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VARIABLES ASSOCIATED WITH SUCCESS IN AN ADOLESCENT DRUG TREATMENT PROGRAM

Judith Ellen Knapp, Donald I. Templer, W. Gary Cannon and Shan Dobson

ABSTRACT

The purpose of this study was to investigate the variables that predicted success in an adolescent inpatient drug treatment program. The prognosis in 94 adolescent polydrug abusers was determined on the basis of the MMPI, the Millon Adolescent Personality Inventory, Wechsler IQ, and historical variables. Favorable outcome was associated with being female, having fewer legal difficulties, fewer neurological risk factors, less pathological MMPI scores, higher Verbal IQ, and lower Performance IQ.

In reviewing the literature on predictor variables of success in adolescent drug abuse treatment, only the Hoogerman, Huntley, Griffith, Petermann and Koch (1984) study was found. The subjects of that study were 314 adolescents in an outpatient peer group setting. A cognitive behavioral intervention was employed, and a positive outcome was found to be associated with being female, having fewer legal difficulties, having fewer conduct problems in school and at home, and having parents with no history of difficulty with the law.

A greater number of prognostic studies with adult drug abusers have been reported. Rounsaville, Tierney, Crits-Christoph, Weissman, and Kleber (1982), in a study of 157 opiate addicts admitted to a drug dependence treatment unit, found that better occupational functioning following treatment was significantly associated with better occupational functioning prior to treatment. Further, more legal problems, more use of illicit drugs, and a greater level of psychological symptoms were associated with more problems in these areas before treatment. Bowden and Langenauer (1972) compared the characteristics of 14 successful and 49 unsuccessful patients in a treatment program for narcotic addicts. Graduation from high school and later onset of opioid use were associated with favorable outcome. Rush (1979) found that having been in school or an educational training program upon ad-

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mission, and time spent in treatment, predicted better outcome. Perkins and Bloch (1970) found that favorable outcome was positively associated with time in a methadone maintenance program. Studies by Simpson (1979, 1981) and Sorenson, Hargreaves, and Weinberg (1981) indicated that treatment length was positively correlated with outcome for opiate addicts. Simpson, Savage, and Lloyd (1979) found that a pretreatment criminal history was inversely related to post-treatment outcome. Vaillant's (1966) study of narcotic addicts revealed that abstinence was directly related to length of hospitalization, and occurred most often in addicts who had a stable early childhood.

Follow-up research on graduates of Phoenix House, a traditional therapeutic community, determined that among dropouts, success and improvement rates increased with the amount of time in residence (deLeon, 1984). Bess, Janus and Rifkin (1972) concluded that one of the factors which enabled their subjects to successfully renounce drug use was the absence of any prominent antisocial behavior. Another factor was coming from an intact family. Follow-up studies by d'Orban (1974, 1975) revealed that degree of criminal history failed to predict prognosis for males, while convictions for females showed a significant inverse relationship to abstinence.

Gibbs and Flanagan's (1977) review of 45 studies of treatment outcome for alcoholism was also used in the selection of independent variables for the present study. Gibbs and Flanagan concluded that favorable prognosis was associated with a diagnosis of psychoneurosis, higher Arithmetic Scale score on the Wechsler Adult Intelligence Scale, steady work history prior to admission, married or cohabiting, higher status occupation, fewer arrests, married and marriage stable, employed at time of admission, type of occupation irrespective of status, history of involvement with Alcoholics Anonymous prior to treatment, and higher social class.

The rationale for the present study includes the fact that generalization of findings for adults to adolescents cannot be assumed, and that the only study with adolescents had distinct limitations. Hoogerman et al. did not employ psychometric instruments, and their subjects were outpatients. Subjects in the present study were in an inpatient program. More importantly, the prior study did not use a criterion oriented toward the target behavior of substance abuse. Further, the most serious limitation was that the authors did not provide the methodological details of their research, which they described as a "descriptive pilot study."

