

Susceptibility to Peer Pressure, Self-Esteem, and Health Locus of Control as Correlates of Adolescent Substance Abuse

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As part of a school-based alcohol misuse prevention study, questionnaires were administered to 2,589 fifth and sixth grade students to determine levels of use of alcohol, marijuana, and cigarettes, intentions to use these substances, and problems resulting from alcohol misuse. The questionnaire also included 45 items concerning susceptibility to peer pressure, self-esteem, and health locus of control. These 45 items were factor analyzed separately for two groups formed by random assignment. Six factors were identified which were both internally consistent and replicable, and indices were constructed. The indices measuring susceptibility to peer pressure, self-esteem, and internal health locus of control were significantly and negatively correlated with most of the substance use, misuse, and intention items, and an external health locus of control index was not significantly related to most of the substance use, misuse, and intention items. The "Susceptibility to Peer Pressure" index correlated more highly with the adolescent substance use, misuse, and intention items than the self-esteem or the health locus of control indices, and it had the highest alpha coefficient. Implications for the design of school-based substance abuse prevention programs are discussed.

INTRODUCTION

In the design of health behavior interventions for adolescents,¹⁻³ the concepts of susceptibility to peer pressure, self-esteem, and health locus of control have been

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regarded as important factors mediating health behavior. As noted by Bush and Iannotti,¹ however, in their review of research on the development of children's health orientations and behavior, very little research has been conducted on the psychometric properties of these concepts or their relationships with the health behavior which the interventions are designed to influence. For example, Lewis and Lewis⁴ listed self-concept as one of the more important determinants of children's health orientations and behavior, but noted that the concept has never been adequately measured as part of a longitudinal investigation.

Some current findings present a mixed picture of the role that self-esteem and health locus of control play in adolescent substance abuse. Kaplan⁵ found negative self-attitudes to be related to subsequent substance abuse and other deviant behavior by adolescents. Dielman et al.⁶ found self-esteem to show low, but significant, negative correlations with adolescent use of cigarettes, alcohol, and marijuana. These correlations ranged from -0.09 to -0.18 for a total self-esteem scale as well as for three subscales ("School Adjustment," "Self-Confidence," and "Happiness"). In some other studies, however, no significant relationships have been found between self-esteem and adolescent substance use.^{7,8}

In examining the correlates of early alcohol use by adolescents, Jessor and colleagues⁹ found that an internal-external locus of control scale did not predict adolescents at risk for alcohol use/misuse. In contrast, Currie and co-workers¹⁰ found that internally oriented youths were less likely to use marijuana than were externally oriented youths. Similarly, Clarke and co-workers¹¹ found adolescents' past and present use of cigarettes and intentions to use cigarettes to be modestly related to an external view of control. A children's locus of control scale specific for health was developed by Parcel and Meyer.¹² Their perspective was that a scale specific for health would be more useful in the prediction of health-related behavior than a generalized internal-external locus of control scale. Bush and Iannotti,¹ however, reported that health locus of control was not a significant predictor of children's reports of use or intentions to use cigarettes, alcohol, or marijuana. With the exception of one external health locus of control subscale, Dielman et al.⁶ found no significant correlations between health locus of control scores and the use of or intentions to use cigarettes, alcohol, or marijuana among fifth and sixth grade students. On this one subscale, however, students who showed less dependence on adults (powerful others) for their health were significantly more likely to use alcohol and cigarettes and to report intentions to do so in the future.

Peer pressure is often cited as an important factor in adolescents' substance abuse. Although recent interventions that are based on social learning theory have proposed to reduce the onset of detrimental health behavior through providing students with social skills to resist such pressures, none of these interventions have included measures of susceptibility to peer pressure.¹³⁻¹⁶ Thus, it is impossible to determine whether the success, or lack of success, in deterring detrimental health behavior was due to a success or failure in the attempt to reduce susceptibility to peer pressure. Other studies that have assessed peer influence have used measures such as substance use by students' friends,³ students' perception of peer pressure to use substances and students' perception of peer attitudes toward substances.¹⁷ There has been no attempt, however, to measure peer pressure from an internal perspective, i.e., students' degree of "susceptibility" to peer pressure.

The purpose of the present report is to provide evidence concerning the psychometric properties of indices of the concepts of susceptibility to peer pressure, self-esteem, and health locus of control, and to provide evidence concerning the relationships of these indices to measures of adolescent alcohol use and misuse, cigarette smoking, and marijuana use.

METHOD

The data utilized in this article were gathered as part of a longitudinal school-based alcohol misuse prevention study. Details concerning the experimental design and methods of the full study are presented elsewhere.¹⁸ The focus of the current article is on the pre-test data, prior to the implementation of the prevention program. At the time of the pre-test, students were in the fifth and sixth grades. This age range was desirable from the perspective of the prevention program because students experience increased exposure to the use and misuse of substances at the junior high school level.^{16,17} A total of 2,895 students were assigned to receive the pre-test in late 1984. Of these 1,950 were in schools which were randomly assigned to a treatment condition and 945 were in schools which were randomly assigned to a control condition. 89% of the original sample (1,753 students in the treatment condition and 836 students in the control condition) consented to participate and were present in the classroom on the day the questionnaires were administered. Because the treatment and control groups were formed on the basis of random assignment, they were equivalent in statistical expectation at the pre-test occasion. These groups were used in the current article to cross-validate the scales developed by factor analyses of the items concerning susceptibility to peer pressure, self-esteem, and health locus of control. In subsequent parts of this paper, the treatment group will be referred to as Group A and the control group as Group B.

