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## SOCIAL LEARNING AND DEVIANT BEHAVIOR: A SPECIFIC TEST OF A GENERAL THEORY\*

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A social learning theory of deviant behavior is tested with survey data on adolescent drinking and drug behavior. The theory is strongly supported. The major explanatory variables from that theory, *differential association*, *differential reinforcement*, *definitions*, and *imitation* combine to account for 68% of the variance in marijuana use (39% of abuse) and 55% of the variance in alcohol use (32% of abuse) by adolescents. The study demonstrates that central learning concepts are amenable to questionnaire measurement, and the findings indicate that social learning theory will do well when tested with other forms of deviant behavior.

### INTRODUCTION

In the last decade we have seen a dramatic shift away from sociological explanations of deviant behavior toward developing theoretical perspectives on societal reactions to and definitions of deviance and crime. Labelling and conflict formulations have become major foci of sociological theorizing as well as the sounding boards for most of the controversy and discourse in the field of deviance. This shift in focus was deemed necessary to redress the previous imbalance of attention to the deviant behavior itself (Akers, 1968), and it clearly has had that effect. Unfortunately, it also has led to the neglect of theoretical developments in the etiology of deviant behavior. Neither labelling nor conflict perspectives has offered a general explanation of de-

viant behavior, although some conflict theorists have offered preliminary but incomplete efforts in that direction (Taylor, et al., 1973; Spitzer, 1975). There have been other efforts directed toward explaining deviant behavior, but these have been fairly narrow in scope; they have usually been limited either to a specific type of deviant behavior or to a restricted range of substantive variables. For example, a good deal of attention has been paid to the modern resurrection of deterrence theory (Gibbs, 1975; 1977; Waldo and Chiricos, 1972; Tittle, 1975; Silberman, 1976; Erickson et al., 1977; Meier and Johnson, 1977; Geerken and Gove, 1977). The scope of deterrence theory has been changed little, however, since its statement by the classical criminologists two centuries ago and is limited to the actual or perceived certainty, severity, and celerity of formally administered legal sanctions for violations of the criminal law. Another example is Travis Hirschi's (1969) control (social bonding) theory which is a more general explanation of deviance than deterrence theory, but which is, in turn, primarily restricted to informal social control which comes from individuals being bonded to groups and institutions.

The most notable exception to the diminished attention to general explanations of deviant behavior is a form of social learning theory developed first by Robert

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L. Burgess and Ronald L. Akers as differential association-reinforcement theory (Burgess and Akers, 1966; Akers et al., 1968) and elaborated on later by Akers (1973; 1977). As the name which Burgess and Akers originally chose to apply to this theoretical perspective makes clear, it was constructed as a revision of Edwin H. Sutherland's differential association theory (Sutherland, 1947; Sutherland and Cressey, 1974) in terms of general behavioral reinforcement theory (Skinner, 1953; 1959; Bandura and Walters, 1963; Bandura, 1969; 1977; Staats, 1975).<sup>1</sup> Social learning theory as a general perspective in deviance is part of a larger move toward incorporation of modern behaviorism into sociological theory (Homans, 1961; Burgess and Bushell, 1969; Kunkel, 1975; Hamblin et al., 1971; Emerson, 1969; 1972; Kunkel and Nagasawa, 1973; Burgess and Nielsen, 1974; Chadwick-Jones, 1976; for reviews of the relevance of behavioral theory for sociology see Friedrichs, 1974; Tarter, 1973). As such it is a theoretical perspective which is compatible with the more specific forays into the explanation of deviant behavior. Indeed, the major features of such theories as deterrence and control theories (Hirschi, 1969) can be subsumed under the principles of social learning theory (Akers, 1977; Conger, 1976; 1977; Feldman, 1977). However, all too often the relevance for social learning theory of some of the deviance research has been ignored or unrecognized even when the authors employ central learning concepts such as reinforcement (Harris, 1975; 1977; Eaton, 1974; Meier and Johnson, 1977; Hirschi and Hindelang, 1977). This inattention is regrettable for, while other theories delineate the structural variables (class, race, anomic conditions, breakdown in social control, etc.) that yield differential

rates of deviance, social learning stresses the behavioral mechanisms by which these variables produce the behavior comprising the rates. As such, social learning is complementary to other sociological theories and could be used to integrate extant formulations to achieve more comprehensive explanations of deviance (in this regard see Akers, 1977:63-8).

The basic learning principles on which this theory is based have received empirical support under laboratory and applied experimental conditions (see Skinner, 1953; Honig, 1966; Ullmann and Krasner, 1969; Bandura, 1969; 1977; McLaughlin, 1971; Staats, 1975). Also, prior research has been supportive of differential association theory (J. Ball, 1957; Short, 1957; Voss, 1964; R. Ball, 1968; Krohn, 1974; Jensen, 1972; Burkett and Jensen, 1975). However, there has been little direct research on learning principles as applied to deviant behavior in natural settings. Akers (1977) has organized a large body of existing research and theory on a wide range of deviant behavior supportive of or consistent with social learning, but his effort is a post hoc application of theoretical principles for he does not present research designed explicitly to test propositions from the theory (in this regard see also Feldman, 1977). The results of other studies are consistent with Akers's social learning approach (Jessor and Jessor, 1975; Thomas et al., 1975), and a couple of studies explicitly testing social learning using secondary data analysis have found support for it (Anderson, 1973; Conger, 1976). However, more crucial and conclusive tests await collecting the relevant primary data in the community. The present study does that. Our purpose here is to report a specific test of social learning theory using standard sociological techniques of data collection and data analysis.

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<sup>1</sup> The label *social learning* has been applied to other theories based on reinforcement principles but the Burgess and Akers formulation is the first and only one which ties general learning theory to a long-standing sociological theory and is directed towards specific forms of deviant behavior (crime, delinquency, drug addiction, suicide, etc.). It is to this theory that social learning usually refers when used here. It will be clear from the context when this is not the case.