The variables chosen for the present study were selected from Hoogerman et al.'s research and the drug and alcohol studies with adults. It would appear that less acting-out behavior, less drug and/or alcohol

use, more assets and success in life, higher social status, and length of time in treatment have been associated with positive outcome. The specific measures employed to assess such dimensions in the present study were: gender, age, years of formal education of mother and father, the Wechsler Intelligence Scale for Children–Revised (WISC-R) or the Wechsler Adult Intelligence Scale–Revised (WAIS-R), the Minnesota Multiphasic Personality Inventory (MMPI) or the Millon Adolescent Personality Inventory (MAPI), history of legal difficulty, and a summated neurological risk score.

The neurological risk score was based on whether the adolescent was full term at birth, was in a regular educational program, and had the following before the age of 10: encephalitis, high fever, meningitis, convulsions, head injury or hyperactivity. It is well-known that neurological deficits impose limitations upon achievement, that they are associated with conduct problems and antisocial behavior in children, adolescents, and adults, and that these deficits traditionally have been regarded as relatively permanent or long lasting and not amenable to psychologically oriented intervention. The indicators chosen to contribute to the neurological risk score have been associated with neurological deficits (Gilandas, Touyz, Beumont, & Greenberg, 1985).

Intelligence quotient was included not only because the previous literature with adult alcoholics found it of prognostic value, but because there is a long history in psychology of IQ being used as a predictor in a number of life endeavors.

The selected outcome variables were based on a multidimensional approach to outcome evaluation. The variables focused on family relationships, involvement with the law, school status, and parental assessment of change, in addition to level of drug and alcohol involvement.

METHOD

The original pool of potential subjects consisted of approximately 300 adolescents who participated in a hospital-based residential drug treatment program in central California. However, a decision was made to employ only the 188 patients who had a substance abuse problem rather than a primary psychiatric diagnosis, and were between the ages of 14 and 17 (mean = 16.00, standard deviation = 1.08). So few subjects were younger than 14 and older than 17 that their inclusion would have restricted generalizability of findings. Parental consent was obtained for 94 patients (63 males and 31 females), who comprised the subjects for the research. Seventy-nine were Caucasian, 11 Hispanic, 1 black, 1 Asian, and 2 "other."

Table 1 shows the number of subjects who received a physician's substance abuse diagnosis in the various substance categories. Such drugs or drug combinations represent primary diagnoses; not all drugs are included. Thus Table 1 presents a conservative picture of the variety of drugs abused. Alcohol and marijuana were most frequently specified, with cocaine the third most common drug, followed by amphetamines and LSD.

All subjects were patients in a private inpatient facility for the treatment of drug and/or alcohol abuse. During the first 5 days of the 30- to 40-day program, patients underwent extensive medical, psychological, and social assessment. The subsequent treatment consisted of individual, group, and family therapy, education, recreation, Alcoholics Anonymous, Narcotics Anonymous, and life-skills training classes that emphasized self-esteem, values clarification, and self-responsibility. Patients also were encouraged to obtain a sponsor in Alcoholics Anonymous or Narcotics Anonymous.

The assessment interview consisted of an extensive intake evaluation, routinely used in the program for admission evaluations. De-

Table 1

Categories of Drugs Abused

Drugs	Frequency
Alcohol/Marijuana	32
Marijuana	17
Alcohol	13
Mixed	7
Cocaine/Alcohol/Marijuana	6
Cocaine/Marijuana	5
Amphetamines/Alcohol/Marijuana	5
Cocaine/Alcohol	3
Marijuana/L.S.D.	1
Marijuana/Cocaine/L.S.D.	1
Cocaine/Heroin/Amphetamines	1
PCP/Marijuana/Alcohol	1
Cocaine	1
Marijuana/Amphetamines	1

mographic data was provided by parents, and included gender, age, the years of formal education of mother and father, and the information utilized to obtain the subject's neurological risk index. This index was obtained by assigning one point each for a positive response to any of the following: not being full term at birth, participation in a special education program, and having experienced encephalitis, high fever, meningitis, convulsions, head injury, or hyperactivity. Scores could range from 0 to 8.

