who fulfilled criteria for alcohol dependence at initial evaluation and who did not have DSM-IV antisocial personality disorder, but subjects with additional axis I diagnoses were included. The major question addressed in the analyses is whether a clinician who diagnoses a patient as alcohol dependent is offered any useful information regarding prognosis through noting which of the seven diagnostic items were endorsed. Although data on a second subset of subjects with alcohol abuse are offered for comparison, subjects with no alcohol use disorder were excluded from the analyses to focus on clinical implications among diagnosed patients. The population for the major analyses reported here encompassed 642 alcohol-dependent individuals, which included the 298 reported in the prior article that predicted DSM-IV problems (Schuckit et al., 2001), and analyses evaluated the relationship between the endorsement of each of the seven DSM-IV dependence items at the time of initial evaluation and the report of occurrence for any of 27 potential alcohol-related difficulties during the approximate 5 years of follow-up. In addition, a principal components analysis (PCA) of tetrachoric correlations was run on the 27 potential problems in an effort to identify functional groupings of outcomes by using a combination of the Kaiser criteria, the scree test, and the presence of interpretable factors to determine the number of factors retained. Both Pearson correlations and *t*-test comparisons for each DSM-IV item for each type of outcome (i.e., the full 27 problems and the factors) were completed. Subsequently, potential combinations of diagnostic items were evaluated as they relate to various types of outcomes by using multiple

Table 1. Rate of Endorsement (%) of 27 Alcohol-Related Problems by 642 Alcohol-Dependent Subjects During Follow-up Grouped by Outcome Problem Factors

Alcohol-related problems	Factor I (control)	Factor II (withdrawal)	Factor III (legal)	Factor IV (treatment)
Became drunk at times not intended*	38.9			
Started drinking/got drunk more than intended*	53.9			
Fights while drinking	48.3			
Tried to quit/cut down on drinking*	50.8			
Drinking caused problems in marital/love relationships	27.6			
Continued drinking despite other known physical problems*	6.5			
Drinking interferes with work/other obligations	30.8			
Reduce important activities to drink*	31.9			
Psychological impairment	25.9			
Compelling desire to drink	24.3			
Mixing alcohol and drugs known to be dangerous	21.5			
Intoxication for 2+ days (binge)	25.9			
Spend much time drinking*	25.5			
Convulsions/seizures after abstinence		3.0		
DTs/hallucinations after abstinence		5.9		
Shakes after abstinence (not full withdrawal)		14.0		
Early morning drinking		32.2		
Two or more withdrawal symptoms*		24.8		
DUI			11.5	
Driving accident while drinking			9.8	
Dinking in hazardous situations			48.4	
Injury while drinking			18.5	
Blackouts			38.8	
Arrested for alcohol-related behavior (non-DUI)			10.1	
Ever in treatment				42.1
Ever seek professional help				38.9
Ever attend self-help group not within formal treatment				3.9

* Items also used for a diagnosis of dependence.

regression analyses. Similar types of analyses also are described for 516 COGA subjects with alcohol abuse.

RESULTS

The 642 alcohol-dependent subjects interviewed at both baseline and follow-up all met DSM-III-R dependence criteria at baseline and included 42.7% women; 42.1% were the original cases in treatment identified by COGA (i.e., probands). The follow-up interviews were carried out 5.3 (±0.80) years after the initial interview at a time when the average subject was 40.9 (±11.09) years old. The racial background was 76.2% white, 14.0% African American, 7.0% Hispanic, and 2.8% other. The marital status of the subjects at follow-up was 50.9% married, 1.6% widowed, 27.4% separated or divorced, and 20.1% never married.

As demonstrated at the left hand side of Table 2, the proportion of subjects who endorsed each of the seven dependence criterion items at initial evaluation ranged from 56% to 96%. Thus, each of the seven items was well represented within this population. At intake, 12.8% of these subjects had endorsed three dependence items, 18.1% admitted to four, 17.9% related experience with five of the criteria, 17.0% reported six, and 34.3% endorsed all seven of the items.