In their 1984 report, Dielman et al.⁶ provided evidence on the factor structure of the 20 children's health locus of control (CHLC) items from the Parcel and Meyer¹² scale, and 17 children's self-esteem (CSE) items adapted from those reported by Coopersmith.¹⁹ These same 37 items were employed in the current study, as well as eight items which were constructed to assess susceptibility to peer pressure. Four of the susceptibility to peer pressure items were created from items originally designed to measure "tolerance of deviance" in a study by Rachal et al.,¹⁷ two were adapted from a study by Davies and Stacey,²⁰ and two were constructed by the study staff for the current study. The frequency of alcohol use and misuse items, and substance use and intention items reported in this paper were taken in part from studies by Rachal et al.,¹⁷ Greenwald,²¹ and Dielman et al.^{6,16} and in part were constructed by the study staff. All items were pilot tested on three separate occasions in three schools which were not in the main study. The items were revised as necessary on the basis of the pilot study results to ensure clarity of meaning and appropriateness for the age range of the subjects in the current study.

The two pre-test data subsets (Group A and Group B) were factor analyzed separately, employing identical analytic procedures in each case. Matrices of Pearson product moment correlations among all of the susceptibility to peer pressure, self-esteem, and health locus of control items were first subjected to a principal compo-

nents analysis. The number of resulting latent roots equal to or greater than 1.0 was taken as the indicator of the number of factors to be extracted in subsequent principal axes solutions. In the principal axes solutions, communality estimates were inserted in the diagonal elements of the correlation matrices. The communality estimates began with the squared multiple correlations with all other variables in the matrix and ended when there were no changes in the third decimal place. The principal axes solutions were rotated to both orthogonal (Varimax) and oblique (Oblimin) criteria. The primary factor intercorrelations were not sufficiently high to warrant the computation of correlated primary factor scores. Factor matching between the two groups was assessed through the computation of congruence coefficients²² between each pair of factors for the two solutions. This resulted in a rectangular matrix of congruence coefficients. Congruence coefficients can range from -1.0 to 1.0 and can be interpreted in the same manner as a correlation coefficient. Thus, the strength of the association between a factor in one solution and each of the factors in another solution can be assessed to determine where the best match occurs, although the standard errors of congruence coefficients are unknown.

The congruence of factor structures was also assessed using confirmatory factor analysis.²³ Such a procedure incorporates substantively motivated constraints into the analysis. Items do not have to load on all factors as is the case in a standard (exploratory) factor analysis. Instead, constraints can be introduced which determine which items load on which factors. A model based on these constraints can be estimated using the LISREL-VI computer program,²⁴ and the fit of the model to the empirical data can then be assessed. This approach was used to substantiate the initial findings based on the separate factor analyses of the Group A and B data and the computation of congruence coefficients.

As will be seen in the Results section, six factors resulted in sufficiently high congruence coefficients across the Group A and B analyses to warrant the development of index scores based on a factor analysis of the combined samples. Consequently, the Varimax solution based on the combined samples was employed as the basis for simple, unit weighted index score construction. Indices included those variables with the highest loadings on each factor. Variables were included in one and only one index. The Pearson product moment correlations were computed among the resulting indices, as well as between these indices and student reports of alcohol use and misuse, cigarette smoking and marijuana use, and intentions to use these various substances.

RESULTS

The principal components analyses of the two correlation matrices among the 45 items concerning susceptibility to peer pressure, self-esteem, and health locus of control resulted in 12 eigenvalues equal to or greater than 1.0 in each instance. In both analyses, the thirteenth eigenvalue was 0.99. Eight of the 12 factors resulted in congruence coefficients of 0.86 or above between the two solutions. Two of these eight factors consisted of only two items each and were regarded as method factors rather than substantive content factors. Table 1 shows the item content for the six indices which were constructed on the basis of the factor analysis of the combined sample and the factor loadings which resulted from each of the separate Group A and B analyses. Also shown in Table 1 are the congruence coefficients resulting from the factor matches

Table 1. Item Content and Factor Loadings by Group for the Susceptibility to Peer Pressure, Self-Esteem and Health Locus of Control Indices^a