For the first nine months of the program's existence, patients were administered the MMPI. After January 1985, patients were administered the MAPI (Millon, 1982), which divides the major personality patterns and primary realms of psychosocial concerns typical of adolescents into three major categories: Personality Styles, measuring eight characteristics (e.g., introversive, confident, sensitive); Expressed Concerns, measuring eight areas of feelings and attitudes; and Behavior Correlates, describing how the adolescent behaves or acts. Each is scored and assessed separately.

Upon admission to the program, all patients 16 years and older were administered the WAIS-R. Those under 16 years were administered the WISC-R. Although all 94 subjects were administered one or the other, only 44 Verbal, 43 Performance, and 46 Full Scale IQ scores were available. This is because the Wechsler IQ tests often were administered by psychologists outside of the agency. As a result, in the psychological reports, sometimes only one score, or the IQ range, was specified.

The parents of those subjects who completed the program were sent a letter advising them that they would be contacted in order to gather information on how their child was currently functioning. Follow-up contact was made by telephone; seven questions were asked (see Table 2). The outcome criteria were taken from the follow-up information, and measured changes in six areas: alcohol use, drug use, difficulty with the law, school grades, school expulsions, and family adjustment. The seventh question asked parents to assess the program's effectiveness.

Subjects who were no longer living at home were not included in the family relationship analysis. Those who graduated from high school and those who dropped out of school (except by expulsion) were not included in the two school-related analyses.

The independent variables for all subjects were gender, age at entrance into the program, mother's education, father's education, presence or absence of legal difficulty, neurological score, Verbal IQ, Performance IQ, Full-Scale IQ, and the scales of either the MMPI or MAPI. Since the WISC-R manual reported that the IQ provided by the

Table 2

Follow-Up Questionnaire

1.a	Is your son or daughter currently using drugs? Yes_____ No_____ (If No, skip to Question No. 2.)
1.b	Is your son or daughter currently using more, less or about the same amount of drugs as prior to entering the program? More____ Same____ Less____
2.a	Is your son or daughter currently using alcohol? Yes____ No____ (If No, skip to Question No. 3.)
2.b	Is your son or daughter currently using more or less or about the same amount of alcohol as prior to entering the program? More____ Same____ Less_____
3.	Are his or her grades better or worse or about the same as prior to entering the program? Worse____ Same_____ Better_____
4.	Has he or she had any expulsions from school since leaving the program? Yes____ No____
5.	How has he or she been getting along with other members of the family since leaving the program? Worse_____ Same_____ Better_____
6.	Has he or she had any trouble with the law since leaving the program? Yes_____ No_____
7.	In general, do you think the program was effective? Yes____ No____

test is about 6 points lower than the Full-Scale WAIS IQ, and the WAIS-R manual reported IQ to be 7.5 points lower than the WAIS, using WISC-R and WAIS-R IQs for different subjects in the same analyses is justifiable.

RESULTS

Table 3 contains the means and standard deviations for all of the continuous independent variables. Table 4 contains the frequency distribution of the dependent variables. The correlations between months since discharge and the criterion variables were $-.26$ ($p < .05$) for drug use, $-.25$ ($p < .01$) for alcohol use, $-.08$ for school grades, $-.10$ for school expulsion, $-.27$ ($p < .01$) for legal difficulty, and $-.10$ for parental assessment. Negative correlations mean that months since discharge were associated with negative outcome. The highest correlations with drug and alcohol use and difficulty with the law were not