#### STATEMENT OF SOCIAL LEARNING THEORY

The social learning theory tested here is summarized from Akers (1977:39-68). The primary learning mechanism in social behavior is operant (instrumental) conditioning in which behavior is shaped

by the stimuli which follow, or are consequences of the behavior. Social behavior is acquired both through direct conditioning and through *imitation* or modelling of others' behavior. Behavior is strengthened through reward (positive reinforcement) and avoidance of punishment (negative reinforcement) or weakened by aversive stimuli (positive punishment) and loss of reward (negative punishment). Whether deviant or conforming behavior is acquired and persists depends on past and present rewards or punishments for the behavior and the rewards and punishments attached to alternative behavior—*differential reinforcement*. In addition, people learn in interaction with significant groups in their lives *evaluative definitions* (norms, attitudes, orientations) of the behavior as good or bad. These definitions are themselves verbal and cognitive behavior which can be directly reinforced and also act as cue (discriminative) stimuli for other behavior. The more individuals define the behavior as good (positive definition) or at least justified (neutralizing definition) rather than as undesirable (negative definition), the more likely they are to engage in it.

The reinforcers can be nonsocial (as in the direct physiological effects of drugs) as well as social, but the theory posits that the principal behavioral effects come from interaction in or under the influence of those *groups which control individuals' major sources of reinforcement and punishment and expose them to behavioral models and normative definitions*. The most important of these groups with which one is in *differential association* are the *peer-friendship* groups and the *family* but they also include schools, churches, and other groups. Behavior (whether deviant or conforming) results from greater reinforcement, on balance, over punishing contingencies for the same behavior and the reinforcing-punishing contingencies on alternative behavior. The definitions are conducive to deviant behavior when, on balance, the positive and neutralizing definitions of the behavior offset negative definitions of it. Therefore, deviant behavior can be expected to the extent that it has been differ-

entially reinforced over alternative behavior (conforming or other deviant behavior) and is defined as desirable or justified. Progression into more frequent or sustained use and into abuse is also determined by the extent to which a given pattern is sustained by the combination of the reinforcing effects of the substance with social reinforcement, exposure to models, definitions through association with using peers, and by the degree to which it is not deterred through bad effects of the substance and/or the negative sanctions from peers, parents, and the law.

The social learning theory proposes a process which orders and specifies the interrelationships among these variables. Differential association, which refers to interaction and identity with different groups, occurs first. These groups provide the social environments in which exposure to definitions, imitation of models, and social reinforcement for use of or abstinence from any particular substance take place. The definitions are learned through imitation, and social reinforcement of them by members of the groups with whom one is associated, and once learned, these definitions serve as discriminative stimuli for use or abstinence. The definitions in interaction with imitation of using or abstinent models and the anticipated balance of reinforcement produces the initial use or continued abstinence. After the initial use, imitation becomes less important while the effects of definitions should continue (themselves affected by the experience of use). It is at this point in the process that the actual consequences (social and nonsocial reinforcers and punishers) of the specific behavior come into play to determine the probability that use will be continued and at what level. These consequences include the actual effects of the substance at first and subsequent use (the perception of which may, of course, be modified by what effects the person has previously learned to expect) and the actual reactions of others present at the time or who find out about it later, as well as the anticipated reactions of others not present or knowing about the use.

From this depiction of them as aspects

of the same learning process, we expect the independent variables to be positively interrelated, and we examine the zero-order relationships among them. Nonetheless, the major variables are conceptually distinct and our measures are empirically distinct enough that we do not expect their interrelationships to preclude separate independent effects. Thus, we also empirically order the independent variables in terms of how much variance is explained in the dependent variables. We test the general hypothesis from the theory that adolescent marijuana and alcohol use and abuse are related to each of the major sets of variables and to all of them combined.

Specifically, we expect that for both alcohol and drugs, the probability of abstinence decreases and the frequency of use increases when there is greater exposure to using rather than to abstinent models, when there is more association with using than with abstinent peers and adults, when use is differentially reinforced (more rewards, fewer punishers) over abstinence, and when there are more positive or neutralizing than negative definitions of use. Similarly, among users the probability of abuse increases with more exposure to abusing rather than moderate or abstinent models, more association with high frequency users or abusers, greater differential reinforcement for abuse over more moderate use, and with more positive and neutralizing rather than negative definitions of use.

#### RESEARCH ON ADOLESCENT DRUG AND ALCOHOL BEHAVIOR

Adolescent drug and drinking behavior is a particularly strategic area for the current effort for two reasons. First, the area is characterized by the narrow scope of current theories of deviant behavior outlined above. The research has been largely restricted to the prevalence and sociodemographic and social-psychological correlates of teenage drinking and drug use (Abelson et al., 1973; Johnston, 1973; Block et al., 1974; National Commission on Marijuana and Drug Abuse, 1972; Drug Abuse Council, 1975; Rachal et al., 1975; O'Donnell et al.,