Item	Factor Loadings	
	Group A	Group B
Factor I. Susceptibility to Peer Pressure ($r_c = 0.99$, Alpha = 0.78)		
1. If a friend offers you a drink of alcohol, would you drink it?	0.73	0.80
2. If a friend offers you a drink of alcohol, would you <i>want</i> to try it?	0.69	0.76
3. If you are at a party where your friends are drinking alcohol, would you feel left out if you are not drinking alcohol?	0.57	0.62
4. If a friend dares you to smoke a cigarette and your parents don't want you to smoke, would you smoke it?	0.56	0.67
5. If a friend dares you to tear a page out of a school library book, would you do it?	0.52	0.52
6. If your friends are going to the movies and you have to study for a test, would you go to the movies anyway?	0.50	0.49
7. If your best friend is skipping school, would you skip too?	0.49	0.54
Factor II. Adult Locus of Control ($r_c = 0.98$, Alpha = 0.70)		
1. Do you believe that other people must tell you what to do to stay healthy?	0.58	0.56
2. Do you believe that the teacher must tell you how to keep from having accidents at school?	0.53	0.60
3. Do you believe that other people must tell you what to do when you feel sick?	0.52	0.50
4. Do you believe that only a doctor or a nurse keeps you from getting sick?	0.47	0.51
5. Do you believe that your mother must tell you how to keep from getting sick?	0.45	0.51
6. Do you believe that you can only do what the doctor tells you to do about your health?	0.41	0.45
7. Do you believe that only the dentist can take care of your teeth?	0.40	0.42
Factor III. Peer Adjustment ($r_c = 0.89$, Alpha = 0.50)		
1. Do kids pick on you?	0.49	0.37
2. Are most kids better liked than you are?	0.46	0.46
3. Do you often wish you were someone else?	0.36	0.55
4. Do you get upset easily if someone yells at you?	0.34	0.29
5. Do kids your age like you?	0.21	0.22
Factor IV. Internal Locus of Control ($r_c = 0.88$, Alpha = 0.52)		
1. Do you believe that you can do many things to fight illness?	0.56	0.49
2. Do you believe that when you are sick, you can do things to get better?	0.49	0.33

Table 1. Item Content and Factor Loadings by Group for the Susceptibility to Peer Pressure, Self-Esteem and Health Locus of Control Indices^a (Continued)

Item	Factor Loadings	
	Group A	Group B
3. Do you believe that you can do things to keep from getting sick?	0.44	0.46
4. Do you believe that there are many things you can do to prevent accidents?	0.36	0.20
5. Do you believe that you can make many choices about your health?	0.29	0.37
6. Do you believe that there are things you can do to have healthy teeth?	0.27	0.07
Factor V. Family Adjustment ($r_c = 0.91$, Alpha = 0.69)		
1. Are you happy at home?	0.60	0.61
2. Are you pretty happy?	0.54	0.28
3. Do your parents understand you?	0.53	0.59
4. Do you and your parents have fun together?	0.48	0.45
5. Do you like the way you are?	0.45	0.20
6. Are you pretty sure of yourself?	0.42	0.17
7. Do you get a lot of attention at home?	0.41	0.48
8. If you have something to say, do you say it?	0.25	0.21
Factor VI. School Adjustment ($r_c = 0.86$, Alpha = 0.53)		
1. Are you happy at school?	0.52	0.48
2. Do you like the teacher to call on you?	0.41	0.41
3. Are you proud of your school work?	0.40	0.40
4. Does your teacher make you feel bad?	0.32	0.18

^aThe pairwise N 's for the input correlation matrices ranged from 1,522 to 1,736 for Group A and from 760 to 830 for Group B.

and the alpha coefficients resulting from the unit-weighted index scores. The two matrices of product moment correlations, principal components matrices, factor pattern matrices with associated eigenvalues and final communality estimates, and matrix of congruence coefficients are available from the senior author upon request.

The first factor from the Group A analysis had a congruence coefficient of 0.99 with the first factor from the Group B analysis. In both solutions, the items loading on these factors were designed to measure susceptibility to peer pressure, and this pair of factors has been labelled accordingly, "Susceptibility to Peer Pressure." The highest loadings were contributed by the items concerning peer pressure to use alcohol. The second factor from both analyses received the highest loadings from items on the CHLC scale that indicate an external health locus of control orientation. In particular, the items dealt with the fact that students saw adults as responsible for their health and safety. This pair of factors has been labelled "Adult Locus of Control." The congruence coefficient for this pair of factors was 0.98. The third factor resulting from

the analysis of the Group B data showed the highest congruence coefficient, 0.89, with the seventh factor from the Group A analysis. The items with the highest loadings on these factors in both solutions were those from the CSE scale which centered on the students' relationships with and feelings about peers. This set of factors has consequently been given the label of "Peer Adjustment." Comparison of the fourth factor from each analysis resulted in a congruence coefficient of 0.88. This pair of factors received loadings in both analyses from the CHLC items that defined an internal locus of control orientation, and the factor has thus been given the label "Internal Locus of Control." The items with the highest loadings on this pair of factors were those indicating that students believed that there were things they could do to keep from getting sick and things that they could do to get better if they were sick. The fifth factor from the Group B analysis had its highest congruence coefficient, 0.91, with the third factor from the Group A analysis. This pair of factors was formed from the CSE scale items concerning the students' home life and has been labelled "Family Adjustment." Factor six from the Group B analysis and factor five from the Group A analysis had a congruence coefficient of 0.86. These factors received their highest loadings from the CSE items relating to school and have been labelled "School Adjustment."

