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# Believability and Attitudes toward Alcohol Warning Label Information: The Role of Persuasive Communications Theory

J. Craig Andrews

*Marquette University*, [craig.andrews@marquette.edu](mailto:craig.andrews@marquette.edu)

Richard G. Netemeyer

*University of Virginia - Main Campus*

Srinivas Durvasula

*Marquette University*, [srinivas.durvasula@marquette.edu](mailto:srinivas.durvasula@marquette.edu)

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Published version. *Journal of Public Policy & Marketing*, Vol. 9 (1990): 1-15. [Permalink](#). © 1990 American Marketing Association. Used with permission.

# Believability and Attitudes Toward Alcohol Warning Label Information: The Role of Persuasive Communications Theory

J. Craig Andrews, Richard G. Netemeyer and Srinivas Durvasula

*Based on tenets of persuasive communications theory, five recently proposed alcohol warning labels are examined for their differential impact on label believability and attitudes. While all warnings are rated as believable, the ones regarding birth defects and driving impairment are perceived to be significantly more believable than the others. In addition, persons with more favorable attitudes toward alcohol consumption tend to disbelieve specific instance hazards (e.g., birth defects, driving impairment and drug combination warnings), while disliking long-term risks of alcohol consumption and abuse (e.g., hypertension, liver disease, cancer and addiction warnings). Implications for public policy and researchers are discussed.*

J. CRAIG ANDREWS is Assistant Professor of Marketing, Marquette University, Milwaukee, Wisconsin. RICHARD G. NETEMEYER is Assistant Professor of Marketing, Louisiana State University, Baton Rouge, Louisiana. SRINIVAS DURVASULA is Assistant Professor of Marketing, Marquette University, Milwaukee, Wisconsin. The authors would like to thank GENE R. LACZNAK, RICHARD W. POLLAY, TERENCE A. SHIMP and the anonymous *JPP&M* reviewers for their helpful comments on earlier versions of this article. This research is funded in part by a grant from the Ralph E. and Audrey Brownlee Research Endowment.

In recent years, there has been considerable interest in the adverse effects and risks associated with alcohol consumption. For example, recent testimony before a Senate Commerce, Science, and Transportation subcommittee cited statistics showing that 100,000 Americans die each year from alcohol-related causes (25,000 of which are auto accidents) and 5,000 babies are born each year with fetal alcohol syndrome ["Senate Urged to Delay Alcohol Warnings," 1988]. Fueling the debate are long-standing charges that alcohol advertising has contributed to these alarming statistics and social problems through promotion of alcohol consumption [Mackie 1985]. While the U.S. Congress has not yet recommended a ban on alcohol advertising, it did enact the Alcohol Beverage Labeling Act of 1988, requiring that a health warning statement appear on all alcoholic beverage containers sold or distributed in the United States [Alcohol Beverage Labeling Act of 1988, 27 USC 201–211]. As stated in Section 202 of the Act, the intent of the health warning statement is as follows:

The Congress finds that the American public should be informed about the health hazards that may result from the consumption or abuse of alcoholic beverages, and has determined that it would be beneficial to provide a clear, nonconfusing reminder of such hazards, and that there is a need for national uniformity in such reminders in order to avoid the promulgation of incorrect or misleading information . . .

For these reasons, the following two warnings are now required to appear on labels of all imported or domestic alcoholic beverages bottled on and after November 18, 1989, for sale and distribution in the U.S.:

GOVERNMENT WARNING: (1) According to the Surgeon General, women should not drink alcoholic beverages during pregnancy because of the risk of birth defects. (2) Consumption of alcoholic beverages impairs your ability to drive a car or operate machinery and may cause health problems.

