# Perceived Believability Among Adolescents of Health Warning Labels on Cigarette Packs[1]

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This study investigated the extent to which adolescents believe the health warning labels on cigarette packs, and the relationship of current smoking status and gender to the believability ratings. Subjects were 691 students in grades 5 through 12. MANOVAs revealed that, smokers, both male and female, reported significantly less belief in the validity of 3 of the health warning labels than nonsmokers. These findings support prior investigations which indicate that adolescent smokers are less likely to accept the specific health risks associated with smoking than nonsmokers. The results, however, also raise the question as to what value such health warning labels have as a deterrent to cigarette smoking.

The U.S. Surgeon General's reports on smoking and health continue to conclude that cigarette smoking is the single, foremost avoidable cause of death in today's society and the most serious public health concern of our time (U.S. Department of Health and Human Services [USDHHS], 1982, 1989a, 1989b, 1992). In spite of the success of many smoking prevention programs for adolescents (USDHHS, 1991), the rate of smoking among adolescents is apparently on the rise again (Johnston, O'Malley, & Bachman, in press) after having reached a plateau during the 1970s and having remained stable during the 1980s (Altman, 1990; Lynch & Bonnie, 1994; USDHHS, 1991). A variety of intrapersonal risk factors (e.g., poor educational achievement; Johnston, O'Malley, & Eveland, 1978) and interpersonal risk factors (e.g., smoking behavior of peers, Kandel, 1978; for a review, see Chassin, Presson, Sherman, & McGrew, 1988) influence the initiation of smoking, one of which is lack of

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acceptance of the specific health risks associated with smoking (Evans et al., 1978; Evans, Henderson, Hill, & Raines, 1979; Palmer, 1970). However, more recently, health beliefs may seem less important than other factors in predicting smoking.

With respect to awareness and acceptance of the health risks associated with smoking, two main conclusions have been drawn. First, the majority of adolescents are unaware of the more specific health consequences of smoking (e.g., cancer of the oral cavity), even though they are generally aware that smoking may cause cancer (Dawley, Fleischer, & Dawley, 1985; O'Rourke, O'Byrne, & Wilson-Davis, 1983; Palmer, 1970). Second, compared to adolescents who smoke and intend to smoke in the future, nonsmokers and nonintenders are more likely to be aware of and to accept the general and specific health consequences associated with smoking (Dawley et al., 1985; Murray & Cracknell, 1980; Murray, Swan, Johnson, & Bewley, 1983). In response to these findings, academic researchers (Evans et al., 1978; Fishbein, 1977; Murray et al., 1983) and the Federal Trade Commission (FTC, 1981; Waxman, 1985) suggested the need for more specific health warning labels on cigarette packs focusing on the more immediate physiological effects, instead of merely labels with the general admonition that cigarette smoking is dangerous to one's health.

In addition to advocating the alteration of the then current health warning label, concern arose during the 1970s about tobacco companies' adherence to the correct display of the health warning label in advertisements. In 1975, the U.S. government filed a complaint against six cigarette companies for their failure to perform the following: (a) display the health warning label in all advertisements, (b) display the health warning label in the specified size on billboards, and (c) place the health warning label properly in all advertisements (FTC, 1982; USDHHS, 1994).

The culmination of these issues occurred in 1981, when the Congressional House Committee on Health and the Environment convened to appraise this situation. Specifically, it considered the effectiveness of the then current label, "Cigarette Smoking is Dangerous to Your Health" (Imperato & Mitchell, 1986; Waxman, 1985). Based on collective expert judgment testimonies, in particular the 1981 report published by the FTC, the Committee concluded that this warning label was probably ineffective because it was too general and had low visibility on cigarette packs (USDHHS, 1994). The committee's report also concluded that Americans were virtually ignoring this label (Waxman, 1985). As a result, Congress advocated the development of four different labels that would convey more specific factual and scientific knowledge pertaining to the harmful consequences of smoking. Furthermore, the labels would have to be designed and positioned on the cigarette pack so that they would be more

readily visible. This recommendation was reflected in the Comprehensive Smoking Education Act passed on October 12, 1984. Effective one year after being signed, this law required the following four different, larger, and more visible labels to be rotated every 3 months (Imperato & Mitchell, 1986; USDHHS, 1994; Waxman, 1985):

