Prediction of Risk for Drug Use in High School Students[1]

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On the basis of questionnaires administered to almost 2,000 high school students in Cali, Colombia, a subset of items was selected that deal primarily with parent-child relationships. This 53–item set, referred to as the Drug Risk Scale (DRS), was administered to two new cross-validation samples, one consisting of high school students and the other consisting of drug addicts attending drug rehabilitation centers. Significant differences in parent-child relations were found between these new groups. The DRS was also found to have reasonably high sensitivity and specificity. Its potential value as a risk-prediction instrument is discussed.

Sociodemographic, personality, interpersonal, environmental, and other characteristics have been repeatedly identified as associated risk factors for drug use, abuse, and dependence among adolescents. Representative examples of this literature may be found in Bry et al. (1), Kandel and Andrews (2), Kandel and Logan (3), Glynn (4), Labouvie and McGee (5), Newcomb and Harlow (6), Weller and Halikas (7), and Wisniewski et al. (8). Newcomb et al. (9) identified 10 risk factors that constitute a summary statement of the literature to date; these are: low grade point average, lack of religiosity, psychopathology, deviance, sensation seeking, early alcohol use, low self-esteem, poor relationships with parents, perceived peer drug use, and perceived adult drug use.

RISK AS A CONCEPTUAL TOOL

The problem with many of the risk factors identified so far as associated with drug use or dependence is that they are mainly demographic, family history, or personality items not changeable to any degree. The identification of risk factors that are subject to change through interventions is therefore an important goal. Variables that are more likely to be affected by social interventions and by education or counseling include the current interpersonal relations of an individual, particularly those within a family setting.

It is evident that the identification of risk factors per se is not necessarily helpful if nothing can be done about them. As Watzlawick et al. (10) have pointed out, education or treatment is ineffective if action is necessary but not taken, if action is taken to change something that is unchangeable, or if action is taken at the wrong level (that is, trying to change an attitude when a change in behavior is more appropriate).

It is also important to emphasize that the identification of risk factors does not enable individual predictions to be made

with great accuracy. Risk factors determine probability statements about groups of individuals of specific types that apply in the long run. This is comparable to the tossing of a pair of dice in which the results of an individual throw cannot be predicted, yet the distribution of throws over a long series can be predicted with great precision.

It is the aim of this paper to present the design of an instrument for the early identification of modifiable risk factors for drug use; essentially it includes aspects of the relationship between children and parents that have been found to be associated with drug use and that can be modified through some interventions with parents and educators.

The items have been obtained from a previous study by Climent and de Aragón (11) that identified some factors associated with drug use in 1,937 high school students drawn from a probabilistic sample of 54 high schools from the city of Cali, Colombia. The study was carried out in two stages, during the first semester of 1985 and the first semester of 1987. Fifteen scales regarding the students' relationships with parents and the attitudes of parents toward them were completed by the entire sample. The study identified parental affection, parental interest, parental time spent with children, and consistency in disciplinary actions by both parents as the factors relatively most associated with non-drug use. In addition, it was shown that the influence of fathers is greater than the influence of mothers for male behavior, whereas for females it is the mother's influence which is greater.

The preventive implications of these results are obvious; once the factors are identified, it is possible to prepare a risk-prediction scale based on this composite information. Such information may be able to identify youngsters at risk for being drug users and will enable the introduction of selected interventions. The purpose of the present report is to describe such a drug risk scale.

In this context it is worth noting that a potential effect of early case finding is the labeling of individuals as being at risk for drug use, with the attendant possibilities of a self-fulfilling prophecy. However, this is not a likely outcome in view of the fact that strong family pressure exists to avoid or prevent such behaviors. Some degrees of success of such prognostications is demonstrated in the present study for the population described. The applicability of the proposed risk scale to other settings and populations needs to be demonstrated.