Some lawmakers and citizen groups, however, feel that these warnings are not strong enough, and that three other proposed warnings should be included citing alcohol's link to hypertension, liver disease, and cancer; its potential hazards in combination with other drugs; and its addictive qualities as a drug [cf. "Alcohol Warning: Impact is Debated," 1989; "Alcohol Warning Labels" hearings 1988]. For example, as proposed in legislation by Senator Strom Thurmond, the Alcohol Bev-

erage Labeling Act of 1988 was to require all five warnings (the two mandated and three suggested) on a rotating basis for all alcoholic beverage containers [cf. "Senate Urged to Delay Alcohol Warnings," 1988]. However, only two of the five warnings (i.e., risk of birth defects and impairing one's ability to drive a car) were adopted in the final legislation.

The current research addresses three issues pertinent to the effectiveness of alcohol warning labels. First, it has yet to be determined whether the information provided in the two required and three suggested warning labels is *believable* and has a positive effect on individual *attitudes* toward the labels. Because the sole regulatory objective of the labels is to better inform the public about the potential health hazards resulting from alcohol consumption, it is important to first determine if this information is perceived as being believable. In this respect, persuasive communications theory [Ajzen and Fishbein 1980; McGuire 1969, 1976, 1980; Petty and Cacioppo 1986] can be used to better understand the likelihood and facilitating conditions under which the objectives of informing (e.g., message believability) can be accomplished. In addition, once an individual believes (i.e., accepts) the warning label information, a favorable *attitude* toward the label information is necessary before one can expect any intention to reduce consumption or an actual reduction in the individual's consumption behavior [Ajzen and Fishbein 1980].

Furthermore, it would be instructive to examine the believability of and attitudes toward the five different warning labels for segments of the population that the labels would benefit the most. Identifying potentially vulnerable segments is important in assessing the effectiveness of the alcohol warning labels. One such affected group is the young adult segment that represents a very lucrative target market for the alcoholic beverage industry [Tenowitz 1988]. Therefore, the present study focuses on a subsegment of young adults, i.e. university students, for which alcohol consumption and abuse remain at high levels [Magner 1988].

A second issue is that while there may be perceived differences across the required and suggested alcohol warning labels, the effectiveness of any warning label information may depend upon its relationship to *previous* attitudes and beliefs toward drinking alcohol. These previous attitudes and beliefs are examined in the present study to determine if they will *mediate* the relative alcohol warning label information → label believability and alcohol warning label information → label attitude relationships.

Finally, to understand better the underlying determinants of attitudes toward alcohol warning labels, we will examine whether these label attitudes are influenced by attitudes toward drinking alcohol, alcohol belief statements and label believability. For example, based on findings from persuasive communications research [cf. Petty and Cacioppo 1986], if the warning label information is scrutinized by individuals and deemed believable, positive attitudes should result.

In sum, the purpose of the present study is threefold: (1) to determine the believability of and attitudes toward alcohol warning label information and whether responses to these measures vary across the five different warning labels, (2) to determine if prior attitudes and beliefs toward drinking alcohol mediate the influence of the different labels on the believability and attitudes toward the labels and (3) to examine whether attitudes toward alcohol label information are influenced by attitudes toward drinking alcohol, alcohol belief statements and label believability.

The paper proceeds as follows. First, a review of the effectiveness of warning labels in general and the role of persuasive communications in processing warning label information is presented. Next, research expectations and an overview of the methodology are offered. Then, results of the study are examined along with a discussion of public policy implications and future research directions.

### The Effectiveness of Warning Labels

Over the past two decades, there has been considerable research on the effectiveness of required product warning labels. Researchers have examined energy consumption labels on appliances [Dyer and Maronick 1988; McNeill and Wilkie 1979], unit price information in stores [Russo 1977], nutritional content on packaged foods [Asam and Bucklin 1973; Daly 1976; Jacoby, Chestnut, and Silberman 1977; Lenahan et al. 1973], prescription drug warnings [deTurck and Goldhaber 1989; Morris, Ruffner, and Klimberg 1985; Wright 1979], toxic product warnings [Bettman, Payne, and Staelin 1986; deTurck and Goldhaber 1989] and cigarette warning labels [McAuliffe 1988; Beltramini 1988; Bhalla and Lastovicka 1984]. Recently mandated warnings for smokeless tobacco [Comprehensive Smokeless Tobacco Health Education Act of 1986; Popper and Murray 1989] and alcohol beverages [Alcoholic Beverage Labeling Act of 1988, 27 USC 201–211] will no doubt generate similar interest.

