

Identifying Optimal Risk and Protective Factors to Predict Adolescent Substance Use

Kelly R. Breeden, M.S., Nicoletta Lomuto, M.A., and P. Allison Minugh, Ph.D.

DATA CORP Providence, Rhode Island

INTRODUCTION

This poster explores the relationship between risk factors, protective factors, and past 30-day substance use. The central question is whether certain risk and protective factors are stronger predictors of adolescent substance use. The data are drawn from a census of students in grades 6, 8, 10, and 12 in a large, sparsely populated Western state. The questionnaire measured student scores on 34 different risk and protective factor scales and on past 30-day use of 12 different substances. A cut point was used to transform the risk scales into dichotomous variables indicating whether a youth was at risk or not at risk. Protective factor scales were also dichotomized using cut points. By summing the dichotomous risk factor variables, a composite variable was created that represents the total number of risk factors for each student. An analogous composite variable was created for the total number of protective factors.

STUDY PURPOSE

The poster focuses on two aspects of the relationship between risk, protection, and past 30-day substance use. The first aspect pertains to the disparity in overall risk and protection between users and non-users. How wide are the disparities? Does the size of the disparity vary by substance? These questions are investigated by comparing the average number of risk factors among users of the substance with the average number among non-users. An analogous comparison was performed using the average number of protective factors. Charts display these disparities for both risk and protection by substance.

The second aspect concerns the relationship between particular risk and protective factors and substance use. Which risk and protective factors best predict the use of each substance? To shed light on this question, the odds ratios for students at risk versus those not at risk with respect to using each substance were calculated. Similar odds ratios were calculated for those students that were protected versus those that were not. A summary of these calculations is presented.

METHODS

A slightly modified version of the Communities That Care® Survey was used to collect data on 6th, 8th, 10th, and 12th grade students in a sparsely populated rural state. Approximately 20,000 students participated in the survey. The variables of interest were risk factors, protective factors, and past 30-day substance use. Any discrepancies between past-month and lifetime substance use were identified and deleted prior to the analysis.

The number of risk and protective factors for each student was calculated from the 34 risk and protective factors that were distributed across four domains: 1) Community, 2) Family, 3) School, and 4) Peer/Individual. Prior to calculating the variables of interest, the scale score for each factor was calculated. If the score was above the cut point for the factor, the student was considered at risk (or protected) for that criteria. Once the students were identified as being at risk or protected across the 34 areas, the number of risk and protective factors for each student was calculated.

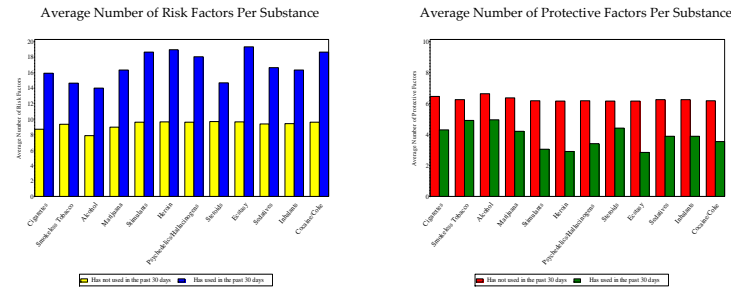
RESULTS

The average numbers of risk and protective factors were significantly different between the students that used the substance and those that did not. The first table presents these values.

Substance	Has Used Substance in Past 30 Days *		Has Not Used Substance in Past 30 Days *	
	Average Number of Risk Factors	Average Number of Protective Factors	Average Number of Risk Factors	Average Number of Protective Factors
Alcohol	13.99	4.95	7.87	6.64
Cigarettes	15.92	4.29	8.67	6.45
Cocaine/Coke	18.62	3.56	9.61	6.18
Ecstasy	19.3	2.85	9.66	6.16
Heroin	18.96	2.91	9.65	6.16
Inhalants	16.34	3.89	9.43	6.24
Marijuana	16.3	4.21	8.94	6.37
LSD/Psychedelics	18.05	3.42	9.61	6.18
Sedatives	16.62	3.9	9.38	6.25
Smokeless Tobacco	14.63	4.91	9.32	6.24
Steroids	14.66	4.41	9.67	6.16
Stimulants	18.63	3.04	9.58	6.19

* - Significant differences in the average number of risk and protective factors between students that used versus those that did not.

The figures below display the average number of risk and protective factors for each of the 12 substances. It can be seen that the average number of risk factors for those that reported using the substance is significantly larger than those that did not use in the past 30 days. It should be noted that the students that reported not using drugs or alcohol were identified as being protected on more factors than those that used in the past 30 days.



The next table presents results from 12 logistic regression models. Each dependent variable is a dichotomous variable, where 1 signifies that the students reported using the substance in the past month. The independent variables are continuous, representing the total number of risk and protective factors that the students had. In the Hawkins and Catalano model, protective factors are said to buffer against the effects of risk factors. Given this theory, the interaction between the two is also included in the model.

It should be noted that the Hosmer and Lemeshow test concluded that ecstasy, heroin, stimulants, cocaine, steroids, and LSD/psychedelics did not have reliable logistic regression models for this first set of analyses. Therefore, the results were not presented in the table below.

Substance	Risk Factor Odds Ratio	Protective Factor Odds Ratio	Interaction Odds Ratio
Alcohol	1.27*	1.06	1.34*
Cigarettes	1.30*	1.03*	1.35*
Inhalants	1.23*	0.93*	1.15
Marijuana	1.31*	1.05	1.38*
Sedatives	1.27*	0.98	1.25
Smokeless Tobacco	1.20*	1.09*	1.33*

* - Significant odds ratios based on parameter estimates being significant

The second set of tables present logistic regressions that attempt to identify the individual risk and protective factors that most strongly predict the use of each substance. The independent variables are the 34 individual risk and protective factor indicator variables. For simplicity, interactions were not included in the models. A value of 1 indicates that the student was at risk or protected based on the criteria in each factor. The tables present the odds ratios for students that use a substance and are at risk or protected by the individual factors.