1976). Little has been done to develop and test explanations of the behavior drawn from general theories. (For a full and comprehensive review of the theory and research literature on adolescent drinking and drug use, see Radosevich et al., forthcoming.) One notable exception to this is the work of the Jessors (Jessor et al., 1968; 1970; 1973; Jessor and Jessor, 1975; 1977; Jessor, 1976) who have built a social-psychological theory of "problem behavior" (deviance) which incorporates part of Rotter's (1954) learning theory (locus of control) and other personality and social variables. Their theory, which is also a version of social learning, consists of three categories of variables—personality, social, and behavioral. Their findings tend to support parts (primarily the social component) of the theory. The Jessors' findings point to the second reason why adolescent drug use and drinking promises to be a fruitful area in which to examine social learning theory; that is, the research on social psychological correlates of drug use and drinking lends support to the relevance of many of the variables in the social learning theory tested here. For instance, research consistently finds that those holding tolerant or positive attitudes toward a substance are much more likely to use it than those holding negative attitudes toward it (Fejer and Smart, 1973; Johnston, 1973; Jessor et al., 1973; Calhoun, 1974; Kendall, 1976). Also, peer and parental influence have been found to be important variables in teenage drug and drinking behavior. Users are more likely than abstainers to associate with peers who are also users and this relationship remains whether friends' use is measured by or independently of the individual's perception of friends' use. (For a review of this research on parental and peer influences see Akers, 1977; recent studies to see are Pearce and Garrett, 1970; Kandel, 1973; 1974; Jessor et al., 1972; O'Donnell et al., 1976; Tec, 1974a; 1974b; Krohn, 1974; Wechsler and Thum, 1973; Kendall, 1976; Lawrence and Velleman, 1974.) Further, the research findings seem to be consistent with the causal ordering of these variables proposed by social learning: the youngster associates with peers who are users, learns defini-

tions favorable to use of the substance, and then uses (Jessor et al., 1973; Krohn, 1974).

#### METHODOLOGY

##### *Sample and Procedure*

Data were collected by administering a self-report questionnaire to 3,065 male and female adolescents attending grades 7 through 12 in seven communities in three midwestern states. A two-stage sample design was followed. First, we selected schools from within each participating school district which were representative in terms of school size and location within the district. In smaller districts this meant selecting all or most of the junior and senior high schools in the district. Secondly, we sampled two to three classrooms (depending on school and average class size) per grade level from among the required or general enrollment classes. Thus, although classrooms were sampled, each student has an approximately equal chance of being included in the sample.<sup>2</sup> The questionnaire (which

was pretested in a district not included in the final sample) was administered to all students in attendance in the selected classes on the day of the survey who had obtained written parental permission. The attrition from this parental permission procedure combined with absenteeism on the day of the survey was not great and 67% of the total number of students enrolled (95% of those with parental permission) in the sampled classes completed the questionnaire.<sup>3</sup>

A small subsample, purposively sampled from among respondents who volunteered in five of the seven districts (n=106, approximately 5% of the sample in these districts), was interviewed two to eight weeks after the administration of the questionnaire. The follow-up interview was intended to serve as a reliability and partial validity check on the questionnaire responses and to provide additional descriptive information. The interviews were conducted individually in private rooms at school during school hours.

##### *Reliability and Validity*

Prior research has consistently shown that the self-report questionnaire technique is reliable and valid in measuring adolescent delinquent, drug, and drinking behavior (Hardt and Peterson-Hardt, 1977; Groves, 1974; Block et al., 1974; Single et al., 1975; Whitehead and Smart, 1972). Our own checks in the present research confirm this. Internal consistency on interlocking questions was high

<sup>2</sup> Our primary aim was to test an explanation of drug and drinking behavior and we had no plans to generalize about the prevalence or sociodemographic variations to a wider national or regional population. Therefore, there was no attempt to get a probability sample or to insure that the total sample was regionally or nationally representative. We did plan to report findings to the participating school districts and to generalize findings within each district. Also, we wanted to follow a design which would require the involvement of as few schools and school personnel as possible, which would minimize adjustments needed in the school routine, and which would facilitate administration of the questionnaire to groups of respondents. The sampling of a limited number of classrooms from within each selected school best served these purposes. We believe that being alert to the problem of minimizing interference of the survey into the school routine and proposing the sampling procedure which we followed was a significant element in gaining the approval and cooperation of the school officials. The resultant sample was sufficiently representative within each district that we could make reasonable generalizations about the drug and drinking problem in the district. Whether two or three classes per grade level were sampled from each school depended on the size of the classes. We tried to include enough classes to secure responses from at least 10% of the total school enrollment or a minimum of 100 respondents per school, whichever was greater, to help protect the confidentiality of respondents in the smaller schools.

<sup>3</sup> Overall, 74% of the parental permission forms distributed were returned (the lowest percentage of return in a district was 62% and the highest return rate was 93%). The forms were first distributed by the researchers in the classrooms one week before the survey; then, one more visit was made to the classrooms to remind students to return the forms. For some classes, telephone calls were made to the parents of those students who had not returned the form. Without this call-back procedure, buttressed by telephone calls, the return rate would have been smaller. For the sample as a whole, 95% of those returning forms were granted parental permission to take part in the survey (we asked that the forms be returned whether permission was granted or denied). Ninety-five percent of those attended class and completed the questionnaire on the day of the survey.

(Gammas=.91 and higher). In addition, a comparison of the responses to the frequency and quantity of use questions on the questionnaire with responses to the same items given at the time of the interview demonstrated a high degree of reliability (Gammas=.89 and higher). Without exception the interview respondents reported that they believed the researchers' assurances of confidentiality and that no one but the researchers would have access to identifiable answers; thus, all said that they felt secure in responding and answered questions both on the questionnaire and in the interview honestly.<sup>4</sup>

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<sup>4</sup> Careful steps were taken to protect the rights of both questionnaire and interview respondents and of the school districts. The usual university procedures were followed regarding approval of the project's procedures for protection of the rights of research participants. At the time of the first visit to the classrooms, the students were informed of the survey and each one present was given an envelope containing a letter explaining the purpose and content of the study to the parents and the parental consent form mentioned in fn. 3. The students were told that participation in the study was completely voluntary. It was made clear that no student had to participate as a condition for class credit or any other school requirement and that approval of the study by the district and school officials in no way made participation mandatory. All of the responses were and are held in strictest confidence. In five of the districts, respondents who were willing to be interviewed later were asked to indicate that willingness and to sign their questionnaires. Also, it was possible for anyone to place his or her name on the questionnaire even if not volunteering for an interview (and many did just that). To protect the confidentiality of those volunteering for an interview, all respondents, whether signing the name sheet or not, separated it from the rest of the questionnaire and deposited it in a separate box from the one in which the completed questionnaires were deposited. Only the research staff had and has access to the name lists which, when not in a locked drawer, were kept in a bank safety deposit box. All other respondents in these districts and all respondents in the other two districts where no interviews were conducted were anonymous. At the interview each respondent was again informed of the confidentiality of the information given. Upon completion of the interview, each respondent was paid the previously stipulated amount of \$2.50 and signed a sheet acknowledging the voluntary nature of the interview and receipt of the payment. The list of interviewee's names was treated in the same way as the name sheets mentioned above. We also protected the identification of the school districts participating in the study. No community, school district, or school has been or will be identified by name in reports or disseminated findings.

