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Personality Subtypes Among Driving-While-Intoxicated Offenders: Relationship to Drinking Behavior and Driving Risk

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The present study investigated the empirical derivation of clinically and theoretically meaningful subtypes among males arrested for driving while intoxicated (DWI). Five subtypes were defined through cluster analysis of driving-attitudinal, personality, and hostility measures. Two subtypes were found to have particularly high levels of risk-enhancing traits. The first was characterized by the highest levels of depression and resentment as well as the lowest levels of assertiveness, emotional adjustment, and perceived control. The second was characterized by the highest levels of driving-related aggression, competitive speed, sensation seeking, assaultiveness, irritability, and indirect and verbal hostility. Subsequent analyses indicated that these two subtypes also were of lower social position, were heavier drinkers, and had higher risks of accident involvement in comparison to the remaining clusters. The results are discussed with respect to the need for differential assessment and treatment approaches when dealing with a DWI population.

Individuals who drive while intoxicated represent a population at risk. They have a high risk of being involved in traffic accidents. The drinking behavior and psychosocial traits that characterize the driving-while-intoxicated (DWI) arrestee are also similar to those found among individuals who are subsequently diagnosed as alcoholics (Fine & Scoles, 1976; O'Leary, O'Leary, & Donovan, 1976). However, as Selzer and Barton (1977) noted, attempts to intervene at a primary prevention level are difficult. The individual must first be identified by his or her alcohol-related arrest before any intervention can be implemented (Selzer & Barton, 1977; Zelhart, Schurr, & Brown, 1975). As such, the DWI population represents an appropriate target for secondary prevention strategies with the dual goals of reducing both the incidence of subsequent driving risk and the development of more severe drinking problems.

Selzer, Vinokur, and Wilson (1977) indicated that before effective treatment programs appropriate to DWI offenders can emerge, increased information is needed about the target population. Within this context, increased attention has been paid to the drinking behavior and psychological functioning of DWI arrestees (Donovan, 1980; Perrine, 1970; Selzer & Barton, 1977; Selzer et al., 1977; Zelhart et al., 1975). The results of such studies indicate that, as a group, these offenders usually have distinctive psychosocial and drinking problems. In contrast to the general driving population, the DWI arrestees have been found to drink more frequently and more heavily, to experience more negative effects from drinking, and to drink more for tension reduction. Similarly, compared to controls they have been found to be more depressed, to have lower levels of self-esteem and emotional adjustment,

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and to exhibit higher levels of both overt and covert hostility (Donovan, 1980; Selzer & Barton, 1977; Selzer et al., 1977).

Zelhart et al. (1975) indicated that the use of psychological measures to predict membership in the DWI population and to discriminate such individuals from the general driving population may be of somewhat limited practical utility. Rather, such measures may be more useful in identifying subtypes of individuals within high-risk groups such as DWI arrestees. Selzer et al. (1977) noted that despite the increased research on the characteristics of intoxicated drivers, most treatment programs deal with these individuals as a homogeneous group. However, more recent investigations have begun to question the homogeneity of this population. Mulligan, Steer, and Fine (1978), for instance, found three subtypes among DWI offenders based upon a cluster analysis of Minnesota Multiphasic Personality Inventory (MMPI) profiles: The profile types were suggestive of individuals with normal personalities, with neurotic symptoms, and with psychotic features. Sutker, Brantley, and Allain (1980) found four distinct MMPI profile types among a sample of DWI arrestees. One of these profiles, characterized by high levels of depression and acting-out behavior, was associated with particularly high levels of alcohol consumption. Steer, Fine, and Scoles (1979) also derived a number of clinically relevant subtypes from a cluster analysis of DWI offenders' blood alcohol concentrations upon arrest, the quantity and frequency of drinking, the problems experienced as a result of drinking, and the level of neuroticism.

The purpose of the present study was to identify, through cluster analytic techniques, subtypes of DWI arrestees. The measures employed assessed certain driving-related attitudes, personality traits, and components of hostility that have been found in previous research to increase the probability of accident involvement (Adams, 1970; Donovan, 1980; Mayer & Treat, 1977; McGuire, 1976; Selzer, Payne, Westervelt, & Quinn, 1967; Signori & Bowman, 1974). A second purpose was to provide external validation and meaning for these subtypes by investigating differences among the derived groups on demographic, drinking, and driving-risk measures (Blashfield, 1980).