It should be noted that logistic regressions on ecstasy, heroin, stimulants, cocaine, LSD/psychedelics, and steroids did not pass diagnostic testing. The results from these models were not available in the following tables.

Substance	Academic Failure	Low School Commitment	Rebellion	Early Initiation of Drug Use	Early Initiation of ASB ^c	Attitudes Favoring ASB ^c	Perceived Favoring Drug Use	Perceived Risk of Drug Use	Interaction with Antisocial Peers	Friends Drug Use	Sensation Seeking	Rewards for ASB ^c	Depressive Symptoms
Alcohol	0.89*	1.21*	0.90	2.19*	1.14*	0.85*	1.85*	1.52*	1.11	1.71*	1.69*	1.45*	0.93
Cigarettes	1.52*	1.34*	1.13	2.44*	1.48*	0.73*	2.90*	1.58*	1.43*	2.39*	1.10	1.20*	1.47*
Inhalants	1.09	0.92	1.80*	2.12*	0.88	1.20	1.43*	1.22	1.18	1.26	1.49*	1.32*	2.00*
Marijuana	1.27*	1.06	0.89	2.33*	1.34*	0.71*	2.85*	3.15*	1.94*	2.88*	1.23*	1.17	0.86
Sedatives	0.87	1.19	1.40*	1.56*	1.22	1.06	1.77*	1.40*	1.47*	1.54*	1.66*	1.06	1.43*
Smokeless Tobacco	1.44*	1.65*	0.89	1.77*	1.61*	0.79*	1.31*	1.29*	1.33*	1.24*	1.54*	1.12	0.74*

* - Significant Odds Ratios
^c - ASB = Antisocial Behavior

Substance	Low Neighborhood Attachment	Community Disorganization	Transitions & Mobility	Law & Norms Favoring Drug Use	Perceived Availability of Drugs	Perceived Availability of Guns	Poor Family Management	Family Conflict	Family History of ASB ^c	Parent Attitudes Favoring Drug Use	Parent Attitudes Favoring ASB ^c
Alcohol	1.04	0.79*	0.82*	0.91	1.46*	0.86*	1.21*	0.79*	1.13*	4.70*	0.67*
Cigarettes	1.01	1.16*	1.09	0.91	1.27*	0.73*	0.83*	0.73*	1.34*	2.25*	0.64*
Inhalants	1.10	0.92	1.03	1.14	1.04	1.22	1.16	1.40*	1.33*	0.65*	1.11
Marijuana	1.02	1.04	0.93	0.83*	1.86*	0.63*	0.99	0.75*	1.47*	1.87*	0.73*
Sedatives	1.03	0.92	0.93	1.09	1.61*	1.06	1.12	1.16	1.54*	1.42*	0.92
Smokeless Tobacco	1.05	1.01	0.76*	1.11	0.80*	1.45*	1.01	0.68*	0.84*	2.41*	1.01

* - Significant Odds Ratios
^c - ASB = Antisocial Behavior

Substance	Community Opportunities for Involvement	Community Rewards for Prosocial Involvement	Family Attachment	Family Opportunities for Prosocial Involvement	Family Rewards for Prosocial Involvement	School Opportunities for Prosocial Involvement	School Rewards for Prosocial Involvement	Religiosity	Social Skills	Belief in the Moral Order
Alcohol	0.92	1.17*	1.04	0.98	1.06	1.20*	0.88*	1.24*	0.38*	0.98
Cigarettes	0.98	1.01	1.12	0.81*	0.89	1.00	1.03	1.07	0.65*	1.16
Inhalants	0.95	1.16	0.99	1.08	0.86	0.84	0.91	1.10	0.62*	0.74*
Marijuana	0.94	1.05	1.03	0.89	1.08	1.04	1.10	0.87*	0.63*	0.94
Sedatives	1.08	0.93	0.87	0.92	0.94	1.08	0.91	1.14	0.77*	1.03
Smokeless Tobacco	1.06	1.62*	1.06	1.16	0.95	1.28*	1.02	1.21*	0.39*	0.71*

* - Significant Odds Ratios

DISCUSSION

The results show there were significantly more risk factors for users versus non-users regardless of substance. There were significantly more protective factors for non-users for all substances, but the disparity was narrower for protective factors than for risk factors. The first logistic regression expands on this by testing risk and protective factors together and allowing for an interaction between the two. With the exception of sedatives, the results confirm that the number of risk and protective factors significantly predicts whether youth have used a substance in the past 30 days. For sedatives, only the number of risk factors was significant.

The relationship between substance use and individual risk and protective factors was also examined. A few risk factors appeared to be strong predictors of all substances. Early initiation of drug use and attitudes favorable to drug use were significant in the expected direction for all substances. Perceived risk of drug use and friends' drug use were significant for all drugs except inhalants, while sensation seeking was significant for all substances except cigarettes. One protective factor, social skills, was significant across all substances.

A number of risk and protective factors produced counterintuitive results, such that the odds ratio was significant in the opposite of the direction expected. For example, community rewards, school opportunities for prosocial behavior, and religiosity have significant odds ratios greater than 1 for alcohol and smokeless tobacco. This implies that students with those protective factors have greater odds of using those substances. However, the counterintuitive results were not found when examining each risk and protective factors individually, suggesting that they may be attributable to interactions among the variables. Complex models that take into account interrelationships among risk and protective factors are needed to shed additional light on these data.