> SURGEON GENERAL'S WARNING: Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy.
>
> SURGEON GENERAL'S WARNING: Quitting Smoking Now Greatly Reduces Serious Risks to Your Health.
>
> SURGEON GENERAL'S WARNING: Smoking by Pregnant Women May Result in Fetal Injury, Premature Birth, and Low Birth Weight.
>
> SURGEON GENERAL'S WARNING: Cigarette Smoke Contains Carbon Monoxide.

The objectives behind the development of the new labels were twofold: (a) to enhance the public's knowledge of the health risks associated with smoking and (b) to deter the uptake of cigarette smoking among nonsmokers (USDHHS, 1994). These goals reflect the underlying assumption that people will be less likely to initiate or continue smoking if they are more knowledgeable of the health risks associated with smoking (Beltramini, 1988; Kaiserman, 1993).

With respect to nonsmoking adolescents, it was anticipated that the new health warning labels would influence the formation of their attitudes concerning smoking which subsequently would influence their behavior (Lynch & Bonnie, 1994; USDHHS, 1994). That is, adolescents would be less likely to initiate cigarette smoking as a result of their having formed more negative attitudes toward smoking as a result of enhanced awareness of the health risks associated with smoking.

To date, few studies in the U.S. have examined the potential influence of the labels required by the Comprehensive Smoking Act (Kaiserman, 1993; MacKinnon, 1995). Studies of young adults suggest that these health warning labels are believable (Beltramini, 1988), that changing the wording of the warning can affect memory (Bhalla & Lastovicka, 1984), and that cigarette advertisements with health warnings are less attractive and less persuasive than advertisements without such warnings (Loken & Howard-Pitney, 1988). With respect to awareness, studies suggest that few persons view the warnings on billboards (Davis & Kendrick, 1989), on taxi cabs (Davis & Kendrick, 1989), or in magazines (Fischer, Richards, Berman, & Krugman, 1989); although it appears that adolescents are able to recall the health warning labels regardless of current smoking status and future smoking intentions (Kellert, 1991; MacKinnon & Fenaughty, 1993).



The majority of investigations examining the efficacy of the health warning messages have been performed in Thailand, Australia, and Canada (Kaiserman, 1993). For instance, Australian researchers have conducted numerous studies of the function of health warning messages and what requirements are necessary for them to influence smoking behavior (Centre for Behavioral Research in Cancer [CBRC], 1992). Although the Australian labels are different, their findings generally are consistent with those reported in the U.S.

Another limitation of the research in the U.S. is that few investigations have employed adolescent subjects. It is imperative to include adolescent subjects because the onset of smoking is more likely to occur prior to age 18 (Johnston, O'Malley, & Bachman, 1987, 1989; Kandel & Logan, 1984). Few adults are recruited to the smoking habit (Lynch & Bonnie, 1994). One way to assess the success of the health warning labels in meeting their intended objectives behind their development is to study adolescents' level of belief for each of them. As put forth by McGuire (1968), in order for a message to impact attitudes and behavior, the message first must be accepted; that is, believed.

Beltramini (1988) found that college students had high levels of belief in the health warning labels, although belief in the labels did not appear to impact their smoking behavior. The sample in this study, however, may not have been optimal because smoking patterns are well established in adulthood, with few adults initiating smoking after adolescence (Johnston et al., 1987, 1989; Kandel & Logan, 1984).

The current investigation was designed to extend Beltramini's (1988) study by employing adolescent subjects. Level of perceived believability of the health warning labels and whether differences in belief levels existed as a function of current smoking status or gender were examined.[3] Of particular interest was whether levels of perceived believability influence the formation of attitudes and behaviors among adolescents. To date, this issue has received little attention in the U.S. but warrants empirical investigation (USDHHS, 1994).