Method

Subjects

The original subject pool was derived from seven regional centers throughout the state of Washington. Research questionnaires were distributed to each regional center in proportion to the number of DWI arrestees seen at each center relative to the total number seen throughout the state during the 6 months prior to the study. The subjects were 172 males solicited from an alcohol-related educational program, which they were required to attend following an arrest for driving while intoxicated. This group represented a 75% probability sample randomly drawn from a larger pool of 230 potential subjects. The subjects had a mean age of 36.74 (SD = 13.67) and a mean of 11.96 years of formal education (SD = 2.12). The mean social position for the group, based upon a weighted combination of academic achievement and occupational status (Hollingshead, Note 1), was 52.38 (SD = 11.75); this group falls within the lower-middle social class (Class IV). The largest percentage of the subjects were married (40.9%); a nearly equal percentage were either single (29.8%) or separated/divorced (28.1%).

No assessment was made concerning the percentage of subjects within the sample who could be diagnosed as alcoholics. However, only 24.2% of the subjects felt that they had a problem with their drinking. With respect to drinking behavior, 99.3% of the subjects were classified as high-maximum drinkers (Cahalan, Cisin, & Crossley, 1969), consuming five to six drinks per occasion at least once in a while. The largest percentage of subjects (42.4%) were also classified as high-volume drinkers, consuming 45 or more drinks per month. Based upon the criteria established by Little, Schultz, and Mandell (1977), over half of the subjects (55.4%) could be classified as frequent, heavy drinkers who reported having had five or more drinks on one or more occasions per week. On the average, the sample reported approximately 15 drinking occasions per month (M = 14.46, SD = 19.71), with approximately 10 of these occasions (M = 9.87, SD = 18.01) involving five or more drinks. Subjects reported that they drove 8.16 days per month (SD = 8.74) after having had one or more drinks. Examination of driving record data indicated that the sample had a mean of 3.88 (SD = 2.57) traffic violation convictions and .41 (SD = .68) accidents in the 3-year period prior to the present study.

Measures

Subjects completed an extensive self-report questionnaire constructed for the present project based upon the pattern of results obtained in prior accident involvement research and factors hypothesized to contribute to accident risk.[1] The development of the questionnaire fol-

[1] Copies of the research questionnaire can be obtained from the first author.

lowed a combined rational and empirical scale-construction strategy (Edwards, 1970) that attempted to provide measures of theoretical relevance and breadth while also utilizing measures previously found to be predictive of risk. The questionnaire contained four sections. The first assessed general personal background and demographic information. The second assessed drinking-related behavior. Items derived from Cahalan et al.'s (1969) Drinking Habits Questionnaire assessed both the frequency of drinking and the average number of drinks consumed per occasion. Four primary measures were derived from these items. These included the number of drinking occasions per month, the number of drinks per occasion, the total number of drinks per month (volume), and the number of monthly occasions on which five or more drinks were consumed. Subjects also indicated the number of days per month in which they drove after having had one or more drinks.

The third section consisted of 38 true–false items dealing with a variety of driving-related attitudes and behaviors. These attitudinal items were divided into five subscales based upon the nature of the content areas sampled. The first of these subscales included 12 items from a driving-aggression scale developed by Parry (1968). The second subscale consisted of the 6-item factor analytically derived measure defined by Goldstein and Mosel (1958) as competitive speed/aggression. A 10-item subscale was derived from a second factor defined by Goldstein and Mosel (1958) that appeared to measure the perceived causality of or responsibility for accidents. The items of this scale might be interpreted as a driving-related locus of control scale representing a situation-specific analogue of Rotter's (1966) measure of generalized perception of control. Six of the included items appear to be stated in the external direction, with the individual attributing causality to factors such as chance or fate (e.g., "Accidents are often caused by conditions beyond the control of the driver."). The remaining four items appear to be internal in orientation, with an attribution of causality to factors within the realm of personal control (e.g., "Accidents are caused by somebody's mistakes."). The fourth subscale, composed of 7 items from a variety of sources (Goldstein & Mosel, 1958; Mayer & Treat, 1977; Pelz & Schuman, 1973; Schuman, Pelz, Ehrlich, & Selzer, 1967), assessed the extent to which the individual uses driving as a form of tension reduction or to increase the level of perceived self-efficacy. The final subscale, labeled driving inhibition, included three items that assessed the extent to which emotional arousal might serve to produce increased cautiousness or attentiveness while driving, factors that hypothetically would be expected to reduce risk.