### *Measurement of Variables*

*Dependent variables.* Abstinence-use of alcohol and marijuana is measured by a six-point frequency-of-use scale ranging from nearly every day to never. A quantity frequency (Q-F) scale was also computed but since there is a near perfect correlation between the Q-F scale and the frequency-of-use scale, the analysis here includes only the latter measure.<sup>5</sup>

Abuse among users is measured by combining responses to the frequency questions with responses to a question asking the respondents to check whether or not they had experienced on more than one occasion any of a list of problems while or soon after using alcohol or marijuana.<sup>6</sup> This combination produced a four-point abuse scale ranging from heavy abuse to no abuse.

*Independent variables.* From the summary of social learning theory presented above it can be seen that the main concepts to be measured are *imitation, differential association, definitions, and differential reinforcement*. For the present analysis, we distinguish between differential reinforcement comprised of social reinforcement combined with non-social reinforcement (experienced or anticipated drug or alcohol effects) and that comprised only of social reinforcement. Each of the resulting five concepts are operationalized by a set of items measuring different aspects of each concept. (The Appendix provides a brief description of the way the five concepts are measured.)

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<sup>5</sup> Alcohol use was measured by responses to separate questions on beer, wine, and liquor. The highest percentage of use and most frequent use was reported for beer, and since there is a very high correlation between use of the three forms of alcohol, use of alcohol in this analysis is measured only by reported frequency of use of beer.

<sup>6</sup> The problems included "had an accident," "couldn't remember later what I had done," "used more than I had planned." This is a fairly standard use of "problems associated with" as a nonclinical measure of abuse of some substance. It should not be confused with our measures of positive and negative consequences of use for the differential reinforcement variables. The questions used to measure abuse were asked separately from and never combined with the questions used to measure differential reinforcement.

These five clusters of variables (a total of 15 variables in the abstinence-use analysis and 16 variables in the abuse analysis) constitute the independent variables in this analysis.<sup>7</sup>

*Method of analysis.* Although most of the measures yield ordinal-level data, we will use multiple regression techniques. It has been demonstrated that regression can be confidently employed with ordinal data without introducing bias in the results (Labovitz, 1970; 1971; Kim, 1975). The use of regression techniques provides an overall summary of the explanatory power of the model while also allowing us to examine the unique effects of the five subsets of variables and of each separate variable.

#### PRESENTATION OF FINDINGS

##### *Explaining Abstinence-Frequency of Use*

The zero-order correlation matrices for the alcohol and marijuana use variables are presented in Tables 1 and 2.<sup>8</sup> As expected, most of the independent variables

are related in a positive direction with variability in the strength of the relationships. Of particular interest are the relatively weak relationships of the deterrence items to the other variables, especially within the matrix on alcohol behavior. Also, note the strength of the relationships of both alcohol and marijuana use to those variables of associations with and attitudes of peers, to reinforcement balance, and to reward-costs of use, and note the interrelationships among these variables. These zero-order relationships anticipate our findings in the multivariate analysis to which we now turn.

The results of the regression analyses show strong support for the social learning theory of adolescent alcohol and drug behavior.<sup>9</sup> When all the independent variables are incorporated into the full regression equation, the model explains 55% of the variance in drinking behavior (abstinence-frequency of use; Table 3) and 68% of the variance in marijuana behavior (abstinence-frequency of use; Table 4).<sup>10</sup>

The power of the full model including the five subsets of variables, therefore, is demonstrated. But, we are also interested in determining the relative predictive values of the subsets and single variables to see if each part of the theory is supported. We do this in two ways. First, we regress the dependent variables on all variables and each subset of variables in separate regression equations. This provides a partial regression coefficient for each variable in each equation and estimates of the total amount of variance explained by each subset (Tables 3 and 4). Second, we compute the proportion of variance which the remaining subsets ex-

<sup>7</sup> The concepts are clearly not equal in the scope of concrete empirical phenomena to which each refers. Differential association with family, peer, and other groups exposes the adolescent to using and nonusing models and normative definitions of use. It is in interaction in these groups in which the reactions of others differentially reinforce substance use or abstinent behavior. It is in this sense, then, that the differential association could include empirical referents of each of the other concepts and a general measure of differential association (in addition to being a measure of with whom one interacts), could serve as a general, albeit indirect, index of the combined effects of social reinforcement, imitation, and exposure to normative definitions. But such an index could not distinguish among the specific mechanisms of taking on definitions, imitating, and reinforcing of behavior which occur within the groups with which one is differentially associated. The combined social/nonsocial reinforcement subset obviously includes a wider array of concrete reinforcers than the subset of only social reinforcers. But, while reinforcement is the most abstract concept, the concrete set of events to which our measures here refer makes neither the social/nonsocial reinforcement, nor the social reinforcement subset broader than the definitions subset. Since it refers specifically to observing the behavior of someone else without reference to attitudes toward or consequences of the behavior, the imitation subset represents the most limited range of phenomena.