[3]As an aside, it must be noted that additional health warning labels exist. In 1986, the Comprehensive Smokeless Tobacco Health Education Act was passed which required the rotation of three health warnings on smokeless tobacco packages and advertisements (USDHHS, 1989a). These labels were not included in this study for three reasons. First, our focus was on cigarette smoking. Second, prior communication with the headmaster and headmistress of the schools indicated that cigarette smoking, but not smokeless tobacco, is highly prevalent in the schools. Third, studies have not investigated belief of health warnings labels developed to deter cigarette smoking among adolescents who may be most influenced by the health warnings labels, thus highlighting the importance of investigating this issue.

Differences in levels of belief for the health warning labels as a function of smoking status was examined to determine whether a relationship between perceived believability and current smoking behavior exists. Although Beltramini (1988) did not find a relationship between believability levels and current smoking status, it was hypothesized that this association would exist among adolescents, whose attitudes and behaviors are not fully crystallized. Specifically, it was expected that compared to smokers, nonsmokers would display greater levels of perceived believability in each of the health warnings. This hypothesis was derived from prior studies reporting nonsmokers to be more accepting of the health risks associated with smoking as compared to adolescents who smoke (e.g., Dawley et al., 1985).

Gender differences in levels of belief for the labels also were explored since gender is related to smoking status (Kozlowski, 1979). That is, adolescent girls are more likely to try cigarettes than their male counterparts (Grunberg, Winders, & Wewers, 1991) and among adults, females are less successfull at quitting (for a review of gender differences and tobacco, see Grunberg et al., 1991). Finally, two of the health warnings are more personally relevant for females than for males. Because this relationship has not been studied previously, no specific hypothesis was generated.

## Method

### *Subjects*

Subjects were 691 students from two private, suburban schools in Brooklandville, Maryland. The sample included 255 girls (36.9%) and 436 (63.1%) boys from Grades 5 though 12. Participation rate by grade is presented in Table 1. Ethnic representation was 85.1% Caucasian, 6.5% African American, 3.1% Asian, 1.5% Mexican American, and 3.8% other. Using subjects' descriptions of their fathers' occupations, level of socioeconomic status/class (SES) was determined employing the Hollingshead coding scheme (Hollingshead, 1957). Because the majority of the mothers were not employed outside of the home, their occupations generally were not used to calculate SES level. However, when the adolescent indicated living solely with his/her mother, then the mother's occupation was used to determine SES. Level of SES ranged from 1 (*the highest class* [e.g., doctor] to 8 (*the lowest class* [e.g., unskilled factory worker]). The majority of students were determined to be in either Class 1 (41.8%) or Class 2 (40.1%), while 13.5% were coded as Class 3, 0.9% as Class 4, 3.2% as Class 5, 0.3% as Class 6, and 0.2% as Class 8.

Comparison of these SES data to national estimates of family income suggests that this sample overrepresents the 4th and 5th highest income level



Table 1

*Participation Rate by Grade*

| Grade | % | *N* | Grade | % | *N* |
|---|---|---|---|---|---|
| 5 | 10.7 | 74 | 9 | 15.9 | 110 |
| 6 | 12.7 | 88 | 10 | 13.9 | 96 |
| 7 | 13.8 | 95 | 11 | 12.9 | 89 |
| 8 | 12.0 | 83 | 12 | 8.1 | 56 |

quintiles (U.S. Bureau of the Census, 1994). Thus, it appears that subjects were primarily from upper-middle-class homes. More direct comparisons are not possible because income data and education levels were not obtained.

### *Measures*

A modified version of the Late Adolescent Smoking questionnaire (LAS; e.g., Evans, Getz, Sharp, & Clapper, 1990) was used to collect both general demographic data and more specific information about the respondents' smoking behavior. *Current smoking status* was categorized based on smoking behavior over the past month, as in Chassin, Presson, Sherman, Corty, and Olshavsky (1981) and Barton, Chassin, Presson, and Sherman (1982). Because smoking levels and frequency are lower and more sporadic during adolescence, many researchers regard any cigarette use within the past month to be "current use" in adolescents (Johnston et al., 1989). Thus, smoking behavior was determined from responses to an item in which subjects indicated their current smoking status. Specifically, respondents indicated whether they were currently smoking the same, less, or more than 1 month ago (smoker), had quit smoking (ex-smoker), or had never smoked (nonsmoker). The validity of these self-report data was verified by cross-checking responses to this item with responses to other items that assessed smoking behavior for the past 6 months and past week. These analyses demonstrated that subjects were extremely consistent in how they answered these items concerning smoking behavior.