The fourth section of the questionnaire represented the primary source of information concerning the arrestees' personality traits. Five subscales of the Buss-Durkee Hostility Inventory (Buss & Durkee, 1957) were included. These measured assaultiveness, indirect hostility, irritability, resentment, and verbal hostility. Ten items derived from Valecha and Ostrom's (1974) abbreviation of Rotter's (1966) scale provided a measure of control orientation. The items were presented individually (rather than in a forced-choice format) to minimize previously obtained social desirability response biases (Hjelle, 1971; Kestenbaum, 1976). The five internal and five external items included were further matched with respect to their previously determined social desirability rating-scale values (Hjelle, 1971; Kestenbaum, 1976). Generalized assertiveness was assessed by 10 items from the Rathus Assertiveness Schedule (Rathus, 1973). These items met two inclusion criteria: (a) They had item–total correlations of .40 or greater, and (b) they were significantly correlated with peer ratings of social outspokenness. Ten items from a scale factor analytically derived by Costello and Comrey (1967) were included to measure a general depressive tendency. A measure of psychological adjustment was comprised of the six items from the Eysenck Personality Inventory that Howarth (1976) found to define a factor of general emotionality. The final subscale of this section provided a brief measure of generalized sensation-seeking. The eight items included in this subscale were derived primarily from the Thrill and Adventure, Experience Seeking, and Disinhibition factors of the Sensation-Seeking Scale (Zuckerman, 1971) and were supplemented by items from a similar factor analytically derived scale developed by Plomin (1976).

The items in both the driving-related attitudinal section and the section assessing personality function were completely randomized with respect to order of presentation. Also, the order of presentation of these two sections of the questionnaire was also counterbalanced so that each section was presented approximately an equal number of times prior to and following one another.

As part of their voluntary participation in the investigation, subjects agreed to allow an examination of their official driving records as maintained by the Washington State Department of Licensing. Data concerning the number of accidents and convictions over the past 3-year period were abstracted. A number of measures were derived from the data. These included the total number of accidents, convictions, and accidents plus convictions per year over this period. Also, a risk-index score (Clay, 1972, Note 2) was derived. This index represents a weighted combination of the number of driving-related convictions, accidents, and accidents involving at least one injury over the 3-year period prior to participation in the study.

Statistical Analyses

In an attempt to derive potentially meaningful, clinically relevant subtypes within the DWI group, a cluster analysis was performed on the standardized scores from the driving-attitudinal, personality, and hostility measures. The cluster analysis program CLUSTAN (Wishart, Note 3) was employed. Ward's (1963) hierarchical clustering procedure was chosen. This method utilizes the squared Euclidian distance to determine the similarity between subjects' profiles on these measures. At each stage of fusion, clusters are formed so as to yield the least increase in the error sum of squares, defined as the sum of the distances from each individual's profile to the centroid of its parent cluster. Thus, those individuals whose profiles have similar elevations and patterns will be grouped together. The procedure results in minimum-variance clusters in which there is a relatively high level of within-cluster homogeneity on the measures em-

ployed and maximal discrimination among the defined clusters. The optimal number of clusters was determined empirically when there was a marked discontinuity in the fusion coefficient value associated with merger and reduction to a smaller number of clusters.

Following the guidelines of Blashfield (1980), we made no attempt to internally validate the clusters through subsequent analyses on those variables originally used to form the obtained subtypes. Rather, an external validation procedure was employed. The subtypes were compared on demographic, drinking, and driving-related variables not included in the original cluster derivation.