Though the cumulative results of these studies are mixed, they still are useful for warning label recommendations regarding risk and information processing [Bettman, Payne, and Staelin 1986], statutory and common law requirements [Ursic 1985], practical suggestions on “how to warn” [Bettman, Payne, and Staelin 1986; Lehto and Miller 1986; Ursic 1985] and labeling systems [Bettman, Payne, and Staelin 1986]. For example, entire warning label systems have been proposed recognizing that advertising, point of purchase (POP) displays, and package inserts must all be coordinated with the label to provide effective, systematic, and comprehensive information for consumers [cf. Wright 1979]. Even with these recommendations, however, certain warning labels may still prove to be ineffective. Persuasive communications theory [cf. Ajzen and Fishbein 1980; McGuire 1969, 1976, 1980; Petty and Cacioppo 1986], however, can be used as a helpful framework to enhance the effectiveness of warning label information.

### The Role of Persuasive Communications

#### Acceptance of Warning Label Information

As indicated by Bettman, Payne, and Staelin [1986, p. 2], “By understanding how consumers process information, [warning label] designers can predict more accurately the effects of a particular format.” This understanding can be acquired by examining the impact of warning label information on various steps in information processing, such as acceptance (i.e., believability) of message information and yielding (i.e., forming favorable attitudes) toward the information [cf. McGuire 1969; 1976; 1980].<sup>1</sup> As stated by Fishbein and Ajzen [1975, p. 389]:

... with persuasive communications, the major problem is to ensure that the receiver accepts (i.e., believes) the communication [e.g., the warning] which attempts to link the object [e.g., consuming alcohol] and the attribute [e.g., birth defects].

Moreover, Petty and Cacioppo [1986, p. 32] warn that message arguments designed to be relatively “strong” may still not be persuasive (i.e., may not influence attitudes) because they are perceived as unbelievable, strain credulity, or are viewed as implausible in the context conveyed. Thus, our first research question is whether the alcohol warning label information will be accepted by respondents and whether respondents will yield to the arguments found in the warning labels.

McGuire [1976, p. 307] states that the believability of information derives from many aspects of the communication, including perceptions of the communicated source, as well as the context of the message (e.g., type of appeal, structure, style, the arguments). Subsequently, the believability of information is an important prerequisite to an individual’s yielding (i.e., agreement) with the arguments found in the message. Depending upon the cogency or strength of message ar-

guments, an individual will form either favorable or unfavorable attitudes, assuming he or she is both motivated and able to process the message content [Petty and Cacioppo 1986].

In the examination of perceived *believability* of cigarette warning label information, Beltramini [1988] found that labels noting specific risk outcomes (e.g., lung cancer, heart disease, emphysema, fetal injury, premature birth) were significantly more believable than those labels suggesting remedial action (e.g., quitting smoking) or harmful contents (e.g., carbon monoxide). Classification variables, such as current smoking consumption, were found by Beltramini not to have significant impact on the perceived believability of the different cigarette warning labels.

#### Mediation and Determinants of Warning Label Acceptance and Persuasion

The second research question in the present study examines whether *initial* beliefs and attitudes toward consuming alcohol will serve to mediate the effect of different warning labels on perceived believability and attitudes formed toward the labels. As indicated by Greenwald [1968], cognitive responses are formed by the comparison of information presented in the message with initial opinions one has about the issue. In fact, it has been argued that “the information people generate about themselves is a more important determinant of the direction and amount of persuasion than is information provided by others” [Cialdini, Petty, and Cacioppo 1981, p. 359]. Why are measuring prior beliefs and attitudes important? Because people may engage in schematic or scripted behavior and systematically ignore part of it, not because the information is irrelevant, but because it is already known [Abelson 1976; Bhalla and Lastovicka 1984]. This schematic or scripted behavior occurs because the information (e.g., fetal alcohol syndrome or drinking and driving) may have been seen many times in the past and details of its structure are already known.