The health warning labels were presented to each subject on a separate page, and were randomly rotated in order to control for the effects of order and fatigue in the questionnaire response process (Maxwell & Delaney, 1990). This methodology was identical to that used by Beltramini (1988). Each health warning label was followed by Beltramini's 10-item Perceived Believability

Scale. Each adjective pair was rated on a 5-point scale with response choices ranging from 1 (*unbelievable*) to 5 (*believable*). A total summary score was created for each health warning label, with higher scores indicating a higher level of believability. The PBS scale has been found to have adequate internal consistency and convergent validity (Beltramini, 1988) and exhibited strong internal reliability herein ($\alpha$ = .92 to .94).

*Procedure*

Surveys were administered during an assembly class period in each school. Students were seated in a theater such that the survey packets were administered concurrently to all of the subjects from each school. The study was presented as a survey of cigarette smoking behavior and attitudes among adolescents. All subjects were informed that their participation was voluntary and that their responses would be anonymous and confidential. Passive parental consent was obtained wherein parents had been informed of the study beforehand and could prevent their children from participation. Approval for this technique was provided by both school personnel and the University of Houston's Committee for the Protection of Human Subjects. All subjects provided informed consent prior to their participation. No subjects declined to participate. Approximately 5% of the total student body was absent.

Subjects were given approximately 40 min to complete a survey packet containing the instruments described below. Upon completion of the surveys, subjects were thanked for their participation and allowed to leave.

## Results

*Smoking Status*

Two hundred and thirty-two subjects (33.6%) were classified as smokers, 96 (13.9%) as ex-smokers, 361 (52.2%) as nonsmokers, and 2 (0.3%) were missing this data. With respect to the number of cigarettes smoked within the past 24 hr, the majority of smokers reported 0 cigarettes (67%). Of the 33% who reported smoking within the past 24 hr, 61% ($N$ = 47) smoked 1 to 6 cigarettes, 22% ($N$ = 17) smoked 7 to 14 cigarettes, and 17% ($N$ = 13) smoked 15 to 20 cigarettes ($M$ = 8.2, $SD$ = 6.1). These results are as one might expect, given the sporadic nature of adolescent smoking behavior (Johnston et al., 1989; USDHHS, 1994).

Breakdowns of smoking status by gender, grade level, SES level, and ethnicity are presented in Tables 2-5. As can be seen in Table 2, the percentage of smokers is similar for both males and females. Interestingly, more males were ex-smokers than females, while more females than males were nonsmokers.



Table 2

*Smoking Behavior of Adolescents by Gender*

| | Males | | Females | | $\chi^2$ |
|---|---|---|---|---|---|
| | $N$ | % | $N$ | % | |
| Smoker | 151 | 34.6 | 81 | 32.0 | |
| Ex-smoker | 71 | 16.3 | 25 | 9.9 | |
| Nonsmoker | 214 | 49.1 | 147 | 58.1 | 7.52* |

*$p$ < .05.

Table 3

*Smoking Behavior of Adolescents by Grade Level*

| | Grade level | | | | | | |
|---|---|---|---|---|---|---|---|
| | Young Grades 5-7 | | Middle Grades 8-10 | | Older Grades 11-12 | | $\chi^2$ |
| | $N$ | % | $N$ | % | $N$ | % | |
| Smoker | 36 | 14.0 | 73 | 38.2 | 123 | 51.0 | |
| Ex-smoker | 22 | 8.6 | 30 | 15.7 | 44 | 18.3 | |
| Nonsmoker | 199 | 77.4 | 88 | 46.1 | 74 | 30.7 | 115.10** |

**$p$ < .001.

The rates of smoking by grade level are presented in Table 3. As one would expect, young adolescents are more likely to be nonsmokers, and rates of smoking increase by each grade level, a pattern observed in national surveys (Johnston et al., in press). However, the rates of smoking are higher than what has been reported in national surveys.

