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# Identification of Which High Risk Youth Smoke Cigarettes Regularly

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# Identification of Which High-Risk Youth Smoke Cigarettes Regularly

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**ABSTRACT:** This study investigated which variables distinguish high school-aged adolescents who identify themselves as members of a high-risk group and, among them, those who report regular (weekly) vs. light levels of cigarette smoking. Youth who identified with a high-risk group were most likely to report problem-prone character-

istics, such as a preference to take risks and smoke cigarettes. Yet, only half of them reported regular levels of smoking. Two variables delineated light smoking among these youth: not having a close friend who smoked and placing an importance on health as a value. Development of new tobacco-use prevention strategies to impart health values is suggested.

Identifying predictors of adolescent cigarette smoking has remained an important research task for several years because those youth who smoke also tend to be engaged in other risky behavior,<sup>1</sup> approximately 70% of youth who smoke regularly are likely to become smokers as adults,<sup>2</sup> and a knowledge of predictors of adolescent

smoking provides information useful for the development of prevention programming.<sup>2</sup> Adolescent peer group influences have been found to be among the strongest predictors of tobacco use, in part because the peer group may promote risktaking values among its members that encourage experimentation with cigarettes.<sup>3</sup>

Adolescents often provide names to the informal peer groups with which they identify. Therefore, two recent studies investigated whether or not identification with discrete adolescent groups was predictive of tobacco use. Mosbach and Levanthal<sup>4</sup> and Sussman et al.<sup>5</sup> used a self-report questionnaire approach, developed from Brown and Trujillo (unpublished study), to assess group identification. This technique requested subjects to identify the one group with which they felt most a part of. The names were then grouped into five main categories: "hot-shots," "regulars," "jocks," "skaters," and "dirts" (to be referred to as "high-risk youth" in the rest of this manuscript). "Hot-shots," or popular youngsters, were described by these researchers as leaders in school activities, such as academic activities. "Regu-

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lars" were described as normal or typical of their grade. The "jocks" were described as having a strong interest in team and individual sports activities. "Skaters" were described as placing importance on an outdoor skateboarding activity. Finally, the "high-risk youth" were described as exhibiting problem-prone attitudes and behaviors that included low self-esteem, a preference to take risks, and drug use. Both studies found that youth who were most likely to smoke cigarettes identified themselves as belonging to a high-risk group. Across both studies, approximately 50% of those 7th-to-10th graders who identified themselves as belonging to a high-risk group were weekly smokers, whereas among the several other self-identified adolescent groups less than 25% were weekly smokers.

Still, not all youth who identified themselves as a member of a high-risk adolescent group were weekly cigarette smokers; 50% smoked cigarettes at a much lower frequency. Because risk was assigned by group membership, and not by use of tobacco, this result was not contradictory. On the other hand, this result is surprising because these youth were likely to have been experiencing relatively intense group pressure to smoke. Predictors that differentiate high-risk youth who are regular smokers from the high-risk youth who are light smokers might suggest strategies that these youth employ to protect themselves from group pressure. Such information is of potential importance to preventive efforts among high-risk youth.

There are at least two sets of predictors that differentiate light from regular smokers among these youth. First, the light smokers simply could rate themselves at lower levels along those same variables that discriminate the high-risk youth from other groups. They may report having fewer close friends who smoke cigarettes, less risk-taking preference, and so on.<sup>5</sup> In other words, they may be less representative of the youth who typically identify themselves as members of a high-risk group.

Alternatively, youth who are not regular smokers yet identify themselves as belonging to a high-risk group may resist social pressures to smoke cigarettes due to certain variables that do not typically differentiate high-risk youth from others. Some previous research has suggested that youth who report problem-prone attitudes and behavior are less likely to smoke or use drugs if they tend to engage in physically

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rigorous activities or report a desire for physically unimpaired functioning.<sup>3-8</sup> Possibly, these youth place greater value on their own health as of "importance to achieve a happy life."<sup>9</sup> Because most youth perceive cigarette smoking as being incompatible with the notion of placing an importance on health as a value,<sup>3</sup> youth who do place a value on health probably would not be likely to smoke. The value placed on health is not uniformly high among children<sup>10</sup> or adults,<sup>9</sup> as some researchers might assume. Thus the importance of health as a value may discriminate between those who are or are not weekly smokers, among youth who are otherwise of similarly high-risk status.