Ajzen and Fishbein [1980, p. 228] argued that “A person may strongly believe (i.e., accept) that smoking is hazardous to health without ever having been exposed to the message containing the argument in question.” This effect may serve to attenuate the impact of alcohol warning labels in the future because of the monotony in which the label appears on the side of the container, coupled with an unchanging message and print type [cf. “Alcohol Warning Impact Is Debated,” 1989; Elliott 1989]. Under these conditions, scripted behavior may be triggered and reduce processing of any new warning in a similar format as old warnings [cf. Bhalla and Lastovicka 1984]. Consequently, any persuasive effects of alcohol warning label information may be attributed, in part, to a person’s prior beliefs and attitudes toward alcohol consumption.

The third research question in the present study examines whether attitudes toward a given warning label are influenced by the believability of information contained in the warning label. According to persuasive communication theory, the acceptance or believability of supportive evidence and arguments should lead to enhanced persuasion [Ajzen and Fishbein 1980], assuming that people are both motivated and able to process the warning label information [Petty and Cacioppo 1986]. If these preconditions of motivation and ability are present, warning label information that is perceived as believable should lead to favorable attitudes toward the label.

#### Study Overview and Expectations

The lack of research on the effectiveness of the recently mandated and proposed alcohol warning labels in Exhibit 1 motivated the present investigation. The alcohol warning labels have generated substantial controversy, including arguments from the alcohol industry claiming the warnings will be ineffective because people

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**Exhibit 1. Alcohol Warning Label Information**

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1. GOVERNMENT WARNING: According to the Surgeon General, women should not drink alcoholic beverages during pregnancy because of the risk of birth defects.
  2. GOVERNMENT WARNING: Consumption of alcoholic beverages impairs your ability to drive a car or operate machinery and may cause health problems.
  3. GOVERNMENT WARNING: The consumption of this product, which contains alcohol, can increase the risk of developing hypertension, liver disease, and cancer.
  4. GOVERNMENT WARNING: This product contains alcohol and is particularly dangerous in combination with other drugs.
  5. GOVERNMENT WARNING: Alcohol is a drug and may be addictive.
- 

are already aware of the risks of consuming alcohol ["Alcohol Warning Labels" hearings 1988].

Given this controversy, it is the intent of the current study to examine three issues relative to the acceptance or believability of the proposed alcohol warning labels, as well as attitudes towards the labels. First, it is expected that both the impairment when driving a car and birth defects warning labels will be perceived as more believable and generate more favorable attitudes than the other three proposed labels (see Exhibit 1). This is because the retrieval of risk information [Bettman, Payne, and Staelin 1986] regarding drinking and driving is made easier because of "50 years of . . . evidence of a direct relationship between alcohol consumption by drivers and increasing risk of a motor vehicle crash" [Gordis 1988]. Retrieval of the birth defects risk is enhanced by widely publicized statements by the Surgeon General recommending that pregnant women avoid consuming any alcohol. Risk information presented in the three other proposed labels can be termed as either controversial [e.g., cancer; Prial 1988], not widely known [e.g., cancer, addictive nature], overlooked [e.g., combination with other drugs] or only recently given serious consideration [e.g., hypertension; Gordis 1988].

Second, given initial attitudes and beliefs toward alcohol consumption and the possibility of schematic or scripted behavior [Bhalla and Lastovicka 1984], prior attitudes and beliefs toward alcohol consumption may *mediate* the effects of the different labels on label believability and attitudes toward the label (see Baron and Kenny 1986 for an examination of the differences between mediating and moderating effects). Covariance analysis [Winer 1971] will be used to determine if any label believability and attitude differences found among the five warning labels remain after adjusting for the effects of the two covariates (i.e., prior attitudes and beliefs toward alcohol consumption).

Finally, consistent with predictions of Petty and Cacioppo [1986], if warning label information is perceived as being believable, it should then have a positive impact on attitudes toward the label. Regression analyses will be conducted for each label to determine this, with attitude toward the label as the dependent variable and label believability as the independent variable. The effects of prior attitudes and beliefs toward alcohol consumption on label believability and attitudes will also be examined.