<sup>8</sup> The zero-order matrices for the abuse variables not presented here are similar to those for use.

<sup>9</sup> The total N in the tables varies because of attrition due to listwise deletion of missing values. The respondents who were eliminated were not significantly different from those included on sociodemographic characteristics and on the dependent variable. We also computed the regression analysis employing pairwise deletion and obtained similar results.

<sup>10</sup> This general level of explained variance and the relationships of the separate independent variables to the dependent variables held when we controlled for such variables as SES and sex (which were not related to the dependent variables) and when we controlled for such variables as grade in school and type of school district (which were related to the dependent variables).



Table 1. Zero-Order Correlation Matrix for Variables Included in Alcohol Use Analysis (N = 2,414)\*

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Imitation	1.00															
2. Techniques of Neutralization	.05	1.00														
3. Law abiding/violating definitions	.11	.40	1.00													
4. Positive/negative definitions	.19	.39	.39	1.00												
5. Adult norm qualities	.18	.08	.14	.35	1.00											
6. Peer norm qualities	.17	.32	.33	.58	.29	1.00										
7. Differential peer association	.22	.32	.44	.49	.18	.48	1.00									
8. Praise for not using	.09	.19	.22	.24	.16	.24	.29	1.00								
9. Friends' reaction	.16	.32	.32	.41	.17	.45	.46	.26	1.00							
10. Parents' reaction	.14	.11	.11	.29	.33	.19	.27	.24	.26	1.00						
11. Informal deterrence	.03	.19	.18	.19	-.01	.16	.17	.12	.18	.02	1.00					
12. Formal deterrence	.02	.07	.12	.09	.01	.08	.06	.10	.12	-.005	.43	1.00				
13. Interference with activities	.05	.20	.24	.24	.07	.19	.23	.14	.18	.10	.19	.14	1.00			
14. Rewards—costs of use	.14	.30	.31	.48	.18	.36	.42	.23	.41	.28	.21	.11	.23	1.00		
15. Reinforcement balance	.15	.36	.39	.47	.18	.37	.46	.21	.38	.23	.20	.09	.27	.44	1.00	
16. Alcohol use	.16	.34	.47	.52	.20	.40	.68	.28	.40	.29	.13	.04	.21	.44	.46	1.00

\* In this and in all subsequent tables independent variables have been coded such that positive coefficients indicate the theoretically expected direction.

plain when each subset in turn is eliminated from the equation. By subtracting each of these values from the proportion of variance explained by the full equation, we have a measure of how much explained variance is lost when a given subset of variables is eliminated. The larger the proportion of explained variance lost (or the smaller the explained variance remaining) when a subset is eliminated, the greater its relative explanatory power (Table 5). By analyzing the data in this fashion, we also circumvent potential problems of multicollinearity among the variables within each subset since our primary concern is with the relative explanatory power of the different subsets of variables and not with the relative power of individual variables within subsets.

With the exception of imitation, each

subset explains a substantial proportion of variance in both alcohol and marijuana use. The findings presented in Table 5 show that even when the most predictive subset of variables is eliminated the remaining variables are still able to explain 43% and 56% of the variance in alcohol and marijuana behavior, respectively. The fact that four of the five subsets of variables taken from social learning theory *each* explains a substantial proportion of the variance (and that the fifth is significantly related to the dependent variables in the expected direction) demonstrates that the theory as a whole is supported; its power is not dependent on any single component.

However, the analyses also plainly show that some subsets of variables specified by the theory are more impor-

Table 2. Zero-Order Correlation Matrix for Variables Included in Marijuana Use Analysis (N = 2,395)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Imitation	1.00															
2. Techniques of neutralization	.23	1.00														
3. Law abiding/violating definitions	.26	.23	1.00													
4. Positive/negative	.39	.45	.53	1.00												
5. Adult norm qualities	.15	.16	.19	.28	1.00											
6. Peer norm qualities	.32	.38	.38	.63	.28	1.00										
7. Differential peer association	.38	.41	.47	.71	.24	.59	1.00									
8. Praise for not using	.15	.25	.24	.32	.13	.30	.32	1.00								
9. Friends' reaction	.32	.37	.39	.55	.18	.52	.59	.29	1.00							
10. Parents' reaction	.12	.10	.13	.20	.18	.13	.18	.09	.18	1.00						
11. Informal deterrence	.18	.24	.28	.38	.08	.31	.33	.18	.32	.11	1.00					
12. Formal deterrence	.11	.18	.22	.22	.01	.17	.18	.12	.20	.10	.49	1.00				
13. Interference with activities	.19	.27	.28	.39	.13	.30	.35	.20	.28	.13	.24	.17	1.00			
14. Rewards—costs of use	.33	.40	.43	.67	.17	.51	.56	.29	.52	.16	.39	.24	.35	1.00		
15. Reinforcement balance	.31	.41	.44	.61	.19	.47	.53	.25	.46	.18	.32	.18	.38	.59	1.00	
16. Marijuana use	.38	.48	.40	.72	.24	.50	.79	.29	.50	.18	.31	.15	.36	.15	.52	1.00

tant than others. They are ranked in terms of relative effectiveness in explaining variance in alcohol and marijuana use as follows: (1) differential association, (2) definitions, (3) combined social/nonsocial differential reinforcement, (4) differential social reinforcement, and (5) imitation.<sup>11</sup> Not only does the differential association subset explain the highest proportion of variance, but the differential peer associa-

tion variable is the most important single variable. The definitions subset accounts for the second highest proportion of variance, and one's positive/negative definitions of the substances is the second most predictive single variable, while one's law-abiding/violating definitions rank third among the single variables. The differential reinforcements variables are next, followed by imitation variables which explain the least amount of variance in the dependent variables.