METHOD

Based on the data of the high school sample (11), several tests were selected which significantly discriminated between the subgroups of students who reported having used illegal drugs during the past month, in contrast with those who did not. These tests were combined into a single new composite scale: the Drug Risk Scale (DRS) (see the Appendix). Only seven scales from the original set of 15 were finally included in the DRS; others were excluded because of their relatively lower ability to discriminate between drug users and non-drug users. The alpha coefficients of internal reliability obtained on the subscales represented in DRS were computed and were found to range from $+0.92$ to $+0.54$. The DRS alpha coefficient of internal reliability for the cross-validation sample of 160 new students was found to be $+0.89$.

The new scale consists of 53 items, each of which is answered on a four-point frequency scale. The scale can be completed in less than 15 minutes by most high school students either individually or in groups. The items can easily be under-

stood by children as young as 11 or 12 years of age.

Part A consists of 24 items that describe how an individual's mother tends to interact with him or her. Examples of the questions asked are: "Does your mother talk to you about your problems?" and "Does your mother discourage your use of alcohol?" Part B consists of 24 items that ask the same questions about one's relation to one's father. Part C deals with issues of impulsivity. An example of an item is: "I take chances." One single overall score is obtained based on all 53 items.

In order to cross-validate the new scale, it was administered to two additional groups. One was a new group of 160 high school students in the 10th, 11th, and 12th grades obtained from a sample of public and private high schools similar to those in the original study. The average age of the students was approximately 16.9 years, and the sample contained 39% males and 61% females. For the entire student sample, only those living with both parents were included.

The other new group consisted of 76 known addicts[5] obtained from various drug addiction treatment clinics in Colombia (Medellín, Pereira, and Cali). Only those addicts who met several criteria were selected: (1) less than 22 years of age, (2) living with both their parents, and (3) currently being treated at a drug dependence clinic. The majority of these addicts (87%) had smoked coca paste ("basuco" or "crack") alone or in combination with other groups; 12 of the addicts had used marijuana alone.

In terms of their other characteristics, the median length of use of drugs was about three years. The majority (45%) were unemployed, 29 were still going to school (26%), and 24% were employed at various odd jobs. The mean age of the addicts was 19 years, and all but 44% were males.

In order to make the original data from the sample of 1,937 students comparable in form to the new data, all students who had been originally identified as drug users were selected and their questionnaires were rescored on the specific items of the DRS. This produced a sample of 62 drug users, defined as individuals who had used an illegal drug in the past month; only those students were included in this sample who had both parents living at home. This was done because the DRS asks separate questions about the student's interactions with mother and with father.

In addition, a random sample of 100 students was drawn from the original population and their questionnaires were also rescored on the items of the DRS. It was found that six of these students did not have one or both parents present in their home, and were therefore dropped from the sample, leaving an original sample of 94 normal individuals to be compared with the cross-validation samples.

Sampling and Testing Procedures

A list of all high schools in Cali, Colombia, was obtained from the Secretary of Education and a stratified random sample of 54 high schools was chosen. This comprised approximately 12% of the existing schools, most of which are small and private. However, both private and public high schools were included as well as those representing all socioeconomic levels.

Letters were sent to all principals of the high schools requesting cooperation with a health survey, and all but two agreed to participate. On a designated day, the in-

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[5]A known addict is a person that (1) has been accepted for treatment in a specialized drug treatment center and (2) has been continuously using drugs for at least six months to the extent of having serious social, legal, family, occupational, and/or academic problems as a result of the drug use.

terviewers arrived at the high school and selected the classes to be interviewed. If there was more than one class at a given level, a random selection was made. Grade levels 10, 11, and 12 were represented. Most classes had 33 to 46 students.

Testing was carried out in a given class following an introduction by the teacher and a brief statement of the health implications of the research by the interviewer. Confidentiality was guaranteed and the students were told not to place any identifying information on the forms other than age and sex. The students only had to check appropriate boxes. Since the questionnaires were all self-report forms, the interviewer simply answered any questions and then, at the conclusion of testing, asked the students to place their questionnaires into a large envelope. This procedure was carried out both in the original sample of 1,937 students and in the cross-validation sample of 160 students.