In general, the size of the loadings on these six factors for both analyses ranged from 0.20 to 0.73. For three of the 37 items, however, one of the loadings on either the Group A or Group B solution was less than 0.20. Based on the factor analysis of the combined samples, the loadings associated with these three items were all greater than 0.20, and these items have been included in the index construction. In all cases, the item content for these items was compatible with the substantive nature of the respective indices.

For these six factors, the three conceptual areas appear to be fairly orthogonal. Items for a given scale tended to load only on the factors for that scale. The loadings on the other scales tended to be small (i.e., < 0.2). For example, all items pertaining to health locus of control and self-esteem had loadings of less than 0.2 on the susceptibility to peer pressure factor in the two solutions. The orthogonal nature of the factors is also suggested by the pattern of congruence coefficients. In general, only one match was found for each factor. An exception was the third factor from the Group A analysis, labelled "Family Adjustment," which had a congruence coefficient of 0.68 with the third factor from the Group B analysis which was labelled "Peer Adjustment." Upon further inspection, it was seen that in the Group B solution, items concerning self-confidence (e.g., feeling sure of one's self, saying what is on one's mind, and liking one's self) all had higher loadings on the "Peer Adjustment" factor. In the Group A solution, these items had higher loadings on the "Family Adjustment" factor. These three items were included in the "Family Adjustment" index on the basis of the solution for the combined sample.

In addition to the six factors described above, two additional pairs of replicable factors emerged from the analyses. One of these pairs was formed from two items dealing with the randomness of events: "sickness just happens" and "accidents just happen." The other pair was formed from two items dealing with the willingness of students to "tell the teacher" about sickness and accidents. Although these two pairs of factors had congruence coefficients of 0.88 and 0.89 across solutions, it is most likely that the observed pattern of loadings were due to superficial similarities in wording rather than being caused by underlying theoretical constructs. This same issue was discussed by Parcel and Meyer¹² in the initial construction of the CHLC scale. The decision was made, therefore, not to build indices for these factors.

The remaining four factors from both sets of analyses did not show adequate matches across solutions. The seventh factor from the Group B analysis had a congruence coefficient of 0.69 with the third factor from the Group A analysis, which has been labelled "Family Adjustment." This "Family Adjustment" factor had a congruence coefficient of 0.91 with the fifth factor from the Group B analysis, and was considered as a match with that factor. This seventh factor from the Group B analysis has not been included among the factors used for further analyses. The remaining factors from both analyses did not have any factor matches with congruence coefficients above 0.50.

Using confirmatory factor analysis, a model was constructed which included the 37 items which were built into the six indices. Each item was assumed to load on one and only one factor, and the factors were assumed to be orthogonal. Using LISREL, the data from both Group A and B can be analyzed simultaneously, and some or all of the parameters can be constrained to be equal over groups. A model in which all of the parameters (i.e., factor loadings, uniquenesses, and variances of the factors) are constrained to be equal in both groups fits the observed data adequately. The ratio of the chi-square value (4571.55) to the degrees of freedom (1332) was equal to 3.43. As suggested by Wheaton et al.,²⁵ a value for this ratio of 5 or less may be considered to indicate a reasonable fit. In addition, the critical N (CN) for the model was 804.44. The critical N represents the sample size needed in order to have the discrepancies between the observed and estimated values be just significant. Thus, large values for the critical N indicate that the discrepancies must be trivial. Hoelter²⁶ has suggested that the fit of a model is acceptable if the CN value is greater than 200 times the number of groups. The current CN value is well above this criterion.

Table 2 gives the item content and percentages of affirmative responses to the alcohol use and misuse indices and the substance use and intention items. The frequency of alcohol use index was simply the reported frequency of the most frequently used alcoholic beverage in the past 12 months. Responses to and codes for the alcohol use items were: I did not drink any or I have only had a taste (0); a few times a year (1); about once a month (2); about once a week (3); three or four days a week (4); and every day (5). In Table 2, the percentage of students having had a "drink" (i.e., reporting any of codes 1-5) is shown for each substance.

Alcohol misuse was measured by items reflecting problems experienced as a result of alcohol use in the past 12 months. Responses to and codes for the items, "How many times did you . . .?" were: never (0); once (1); two times (2); and three or more times (3). Because the frequency of these problems was low in this age group, responses to each item were collapsed to none (0) and at least once (1). Three indices were developed from these alcohol misuse items: overindulgence, alcohol use resulting in trouble with peers, and alcohol use resulting in trouble with adults. Each index was created by summing the total number of problems reported in each area. These indices were constructed on an *à priori*, face validity basis rather than from factor analytic findings. As shown in Table 2, alpha coefficients for these three misuse indices ranged from 0.21 to 0.66.