Table 4 presents the breakdown of smoking status by SES level. For this analysis, the class levels, 4 through 8, were combined given the small cell sizes for each of these levels. This analysis revealed similar rates of smoking and

Table 4

*Smoking Behavior of Adolescents by SES*

| | SES level | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | $\chi^2$ |
| | *N* | % | *N* | % | *N* | % | *N* | % | |
| Smoker | 84 | 32.0 | 98 | 38.9 | 25 | 30.1 | 5 | 17.2 | |
| Ex-smoker | 35 | 13.3 | 42 | 16.7 | 11 | 13.2 | 6 | 20.7 | |
| Nonsmoker | 144 | 54.7 | 112 | 44.4 | 47 | 56.6 | 18 | 62.1 | 10.69 |

Table 5

*Smoking Behavior of Adolescents by Ethnicity*

| | Ethnicity | | | | | | |
|---|---|---|---|---|---|---|---|
| | Caucasian | | African American | | Other | | $\chi^2$ |
| | *N* | % | *N* | % | *N* | % | |
| Smoker | 210 | 36.0 | 3 | 6.7 | 18 | 31.0 | |
| Ex-smoker | 83 | 14.2 | 4 | 8.9 | 8 | 13.8 | |
| Nonsmoker | 291 | 49.8 | 38 | 84.4 | 32 | 55.2 | 21.25** |

**$p < .001$.

nonsmoking behaviors, regardless of SES level. This result probably reflects the little variation in class level and that the majority of students were in Class 1 or 2.

The breakdown of smoking behavior by ethnicity is presented in Table 5. Due to the small numbers of distinct ethnic groups, comparisons were performed for the ethnic groups Caucasian, African American, and other. Chi-square analysis revealed similar smoking rates among Caucasians and other. In contrast, few African Americans were smokers or ex-smokers. Most African Americans were nonsmokers, which is in accordance with national data (Johnston et al., in press).



The incidence of smoking was extremely low among students in Grades 5 and 6 (1%), a finding which is expected, given previous reports that smoking is initiated primarily between the ages of 12 and 16 (Kandel & Logan, 1984; McKennell & Thomas, 1967; USDHHS, 1989a). Consequently, the subsequent analyses were restricted to those adolescents 12 and older ($n = 594$).

As an aside, one must note that a higher prevalence of smoking was observed for this sample (34%) than has been reported in national surveys of smoking behavior among adolescents. Although subjects answered items assessing smoking behavior consistently, it is plausible that subjects were not honest in their reports. In particular, the mass administration of surveys may have contributed to the reporting of inaccurate behavior because subjects desired to enhance their images with their peers. However, communication with the headmistress prior to administration of the survey revealed that smoking is highly prevalent at these schools and of great concern to faculty and parents. In addition, the anonymity and confidentiality of the survey were emphasized to subjects. Previous research has suggested that adolescents are likely to report honestly about smoking behavior when assured confidentiality and anonymity (Murray, O'Connell, Schmid, & Perry, 1987; Murray & Perry, 1987), and when smoking is evaluated as a positive behavior (Botvin, Botvin, Renick, & Filazzola, 1984), which may have been the case for this study. However, no external data exist to determine the reliability of the responses given in this setting. Thus, caution must be exercised when comparing this study's sample to other samples with lower prevalence rates of cigarette smoking.