During the follow-up, these 642 subjects endorsed an average of 7.1 ± 6.73 of the 27 potential outcome problems. Table 1 describes the proportion of subjects who reported each of the 27 potential problems during the follow-up. The range was from less than 10% (for continued use despite physical problems, withdrawal convulsions, delirium tremens, alcohol-related driving accidents, and involvement with self-help groups outside of formal treatment) to greater than 40% (for drinking or becoming intoxicated without intention, fights, inability to cut down, drinking in hazardous situations, and receiving treatment).

As shown by the columns in Table 1, a PCA was carried out with the 27 outcome items to determine if there were subsets of events that subsequently might relate differentially to each of the dependence criterion. For these binary items, a tetrachoric correlation matrix was factored, and, by using the Kaiser criterion and scree test for decisions regarding factor retention, resulted in the four factors presented in the tables. Factor I was composed of 13 items with an eigenvalue of 16.1, 6.45% of the variance explained, factor loadings ranging from 0.50 to 0.78, and Cronbach alpha of 0.91. Factor II involved five items with an eigenvalue of 2.29, 5.97% of the variance explained, factor loadings ranging from 0.64 to 0.98, and a Cronbach alpha of 0.75. Factor III incorporated six items with an eigenvalue of 1.71, 5.36% of the variance explained, factor loadings ranging from 0.51 to 0.89, and a Cronbach alpha of 0.72. Finally, Factor IV, which involved three items, had an eigenvalue of 1.03, 3.50% of the variance explained, factor loadings of 0.57 to 1.00, and a Cronbach alpha of 0.66. All factors together explain 21.2% of the variance in the correlation matrix.

Table 2 presents the mean (±SD) for each of the five relevant outcomes (the total for the number of the 27 items endorsed at follow-up and the four factors) for subjects who endorsed each of the seven alcohol dependence items

Table 2. Relationships Between DSM-IV Dependence Items at Baseline and the Total Number of Problems and Each of Four Problem Factors Regarding Outcome

DSM-IV dependence items (% who endorsed the item at baseline)	Total 27 problems	Factor I (control)	Factor II (withdrawal)	Factor III (legal)	Factor IV (treatment)
	mean (SD) *t* value (*r*)	mean (SD) *t* value (*r*)	mean (SD) *t* value (*r*)	mean (SD) *t* value (*r*)	mean (SD) *t* value (*r*)
1. Tolerance (89.7%)					
Yes	7.5 (6.85)	4.3 (4.07)	0.9 (1.28)	1.4 (1.53)	1.8 (0.98)
No	4.4 (4.86)	2.7 (3.19)	0.2 (0.52)	1.1 (1.38)	1.3 (0.67)
	4.64* (.14*)	3.63* (.11ˣ)	8.24* (.17*)	1.59 (.06)	5.13* (.15*)
2. Withdrawal (56.2%)					
Yes	9.1 (7.23)	5.2 (4.28)	1.2 (1.42)	1.5 (1.60)	2.1 (0.96)
No	4.6 (5.03)	2.8 (3.19)	0.3 (0.65)	1.2 (1.37)	1.3 (0.76)
	9.26* (.33*)	8.05* (.29*)	11.00* (.37*)	3.21ˣ (.12ˣ)	11.50* (.40*)
3. Larger amounts, longer than intended (96.3%)					
Yes	7.2 (6.77)	4.1 (4.03)	0.8 (1.25)	1.4 (1.52)	1.6 (0.96)
No	6.8 (5.92)	4.3 (3.85)	0.5 (0.78)	1.3 (1.48)	1.7 (0.96)
	0.26 (.01)	−0.22 (−.01)	1.86 (.05)	0.40 (.02)	0.54 (.02)
4. Persistent desire to cut down or control use (90.8%)					
Yes	7.5 (6.84)	4.3 (4.08)	0.8 (1.27)	1.4 (1.53)	1.8 (0.97)
No	3.7 (4.32)	2.1 (2.64)	0.3 (0.60)	1.0 (1.27)	1.2 (0.63)
	5.96* (.16*)	5.75* (.16*)	5.57* (.12*)	1.80 (.07)	7.06* (.19*)
5. Great deal of time obtaining, using, or recovering from effects (61.8%)					
Yes	8.4 (7.16)	4.8 (4.26)	1.0 (1.37)	1.5 (1.57)	2.0 (0.99)
No	5.1 (5.39)	2.9 (3.26)	0.4 (0.88)	1.3 (1.41)	1.5 (0.82)
	6.37* (.24*)	6.37* (.23*)	6.61* (.23*)	2.60ˣ (.10ˣ)	7.11* (.26*)
6. Important activities given up or reduced (59.0%)					
Yes	8.8 (7.31)	5.1 (4.38)	1.1 (1.39)	1.5 (1.60)	2.0 (1.00)
No	4.7 (4.87)	2.7 (2.91)	0.4 (0.82)	1.2 (1.37)	1.4 (0.75)
	8.61* (.30*)	8.24* (.29*)	7.97* (.28*)	3.12ˣ (.12ˣ)	9.38* (.33*)
7. Continued use despite physical/ psychological problems (88.0%)					
Yes	7.6 (6.84)	4.4 (4.07)	0.9 (1.28)	1.5 (1.54)	1.8 (0.97)
No	3.6 (4.55)	2.2 (3.01)	0.2 (0.59)	0.8 (1.21)	1.2 (0.65)
	6.84* (.20*)	5.55* (.17*)	7.29* (.16*)	4.22* (.14*)	7.74* (.22*)
Correlation with total number DSM-IV items endorsed: mean (SD) = 5.4 (1.44)	.41*	.37*	.41*	.18*	.47*
% who endorsed one or more scale items	78.7	69.2	38.9	57.9	50.8