The drug addict sample was collected in a different way. Three drug addiction rehabilitation centers were contacted in three large Colombian cities and permission was requested for a health survey. All agreed. The interviewers explained the project to small groups of addicts and requested cooperation. All but two addicts agreed to complete the questionnaires. The information was collected in such a way that the addicts remained anonymous.

RESULTS

Table 1 presents the mean scores on the DRS for the four different groups being compared. When the non-drug users are compared to the drug users in the original high school sample on the DRS, it is found that the drug users' scores are significantly higher ($t=4.85$; $df=154$; $p<0.01$). When the new cross-validated sample of 160 high school students is compared with the new drug addict sample, a highly significant difference is found ($t=10.6$; $df=243$; $p<0.001$). The drug addicts are found to be significantly higher on the DRS than the drug users in the original sample ($t=2.9$; $df=136$; $p<0.01$). These results thus support a trend in severity of DRS scores from students to confirmed drug addicts. These findings support the idea that the parent-child patterns of interaction described by the DRS are in fact related to severity or frequency of drug use.

The sensitivity and specificity of the DRS were also determined using the cross-validation samples of 76 drug addicts and 160 high school students. Sensitivity and specificity were calculated for several different cutoff scores on the DRS and plotted against test score value. As usual, as sensitivity decreased, specificity increased. The two curves intersect at a DRS score of 55 and a corresponding sensitivity and specificity of approximately 78%. These are reasonably high values, but their predictive efficiency is clearly a

Table 1. Mean scores of the Drug Risk Scale (DRS) for the various groups.

Groups	DRS	Standard deviation
Cross-validation sample: high school students (N=160)	40.0	18.6
Non-drug users: sample from original high school population (N=94)	46.6	16.6
Drug users: sample from original high school population (N=62)	62.0	21.7
True drug addicts (N=76)	73.2	24.2

function of the base rate of the condition being studied in the population at risk; generally, even very sensitive tests tend to produce too many false positives (12).

DISCUSSION

The DRS appears to be useful for identifying high school students at risk for drug use. This is done through information gathered on youngsters about modifiable aspects of the parent-child relationships. This includes data on degree of approval by the parents of drug use, the sharing of affection and communication with children, parental interest in the children's activities, and degree of impulsivity of the students. With such data a profile of the parent-child relationship is identified for each student, and it is compared against profiles of nonusers of drugs and drug addicts. A given score determines the statistical similarity of a given student's parental relationships to one of the groups.

It should be emphasized that the DRS does not ask directly about drug use, but only about various aspects of parent-child relationships. A given score tells a parent (or a teacher) when the features of the relationship of a given youngster with his or her parents are similar to that of a drug addict. This is a probability statement, and although it is not a prediction of a future fact, *it is a prediction of a future risk.*

For those concerned with the possibility of "early tagging" it is important to keep in mind that the DRS does not ask questions about drug use; the instrument identifies a given family behavior, not a problematic child. In addition, if the information is presented to parents by an interested teacher or counselor in a positive way, if the aim of the data gathered is properly explained, and if alternative approaches for the parent-child relationship are presented, the potential harm of "early tagging" is considerably decreased.

The potential advantages are obvious. First, early awareness of undesirable parent-child behaviors could be followed by corrective measures. Second, the emphasis on positive constructive aspects of change means an optimistic view of the situation exists. And third, early detection facilitates cost-effective and more humane interventions. Nevertheless, the identification of those found at risk as bad or dangerous, although an unwarranted conclusion, is always a possibility if this instrument is not used in the ways suggested here.

It is reasonable to expect, because of the general nature of the parenting relations described by the DRS, that the insights it generates may have some benefits for children with other types of problems as well. Future research, especially of a prospective nature, should determine the impact of alternate parenting styles on social adjustment, in other cultures, settings, and populations.