Results

Cluster Derivation

The clustering procedure yielded five unique groups within the DWI sample. Table 1 presents the within-sample standard scores on the 17 variables entered into the analysis. Based upon the pattern of these scores, the following descriptions characterize the five groups. Clusters 2 and 5 were the least deviant of the five groups. The former group evidenced the greatest overall degree of affective and behavioral adjustment. These individuals were the least depressed and had the highest level of emotional adjustment; they had relatively low levels of risk-enhancing driving attitudes, with the lowest overall level of driving-related aggression. They also had the lowest levels on sensation seeking and on each of the five measures of hostility. Cluster 5 had somewhat higher scores on the affective and behavioral dimensions than did Cluster 2; they were noteworthy for the highest overall level of assertiveness and the lowest levels of competitive speed and driving for tension reduction.

Individuals in Cluster 3 tended to deviate from members of the other DWI subtypes primarily along an affective dimension. They were characterized by the highest levels of depression and resentment as well as the low-

Table 1
Mean Standard Scores on Variables Defining DWI Clusters

	DWI cluster				
Variable[a]	1 (n = 33)[b]	2 (n = 51)	3 (n = 28)	4 (n = 27)	5 (n = 22)
Driving-related					
Internality	53.1	51.6	53.9	46.5	43.1
Externality	46.5	49.2	54.3	52.1	49.1
Aggression	51.3	42.6	49.8	65.1	46.1
Competitive speed	48.3	48.3	47.5	60.1	47.3
Tension reduction	56.6	47.1	48.9	54.7	42.5
Inhibition	50.1	51.0	56.1	45.8	45.0
Personality					
Assertiveness	50.0	50.9	42.4	52.3	54.7
Depression	46.9	44.4	59.1	53.4	51.8
Emotional adjustment	48.9	43.9	60.2	53.9	49.3
Internality	54.9	53.3	50.9	47.3	37.0
Externality	43.9	48.2	58.1	54.6	47.2
Sensation seeking	54.0	43.2	53.5	57.3	46.3
Hostility/aggression					
Assaultiveness	50.8	45.4	48.6	58.4	51.0
Indirect hostility	51.9	42.2	51.7	60.4	50.2
Verbal hostility	53.9	42.6	48.6	60.2	50.3
Irritability	51.7	42.2	55.9	58.9	46.9
Resentment	47.1	44.6	57.8	57.2	48.0

Note. DWI = driving while intoxicated.
[a] Higher scores indicate higher levels of the trait named, except for emotional adjustment, where higher scores indicate lower levels of adjustment.
[b] The total number of subjects was reduced from the original 172 due to listwise deletion of those with missing data points.

est levels of assertiveness and emotional adjustment. They also perceived themselves as having the least personal control over the outcome of significant events in their lives and assumed the least personal responsibility toward accident involvement. However, they had only mild to moderate elevations on most of the remaining driving-attitudinal and hostility measures. Cluster 4 individuals appeared to be distinguished from the remaining subtypes by a primary elevation along a behavioral dimension as well as a moderate but less striking elevation on an affective dimension. These individuals had the highest level of driving-related aggression and competitive speed as well as the lowest level of caution while driving when upset. They also had the highest levels of sensation seeking, assaultiveness, indirect and verbal hostility, and irritability. In addition, these individuals had moderate levels of depression, emotional instability, and external perception of control. Cluster 1 represented a profile that was similar to but less marked than that of Cluster 4. Individuals in this subtype were particularly noteworthy for their high levels of driving for tension reduction, low levels of general and driving-related externality, and relatively low levels of depression and resentment.

External Validation of the Clusters

The five DWI clusters were compared on a variety of demographic, current drinking, and driving-risk measures. The means and resultant *F* ratios for these comparisons are presented in Table 2. Significant differences were found on age and social position within the demographic variables. Cluster 4 members were significantly younger than individuals in Clusters 2, 3, or 5; also, members of Cluster 1 were younger than those in Cluster 2. Cluster 2 members were of higher social status than were members of Clusters 3 or 4. Only one of the five current drinking-related measures yielded significant differences.