ˣ$p < 0.01$; *$p < 0.001$.

at intake. For example, in the first data column that relates to the total of the 27 possible problems, subjects who originally had endorsed tolerance had 7.5 (±6.85) problems during the follow-up, whereas those with no report of tolerance at intake had 4.4 (±4.86) subsequent items endorsed ($t = 4.64$, 640 *df*, $p < 0.001$). Table 2 also offers the correlation between the endorsement of the original dependence criterion and the relevant outcome score. The results in the first data column of Table 2 show that the single original diagnostic item that did not relate to a significantly higher number of the broad range of 27 possible alcohol-related problems reported during follow-up was item 3, which dealt with the use of alcohol in larger amounts or over longer periods than intended. Of the remainder, items 1 (tolerance) and 4 (persistent desire to cut down) showed a relatively weak relationship to problems, whereas items 2 (ever having experienced withdrawal) and 6 (having given up or reduced important activities to drink) performed relatively well. The remaining criteria fell between the two extremes. The second to last row at the bottom of Table 2 demonstrates that a simple count of the total number of DSM-IV items endorsed at baseline appears to correlate with outcome better than any one dependence item, explaining between 16% and 17% of the variance. The final row indicates that almost 79% of the subjects had experienced at least one of the 27 items during follow-up.

The remainder of Table 2 evaluates the relationships between the endorsement of each of the seven DSM-IV dependence items at baseline and the more focused four outcome factors of control, withdrawal, legal, and treatment problems. The patterns of the manner in which the four outcome factors related to the seven DSM-IV items were fairly similar to the 27 problem total score. Diagnostic item 3 (taking alcohol in larger amounts or for longer periods than intended) did not relate well to any outcome, whereas items 2 (withdrawal) and 6 (giving up activities) had the most robust relationships.

Table 3. Summary of Significant Standardized Regression Coefficients (β Weights) From Multiple Regression Analyses of Baseline DSM-IV Items Predicting the Total Number of Problems and Each of Four Outcome Factors

DSM-IV dependence items at baseline	Total 27 problems	Factor I (control)	Factor II (withdrawal)	Factor III (legal)	Factor IV (treatment)
1. Tolerance	.09✓	.08✓	.11ˣ	—	.09ˣ
2. Withdrawal	.18*	.13ˣ	.29*	—	.25*
3. Larger amounts, longer than intended	—	—	—	—	—
4. Persistent desire to cut down or control us	.10ˣ	.10ˣ	—	—	.12*
5. Great deal of time obtaining, using, or recovering from effects	—	.08✓	—	—	.09✓
6. Important activities given up or reduced	.18*	.17*	.14*	.10✓	.18*
7. Continued use despite physical/psychological problems	.12ˣ	.10ˣ	—	.12ˣ	.13*
Proportion of variance explained (R^2)	.17	.15	.17	.03	.23

✓$p < 0.05$; ˣ$p < 0.01$; *$p < 0.001$.