The percentages in Table 2 are given for Group A and B separately in order to provide evidence concerning the replicability of the findings in two equivalent samples created by random assignment, as well as to provide evidence concerning the pre-test equivalence of these two samples on these measures. The results of a series of *t*-tests comparing the means of the two groups suggested that the two groups differed in certain

Table 2. Percentage Distributions and Item Content for the Substance Use/Misuse Indices and Items^d

I. Alcohol Use and Misuse Items ^e	Percentage Responding "Once or More"	
	Group A	Group B
A. Frequency of Alcohol Use Index ^f		
1. How often have you had a "drink" of beer?	7.6	9.0
2. How often have you had a "drink" of wine?	11.6	13.5
3. How often have you had a "drink" of liquor?	8.5	9.8
B. Alcohol Misuse Index I – Overindulgence (Alpha = 0.63)		
1. How many times did you get very drunk?	8.8	10.9
2. How many times did you drink more than you planned to?	15.7	18.5
3. How many times did you feel sick to your stomach after drinking?	8.6	10.2
C. Alcohol Misuse Index II – Trouble with Peers (Alpha = 0.66)		
1. How many times did you get into trouble with your friends because of drinking?	1.3	2.6 ^a
2. How many times did you have a friend of the same sex complain because of your drinking?	1.3	2.6 ^a
3. How many times did you have a friend of the opposite sex complain because of your drinking?	2.7	3.8
4. How many times did you have someone you were dating complain about your drinking?	2.0	2.6
D. Alcohol Misuse Index III – Trouble with Adults (Alpha = 0.21)		
1. How many times did you get into trouble with your parents because of your drinking?	2.5	4.6 ^b
2. How many times did you get into trouble with teachers, school counselors or the principal because of your drinking?	0.2	0.5
3. How many times did you get into trouble with the police because of your drinking?	0.4	0.2
II. Substance Use and Intentions Items	Percentage Responding "Yes"	
	Group A	Group B
A. Alcohol ^f		
1. Have you ever had a "drink" of alcohol?	25.2	27.8
2. In the past month, have you had a "drink" of alcohol?	5.4	06.5
3. If you had a chance to drink alcohol in the next two years, would you do it?	9.4	10.4

Table 2. Percentage Distributions and Item Content for the Substance Use/Misuse Indices and Items^d (Continued)

4.	Do you think you will drink alcohol after you're 21?	32.5	34.2
B. Cigarettes			
1.	Have you ever smoked a cigarette?	26.5	30.4 ^a
2.	Have you smoked a cigarette in the past month?	5.1	8.8 ^c
3.	If you had a chance to smoke cigarettes in the next two years, would you do it?	8.1	13.5 ^c
4.	Do you think you will smoke cigarettes after you're 21?	15.1	19.4 ^b
C. Marijuana			
1.	Have you ever smoked marijuana?	5.0	7.1 ^a
2.	Have you smoked marijuana in the past month?	1.0	1.3
3.	If you had a chance to smoke marijuana in the next two years, would you do it?	3.2	3.8
4.	Do you think you will smoke marijuana after you're 21?	3.7	3.3

^a $p < 0.05$.^b $p < 0.01$.^c $p < 0.001$.^dPercentages are based on *N*'s ranging from 1,629 to 1,734 for Group A and from 790 to 831 for Group B.^eThese questions use the past 12 months as the reference period.^fA "drink" was defined as a can or bottle of beer, a glass of wine, a shot of liquor, or a mixed drink with alcohol in it.

respects. Students in Group B were more likely to have been in trouble with their friends or their parents because of drinking, were more likely to have ever used, currently use, and intend to use cigarettes, and to have ever used marijuana. It should be noted, however, that the differences between the means for the two groups for the alcohol misuse and marijuana items are very small (< 2.4%) and thus, although statistically significant with this large sample, are likely to be unimportant from a practical standpoint.

The correlations among the indices of susceptibility to peer pressure, self-esteem, health locus of control, alcohol use, alcohol misuse, and the items concerning substance use and intentions are given in Table 3. All of the alcohol use and misuse items and indices were significantly and positively correlated, and these items and indices were also significantly and positively correlated with the cigarette smoking and marijuana use and intention items. The correlations were all significant beyond the 0.001 level and ranged from 0.12 to 0.74. The "Susceptibility to Peer Pressure" index was significantly and positively correlated with all of the substance use, misuse, and intention items and indices. All of these correlations were significant beyond the 0.001 level and ranged in magnitude from 0.24 to 0.59. The three children's self-esteem indices

Table 3. Pearson Product Moment Correlations among the Susceptibility to Peer Pressure, Self-Esteem, Health Locus of Control, Alcohol Use and Misuse, and Substance Use and Intention Variables^a