Controlling for the attitudinal value placed on health, neglect of standard health practices, such as those practices measured by the Human Population Laboratory ("risk factors"),<sup>11,12</sup> is likely to be associated with smoking. Specifically, youth who drink alcohol, do not exercise, do not sleep well, do not eat breakfast, keep a poor diet, and feel stressed may be those who also are likely to smoke regularly. Participating in healthy practices may protect against smoking by providing the individual with alternative means of fulfilling the same functions (e.g., feeling better) or because smoking interferes with full participation in some other, healthier behaviors, such as involvement in rigorous activities.<sup>3</sup>

The present study investigated which questionnaire items differentiate high-risk youth from other self-identified groups. Domains assessed included demographic information (e.g., parents' education), various psychosocial variables (e.g., risk-taking).

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socioenvironmental smoking, and health-related variables. The current study also investigated which of those same questionnaire items differentiate high-risk youth at different tobacco use levels. In particular, the present study examined whether those who were regular vs. light smokers differed on health value<sup>9</sup> and health risk-factor<sup>11</sup> items.

## **METHOD**

### **Subjects**

The total sample consisted of 1,245 high-school students in grades 9 through 12. The subjects were 52% male, 59% white, 21% Hispanic, and 20% other ethnicities. Modal occupational status of father was minor professional (27%) and skilled laborer (25%). Modal occupational status of mother was housewife (30%) and minor professional (22%). Students were sampled in equal numbers from 12 high schools in southern California. One classroom of students per grade was randomly selected from each school to be surveyed. Eighty-five percent of the 1,518 students enrolled completed the evaluation. A passive consent procedure was used, in which parents were informed that if they did not return active dissent forms, the student would be measured. Ten percent of the enrolled students were absent on the day of the evaluation (an average daily absence rate at these schools), and five percent provided active student or parent dissent.

### **Procedure**

Students were asked to complete a voluntary, anonymous health questionnaire. Questionnaires were administered by highly trained data collectors who were not employees of the schools. The anonymity of responses was emphasized in verbal instructions to the students. Previous research<sup>13</sup> has shown that adolescents can be expected to provide valid self-reports of smoking when their anonymity is guaranteed.

### **Questionnaire Items**

The questionnaire consisted of 17 pages. The items used for this study were part of a larger tobacco use assessment project that measured tobacco knowledge, attitudes, beliefs, and behaviors among high school students. The questionnaire was administered in a single classroom period. The questionnaire required approximately 45 minutes to complete. Of the 204 items included in the survey, 41 (19.6%) were used in this study. One set of items assessed basic demographic information, such as ethnic status, gender, region (urban/rural), school grade, and parents' socioeconomic status (defined by two 6-point parent-level-of-education scales and two 9-point level-of-occupation scales). Each education item (one regarding the father, one regarding the mother) requested the parent's educational attainment extending from *completed graduate school* (doctor, lawyer) to *not completed elementary school*. Each occupation item requested the parent's "main job," with response options extending from *major professional* (doctor, lawyer, large business owner) to *unemployed, welfare or housewife/husband*. Other items assessed behavioral information, such as current use of cigarettes and alcohol,<sup>14</sup> several psychosocial constructs, socioenvironmental smoking, health-related items, and group self-identification (described in the subsequent section).

One psychosocial construct assessed student involvement in sports (3-item index coded as "1" (at least one category checked) or "0" (no category checked)), requesting the subject to indicate on a checklist format participation at school or outside of school in team or individual sports. Participation in sports tends to be inversely related to cigarette smoking.<sup>5,8</sup> A second psychosocial construct assessed preference for risktaking, using an index consisting of the mean of two 4-point rating scales, with endpoints of *strongly agree* to *strongly disagree*. Items included "I enjoy doing things people say should not be done" and "It is worth getting in trouble to have fun" (inter-item  $r=.55$ ).<sup>3</sup> High risktaking preference is strongly predictive of cigarette smoking and other problem behaviors.<sup>5,16,17</sup> Self-esteem was assessed with Rosenberg's 10-item scale (Cronbach's  $\alpha=.85$ ).<sup>18</sup> Low self-esteem is associated with cigarette smoking and is reported relatively often by high-risk youth.<sup>5,15</sup>