Table 3 turns to the question of whether any combination of diagnostic items stood out regarding the prediction of either total problems or the four outcome factors. Thus, five multiple regression analyses were carried out, with Table 3 reporting the β weights for each outcome measure, while listing the levels of significance with which the original DSM-IV items contributed. Neither item 3 (using alcohol in larger amounts or longer than intended) nor 5 (spending a great deal of time using or recovering from the effects) added much to any of the equations when considered in the context of the other predictors. In contrast, once again items 2 (withdrawal) and 6 (giving up important activities) performed well across most outcomes. A comparison of the proportions of the variance explained by each equation indicates that factor III (legal problems) might have been especially difficult to predict. It is interesting to note that, as described previously, the simple count of the number of DSM-IV items at baseline in Table 1 explained almost 17% of the variance of outcome for total scores.

The results reported here were reevaluated in several subsets of subjects. First, when the data in Tables 2 and 3 were calculated as they related separately to males and females, the general pattern of the overall analyses remained across sexes. The only exception in Table 2 was that item 1 (tolerance) appeared to be more closely tied to future problems in men. For Table 3, the major sex-related differences involved the performance of item 5 (spending time using), which appeared especially relevant for women in the equations for total, factor III, and factor IV. Finally, because 42.1% of the original subjects had been probands entering treatment, evaluations were carried out separately for nonprobands. Once again, the general pattern of results remained similar with several exceptions. For factor I, DSM-IV items 1 and 2 no longer contributed to the regressions, whereas for factor III, item 6 was no longer related to outcome.

To this point the analyses have focused on the potential clinical implications of each of the dependence criterion items among dependent individuals. The emphasis has been on dependence, because this generally is accepted as the more severe of the two substance use disorders, with more than two-thirds of alcohol-dependent subjects experiencing relatively severe problems over the subsequent 5 years, whereas the same was true for less than 30% of those with abuse (Hasin et al., 1997a; Schuckit et al., 2000, 2001). However, to offer data that might help put the information in Tables 1 through 3 in some perspective, additional analyses were carried out with 516 additional COGA subjects who had met criteria for alcohol abuse (not dependence) at intake into the study. During the follow-up, these subjects had an average age of 50.1 ($\pm$11.72) years, 50.2% were women, 6.6% were original probands, and they had been followed up for 5.2 ($\pm$0.71) years after the original interview. The racial background included 85.7% white, 6.0% African American, 6.6% Hispanic, and 1.7% other, and at the time of follow-up evaluation, 67.8% were married, 0.6% widowed, 12.2% separated or divorces, and 19.4% never married. At baseline, these men and women had endorsed an average of 1.2 $\pm$ 0.48 of the four possible abuse items, which included 6.8% who fulfilled item 1 related to interference with role obligations, 92.1% who met item 2 regarding use in hazardous situations, 1.6% who endorsed item 3 (legal difficulties), and 23.1% who had noted item 4 (social difficulties). These included 79.1% who had endorsed only one of the four potential items, 18.4% who had noted problems in two areas, and 2.5% who endorsed three of the possible four items, with none endorsing all four.