Table 3

Means and Standard Deviations for All of the Continuous Independent Variables

Variable	Cases	Mean	Standard Deviation
Age	94	16.00	1.08
Sex (F=1, M=2)	94	1.33	.47
Mother's Education	93	12.92	1.98
Father's Education	93	13.63	2.53
Verbal IQ	44	95.43	11.11
Performance IQ	49	103.70	18.75
Full Scale IQ	46	98.63	10.88
Neurological Index	93	.84	1.03
Head Injury	93	.17	.38
Premature	93	.03	.18
Special Education	93	.15	.36
Encephalitis	93	.00	.00
High Fever	93	.19	.40
Meningitis	93	.00	.00
Convulsions	93	.05	.23
Hyperactive	93	.25	.43
Legal Difficulties	72	1.39	.49
Minnesota Multiphasic Personality Inventory			
LM - Lie	21	48.33	8.78
FM - Validity	21	67.95	11.07
KM - Correction	21	52.05	8.26
HS - Hypochondriasis	21	55.33	20.01
DN - Depression	21	55.57	15.83
HY - Hysteria	21	60.14	14.37
PD - Psychopathic Deviate	21	73.95	13.73
MF - Masculinity - Femininity	21	54.00	9.75
PA - Paranoia	21	64.05	13.54
PT - Psychasthenia	21	60.95	18.45
SC - Schizophrenia	21	71.43	17.62
MA - Hypomania	21	71.33	12.56
SI - Social Introversion	21	52.95	11.87
Millon Adolescent Personality Inventory			
INT - Introversive	57	29.75	21.05
INH - Inhibited	57	58.21	22.90
COOP - Cooperative	57	35.39	22.16
SOC - Sociable	57	59.26	23.92
CONT - Confident	57	47.11	23.08
FORCE - Forceful	57	71.25	20.97
RES - Respectful	57	27.88	18.31
SEN - Sensitive	57	77.77	22.93
SCN - Self-concept	57	64.88	20.40
PE - Personal esteem	57	66.47	19.45
BC - Body comfort	57	54.86	23.07
SA - Sexual acceptance	57	48.04	20.37
PS - Peer security	57	49.16	21.49
ST - Social tolerance	57	55.46	22.29
FR - Family rapport	57	82.21	17.75
AC - Academic confidence	57	73.14	18.99
IC - Impulse control	57	73.14	18.99
SCM - Social conformity	57	74.05	19.83
SCH - Scholastic achievement	57	63.64	18.85
ATT - Attendance consistency	57	58.36	17.28

Table 4

Frequency Distribution for Outcome Variables

Outcome Variable	Subjects	
1. Drug use		
No	37	(39.4%)
Less	31	(33.0%)
Same	14	(14.9%)
More	12	(12.8%)
2. Alcohol use		
No	31	(33.0%)
Less	31	(33.0%)
Same	16	(17.0%)
More	16	(17.0%)
3. Grades		
Better	42	(44.7%)
Same	14	(14.9%)
Worse	12	(12.8%)
Not applicable	26	(27.7%)
4. School expulsion		
No	59	(62.8%)
Yes	9	(9.6%)
Not applicable	26	(27.7%)
5. Family adjustment		
Better	66	(70.2%)
Same	22	(23.4%)
Worse	6	(6.4%)
6. Legal difficulty		
No	63	(67.0%)
Yes	31	(33.0%)
7. Parent judged effectiveness		
Yes	72	(76.6%)
No	22	(23.4%)

surprising since months since discharge translates into more time for a behavior to occur. To control for months since discharge, partial correlations controlling for this variable were performed. Table 5 contains the partial correlations between the independent and dependent variables. It is apparent that the drug and alcohol target variables yielded, as anticipated, more significant correlations than did the subsidiary variables. It is also apparent that the subjects with more favorable outcome tended to be female, to be younger, and to have a higher Verbal IQ, a lower Performance IQ, a history of fewer neurological risk factors, fewer legal problems, and less psychometrically assessed psychopathology.

DISCUSSION

The most encompassing generalization permitted by the findings is that they generally mesh rather well with the literature on adult substance abusers, and could be regarded as congruent with common sense. The overall findings are also consistent with the prognostic research with adult alcohol and drug users insofar as patients who were better endowed with respect to assets and success in life tended to exhibit more favorable outcome. In particular, those adolescents with higher