Other psychosocial constructs evaluated in the present study included at-risk coping

**TABLE 1**  
**Health-Related Questionnaire Items**

Health Risk-Factors	Response
I almost always sleep well at night	True/False
I almost always eat breakfast	True/False
I almost always am good at handling stress	True/False
I will never become a smoker	True/False
I will never become a heavy drinker	True/False
I almost never eat lots of french fries, butter, or candy	True/False
I almost always get lots of exercise	True /False
Health Values	Response
I feel that if I don't have my health I don't really have anything	True/False
I want to take care of my health now so my future will be good	True/False

strategies, peer commitment, family conflict, and importance of having a good reputation at school. At-risk coping strategies were assessed with two binary indicators taken from categories used by Wills<sup>19</sup> "When I have a problem," "I get revenge," or "I party." Examined separately, these two items have been found to be significant concurrent and prospective predictors of cigarette smoking.<sup>19,20</sup> Their intercorrelation is low ( $\phi = .25$ ), and they were examined separately in the present study. Peer commitment was assessed with two items: "If you found that your group of friends was leading you into trouble, would you still hang around with them?" ("yes" or "no") and "If your group of friends got into trouble, would you lie to protect them?" ("yes" or "no"). These items were examined because they tend to be among those relatively likely to be endorsed by risktaking youth<sup>21</sup> and may be predictive of cigarette smoking. Their intercorrelation is low ( $\phi = .28$ ), and they were examined separately in the present study. Family conflict was assessed with three items: "My family looks for things to nag me about" ("true" or "false"); "My family doesn't understand me" ("true" or "false"); and "I have a lot of arguments with my family" ("true" or "false"). These items were selected because they tend to be among

those relatively likely to be endorsed by risktaking youth<sup>21</sup> (also Sussman et al., under review) and they may be predictive of cigarette smoking. These items showed an adequate internal consistency to combine them (Cronbach's  $\alpha = .76$ ). The mean of the items was used as the predictor. Importance of school reputation was assessed with one 4-point rating scale item "How important is it for you to have a good reputation at school?" The response choices ranged from *very important* to *not important at all*. Lack of concern over school reputation is relatively likely to be endorsed by risktaking youth and has been found to be predictive of cigarette smoking.<sup>8,21</sup>

Socioenvironmental smoking was assessed with six binary items, requesting the subject to indicate on a checklist format which persons they knew who currently smoke, including father, mother, sibling, other relative, close friend, and other adult. The items do not show high internal consistency (Cronbach's  $\alpha = .45$ ) and generally are best analyzed individually since they tend to vary in importance as predictors of adolescent smoking. Socioenvironmental smoking, particularly among peers, is strongly predictive of smoking.<sup>21,22,23</sup>

Finally, a set of health-related items was included to explore potential differences be-

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**Health risk-factor and health value items have been found to be highly intercorrelated among adults, but they were not highly correlated in this sample.**

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between high-risk youth who are regular smokers and those who are light smokers. These included health risk-factor items (seven binary indicators adapted for adolescents),<sup>11</sup> and health value items (two items).<sup>9</sup> Health risk-factor and health value items have been found to be highly intercorrelated among adults,<sup>23</sup> but they were not highly correlated in this sample (Cronbach's  $\alpha = .51$  for the risk factor items;  $\phi = .20$  for the health value items). Thus, these items were examined individually. All health-related items are shown in Table 1.

#### **Group categories and description**

In previous work, group names were identified as an open-ended item.<sup>5</sup> The 21 most popular responses, which accounted for approximately 90% of all group names mentioned, were retained for use as a multiple choice item in the present study. The group categories were created using the following procedure. Students were asked to respond to the statement "People often hang out in different groups at school. Please choose the one group below which most closely matches the group you belong to. (Check only one.)" The 21 group names were recoded to conform to a five-group typology based on Brown and Lohr,<sup>26</sup> Mosbach and Levanthal,<sup>4</sup> and Sussman et al.<sup>5</sup> Thus, several group categories included multiple group names. For example, the general group category "high-risk youth" was composed of "stoners," "heavy metalers," "bad kids," "hippies," and "punks or skinheads." Two additional categories were included in the analyses: "Other" and "I am not part of any group."