The fact of peer group influence on substance use comes as no surprise; it is documented by several previous studies. But, previous studies have not shown what the mechanisms are by which peer influence is exerted, and why, therefore, peer group association is so important. Our data show, as predicted by social learning theory, what these mechanisms are—friends provide social reinforcement

<sup>11</sup> It is possible that the relative explanatory power of each subset may be due in part to the different number of variables that are contained within each subset. To examine this possibility we selected the most predictive variable from each subset and entered those variables in a multiple regression equation. The result produced no change in the rank ordering of the concepts in either the alcohol or marijuana equation. This also allowed us to examine the possible effects of multicollinearity within subsets on the relative explanatory power of single variables. Again the results were similar to those obtained above, indicating small multicollinearity effects.

Table 3. Partial Regression Coefficients in Standard Form for Alcohol Use (N = 2,414)

Independent Variables	All Independent Variables	Imitation	Definitions	Differential Association	Differential Reinforcement: Social	Differential Reinforcement: Social/Nonsocial
1. Imitation	-.014	.161				
2. Techniques of neutralization	.040		.086			
3. Law abiding/violating definitions	.142		.288			
4. Positive/negative definitions	.160		.372			
5. Adult norm qualities	.002			.068		
6. Peer norm qualities	-.055			.071		
7. Differential peer association	.458			.629		
8. Praise for not using	.035				.141	
9. Friends' reaction	.008				.290	
10. Parents' reaction	.059				.168	
11. Informal deterrence	-.026				.060	
12. Formal deterrence	-.021				-.045	
13. Interference with activities	-.005				.119	.326
14. Rewards—costs of use	.067					.301
15. Reinforcement balance	.093					
R =	.738	.161	.598	.683	.483	.532
R <sup>2</sup> =	.545	.026	.357	.466	.233	.283

Table 4. Partial Regression Coefficients in Standard Form for Marijuana Use (N = 2,395)

Independent Variables	All Independent Variables	Imitation	Definitions	Differential Association	Differential Reinforcement: Social	Differential Reinforcement: Social/Nonsocial
1. Imitation	.033	.378				
2. Techniques of neutralization	.016		.070			
3. Law abiding/violating definitions	.054		.123			
4. Positive/negative definitions	.257		.619	.057		
5. Adult norm qualities	.018			.038		
6. Peer norm qualities	-.080			.751		
7. Differential peer association	.550				.118	
8. Praise for not using	.001				.366	
9. Friends' reaction	-.016				.063	
10. Parents' reaction	.006				.139	
11. Informal deterrence	.007				-.044	
12. Formal deterrence	-.035				.196	.280
13. Interference with activities	.034					.410
14. Rewards—costs of use	.016					
15. Reinforcement balance	.082					
R =	.826	.378	.728	.790	.579	.618
R <sup>2</sup> =	.683	.143	.530	.625	.335	.382

Table 5. Results from Regression Analysis Alternately Eliminating Subsets from the Full Equations for Alcohol and Marijuana Use

Subset Eliminated	Alcohol Use (N = 2,414)		Marijuana Use (N = 2,395)	
	When Subset Is Eliminated		When Subset Is Eliminated	
	R <sup>2</sup> Remaining =	Loss of Explained Variance =	R <sup>2</sup> Remaining =	Loss of Explained Variance =
Differential Association	.427	.118	.561	.122
Definitions	.510	.035	.657	.026
Imitation	.544	.001	.682	.001
Differential Reinforcement: Social	.539	.006	.681	.002
Differential Reinforcement: Social/Nonsocial	.535	.010	.679	.004
Full Equation R <sup>2</sup> =	.545		.683	

or punishment for abstinence or use, provide normative definitions of use and abstinence, and, to a lesser extent, serve as admired models to imitate. This is indicated by the fact that these other variables, on their own, explain a substantial amount of the variance in marijuana and alcohol behavior when the effect of the differential peer association variable is removed. The fact that differential interaction explains more variance in the dependent variables than do the reinforcement, definitions, and imitation variables indicates that there may be additional variables at work in interaction beyond those identified by social learning theory, that there are additional effects of the mechanisms specified by our theory which are not captured by our measures of them, or that there are effects of other learning variables which we have not included (e.g., discriminative stimuli in the interactional setting in which reinforcement takes place).

Since social learning theory includes modelling as an important part of the process, the lower levels of variance explained by our imitation measures may seem surprising. However, the relatively weak effect of the imitation subset on our frequency of use and abuse measures was not unexpected. First, imitation refers to the narrowest empirical phenomenon among our measures (see footnote 7) and while, as we have noted, multicollinearity is not a severe problem, the interrelationships specified in the theory would indicate that removing imitation has less effect because its impact is still reflected to some extent in the remaining broader measures. Second, and more important,

as indicated in the process outlined in the statement of the theory above, imitation in social learning theory is considered to have its greatest effect in the first acquisition or initial stages of behavior while the associational, reinforcement, and definitional variables are more important in the maintenance of a behavioral pattern. We expect imitation to be more important in first starting to use than we find it to be in explaining frequency of use as analyzed here (but still probably not more important than definitional and reinforcement variables). The analysis here which employs frequency of using as the dependent variable militates against finding a large effect for imitation variables. We would expect imitation to be even less important in accounting for maintenance of abusive patterns of use.

It is evident that social learning theory has been shown to be a powerful explanation of whether youngsters abstain from or are users of alcohol and marijuana. As predicted by the theory, the adolescents in our sample use drugs or alcohol to the extent that the behavior has been differentially reinforced through association in primary groups and defined as more desirable than, or at least as justified as, refraining from use. The next step in testing the validity of this perspective will be to examine how well these same variables account for levels of abuse of alcohol and drugs.

#### *Explaining Abusive Patterns of Use*

The results of the analyses of alcohol and marijuana abuse among adolescents are presented in Tables 6, 7, and 8. For these analyses, only users are included.