During the follow-up, these 516 subjects endorsed an average of 1.7 $\pm$ 2.53 of the 27 potential outcome problems, including 45.2% who reported no such difficulties, 16.7% who noted one problem, 13.8% who noted two problems, 8.3% who endorsed three, 4.5% with four, 3.5% with five items, 2.7% with six of the 27 potential items, and the remaining 5.3% endorsing seven or more items, and a

highest frequency of problems of 18. The difference in the number of follow-up problems endorsed for those with abuse and dependence was significant ($t = 17.3$, 1156 *df*, $p < 0.001$). Because only eight of the outcome items had been endorsed by 5% or more of the subjects with abuse (inability to cut down, drinking when not intended, becoming intoxicated without intention, blackouts, morning drinking, hazardous use, alcohol-related fights, and mixing alcohol and drugs), it was not possible to divide the outcomes into factors. In addition, the relatively low rate of experience of problems during follow-up resulted in relatively weak relationships between any of the four abuse diagnostic items at intake and the rate of occurrence of any of the 27 potential items, with nonsignificant correlations between each of the four criterion items and the number of the 27 potential items endorsed of 0.06 or less. The total number of the abuse items endorsed did correlate a bit better (0.09, $p < 0.05$), although even this figure was relatively weak.

Finally, the results in Tables 2 and 3 were reanalyzed for the combined group of 1158 COGA subjects who carried original diagnoses of alcohol dependence or abuse. Although the evaluation of this more heterogeneous population resulted in higher correlations between each of the seven dependence criterion items and the rate of experience of the 27 outcome problems or the relevant four factors, the pattern of performance for the DSM-IV items remained the same as those reported in the relevant tables. Once again, even with the expanded population, dependence item 3 did not relate well to any outcome, whereas items 2 and 6 maintained relatively strong relationships to the experience of problems during follow-up.

DISCUSSION

Similar to prior studies (Hasin and Paykin, 1999a, 1999b; Schuckit et al., 2000, 2001), the current data reveal that a diagnosis of alcohol dependence might be a useful predictor of future alcohol-related life problems. The present analyses went beyond most previous work by evaluating how specific DSM-IV dependence items predicted a fairly broad array of difficulties over the subsequent 5 years, while attempting to determine whether any specific combination of items functioned optimally in predicting problems overall or subsets of difficulties.

The analyses reported here support the conclusion that all components except item 3 (use in larger amounts or longer than intended) were significantly associated with the occurrence of one or more of a broad array of alcohol-related life problems. This general conclusion also applied to subsets of alcohol-related difficulties across a variety of categories that included the prediction of problems with controlling use, withdrawal, legal problems, and treatment. Thus, on a univariate level, only item 3 might be considered to be potentially problematic regarding predictive validity.

The current results differ in some important ways from those noted in some earlier analyses (Schuckit et al., 2000, 2001). Those earlier studies on smaller samples reported no significant relationships among dependent individuals between any specific DSM-IV item and the occurrence of the relatively narrow range of the 11 abuse or dependence items over the subsequent 5 years. Although all DSM-IV items worked well in predicting problems when both subjects with substance use disorders and controls were included in the analyses, they did little to highlight the predictive validity of any specific DSM-IV item among those with dependence. The current results might indicate that once the span of potential problems is broadened, the diagnostic items do indeed perform fairly well in predicting future difficulties among alcohol-dependent subjects.

The lack of performance for item 3 must be placed into the appropriate context. This criterion was endorsed by 96% of the subjects at the time of initial interview, and the inability to differentiate between individuals who did and did not go on to experience problems over the subsequent 5 years is likely to reflect the lack of variability.

The generic conclusions regarding the relative performance of the seven criterion items appear to apply across the four outcome factors. In general, item 3 (using more or longer than intended) performed relatively poorly in predicting outcomes in specific categories, items 2 (withdrawal) and 6 (giving up important activities) performed relatively better than others, and the remainder fell between the two extremes. The fact that item 6 may have worked best in the past with a heterogeneous sample of subjects and performed relatively well here with a wide range of outcomes might indicate that the usefulness of this item is related more closely to less impaired subjects with more modest difficulties at follow-up. Problems that reflect higher rates of endorsement at baseline might have interfered with an optimal evaluation of other items used. Also, the fact that some items were less powerful predictors when probands were excluded might reflect the probable more intense severity of alcohol problems in the original subjects.