Raters are consistent in their coding of these categories into the five-group typology and have shown 93% agreement (Cohen's Kappa=.85%,  $Z=70.18$ ,  $p<.0001$ ) when coding open-ended responses into the same five

categories: hot-shots, regulars, jocks, high-risk youth, and skaters.<sup>5</sup> This group self-identification method results in the same types of group categories, reliably rated by youths or adults, across two regions of the country and across multiple school grades.<sup>4,5,24</sup>

#### **Analysis**

First, five group categories were created as described in the previous section. Next, the high-risk youth group was compared to other groups (as well as to "Other" and "No Group" categories) on all questionnaire items listed above. Data analyses consisted of calculation of CATMOD logistic regression models that provide  $\chi^2$  tests of association.<sup>27</sup> In these analyses, group status was predicted from individual measures. This type of modeling permits the use of the same type of analysis for all measures (with the same set of assumptions) regardless of whether the predictor variable is qualitative or quantitative. If an overall association test that included a quantitative measure was significant, a series of LSD  $t$ -tests would be calculated to compare the mean of the high-risk youth group with each of the other groups on the quantitative measure. To control for the overall alpha inflation resulting from calculation of multiple tests, the Bonferroni Multistage Procedure was used. The alpha level of .05 was divided by the number of tests completed to provide an overall alpha level at each stage of the procedure. Tests found to meet that overall level would be removed at subsequent stages.<sup>28</sup> Thirty-three analyses were calculated comparing the groups on four sets of items (2 behavioral, 7 demographic, 9 psychosocial, 6 socioenvironmental, and 9 health-related). At the first stage of the procedure an overall alpha level was set at .002. The final-stage alpha level was set at .003. All analyses meeting this final-stage level are presented in the text.

The sample of high-risk youth was retained for the second set of analyses, which explored those variables that differentiate regular vs. light smoking among these youth. Although some studies have used monthly smoking as a cut-off level for regular smoking,<sup>2</sup> most studies have used weekly smoking as the cut-off level.<sup>29</sup> Thus, current smoking was binary coded into "1" (weekly smoking or greater) or "0" (less than weekly smoking). Next, a series of logistic regression analyses was completed to examine, among the high-risk youth, which of the

**TABLE 2**  
**Differences Between High-Risk Youth and the Other Groups**

Items	$\chi^2$ Values	Percentages or Means	
		High-Risk Youth	Range Other Groups
<b>Psychosocial Variables</b>			
Sports Participation	88.9***	46	53 to 95
Risktaking(1=high to 4=low)	44.0***	2.5(0.8)	2.6(0.7) to 3.0(0.7)
Get Revenge	23.8***	26	9 to 22
"Party"	44.0***	36	9 to 27
Trouble with Friends	32.8***	53	12 to 26
Lie for Friends	21.2**	82	60 to 71
Family Conflict(1=high to 2=low)	27.2***	1.4(0.5)	1.6(0.4) to 1.7(0.4)
School Reputation (1=important to 4=not important)	58.2***	2.4(1.1)	1.5(0.7) to 2.1(1.1)
<b>Socioenvironmental Smoking</b>			
Sibling's Smoking	23.8**	40	15 to 21
Close Friend's Smoking	71.2***	68	19 to 50
<b>Health-Related Items</b>			
Likelihood of Becoming a Smoker	57.12***	53	12 to 29
Likelihood of Becoming a Heavy Drinker	55.63***	33	7 to 12
Likelihood of Exercising	37.73***	67	71 to 90
Take Care of Health Future	21.20**	83	92 to 97

Note: + $p < .06$ , \* $p < .05$ , \*\* $p < .001$ , \*\*\* $p < .0001$ ;  $df=6$  for all models; standard deviations are shown in parentheses next to the means.

above items discriminated weekly smokers (or greater) from lower levels of use; 32 tests were calculated. Again, the Bonferroni Multistage Procedure was used. At the first stage the overall alpha level was set at .002, and the final-stage alpha level was .002. All analyses meeting this final-stage level are presented in the text.