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
1. Frequency of Alcohol Use Index	-																						
2. Alcohol Misuse Index I: Overindulgence	55	-																					
3. Alcohol Misuse Index II: Trouble with Peers	38	45	-																				
4. Alcohol Misuse Index III: Trouble with Adults	29	38	41	-																			
5. Ever Drank Alcohol	74	55	29	23	-																		
6. Drank Alcohol in Past Month	56	35	27	15	42	-																	
7. Intend to Drink Alcohol in Next 2 Years	42	37	22	18	43	38	-																
8. Intend to Drink Alcohol after 21	35	32	16	16	37	27	52	-															
9. Ever Smoked Cigarettes	32	35	25	19	36	19	30	26	-														
10. Smoked Cigarettes in Past Month	27	26	22	14	23	24	21	15	42	-													
11. Intend to Smoke Cigarettes in Next 2 Years	31	35	20	16	32	22	37	33	51	50	-												
12. Intend to Smoke Cigarettes after 21	30	31	18	17	30	19	31	38	45	41	71	-											
13. Ever Smoked Marijuana	36	34	27	18	30	20	26	18	33	33	31	26	-										
14. Smoked Marijuana in Past Month	25	27	23	19	17	19	15	12	16	29	19	18	43	-									
15. Intend to Smoke Marijuana in Next 2 Years	32	33	25	17	27	21	35	24	30	32	45	35	46	42	-								
16. Intend to Smoke Marijuana after 21	29	30	25	17	24	20	34	29	27	27	41	40	42	38	74	-							
17. Susceptibility to Peer Pressure Index	46	45	34	24	44	36	59	45	39	32	45	38	37	24	44	41	-						
18. Family Adjustment Index	-15	-17	-09	-10	-16	-08	-12	-10	-20	-14	-18	-15	-13	-11	-17	-19	-19	-					
19. Peer Adjustment Index	-04	-10	-06	-06	-08	01	-04	-04	-13	-09	-10	-11	-06	-04	-06	-07	-09	38	-				
20. School Adjustment Index	-20	-20	-13	-13	-20	-14	-17	-15	-21	-15	-22	-22	-18	-16	-25	-24	-29	31	19	-			
21. Adult Locus of Control Index	-05	-01	01	-00	-02	-01	-10	-14	-04	01	-01	01	-04	00	-03	-02	-11	02	-08	02	-		
22. Internal Locus of Control Index	-05	-10	-13	-09	-03	-04	-00	03	-07	-07	-06	-06	-04	-06	-08	-07	-03	16	06	09	-11	-	

^a Decimal points have been omitted. Correlations above 0.04 are significant at the 0.05 level. Pairwise *N*'s ranged from 2,417 to 2,551.

showed generally significant and negative correlations with the substance use, misuse, and intention items and indices. The "Family Adjustment" index had significant ($p < 0.001$) negative correlations with all of the substance use, misuse, and intention items and indices ranging from -0.08 to -0.20 . The "Peer Adjustment" index correlations with the substance use, misuse, and intention variables were significant beyond the 0.05 level and ranged from -0.04 to -0.13 , with the exception of the nonsignificant correlation of 0.01 with alcohol use during the past month, the nonsignificant correlation of less than -0.04 with intentions to drink in the next two years, and the nonsignificant correlation of less than -0.04 with marijuana use during the past month. The correlations of the "School Adjustment" index with these same variables ranged from -0.13 to -0.25 . With the exception of ever having used alcohol and intending to use alcohol in the future, the "Internal Locus of Control" index was significantly and negatively correlated with all of the alcohol use and misuse and substance use and intention items and indices. The correlations of the "Adult Locus of Control" index with the substance use, misuse, and intention items were for the most part nonsignificant.

The "Susceptibility to Peer Pressure" index was significantly and negatively correlated with all of the self-esteem indices and with the "Adult Locus of Control" index. These correlations ranged from -0.09 to -0.29 . The correlation between the "Susceptibility to Peer Pressure" index and the "Internal Locus of Control" index was not significant. The three self-esteem indices were significantly and positively intercorrelated. The correlations between the "Family Adjustment" index and the "Peer Adjustment" and "School Adjustment" indices were 0.38 and 0.31, respectively. The correlation between the "School Adjustment" index and the "Peer Adjustment" index was 0.19. The self-esteem indices were significantly and positively correlated, ranging from 0.06 to 0.16, with the "Internal Locus of Control" index. Only the "Peer Adjustment" index, of the three self-esteem indices, showed a significant correlation with the "Adult Locus of Control" index ($r = -0.08$). The correlation between the "Internal Locus of Control" and "Adult Locus of Control" indices was negative and significant, although small ($r = -0.11$).

DISCUSSION

The susceptibility to peer pressure, self-esteem, and health locus of control scales which were utilized in this study appear to be both consistent and reliable for this population. As a result of the analyses, six factors were identified which had acceptably high congruence coefficients and which had item content of a sufficiently varied nature to reflect substantive constructs rather than subsets of items based on superficial item similarity. The congruence coefficients were very high for these six factors and the fit of a confirmatory factor model in which all parameters were constrained to be equal across groups was reasonable. In addition, the internal consistency reliability (alpha) coefficients based on the combined sample were adequate.

The health locus of control factors resulting from the current analyses are similar to those discussed by Parcel and Meyer¹² and Levenson.²⁷ An external orientation is broadly defined as an expectancy that fate, chance, or powerful others will control events.²⁷ Levenson introduced the idea that belief in chance expectation should be measured separately from an orientation to powerful others. In the work of both

Parcel and Meyer and Levenson, three subscales were described: "Powerful Others Control," "Internal Control," and "Chance Control." These first two subscales appear to define similar constructs to those which resulted from the current study, i.e., "Adult Locus of Control" and "Internal Locus of Control." A pair of factors similar to "Chance Control" did emerge in the current data. This pair of factors was not highly congruent between groups, however, and therefore was not used for further analyses.