### *Believability of the Health Warning Labels*

The data were analyzed using a 4 × 2 × 3 × 4 (Order × Gender × Smoker Category [Smoker, Ex-Smoker, Nonsmoker] × Health Warning Label) repeated measures multivariate analysis of variance (MANOVA). Order in which labels were rated was not found to be of importance ($p = .88$). Main effects were observed for health warning label, $F(3, 524) = 13.16$, $p = .0001$; smoker category, $F(8, 1046) = 4.18$, $p = .0001$; and gender, $F(4, 523) = 2.77$, $p = .026$, such that female adolescents' ratings of believability for all four health warning labels ($M = 43.8$, $SD = 7.7$) were higher than those for males ($M = 41.7$, $SD = 8.3$). The main effects of health warning label and smoking status were qualified, however, by a significant interaction of Health Warning Label × Smoker Category, $F(6, 1048) = 2.11$, $p = .05$. No other two-way

Table 6

*Mean Ratings of the Health Warning Labels as a Function of Label Rated and Current Smoking Status*

| Health warning label | Smoking status: Smoker ($N = 232$) | Ex-smoker ($N = 96$) | Nonsmoker ($N = 361$) | $F$ | $p$ |
|---|---|---|---|---|---|
| Smoking causes lung cancer, heart disease, emphysema, and may complicate pregnancy | 41.5[b] (8.3) | 44.2[a] (6.7) | 44.9[a] (6.7) | 7.86 | .0001 |
| Quitting smoking now greatly reduces serious risks to your health | 38.8[b] (8.3) | 42.3[a] (6.7) | 42.8[a] (6.7) | 6.51 | .0001 |
| Smoking by pregnant women may result in fetal injury, premature birth, and low birth weight | 42.5[b] (8.3) | 42.8[ab] (6.7) | 44.8[a] (6.7) | 5.33 | .0001 |
| Cigarette smoke contains carbon monoxide | 41.1 (8.3) | 40.9 (6.7) | 42.5 (6.7) | 1.52 | *ns* |

*Note.* Range of believability is from 10 to 50. Means with different superscripts are different.

interactions were significant, and none of the three-way interactions were significant.

Follow-up univariate tests revealed a significant relationship between smoking status and believability ratings for health warning Labels 1, 2, and 3. As can be seen in Table 6, Tukey post-hoc tests indicated that smokers reported significantly less belief in Labels 1 and 2 than ex-smokers and nonsmokers ($p < .05$). Smokers also rated Label 3 as significantly less believable than did nonsmokers ($p < .05$; Table 6).



## Discussion

The data from this study reveal that many of the adolescents surveyed indicated a high belief in the validity of the health warning labels appearing on cigarette packs, with believability scores ranging from 40 to 50 for all four labels combined. This finding is consistent with Australian data reporting that many adolescents state that it is easy to believe cigarette warnings related to specific diseases (CBRC, 1992). Ratings of believability of the health warning labels, however, varied as a function of current smoking status, as one would expect given prior research demonstrating nonsmokers to be more aware of both the general and specific health consequences of smoking (Dawley et al., 1985; Murray & Cracknell, 1980; Palmer, 1970). However, one must note that the effect size was small.

For two of the labels, smokers also indicated less belief in the messages than did ex-smokers. This finding suggests that a postdecision attitude change concerning the health risks of smoking may accompany quitting. One explanation for this finding is offered by Festinger (1957), who postulated that people are motivated to maintain consistency among cognitive elements. Thus, one possibility is that once one quits smoking, he or she then may reevaluate the health risks associated with smoking and increase his or her belief in the health risks to justify his or her altered smoking status. However, an alternative possibility is that those smokers who believe the health warnings labels are most likely to quit. Use of a cross-sectional design precludes demonstration of the direction of this relationship which could, of course, be addressed only in a longitudinal investigation.

Adolescents who smoked, and presumably were exposed most frequently to the health warning labels, believed the least in their validity. These data lead one to question the utility of the current health warning labels as a deterrent to the initiation of cigarette smoking. However, this speculation is tentative, given the cross-sectional design. To determine whether the health warning labels deter cigarette smoking, one would need to study prospectively young children, who have not yet initiated cigarette smoking. Another plausible explanation is that, as suggested by Fischer, Krugman, Fletcher, Fox, and Rojas (1993), these labels are "worn out" and need to be replaced. Nonetheless, our results intimate that more persuasive labels on cigarette packs may be necessary if they are intended to encourage smokers to quit or to deter potential smokers from starting. It has been suggested that larger labels containing fewer words and novel formats may be more noticeable and hence more effective in influencing behavior (Beltramini, 1988; CBRC, 1992; Lynch & Bonnie, 1994).