Finally, a multivariate logistic regression model was calculated among the sample of high-risk youth with predictors found to be significant in the univariate models after using the Bonferroni procedure. The dependent variable was the binary-coded weekly cigarette smoking item. School grade level was entered as an additional predictor in the final multivariate logistic regression model. Although both Mosbach and Levanthal and Sussman et al. failed to find a relationship of group self-identification with school grade,<sup>4,5</sup> tobacco use does vary across grades, and it is prudent to demonstrate that findings hold across grades.

## RESULTS

### *Differences of the high-risk youth from the other groups*

**Behavior.** Overall, 19% and 37% of the sample were weekly users of cigarettes and alcohol, respectively. High-risk youth were most likely to be weekly cigarette smokers (51% vs. 8 to 23%;  $\chi^2(6)=76.78$ ,  $p < .0001$ ). They also were most likely to be weekly alcohol drinkers (71% vs. 27 to 48%;  $\chi^2(6)=74.15$ ,  $p < .0001$ ).

**Demographic variables.** The high-risk youth group was composed of 82 youths, who were 60% female and 60% white. While gender varied across the groups (from 13% female among the jocks to 62% female among the regulars;  $\chi^2(6)=142.9$ ,  $p < .0001$ ), both genders were roughly equally represented among the high-risk youth. Ethnic status (white/nonwhite) did not vary significantly across the groups (from 53% white among the jocks to 74% white among the skaters). Educa-



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**High-risk youth were most likely to report that they would hang around with their friends even if they were being led into trouble, and most likely to report that they would lie to protect their friends.**

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tional and occupational status of father or mother also did not differentiate the high-risk youth from the other groups. Occupational status of mother provided the only significant model among the socioeconomic items at a univariate or overall level ( $\chi^2(6)=19.6, p<.003$ ). The regulars reported a lower occupational status of mother than did the hot-shots. No differences were found across urban and rural youth.

Group name varied over grade only at a univariate alpha level ( $\chi^2(18)=31.9, p<.02$ ), not at the overall level. Although number of skaters decreased between grades 9 and 12 ( $ns=24, 19, 15$ , and 7) and number of hot-shots tended to increase ( $ns=33, 32, 46$ , and 48), the number of subjects in other groups was stable across grades and composed the same relative percentages of the adolescent sample across grades. The high-risk youth composed between 6.7% and 7.1% of the sample across grades ( $ns=20, 20, 24, 22$ ). Also, in the full sample, weekly (or greater) smoking vs. a lower level of smoking varied only marginally by grade and was not significant at the Bonferroni final-stage level of .003 ( $ns$  of weekly smokers by grade= 43, 63, 77, and 57;  $\chi^2(3)=7.5, p<.06$ ).

**Psychosocial variables.** Contrary to most studies, but consistent with that of Mosbach and Levanthal,<sup>4</sup> high-risk youth were not found to differ significantly in level of self-esteem from any of the groups. Consistent with the findings of Sussman et al.,<sup>5</sup> the high-risk youth were least likely to be involved in sports and were most likely to enjoy taking risks (though not significantly higher than the skaters). Regarding preference for at-risk coping responses, high-risk youth were most likely both to get revenge and "party." High-risk youth were most likely

to report that they would hang around with their friends even if they were being led into trouble, and most likely to report that they would lie to protect their friends. High-risk youth were most likely to report family conflict (e.g., that their family nagged them all the time). Also, having a good reputation at school was least important to the high-risk youth.

**Socioenvironmental smoking.** Of six socioenvironmental categories (father, mother, sibling, other relative, close friend, and other adult), two differentiated the high-risk youth from the other groups at the overall alpha level. High-risk youth were most likely to report sibling's smoking and close friend's smoking.

**Health-related items.** On the health risk-factor items, high-risk youth did not differ from the other groups in likelihood to eat junk food, even at the univariate alpha level. Their responses were statistically lower on several of the items at a univariate alpha level (i.e., sleep well, eat breakfast, handle stress, not become a smoker, not become a heavy drinker, exercise). However, at the overall level they were statistically lower only on being not likely to become a smoker, being not likely to become a heavy drinker, and being likely to exercise. High-risk youth were not significantly less likely among the groups to endorse the statement "If you don't have your health, you don't have anything" at the overall level, although they were significantly lowest regarding endorsement of the statement "I want to take care of my health now so my future will be good."