The self-esteem factors resulting from the current analyses were only moderately comparable to those of an earlier study by Dielman et al.⁶ which used the same items. For the "School Adjustment" factor, the highest loadings in both studies were obtained by identical items. The congruence coefficient between the current "School Adjustment" factor and the factor resulting from the earlier study, however, was only 0.64. Items loading on the "Family Adjustment" factor in the current study had loaded on factors identified as "Family," "Happiness," "Self-Confidence," and "Assertiveness" in the previous study. The "Family Adjustment" factor in the current study was about equally congruent with the "Happiness" and "Family" factors from the previous study, with congruence coefficients of 0.86 and 0.79, respectively. Items loading on the "Peer Adjustment" factor in the current study had loaded on factors labelled "Self-Control," "Happiness," and "Assertiveness" in the previous study. The congruence coefficients between "Peer Adjustment" in the current study and these factors from the earlier study were 0.18, 0.31, and 0.46, respectively.

One hypothesis for the difference in results is that it was due to a difference in methods. In the current analyses, the self-esteem items were factor analyzed simultaneously with the susceptibility to peer pressure and health locus of control items; whereas, in the Dielman et al.⁶ analyses, the self-esteem items were factor analyzed independently. The data, however, do not support this hypothesis. When a factor analysis using the current data was conducted separately for the self-esteem items, a pattern of results very similar to those obtained from the combined factor analysis of all three scales emerged. Congruence coefficients for the self-esteem factors for the combined and independent solutions ranged from 0.99-1.00. Other hypotheses for the difference in results are that true change occurred in the factor structures over time or that the populations were sufficiently different to generate different factor structures. Although the ages of the subjects in the two studies were similar, the populations differed. The previous study included fifth and sixth grade students from only one of the six school districts involved in the current study. In addition, there was a difference of about four years between the data collection in the two studies. In contrast to the discrepant results on the self-esteem factors, the CHLC factor analytic results of the current study were quite comparable to those obtained from the earlier Dielman et al.⁶ study. The congruence coefficients between the two studies for the "Adult Locus of Control" and "Internal Locus of Control" factors were 0.91 and 0.73, respectively.

The reduction of susceptibility to peer pressure has been an implicit focus of recent adolescent health behavior interventions, but the absence of any operationalization of the construct has rendered it impossible to test whether the interventions, if effective, acted through the reduction of this susceptibility. A scale was constructed in the current study to measure susceptibility to peer pressure. The items from this scale, when factor analyzed concurrently with the CHLC and CSE items, resulted in one factor which was highly congruent across both groups ($r_c = 0.99$). In addition, the internal consistency reliability (alpha) coefficient, and thus the upper limit of empirical

validity^{28,29} was higher for the "susceptibility to Peer Pressure" index than for the two locus of control and the three self-esteem indices. Yet, a caveat needs to be added concerning the construct validity of the "Susceptibility to Peer Pressure" scale. Although face validity suggests that susceptibility to peer pressure is being measured, it should be recalled that these items were adapted in part from a scale which was originally designed to measure "tolerance of deviance."¹⁷ Also, note that all of the items represent pressure to engage in behavior which could be considered deviant for adolescents. Thus, this scale may also be measuring tolerance of deviance to some extent. Jessor and Jessor⁷ have reported that tolerance of deviance showed significant correlations with adolescent substance use and abuse. The operational distinction between these constructs of "susceptibility to peer pressure" and "tolerance of deviance" must await studies of the convergent and discriminant validity of operations defining the two constructs.

The significant positive correlations among the substance use, misuse, and intention variables lend support to Jessor and Jessor's⁷ hypothesis of adolescent problem behavior constituting a syndrome for which comprehensive preventive education efforts might be effective. Previous findings,¹⁶ however, have indicated that preventive efforts which were effective in one area of adolescent problem behavior, e.g., smoking, were not necessarily effective in the prevention of other problem behaviors, e.g., alcohol or marijuana use. These previous efforts have been oriented toward the prevention of the use of single substances, however, and have been generally brief interventions. Additional effort needs to be directed toward the development of effective, generalizable, comprehensive substance abuse prevention programs using the social skills and resistance to social pressure techniques that have shown promise in the single substance prevention programs.

The positive correlations of the susceptibility to peer pressure index with all of the substance use, misuse, and intention variables lend support, for the first time in an operationally defined manner, to the focus on the concept of susceptibility to peer pressure in the development of future prevention efforts. This construct, whatever label may finally be applied to it, was more highly correlated with all of the substance use, misuse, and intention variables than were the measures of self-esteem and health locus of control. This provides evidence for the predictive validity of the "Susceptibility to Peer Pressure" scale and suggests that the direct effects of health locus of control or self-esteem on substance use or misuse may be of a sufficiently small magnitude to be unimportant as foci for substance abuse prevention efforts.

The results indicated that the self-esteem and health locus of control constructs are less central to adolescent substance use and misuse than is susceptibility to peer pressure. The development of adolescent health behavior interventions in the future should include an explicit focus on the reduction of susceptibility to peer pressure. This concept should be included in the evaluation instruments in order to determine whether the interventions are successful in reducing such susceptibility and, through that reduction, successful in deterring substance use and misuse.