Table 6. Partial Regression Coefficients in Standard Form for Alcohol Abuse (N = 1,764)

Independent Variables	All Independent Variables	Imitation	Definitions	Differential Association	Differential Reinforcement: Social	Differential Reinforcement: Social/Nonsocial
1. Imitation	.046	.128				
2. Techniques of neutralization	-.005		.007			
3. Law abiding/violating definitions	.094		.220			
4. Positive/negative definitions	.077		.200			
5. Adult norm qualities	.050			.065		
6. Peer norm qualities	-.010			.040		
7. Differential peer association	.351			.474		
8. Praise for not using	.025				.115	
9. Friends' reaction	.042				.123	
10. Parents' reaction	-.130				-.195	
11. Informal deterrence	-.030				.010	
12. Formal deterrence	-.030				-.041	
13. Interference with activities	-.014				.057	
14. Rewards—costs of use	.039					.141
15. Reinforcement balance	-.036					-.047
16. Usual effects of alcohol	.144					.315
R =	.561	.128	.334	.500	.261	.366
R <sup>2</sup> =	.315	.016	.111	.250	.068	.134

Table 7. Partial Regression Coefficients in Standard Form for Marijuana Abuse (N = 948)

Independent Variables	All Independent Variables	Imitation	Definitions	Differential Association	Differential Reinforcement: Social	Differential Reinforcement: Social/Non-social
1. Imitation	.032	.098				
2. Techniques of neutralization	.036		.106			
3. Law abiding/violating definitions	.098		.182			
4. Positive/negative definitions	.090		.298	.047		
5. Adult norm qualities	.000			.030		
6. Peer norm qualities	-.061			.533		
7. Differential peer association	.384				.080	
8. Praise for not using	-.004				.198	
9. Friends' reaction	.057				-.195	
10. Parents' reaction	-.130				.024	
11. Informal deterrence	-.010				-.067	
12. Formal deterrence	-.040				.201	
13. Interference with activities	.070					.228
14. Rewards—costs of use	.064					-.022
15. Reinforcement balance	-.020					.260
16. Usual effects of marijuana	.130					
R =	.623	.098	.440	.556	.381	.393
R <sup>2</sup> =	.389	.010	.194	.310	.146	.154

Table 8. Results from Regression Analysis Alternately Eliminating Subsets from the Full Equations for Alcohol and Marijuana Abuse

Subset Eliminated	Alcohol Abuse (N = 1,764)		Marijuana Abuse (N = 948)	
	When Subset Is Eliminated		When Subset Is Eliminated	
	R <sup>2</sup> Remaining =	Loss of Explained Variance =	R <sup>2</sup> Remaining =	Loss of Explained Variance =
Differential Association	.222	.093	.296	.093
Definitions	.302	.013	.372	.017
Imitation	.313	.002	.388	.001
Differential Reinforcement: Social	.292	.023	.364	.025
Differential Reinforcement: Social/Nonsocial	.297	.018	.371	.018
Full Equation R <sup>2</sup> =	.315		.389	

The results parallel those of the analyses of abstinence-frequency of use reported above. Both marijuana and alcohol abuse are strongly related to the social learning variables. The proportion of variance explained in use-abuse is well below the explained variance in abstinence-frequency of use but it is still substantial—32% and 39% of the variance in alcohol and marijuana abuse, respectively. The differential association subset again explains the greatest proportion of variance (Tables 6 and 7), but, even without the differential association variables, the other variables in the model do well in accounting for the variance (22% and 30%; Table 8).

The variables are not ordered in terms of relative effectiveness in predicting abuse in the same way they were ranked in explaining abstinence-use. In the analysis of abstinence-use, definitions were the second most effective subset, whereas this subset ranks fourth in accounting for use-abuse while the differential reinforcement variables are ranked higher. In substance abuse the user comes more and more to respond to direct reinforcement, especially from the drug effects themselves; definitions would be expected to play a less significant role. This is shown fairly clearly when we examine the effect of adding an alcohol and marijuana effects variable which was not included in the previous analysis of abstinence-frequency of use. This variable was measured by asking using respondents to report the effects which they usually obtained from smoking marijuana or

drinking alcohol.<sup>12</sup> This variable has the largest beta weight among the single variables making up the social/nonsocial differential reinforcement subset and ranks second for marijuana abuse and third for alcohol abuse among the entire set of single variables.

The variable of parental reaction appears to be related to abuse in the direction opposite to that found in the analysis of use. For the latter a lower probability of use is found for those reporting the strongest or harshest parental punishment while for the former a lower probability of abuse is found for those reporting lesser punishment or no parental response. A cross-tabular examination of these relationships reveals a curvilinear relationship between parental reaction and both adolescents' use and abuse of alcohol and marijuana. That is, higher frequency of use and abuse is found with parental response (actual or anticipated) at both the most lenient (encourage or do nothing) and the harshest end of the scale (take some drastic action such as kick the youngsters out of the house or turn them over to the police). The highest probability of abstinence and the lowest levels of use and abuse are found among adolescents who report that their parents have responded or would respond to their use with a moderate negative reaction such as

<sup>12</sup> Since abstainers could only report anticipated effects, the question of actual physical effects usually obtained from using the substances could not be included in the analyses of abstinence-frequency of use. Only among users are we able to differentiate between social and nonsocial reinforcement.



a scolding. Our post hoc interpretation of these relationships is that anticipated parental punishment is a deterrent to use and sustains abstinence. Even after use has begun a reasonable amount of parental punishment holds down the chances of increasing frequency of use or moving into abuse. However, once adolescents have gotten into heavy use or abuse, parental reaction has lost its effect and the increasing abuse of the substances by their children may produce ever harsher reactions by parents in increasingly desperate attempts to do something about it.