#### **Differences between regular and light smokers among the high-risk youth**

**Behavior.** The mean level of current smoking for the regular smokers (i.e., weekly or greater) was approximately 10 cigarettes each day with a standard deviation extending from smoking a few times each week to smoking a pack or more per day. The mean response for high-risk youth who were light smokers (i.e., less than weekly) was smoking 0 cigarettes in the last year with a standard deviation extending from "never smoked" to "smoked a few times this year." Thus, individuals could be grouped into the categories of either those who were "regular" (weekly) smokers, or those who were "light" smokers (either smoking a few times a year or never). Current alcohol use did not pre-

**TABLE 3**  
**Health-Related Differences Between Regular vs.**  
**Light Smoking High-Risk Youth**

		Percentages	
Health Items	$\chi^2$ Values	Regular Smokers	Light Smokers
Risk Factors			
Sleep Well	0.0	51	53
Eat Breakfast	3.7+	28	59
Handle Stress Well	1.1	45	57
Never Become a Smoker	56.3***	5	92
Never Become a Drinker	5.6*	55	81
Never Eat Lots of Fried Food	1.0	33	22
Get Lots of Exercise	3.5+	58	78
Health Values			
Health Worth	15.7***	28	74
Health Future	10.8***	68	97

Note: + $p < .06$ , \* $p < .05$ , \*\* $p < .001$ , \*\*\* $p < .0001$ ;  $df=1$  for all models

dict regular vs. light smoking among the high-risk youth at the overall alpha level, although this item was a significant predictor at a univariate level ( $\chi^2(1)=3.77$ ,  $p < .05$ ; comparing regular to light smokers, the means were the equivalent of drinking approximately once a week vs. once a month).

**Demographic variables.** Regular smoking high-risk youth did not differ from light smoking high-risk youth on any of the demographic variables at the overall alpha level of .002 (i.e., regarding ethnic status, school grade level, parents, SES, and region). At a univariate alpha level, regular smokers were more likely to be female (69% vs. 40%;  $\chi^2(1)=6.01$ ,  $p < .01$ ).

**Psychosocial variables.** Even at a univariate alpha level, regular vs. light smoking status failed to predict risktaking, self-esteem, likelihood these youth would hang around with their friends even if they were being led into trouble, likelihood they would lie to protect their friends, or that it was not important for them to have a good reputation at school. At a univariate alpha level, but not at the overall level, regular smokers were less likely to participate in sports ( $\chi^2(1)=5.4$ ,  $p < .02$ ), more likely to use "get revenge" ( $\chi^2(1)=4.7$ ,  $p < .03$ ) or "party" ( $\chi^2(1)=3.7$ ,  $p < .05$ ) as coping strategies, and marginally more likely to report family con-

flikt ( $\chi^2(1)=3.5$ ,  $p < .06$ ). Thus, none of the psychosocial characteristics that had been found to distinguish the high-risk youth from other groups were found to distinguish regular from light smokers among the high-risk youth at the overall alpha level after using the Bonferroni Multistage Procedure.

**Socioenvironmental smoking.** Only one of the six categories differentiated regular from light smokers at a univariate or overall alpha level. Regular smokers were more likely to have a close friend who smoked ( $\chi^2(1)=11.62$ ,  $p < .001$ ; 85% vs. 50% of regular vs. light smokers, respectively).

**Health-related items.** Table 2 presents a summary of the univariate health-related differences between regular vs. light smokers. Three of these items distinguished between regular vs. light smokers at the overall alpha level: likelihood of becoming a regular smoker, "I feel that if I don't have my health I don't really have anything," and "I want to take care of my health now so my future will be good." In summary, only 4 of 32 relations in this second set of analyses remained significant when applying the overall alpha level. Regular smokers were more likely to report having a close friend who smoked, being likely to become a smoker in the future, and placing a lower value on health (two items).