References

1. Bush PJ, Iannotti RJ: The development of children's health orientations and behaviors: Lessons for substance use prevention. *Ntl Inst. on Drug Abuse Research Monogr Ser* 56:45-74, 1985.

2. Flay BR: Psychosocial approaches to smoking prevention: A review of findings. *Health Psychol* 4:449-488, 1985.
3. Jessor R: Marijuana: A review of recent psychosocial research, in RI Dupont, A Goldstein and J O'Donnell (eds): *Handbook on Drug Abuse*. Washington, DC, NIAAA, 1979.
4. Lewis CE, Lewis MA: Improving the health of children: Must the children be involved? *Annu Rev Public Health* 4:259-283, 1983.
5. Kaplan HB: Increase in self-rejection as an antecedent of deviant responses. *J Youth Adoles* 4:281-292, 1975.
6. Dielman TE, Leech SL, Lorenger AT, Horvath WJ: **Health locus of control and self-esteem** as related to adolescent health behavior and intentions. *Adolescence* 19:935-950, 1984.
7. Jessor R, Jessor SL: *Problem Behavior and Psychosocial Development - A Longitudinal Study of Youth*. New York, Academic Press, 1977.
8. Kandel DB: Antecedents of adolescent initiation into stages of drug use: A developmental analysis, in D Kandel (ed): *Longitudinal Research on Drug Use*. Washington, DC, Hemisphere Publishing Corporation, 1978.
9. Jessor R, Collins MI, Jessor SJ: On becoming a drinker: Social-psychological aspects of an adolescent transition. *Ann NY Acad Sci* 197:199-222, 1972.
10. Currie RF, Perlman D, Walker L: Marijuana use among Calgary youths as a function of sampling and locus of control. *Br J Addict* 72:159-165, 1977.
11. Clarke JH, MacPherson BV, Holmes DR: Cigarette smoking and external locus of control among young adolescents. *J Health Soc Behav* 23:253-259, 1982.
12. Parcel GS, Meyer MP: Development of an instrument to measure children's health locus of control. *Health Educ Monogr* 6:149-159, 1978.
13. Evans RI, Rozelle RM, Mittelmarm MB, Hansen WB, Bane AL, Havis J: Detering the onset of smoking in children: Knowledge of immediate physiological effects and coping with peer pressure, media pressure, and parent modeling. *J Appl Psychol* 8:126-135, 1978.
14. McAlister A, Perry C, Killen J, Slinkard LA, Maccoby N: Pilot study of smoking, alcohol, and drug abuse prevention. *Am J Public Health* 70:719-721, 1980.
15. Perry CL, Killen J, Slinkard LA, McAlister AL: Peer teaching and smoking prevention among junior high students. *Adolescence* 15:277-281, 1980.
16. Dielman TE, Lorenger AT, Leech SL, Lyons AL, Klos DM, Horvath WJ: Resisting pressures to smoke: Fifteen-month follow-up results of an elementary school based smoking prevention project. *Hygie* 4:28-35, 1985.
17. Rachal JV, Guess LL, Hubbard RL, Maisto SA, Cavanaugh ER, Waddell R, Benrud CH: *The Extent and Nature of Adolescent Alcohol and Drug Use: The 1974 and 1978 National Sample Studies*. Rockville, MD, NIAAA (NTIS No. PB81199267), 1980.
18. Dielman TE, Shope JT, Butchart AT, Campanelli PC: Prevention of adolescent alcohol misuse: An elementary school program. *J Pediatr Psychol* 11:259-282, 1986.
19. Coopersmith S: *The Antecedents of Self-Esteem*. San Francisco, Freeman, 1967.
20. Davies J, Stacey B: *Teenagers and Alcohol: A developmental study in Glasgow*. London, Office of Population Censuses and Surveys, Social Survey Division, 1972.
21. Greenwald MA: *Minimizing Alcohol Problems and Smoking: Final Report Year II*. Pittsburgh, University of Pittsburgh, 1982.
22. Tucker LR: *A Method for Synthesis of Factor Analysis Studies*. Personnel Research Section Report No. 984, Washington, DC, Department of the Army, 1951.
23. Long JS: *Confirmatory Factor Analysis: A preface to LISREL*. Beverly Hills, CA, Sage, 1983.
24. Joreskog K, Sorbom D: LISREL VI: *Analysis of Linear Structural Relationships by the Method of Maximum Likelihood*. Mooresville, IN, Scientific Software, Inc., 1984.
25. Wheaton B, Muthen B, Alwin D, Summers G: Assessing reliability and stability in panel models, in DR Heise (ed), *Sociological Methodology*. San Francisco, Jossey-Bass, 1977.
26. Hoelster JW: The analysis of covariance structures. *Soc Meth Res* 11:325-344, 1983.
27. Levenson H: Activism and powerful others: Distinctions within the concept of internal - external control. *J Pers Assess* 38:377-383, 1974.
28. Bohrnstedt GW: Measurement, in PH Rossi, JD Wright, AD Anderson (eds), *Handbook of Survey Research*. New York, Academic Press, 1983.
29. Nunnally JC: *Psychometric Theory*. New York, McGraw-Hill, 1978.