## Method

**Sample** As indicated by many alcoholic beverage companies, the young adult segment (e.g., university students) represents a very attractive and substantial market [Tenowitz 1988]. However, due to the persistence of alcohol-related problems on

college campuses [cf. Magner 1988], the promotion of alcoholic beverages to students has been the target of substantial discussion and criticism [Lightner 1984; Lipman 1989; Magner 1988; Redfield 1984; Seessel 1988]. As suggested by recent Senate hearings, this criticism is due in part to alcohol-related highway deaths being the number one killer of young adults between the ages of 16 and 24 ["Media Advisory," U.S. Senate Governmental Affairs Committee, 1988]. The potential for abuse is also present in the form of taking other drugs in combination with alcohol and the possibility that university women would continue to drink if pregnant. In fact, 20 percent of university student drinkers are classified as heavy or abusive drinkers (six or more drinks at one sitting more than once per week; Magner 1988). Because of their heavy usage, then, many students are at increased risk to experience alcohol-related problems and diseases [Gordis 1988; Magner 1988; Prial 1988]. Since the primary objective of the alcohol warning labels is to inform individuals (especially vulnerable ones) of the health risks associated with alcohol consumption, university students represent an appropriate sample for which the alcohol warning labels might benefit. Therefore, our sample consists of a total of 273 undergraduate marketing students from two universities that provided a complete set of responses for the study. Males constitute 47 percent of the sample. The mean age is 21.4 years ( $SD = .91$ ) with a range from 19 to 27. All data were collected prior to November 18, 1989, the date on which the Alcohol Labeling Act of 1988 took effect.

**Procedure** Students were informed that the purpose of the study was to determine college students' views toward alcohol consumption and related topics. Nothing at this time was mentioned regarding the evaluation of alcohol warning labels. Students were then asked to indicate their attitudes toward drinking alcohol and beliefs toward alcohol consumption. Following these measures, they were given one of five randomly assigned alcohol warning labels (see Exhibit 1) that appeared at the top quarter of the page. The labels were professionally designed and depicted the warning's appropriate placement on a light beer bottle and a wine cooler bottle. Each label contained the exact wording as either federally mandated (in the case of the birth defect and driving impairment warnings; Alcohol Beverage Labeling Act of 1988) or as federally proposed (in the case of the hypertension, liver disease, and cancer; drug combination; and addiction warnings; "Alcohol Warning Labels" hearings 1988). Directly beneath the label were measures regarding the believability of the label and attitudes toward the label. After responding to the measures, students were queried as to the purpose of the study, asked to provide demographic information, and then thanked for their participation. All participants were later debriefed on the purpose of the study.

**Measures** Students' attitudes toward drinking alcohol were measured on five, seven-point semantic differential scales: good-bad, harmful-beneficial, worthless-valuable, unpleasant-pleasant, and wise-foolish (coefficient alpha = .88). These items represent a sample of measures used in previous attitude research [cf. Ajzen and Fishbein 1980; Petty and Cacioppo 1986]. Six belief statements, directly related to the information to be provided in the alcohol warning labels, were each measured on a seven-point Likert-type scale ranging from "strongly agree" to "strongly disagree." For example, the first belief statement was "Women should not drink beverages during pregnancy because of the risk of birth defects." Other belief statements included impairment when driving a car or operating machinery (#2); health problems (#3); hypertension, liver disease, and cancer (#4); dangerous in combination with other drugs (#5); and alcohol is a drug and may be addictive (#6). Coefficient alpha for the summation of the six alcohol consumption belief items was .69.

Perceived believability of each label was measured with ten, seven-point items based on Beltramini's [1988] examination of the believability of cigarette warning labels. The ten items are: believable-unbelievable, trustworthy-untrustworthy, convincing-unconvincing, credible-not credible, reasonable-unreasonable, honest-dishonest, unquestionable-questionable, conclusive-inconclusive, authentic-not authentic and likely-unlikely (coefficient alpha = .91). Finally, the summation of three, seven-point items measured respondents' attitudes toward the label. These items were favorable-unfavorable, good-bad and positive-negative (coefficient alpha = .97).