Table 5

Partial Correlation Between Dependent and Independent Variables

Independent Variable	N	Drug Q 1	Alch. Q 2	School Q 3	Status Q 4	Family Q 5	Legal Q 6	Parent Q 7
Age	94	-.01	.17	-.17	-.14	.09	.03	.01
Sex 1 = Male 2 = Female	94	-.20*	-.21*	-.29**	-.28*	-.12	-.23*	-.22*
Formal Education - Father	93	-.07	-.05	-.05	-.09	-.02	-.11	-.09
Formal Education - Mother	93	.05	.06	.10	.00	.10	-.02	-.01
Verbal IQ	44	.12	.20	.16	.13	.14	.31*	.03
Performance IQ	43	-.29	-.05	-.17	-.17	-.03	.03	-.12
Full Scale IQ	46	-.13	.06	.05	-.05	.09	.11	-.06
Neurological Index	92	-.27**	-.16	.00	-.02	-.07	-.31**	-.13
Legal Difficulty	72	-.21*	-.09	-.24*	.08	-.12	-.32**	-.21*
Minnesota Multiphasic Personality Inventory	21							
LM - Lie		.18	.06	.20	.14	.23	.29	.07
FM - Validity		-.30	-.34	-.03	-.58	-.29	-.17	.06
KM - Correction		-.03	-.01	-.20	.27	.14	-.03	-.15
HS - Hypochondriasis		-.31	-.02	-.17	-.07	-.19	-.33	.02
DN - Depression		-.48*	-.07	-.14	-.37	-.22	-.25	.00
HY - Hysteria		-.43*	-.11	-.29	-.14	-.13	-.39*	-.13
PD - Psychopathic Deviate		-.16	-.27	-.18	.01	-.27	.00	-.12
MF - Masculinity - Femininity		-.22	-.50*	.03	-.27	-.13	-.27	.35
PA - Paranoia		-.38	-.46*	.03	-.44*	-.36	-.24	.19
PT - Psychasthenia		-.13	.15	-.05	-.19	-.39*	-.27	.10
SC - Schizophrenia		-.16	.03	.09	-.31	-.46*	-.37	.19
MA - Hypomania		.26	.06	.29	.06	.10	-.04	.17
SI - Social Introversion		-.61**	-.65**	-.32	-.35	-.40*	-.50*	.20

Table 5 - Continues

Table 5 - Continued

Partial Correlation Between Dependent and Independent Variables

Independent Variable	N	Drug Q 1	Alch. Q 2	School Q 3	Status Q 4	Family Q 5	Legal Q 6	Parent Q 7
Millon Adolescent Personality Inventory	57							
INT - Introversive		-.03	-.09	-.12	-.08	-.03	-.01	-.08
INH - Inhibited		-.09	.07	-.08	-.04	-.11	.15	.02
COOP - Cooperative		-.18	-.09	-.32*	-.15	.10	-.01	-.12
SOC - Sociable		-.01	-.13	.16	-.03	-.02	-.11	-.05
CONT - Confident		.10	-.05	.24	.20	.16	-.09	-.03
FORCE - Forceful		.15	.07	.36*	.15	-.09	.02	.11
RES - Respectful		-.19	-.21	-.11	.09	.13	.00	-.10
SEN - Sensitive		.02	.17	.06	.01	-.09	.06	-.03
SCN - Self-concept		-.06	.06	-.12	-.02	-.13	.18	.09
PE - Personal esteem		-.04	.07	.01	-.08	-.19	-.04	.02
BC - Body comfort		-.08	.05	-.11	-.24	-.23 *	-.06	-.05
SA - Sexual acceptance		-.08	.02	-.02	-.06	-.11	-.04	-.01
PS - Peer security		-.04	.01	.03	.02	-.04	.17	.10
ST - Social Tolerance		.01	-.08	.22	.04	-.21	-.02	-.02
FR - Family rapport		.09	.11	.08	.09	-.16	.04	.08
AC - Academic confidence		.01	.03	-.11	.10	-.18	.14	.11
IC - Impulse control		.15	.22*	.14	.02	-.12	.09	.12
SCM - Social conformity		.18	.13	.15	.09	-.09	.12	.17
SCH - Scholastic achievement		.12	.22	-.05	-.02	-.11	.18	.06
ATT - Attendance consistency		-.06	.10	.06	.09	-.13	-.02	-.05

*p < .05
**p < .01

academic relevant intelligence (Verbal IQ), a history of fewer neurological risk factors, and more favorable emotional health tended to do better.