***Interestingly, the percentage of females reporting membership in a high-risk group was slightly higher than that for males.***

**Comparison of socioenvironmental vs. health-related items.** To compare the predictive precedence of socioenvironmental vs. health-related items, controlling for grade level, a logistic regression model was calculated using CATMOD,<sup>27</sup> predicting regular vs. light smoking from three variables in a main effects model, with all three predictors entered simultaneously. Both the health value item "If I don't have my health, I don't have anything" ( $\chi^2(1) = 7.17, p < .008$ ) and the cigarette-use-by-close-friend item ( $\chi^2(1) = 4.70, p < .03$ ) were significant nonredundant predictors of cigarette use status (residual  $\chi^2(9) = 5.02, p > .1$ ). Grade was not a significant predictor ( $\chi^2(3) = 5.48, p > .1$ ). A second model, using the other health values item as one of the three predictors, did achieve a significant effect for grade ( $\chi^2(3) = 9.80, p < .02$ ), a marginal effect for that health values item ( $\chi^2(1) = 3.35, p < .07$ ), and a significant effect for the close friend item (chi-square(1) = 6.45,  $p < .01$ ; residual  $\chi^2(9) = 2.18, p > .1$ ).

**Effects of grade and high-risk subgroups.** At least two variables could affect the interpretation of the results presented herein, grade and high-risk subgroup. Thus, first the patterns of univariate findings were explored as a function of grade simply as a check of those results. The pattern of the univariate results remained the same when analyzed by grade, whether comparing the self-identified groups or comparing regular vs. light smoking high-risk youth. Second, a comparison was made regarding high-risk subgroups (i.e., stoners, heavy metalers, bad kids, hippies, and punks or skinheads); the final logistic regression model was examined replacing grade with subgroup (five categories). When entered along with the other predictors, subgroup name was not a significant predictor of regular vs. light smoking among the high-risk youth, whereas the pattern of

the relations of the other variables with smoking level remained the same. These results indicate that the grouping of subgroups into the high-risk group did not provide a third-variable confound.

## DISCUSSION

This study revealed that, as in previous studies, high school-aged high-risk youth show the problem-prone distinguishing characteristics of relatively high risk-taking, noninvolvement with sports or school, greater use of cigarettes and alcohol, greater socioenvironmental use of cigarettes (particularly among close friends), greater likelihood to violate norms to protect friends, greater family conflict, and greater likelihood to use "revenge" or "party" as coping strategies. Not too surprisingly, high-risk youth were somewhat less likely to endorse healthy responses on the seven health risk-factor items and on the two health value items. When the Bonferroni Multistage Procedure was used, 18 of 33 findings remained significant, including both behavioral items, only 2 of 7 demographic items, 8 of 9 psychosocial items, 2 of 6 socioeconomic items, and 4 of 9 health-related items. Even though the present cohort was somewhat older than in previous studies,<sup>4,5</sup> the major results of those studies were replicated. Furthermore, other problem-prone related variables, such as lying to protect friends and family conflict, which had not been examined previously in this context, were associated with belonging to a high-risk group.

The male-to-female ratios differed across groups. Interestingly, the percentage of females reporting membership in a high-risk group was slightly higher than that for males. Also within the high-risk group, the regular smokers were more likely to be female. It appears that females are at least as susceptible as males, if not more so, to the negative influences of high-risk peer groups.<sup>30</sup>

Among the other group categories the percentage of regular smokers ranged from 8-23% while over 50% of all high-risk youth smoked cigarettes regularly. We explored which of the 32 items differentiate regular from light smokers from among this self-identified high-risk group category. The Bonferroni-adjusted results indicated that, aside from the obvious health risk-factor item "I will never become a smoker," the two health value items and having a close friend who smoked discriminated between high-risk youth who were regular smokers vs. those

who were light smokers. Also, the multivariate logistic regression results indicated that youth who otherwise show the features of being high-risk are less likely to be regular cigarette smokers if they value their health, even after controlling for socioenvironmental smoking.

The results have potential implications for comprehensive social influences-oriented prevention programs. These programs may succeed in dissuading some high-risk youth from smoking regularly because such programs help youth directly resist pressures to smoke exerted by same-sexed peers. Strategies focusing on refusing offers made by close friends appear to be of particular importance. However, few programs have tried to change attitudes regarding the importance of health to the individual. Novel strategies that affect this intrapersonal variable need to be developed.