Cluster 2 members consumed significantly fewer drinks per occasion than members of

Table 2
Comparison of DWI Clusters on Demographic, Drinking, and Driving-Risk Variable Means

Variable	DWI cluster 1	2	3	4	5	*F*
Demographic						
Age	31.5	43.4	37.5	29.1	37.6	7.35**
Education	11.8	11.9	12.0	11.9	12.2	0.12
Occupational status[a]	5.3	4.8	5.5	5.3	5.1	1.41
Social position[a]	41.5	22.7	62.9	75.2	33.2	3.10*
Drinking-related						
Occasions/month	19.9	12.6	14.4	15.2	9.4	1.09
Drinks/occasion	4.6	3.5	4.3	4.7	3.6	4.43**
Drinks/month	100.7	52.5	58.0	76.6	39.5	1.38
Monthly occasions of 5 or more drinks	15.7	7.2	8.2	12.1	6.2	1.56
Days/month of driving after drinking	8.8	5.8	9.4	11.7	7.0	2.12
Driving-related[b]						
Accidents/year	.14	.08	.13	.28	.09	2.85*
Convictions/year	1.42	.93	1.55	1.63	1.38	3.86**
Accidents and convictions/year	1.58	1.06	1.73	1.92	1.53	3.93**
Risk index	41.4	22.7	61.9	73.2	32.9	2.81*

Note. DWI = driving while intoxicated.
[a] Higher scores indicate lower status.
[b] Variables adjusted for exposure as measured by the number of miles driven annually.
* $p < .05$. ** $p < .01$.

Clusters 1, 3, or 4; Cluster 5 members also had fewer drinks per occasion than those in Clusters 1 or 4. There was no difference in the distribution of subjects classified by Little et al.'s (1977) criteria as frequent, heavy drinkers across the five clusters ($\chi^2 = 3.923$, $df = 4$). Significant differences were obtained on each of the four measures of driving risk. Cluster 2 members had significantly fewer convictions and accidents plus convictions annually than did individuals in Clusters 1, 3, or 4; they also had significantly lower risk index scores than members of Clusters 3 or 4. Those individuals in Cluster 4 had significantly more accidents per year than did those in each of the remaining subtypes.

Discussion

The present results further support the potential usefulness of identifying subtypes within the DWI population. Five distinct groups were derived based upon differential levels of driving-related attitudes, personality functioning, and hostility. Three of these groups (Clusters 1, 3, and 4) appeared to be more deviant, having particularly high levels of risk-enhancing characteristics relative to the overall DWI sample norms; the remaining two groups (Clusters 2 and 5) had relatively low levels on these characteristics, evidencing considerably lower levels across the affective and behavioral dimensions assessed.

A number of methodological caveats should be noted. The research questionnaire, in attempting to assess a broad range of traits, was quite lengthy. This factor contributes to what Cronbach (1970) has described as the "bandwidth-fidelity dilemma." The attempt to gain such breadth of coverage within a given time frame may reduce the "fidelity" of measurement by utilizing shorter, less reliable scales. A second factor involves the use of scales out of their original context and distributing items randomly throughout the questionnaire. Such a procedure may alter the originally developed reliability, internal consistency, and/or factor structure of the measures (e.g., Berndt, 1979). Third, the length of time required to complete the questionnaire may have led to an increase in error variance; an attempt was made to minimize this source of error by counterbalancing the driving-attitudinal and personality sections of the questionnaire. A final factor deals with the possible influence of a systematic response set. The DWI arrestees completed the questionnaires in conjunction with an alcohol-related educational program that they were required to attend as a consequence of their arrests. As such, it might be anticipated that they would attempt to present themselves in a more favorable light. However, this was not the case. The DWI arrestees did not differ from a group of subjects randomly drawn from the general driving population with respect to a social-desirability response set (Donovan, 1980).

Blashfield (1980) indicated that it is possible to derive clusters regardless of the variables involved. Therefore, it is necessary to provide evidence of the meaningfulness of derived clusters by relating them to variables other than those used in the composition of the subtypes. The present clusters meet the criteria for external validation suggested by Blashfield (1980). Differences were found among the subtypes on certain demographic, drinking, and driving-risk measures. The differences were most pronounced between those groups evidencing the greatest and least affective and behavioral adjustment. Cluster 2 was composed of significantly older individuals of higher social status who drank less per occasion than those in either Cluster 3 or 4. The latter two groups, which were the most deviant within the DWI sample, also had the highest overall indexes of driving risk. These findings are consistent with previous results in which both drinking behavior and driving risk were predicted from personality characteristics on a univariate basis (Adams, 1970; Goldstein & Mosel, 1958; Mayer & Treat, 1977; McGuire, 1976; Perrine, 1970; Schuman, et al., 1967; Selzer & Barton, 1977; Selzer et al., 1967, 1977; Signori & Bowman, 1974). In addition to fitting within this previously established empirical base, the meaningfulness of the derived clusters is suggested by their fitting within a consistent theoretical framework concerning the relationship among personality factors, drinking behavior, and driving

risk (Donovan, 1980). Thus, it appears that the present clusters represent meaningful subtypes rather than an artifact of the clustering procedure.