The multiple regression analyses did not indicate that any unique combination of DSM-IV dependence items at time 1 predicted the rate of occurrence of problems overall, nor, in general, did any combination stand out in predicting any of the factors. In addition to confirming a lack of relationship between item 3 and outcome in the multiple regressions in Table 3, the analyses also indicated that item 5 (spending a great deal of time using or recovering) did not perform as well when considered in the context of the other DSM-IV baseline items, with β weights that were relatively low. Among the remaining DSM-IV criteria, the highest β weights were noted for items 2 (withdrawal) and 6 (giving up important activities), and only item 6 added significantly to all equations. Thus, items 2 and 6 might prove to be relatively useful in predicting a wide range of outcomes among alcohol-dependent persons. With that exception, the results of these regression analyses do not seem to highlight any specific combination of items that

would be particularly useful in predicting any specific type of outcome. Although items 6 and 7 were the only two to enter the equation for the prediction of legal problems, this result might have reflected the relatively low number of subjects who experienced these problems and the low proportion of the variance of the prediction of outcome that was explained.

Although not the major focus of the current study, several of the analyses support the earlier findings which indicate that the diagnosis of alcohol abuse is associated with a lower number of subsequent problems than is the diagnosis of alcohol dependence (Hasin et al., 1999a; Schuckit et al., 2000, 2001). Although prior studies have shown that this rate of problematic behavior is significantly higher for abuse than for those with no diagnosis (Schuckit et al., 2000, 2001), it is not surprising that the relationship between any one of the four abuse items and the broad outcome associated with the 27 potential follow-up problems is relatively weak.

Finally, it is relevant to note that a simple count of the number of dependence items endorsed explained a similar proportion of the variance, as was observed with multiple regression analyses that looked for a potential optimum combination of the seven DSM-IV items. These data might be useful for a DSM-V substance use disorders workgroup, which might consider a simple count as a potentially relevant indicator of severity, at least as it relates to outcome.

There are several reasons why the current results should be interpreted with some level of caution. First, the list of 27 problems at outcome was chosen to reflect all such items available for the determination of occurrence during the follow-up on the SSAGA and was not generated by a systematic problem inventory. Seven of these problems are related closely to the original DSM-IV dependence criteria and, thus, we are able to describe the outcomes but have no independent outcome measures that tap areas of function completely unrelated to the criteria themselves. Second, the high rate of endorsement of several of the DSM-IV items at baseline makes it difficult to adequately evaluate their predictive validity. In fact, it is probable that the most meaningful data might relate to DSM-IV items 2, 5, and 6, which had the lowest rate of endorsement at baseline, and the data related to more frequently noted DSM-IV criteria will require additional evaluation in even larger samples. Third, the groupings of outcome items by the PCA only account for a modest proportion of the variance. A fourth caveat is that all outcome information on subjects was obtained from the alcohol-dependent individuals themselves, without corroborating data. Fifth, the outcome factors reported in Table 3 represent the evaluation of statistically coherent groups of items that might not necessarily reflect the way a clinician might categorize problem patterns. Sixth, the grouping of items into factors was carried out with dichotomous (yes/no) items by using a procedure with which some statisticians might disagree. In addition, to avoid unnecessary complexity, possible differences for results across sex and for proband status were evaluated through descriptive approaches, and formal tests of interaction terms were not carried out. Finally, the focus of these analyses was to evaluate how the existing DSM-IV dependence criterion items performed regarding the outcome over 5 years, and we did not compare different diagnostic approaches.

Despite these limitations, the current study supports the general usefulness of the DSM-IV criterion items for alcohol dependence in predicting the occurrence of one or more of a variety of life problems related to alcohol over the subsequent half decade. Although Table 3 reveals that, at best, only 23% of the variance of outcome is explained by the endorsement of any combination of DSM-IV dependence items at baseline, these figures are in line with other studies attempting to predict outcome among alcohol-dependent individuals by using additional diagnoses, demographic characteristics, and other aspects of social and interpersonal functioning (Beattie, 2001; Miller et al., 1999; Schuckit et al., 1986). The data do not indicate that any unique subset of items is likely to be particularly useful in predicting outcomes in general or in highlighting specific problem patterns.

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