There are at least four possible strategies that could be incorporated into tobacco use prevention programming that might manipulate the value these youth place on health. First, discussion of alternative activities available to youth may help to involve them in healthy activities.<sup>7</sup> Univariate results of the present study showed that youth who valued their health also were relatively likely to be involved in sports. Perhaps, youth who are committed to activities that promote good health are those who will value their health. A second strategy might be to encourage associations between health values and values high-risk youth greatly admire. For example, they may find, perhaps through use of a media presentation, that a value placed on health is essential to continue an ongoing "exciting" life (e.g., that rock and roll singers who continue to thrive are those who come to value health).

Third, youth who are threatened with personally relevant physical consequences may place renewed importance on their health. One strategy would be to confront youth with increasing negative consequences resulting from cigarette smoking, through use of role-play situations, and then use group discussion to direct youth to place a greater value on their health.<sup>31</sup>

Finally, some social influence techniques can be adapted to create a change in the value placed on health. For example, in school-based prevention programs, using the "normative restructuring" method,<sup>31</sup> youth would stand under signs that indicate their opinions of the value of health, and the class would be confronted with the importance the majority places on health.

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***There are at least four possible strategies that could be incorporated into tobacco use prevention programming that might manipulate the value these youth place on health.***

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This activity uses peer social influence to exert a more positive value placed on health. This method has been used successfully in school-based prevention programs to manipulate perceptions of peer approval or social information associated with behaviors, such as smoking or drinking,<sup>31</sup> and would be likely to be efficacious in the present context.

Three substantive caveats should be considered regarding the range of applicability of a health values component in prevention programming. First, according to Millstein and Irwin,<sup>32</sup> older youth think of health as more of a holistic concept than do younger youth, who view health more simply as the absence of illness. Perhaps, health value-directed strategies are more relevant for older youth, including those of high school age. Second, regular smokers may hold a relatively skeptical perception of the harmfulness of smoking<sup>33</sup> (although some research suggests that regular smokers are just as aware as nonsmokers of consequences of use<sup>34</sup>). Regular smokers may need to be taught that smoking is immediately harmful to them as well as that they should pursue healthy values. In other words, they should be taught that smoking and pursuit of health values are mutually exclusive options. Third, the regular smokers may be at a later stage of development of tobacco use.<sup>34</sup> As discussed by Stern et al., an adolescent's stage of tobacco use development may influence the relative effectiveness of smoking prevention programs.<sup>34</sup> Among the high-risk youth, light smokers might be at an earlier stage in the development of tobacco use. Because those adolescents in the contemplation or decision-making stages of tobacco use are most vulnerable to a variety of influences to smoke or

not smoke, programs designed to increase the value placed on health may be particularly beneficial in preventing further smoking among these subjects. However, health value manipulations may be resisted by those in later stages of smoking, unless some emphasis is placed on convincing these youth that the benefits of participation in healthy activities outweigh their positive perceptions regarding smoking. Further research is needed to examine at what grade level and stage of tobacco use development health value material should be added to prevention programming to exert a maximum preventive impact.

Also, one methodological caveat should be mentioned. As is the case with any nonexperimental procedure, it is possible that some unmeasured variable accounts for the association between tobacco use and a health value preference among high-risk youth. If a third variable confound does exist, the present results would imply that some strong correlate of health value preference predicts tobacco use in high-risk youth. In the present study, we found no evidence of a spurious effect between the two health value items and identification with a high-risk group. Also, a response bias regarding tobacco use is unlikely because data collection procedures maintained the anonymity of responses, which tends to maximize the validity of self-reports of tobacco use.<sup>13</sup> Still, future research should consider at least two approaches to provide additional tests of the conclusions stated herein. First, a prospective study should be completed to provide a more complete explanation of these results because this type of study could establish order of precedence between placing a value on health and tobacco use behavior. Second, consideration should be made of use of a greater variety of alternative health value measures to provide a means of convergent validation of this concept.<sup>33</sup>

In summary, this study indicates that, although several variables distinguish high-risk youth from other groups, only use of tobacco by a close friend and the value one places on health are significant predictors of regular smoking among high-risk youth. Prevention strategies may need to consider implementing activities aimed at modification of health values as well as confrontation of peer influences to smoke. More research should be completed regarding formation of health values and how such values come to achieve relative importance among other life values, including pleasure or success.

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