Clay (1972) has asked the question "Which drunks shall we dodge?" The overall pattern of previous results suggests that it is appropriate to avoid all intoxicated drivers, since the average driving-risk index of the DWI offenders is approximately nine times greater than that of the general driving population (Donovan, 1980). However, the results of the cluster analysis indicate that certain individuals may get into more trouble than others when driving while intoxicated. Consistent with Clay's (1972) and Zylman's (1975) contention, those individuals who drink heavily on a given occasion and who have a high level of hostility represent the highest overall level of driving risk within the present DWI sample. Those DWI arrestees who were characterized by a constellation of depression, resentment, minimal perceived personal control, and low levels of emotional adjustment and assertiveness in conjunction with heavy drinking per occasion were also noteworthy for their driving risk. In a manner similar to that noted by Selzer et al. (1967), high-risk driving styles that accompany intoxication among these two subtypes of DWI offenders may represent a means of expressing their underlying psychopathology in the absence of more adaptive means of coping.

The results of studies evaluating the effectiveness of currently available intervention programs for DWI offenders have suggested that such programs result in mixed outcomes. While the level of knowledge concerning alcohol and its effects on driving, as well as attitudes the participant holds toward drinking, typically show changes as a result of intervention, subsequent recidivism and drinking behavior are frequently unchanged (Michelson, 1979; Nichols, Weinstein, Ellingstad, & Struckman-Johnson, 1978; Scoles & Fine, 1977; Zelhart & Schurr, 1977). A factor that may contribute to this low efficacy, as Selzer et al. (1977) noted, is that most programs treat DWI offenders as if they were a homogeneous group. The present results, as well as those of Mulligan et al. (1978), Steer et al. (1979), and Sutker et al. (1980), suggest that the DWI population is not homogeneous but rather is composed of a number of clinically relevant subtypes. Such findings imply the need for differential assessment of personality characteristics of the DWI offender (Zelhart et al., 1975). Similarly, attention should be directed toward a more thorough delineation of drinking styles, benefits, and consequences within this population (e.g., Sobell, Sobell, & Sheahan, 1976; Wanberg, Horn, & Foster, 1977).

The model of differential assessment suggested by the present results potentially would lead to a closer match between DWI arrestees and modes of intervention most appropriate to their particular needs. A primary focus of such intervention strategies is the active development of skills to deal more effectively with both situational and emotional factors frequently related to drinking. Such techniques have been used in the treatment of both alcoholics and problem drinkers (Sobell & Sobell, 1978). Recently Brown (1980) found that involvement in an educational course focusing on controlled drinking skills was significantly more effective than a traditional alcohol-related educational program in reducing subsequent problematic drinking among DWI arrestees. It may be that such self-control drinking programs would be particularly appropriate for DWI arrestees whose drinking is less frequent and less heavy than that of others (e.g., Clusters 2 and 5).

Therapeutic interventions must also attend to potentially problematic aspects of personality functioning and behavior among the DWI offenders. For those whose primary difficulties appear to involve depression, resentment, a lack of assertiveness, and an external perception of control (e.g., Cluster 3), a wide variety of depression self-management skills and assertiveness training would appear appropriate (Lewinsohn, Munoz, Youngren, & Zeiss, 1978). The cognitive-behavioral anger-management procedures outlined by Novaco (1975) would seem particularly suited to those DWI arrestees who are characterized by a high level of anger, hostility, and aggression (e.g., Cluster 4). Future research should continue to pursue the derivation of clinically meaningful personality clusters within the DWI population

and to investigate the relative outcome of differential treatment programs across such subtypes.

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