An interesting sidelight of the present investigation is that female adolescents indicated greater acceptance of the validity of all of the health warning

labels than did males. This result may reflect that female adolescents are more troubled about developing cancer from smoking (Palmer, 1970) and have more health concerns during their adolescent years (Chassin et al., 1981; Murray & Cracknell, 1980) and adult years (Waldron, 1983). However, it is important to note that gender did not interact with either belief in the health warning label or current smoking status. So, the possible relationship between relative belief in the validity of the health warning labels as related to current smoking does not appear to be a function of gender.

The data do suggest that many adolescents believe the health warning labels. Yet, belief in the validity of the health warnings may not be instrumental in persuading adolescents who smoke to quit. This may be because the content is not understood, is not seen as personally relevant, or is "worn out" (CBRC, 1992; Lynch & Bonnie, 1994). The health warning labels may contribute to adolescents' decisions to either not initiate frequent smoking or to remain quitters. But, without further data, this, of course, remains in the realm of speculation.

Aside from the perception of the health warning labels, it is important to note that many other factors (e.g., direct or perceived peer pressure, cigarette advertisements in general) may influence adolescents' decisions to initiate or maintain smoking. The influence of the current health warning labels, however, may be at best minimal, given that they often go unnoticed in their current format (Davis & Kendrick, 1989; Fischer et al., 1989; Kaiserman, 1993). Furthermore, any effects of health warning labels on smoking may become of even less relative importance because the tobacco industry is shifting toward using other strategies to promote their product that would even further offset the possible effects of warning labels present on cigarette packs (Myerson, 1994).

An additional point to consider is that the current health warning labels ostensibly shield the tobacco industry from product liability lawsuits (Fischer et al., 1989, 1993; Kaiserman, 1993). Although high levels of belief in the labels was found, our research leads us to question whether the current labels provide the public with adequate warning knowledge. Thus, we concur with Fischer et al. (1993) that the current legislative approach to cigarette warnings is ineffective as a public health policy and needs to be augmented with federal policies and programs that are efficacious in communicating the dangers of smoking.

Four limitations of this study may be cited. First, the design was cross-sectional. As a next step, a longitudinal study might be undertaken that follows a cohort though the process of initiating smoking with the inclusion of measures of the various influences that may contribute to the decision to initiate or maintain smoking, as well as the belief in the validity of the health warning labels. Second, the sample was comprised predominantly of Caucasian, upper-middle-class subjects. The inclusion of a greater number of subjects with lower SES and ethnic minorities would have enhanced this investigation's external validity. However, African American adolescents in the present investigation were less likely to be smokers, which is consistent with national survey data (Johnston et al., in press) and with other studies involving samples of low SES African Americans (Evans et al., 1990). This suggests that our study has some generalizability. Third, the methodology used to study the perceived believability of the health warning labels does not parallel real-world interactions with the labels which are encountered on cigarette packs and in advertisements. In addition, the current study involved forced exposure to the labels. Real-world exposures to the labels are less intense and may produce lower levels of belief. Thus, the obtained findings concerning believability may not be replicated in a more applied setting. Fourth, it is important to note that many of the subjects probably had prior environmental exposure to the warnings. It cannot be determined what impact this prior experience had on subjects' levels of believability.

In conclusion, we found high levels of belief in the validity of the health warning labels introduced in 1985. Differences in levels of belief according to smoking status were obtained, although the effect size was small. The development of different labels that are shorter in length, more visible, and include pictorial designs may be more effective than the current warning labels (Beltramini, 1988; CBRC, 1992; USDHHS, 1994). A carefully designed pretest of possible labels on various target populations, including adolescents, should be the basis for developing more effective labels. Such labels incorporated in school-based smoking prevention programs could, in fact, highlight these warnings on cigarette packs for children and adolescents. On the other hand, as presently employed, the cigarette pack as a medium of dissemination of the health warning labels may be less than efficacious.

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