Neurological risk factors apparently have not previously been employed in prognostic research with alcohol and drug abusers. Nevertheless, the present results are consistent with decades of literature which show that brain-disordered persons tend not only to be less successful in life, but employ less than optimal judgment and have difficulty with impulse control.

The significant correlations with the MMPI were obtained more with the scales that assess subjective distress or neuroticism than with those which tap character disorder. Neither the Psychopathic Deviate Scale nor the Hypomania Scale yielded significant correlations. This appears to be consistent with a prognostic study involving adult opiate addicts which specifically reported depression to be associated with negative outcome (Rounsaville et al., 1982).

The fact that the Psychopathic Deviate Scale did not predict outcome, in spite of the fact that it clearly had the highest MMPI mean score, deserves comment. A mean of 73.95 and standard deviation of 13.73 indicates that about five-sixths of the subjects were above a T-score of 60, which is a standard deviation above the mean and an often-given line of demarcation for abnormality. There may be so much acting out or antisocial propensity in an overwhelming number of these adolescents that this dimension does not have much predictive power. Certainly the fact that these adolescents were in an inpatient treatment program indicates that their behavior was out of control.

The dearth of significant correlations between the dependent variables and the MAPI was disappointing. One explanation might be that the subjects were rebellious and low-frustration-tolerant adolescents who did not complete the MAPI with care. However, the MMPI, which takes much longer to complete, did produce a number of significant correlations. The fact that the MMPI produced higher correlations is not so immediately apparent from the number of significant correlations, both because the MMPI had a smaller sample size and because it has fewer scales. Furthermore, the mean MMPI profile in the present study was not what would be expected if a substantial percentage of respondents were not producing valid profiles. Although the MAPI is buttressed by a great deal of development and generally good psychometric properties, its large number of scales with a relatively small number of items perhaps imposes psychometric limitations. Regardless of the reasons, the MAPI was not able to predict outcome in the present research.

The findings with respect to gender and previous legal involvement seem comprehensible, in addition to being congruent with previous literature. Since females are less likely to abuse drugs and alcohol, and generally less likely to act out, it could be reasoned that they have a higher threshold for these behaviors. With regard to the prediction afforded by previous legal status, a long-recognized principle of psychology is that past behavior predicts future behavior. This may be especially the case with respect to recidivism and acting out in general.

Association of lower Performance IQ with better prognosis was not predicted. In fact, inverse correlations between abilities and various indices of success in life are the exception rather than the rule. However, delinquents, or at least Caucasian delinquents, tend to have a higher performance IQ. Perhaps it could be argued that any characteristic that can conceivably be regarded as typically delinquent might have the potential to predict unfavorable prognosis in delinquents. And, in the present study, higher Performance IQ was most predictive of legal difficulty. Further, higher Performance IQ is a male characteristic just as higher Verbal IQ is regarded as a female characteristic

that is associated more with sedentary and scholastic pursuits than with physical-action-oriented pursuits. It should be borne in mind that gender was the variable most consistently predictive of success in the various criteria employed.

Although length of hospitalization was not chosen as an independent variable in the study, the fact that the correlations between this variable and the independent variables do not approach significance and are generally of zero order is worthy of mention. This is consistent with the review of the literature for adult alcoholics by Miller and Hester (1986), who concluded that length of hospitalization was not related to outcome. However, it is at variance with the literature which shows that more positive outcome is associated with length of treatment for adult drug abusers. Perhaps the different findings could be explained in terms of treatment length relating to motivation in adults, but to parental motivation and resources in adolescents. In the present study, it is not known whether the changes over time were a function of intervention, or the natural history of substance abuse, or both. Regardless of the reasons for change, length of hospital stay was not found to be associated with these changes.

The ultimate worth of follow-up findings is the potential for impact upon intervention. The present findings suggest that male, higher neurological risk, and more emotionally disturbed adolescents may profit from augmentation or modification of programs such as the one under consideration. Most adolescent and adult substance abuse treatment regimens focus heavily upon the elimination of undesirable behavior and reduction of associated characterological traits, often with emphasis on group modalities. However, it is possible that a not inconsequential proportion of adolescents in such programs require more individual attention tailored to their subjective distress.

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