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APPENDIX

DRUG RISK SCALE (DRS)*

Your name (or code number) _____ Age _____ Sex _____

Your level of education _____ Today's date _____

PART A (MOTHER)

For each of the following questions please check (X) the answer that best describes the way your mother relates to you.	Very frequently	Frequently	Occasionally	Almost never
1. Shows affection?	_____	_____	_____	_____
2. Does pleasant things with you?	_____	_____	_____	_____

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	Very frequently	Frequently	Occasionally	Almost never
3. Talks to you about your life (plans, friends, play)?	_____	_____	_____	_____
4. Talks to you about your problems?	_____	_____	_____	_____
5. Shows interest in helping you?	_____	_____	_____	_____
6. Shows that she cares about you?	_____	_____	_____	_____
7. Tries to give you whatever you need?	_____	_____	_____	_____
8. Is fair with you?	_____	_____	_____	_____
9. Expresses her love for you?	_____	_____	_____	_____
10. Knows where you are when you are out?	_____	_____	_____	_____
11. Knows with whom you are when you are out?	_____	_____	_____	_____
12. Enjoys talking to you about the things you do?	_____	_____	_____	_____
13. Enforces curfews in a consistent way?	_____	_____	_____	_____
14. Talks to you about your sexual interests?	_____	_____	_____	_____
15. States that sexual intercourse should be postponed until adulthood?	_____	_____	_____	_____

For each of the following items please check (X) the response that best describes the way your mother behaves with regard to your using the following products	Frequently discourages it	Sometimes discourages it	Says nothing	Does not care
16. Soft drinks	_____	_____	_____	_____
17. Alcohol (beer, wines, etc.)	_____	_____	_____	_____
18. Aspirin	_____	_____	_____	_____
19. Cigarettes	_____	_____	_____	_____
20. Coffee	_____	_____	_____	_____
21. Tranquilizers	_____	_____	_____	_____
22. Marijuana	_____	_____	_____	_____
23. Cocaine	_____	_____	_____	_____
24. "Crack" (or other hard drugs)	_____	_____	_____	_____

PART B (FATHER)

For each of the following questions please check (X) the answer that best describes the way your father relates to you.	Very frequently	Frequently	Occasionally	Almost never
25. Shows affection?	____	____	____	____
26. Does pleasant things with you?	____	____	____	____
27. Talks to you about your life (plans, friends, play)?	____	____	____	____
28. Talks to you about your problems?	____	____	____	____
29. Shows interest in helping you?	____	____	____	____
30. Shows that he cares about you?	____	____	____	____
31. Tries to give you whatever you need?	____	____	____	____
32. Is fair with you?	____	____	____	____
33. Expresses his love for you?	____	____	____	____
34. Knows where you are when you are out?	____	____	____	____
35. Knows with whom you are when you are out?	____	____	____	____
36. Enjoys talking to you about the things you do?	____	____	____	____
37. Enforces curfews in a consistent way?	____	____	____	____
38. Talks to you about your sexual interests?	____	____	____	____
39. States that sexual intercourse should be postponed until adulthood?	____	____	____	____

For each of the following items please check (X) the response that best describes the way your father behaves with regard to your using the following products.	Frequently discourages it	Sometimes discourages it	Says nothing	Does not care
40. Soft drinks	____	____	____	____
41. Alcohol (beer, wines, etc.)	____	____	____	____
42. Aspirin	____	____	____	____
43. Cigarettes	____	____	____	____
44. Coffee	____	____	____	____
45. Tranquilizers	____	____	____	____
46. Marijuana	____	____	____	____

PART B (FATHER) *(continued)*

	Frequently discourages it	Sometimes discourages it	Says nothing	Does not care
47. Cocaine	————	————	————	————
48. "Crack" (or other hard drugs)	————	————	————	————

PART C (YOU)

For each of the following items please check (X) the response that best describes you.

	Very frequently	Frequently	Occasionally	Almost never
49. I do risky things just for excitement.	————	————	————	————
50. I do risky things on the spur of the moment.	————	————	————	————
51. I take chances.	————	————	————	————
52. I do what I feel like doing without thinking about what will come of it.	————	————	————	————
53. I easily become inpatient with people.	————	————	————	————