While not contradictory to the theory, neither the difference between the amount of variance explained in abstinence-frequency of use and that explained in use-abuse for both alcohol and marijuana behavior nor the difference between the amount of variance explained in alcohol behavior and the amount explained in marijuana behavior was specifically anticipated. The lower level of explained variance in substance abuse than in substance use may be due simply to the fact that the variance in the abuse variables is restricted, thereby producing attenuation in the total variance explained. The differences in the explained variances in alcohol and marijuana behavior may be an artifact of our measurements, may indicate that the stimuli surrounding alcohol behavior are more uniform than those surrounding marijuana behavior, or may point to some real difference in the ability of the theory to account for the two kinds of substance use.

#### SUMMARY AND CONCLUSIONS

In the past decade sociological attention in the study of deviance has shifted to explanations of the control system and away from the equally important task of proposing and testing general explanations of deviant behavior. We have presented a social learning perspective on deviant behavior developed during this same time period which holds promise as a general theory of the process of coming to engage in deviant acts but which had not been tested with primary data collected in the community and subjected to multivariate

analysis. We have tested it here on specific forms of adolescent deviance—drug and alcohol use and abuse.

The results of the tests support the theory. All of the dependent variables are strongly related to the social learning variables of differential association, definitions, differential reinforcement, and imitation. The most powerful of these independent variables is differential association. The other variables stand on their own, however, and explain substantial portions of variance even without the differential association measures (except for imitation which is the weakest of the variables for use and explains almost none of the variance in abuse).

The strength of empirical support for the theory suggests that the theory will have utility in explaining the use and abuse of other substances by adolescents. These findings also indicate that social learning theory will do well when tested with other forms of deviant behavior in future research. Future research could test the general theory in any number of specific contexts. We believe that our study demonstrates that the central learning concepts are amenable to meaningful questionnaire measurement and that social learning theory can be adequately tested with survey data. This is important given the lack of survey data measuring social learning concepts, and the collection and analysis of cross-sectional data presented here is a necessary step, but a first step, nonetheless. Therefore, the next steps in testing social learning theory not only should include analysis of the use and abuse of stronger and more severely disapproved substances than marijuana and alcohol (stimulants, depressants, psychedelics, and opiates), but also should include the collection of longitudinal data (Jessor and Jessor, 1977; Kandel, 1978). Longitudinal data will allow more adequate testing of the process of learning and temporal-ordering of variables in the theory.

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## APPENDIX

## LIST OF SOCIAL LEARNING VARIABLES\*

## I. Imitation

1. *Index of Imitation*

Total of all the "admired" models (parents, friends, other adults, etc.) whom the respondent reports having observed using the substance.

## II. Definitions Favorable or Unfavorable to Use

2. *Techniques of Neutralization Scale*

A scale of three items measuring Sykes and Matza's (1957) "techniques of neutralization" or definitions justifying or excusing use by "denial of injury," "denial of responsibility," or "condemning the condemners." Item to scale interrelation for the scale referring to alcohol range from .68 to .76; for marijuana the range is from .68 to .78.

3. *Scale of Law-Abiding or Law-Violating Definitions*

A scale of items measuring obedient or violating attitudes toward the law in general and alcohol and drug laws in particular. Item to scale intercorrelations range from .53 to .76.

4. *Positive or Negative Definitions of Use*

Respondents' own approval or disapproval of use.

## III. Differential Association

5. *Significant Adults' Norm Qualities*

Respondents' perception of the approving-disapproving attitudes toward use held by adults whose opinions they value.

6. *Significant Peers' Norm Qualities*

Respondents' perception of the approving-disapproving attitudes toward use held by other teenagers whose opinions they value.

\*The variable numbers in this list correspond to the variable numbers in the regression tables. For all items, questions were asked separately for alcohol and marijuana. Copies of the questionnaire and list of concepts measured by questionnaire items are available on request.

7. *Differential Peer Association Scale*  
A scale of three items measuring how many of respondents' best friends, friends with whom they associate most often, and friends whom they have known for the longest time use the substance. Item to scale intercorrelations of the alcohol scale range from .85 to .96; for marijuana the range is from .83 to .96.
- IV. *Differential Reinforcement: Social*
8. *Praise for Not Using*  
Respondents' report as to whether or not friends, parents or both encouraged them *not* to use.
9. *Friends' Rewarding or Punishing Reactions*  
Respondents' report of anticipated or actual positive or negative sanctions of friends to respondents' use of the substance, ranging from encouraging their use to turning them in to the authorities.
10. *Parents' Rewarding or Punishing Reactions*  
Respondents' report of anticipated or actual positive or negative sanctions of parents for respondents' use of the substance, ranging from encouraging their use to turning them in to the authorities.
11. *Informal Parental Deterrence*  
Respondents' perceived probability that their parents would catch them if they used the substance.
12. *Formal Deterrence*  
Respondents' perceived probability that the police would catch them if they used the substance.
13. *Interference with Other Important Activities*  
Respondents' perception of the extent to which using the substance would interfere with their participation in activities (i.e., school work, athletics, etc.) important to them.
- V. *Differential Reinforcement: Combined Social/Nonsocial*
14. *Index of Social/Nonsocial Rewards Minus Costs of Use*  
The total good things from a list of positive drug effects and social outcomes which the using respondent checked as having actually experienced and the nonusing respondents checked as what they perceived they would experience as a result of using the substance *minus* the total bad things checked (there is an equal number of good and bad possible consequences in the list).
15. *Overall Reinforcement Balance*  
Respondents' assessment of whether on balance mostly good things (such as "a good high or get along better with others") or mostly bad things (such as "a bad high or get into trouble") would (as perceived by nonusers if they were to use) or did (as reported by users when they used the substance) happen.
16. *Usual Effects Felt When Used*  
Respondents' report of the effects the substance usually has on them (from no effect, to mostly good, to mostly bad effects). Asked only of those using more than once.