## Results

### Effects of Label Information on Believability and Attitudes

A multivariate analysis of variance (MANOVA) was conducted to examine the overall influence of the warning label treatment (with its five different levels) on label believability and attitude toward the label. Because label believability and attitude toward the label are theoretically correlated, MANOVA was the appropriate technique for analysis. As indicated in Table 1, the multivariate *F* indicates a significant overall effect of the different warning labels on the dependent variables. In particular, the univariate results in the MANOVA program show that both believability ( $F(4,268) = 10.90$ ;  $p < .001$ ) and attitude toward the label ( $F(4,268) = 6.00$ ;  $p < .001$ ) were significantly different across the five warning labels. Thus, pairwise comparisons were performed to assess differences across the labels. Based on Student-Newman-Keuls (SNK) pairwise comparisons in Table 1, the birth defects and driving impairment labels were perceived as significantly more believable than the other three labels, as expected. Interestingly, the

**Table 1. Effects of Alcohol Warning Label Information on Believability and Attitudes Toward the Labels**

Independent variable	Multivariate analysis of variance results							
	<i>Wilks' <math>\Lambda</math></i>	<i>F</i>	<i>d.f.</i>	<i>p</i> <				
Warning labels	.831	6.49	8,534	.001				
	Univariate analysis of variance results*							
	Alcohol Warning Labels: means and (standard deviations)							
Dependent variables	(a)	(b)	(c)	(d)	(e)	<i>F</i>	<i>p</i> <	$\omega^2$
	Birth defects	Driving a car, operating machinery, health problems	Hypertension, liver disease, cancer	Dangerous in combination with other drugs	Is a drug and may be addictive			
Believability of the label	56.55 <sup>c,d,e</sup> (9.26)	53.92 <sup>c,d,e</sup> (11.26)	47.58 <sup>a,b</sup> (9.71)	47.48 <sup>a,b</sup> (11.16)	45.44 <sup>a,b</sup> (11.23)	10.90	.001	.138
Attitude toward the label	17.82 <sup>b,c,d,e</sup> (3.58)	15.10 <sup>a</sup> (5.44)	14.18 <sup>a</sup> (5.13)	14.91 <sup>a</sup> (4.94)	13.47 <sup>a</sup> (5.00)	6.00	.001	.068

\*A listing of each entire alcohol warning label can be found in Exhibit 1. The believability measure is a summated scale of ten, 7-point items. Attitude toward the label is a summated scale of three, 7-point items. <sup>abcde</sup>Superscripts indicate significant differences across cell means according to SNK pairwise comparisons ( $p < .05$ ). For example, the first mean for "believability of the label" indicates that the birth defects label is significantly more believable than labels c, d, and e above.



birth defects label was viewed as significantly more favorable than all other labels (including driving impairment). It should also be mentioned that while there are relative differences among the labels on label believability and attitudes toward the labels, all labels were above the scale midpoint for label believability (40) and attitude toward the label (12). Also, while label believability and attitudes toward the label vary slightly by gender (i.e., females believe the birth defects warning more, while males believe the drinking and driving warning more), interaction and main effects for gender were not significant.

#### Covariance Analysis

A multivariate analysis of covariance (MANCOVA) was conducted to determine if two covariates, prior attitudes and beliefs toward drinking alcohol, would mediate the significant effect of the different warning labels on label believability and attitude toward the label. Evidence for mediation can be claimed to the extent that the univariate F ratios and  $\hat{\omega}^2$  estimates are reduced by the covariates/mediators [cf. Olson, Toy, and Dover 1982, p. 256].

Table 2 shows that the multivariate F for the within-cells regression is significant indicating that the covariates (i.e., prior attitudes and beliefs toward drinking alcohol) had a significant impact on the dependent variables. Individual t-values for within-cells regression reveal that prior attitudes toward drinking had a significant (and inverse) impact on believability and attitude toward the label. In addition, prior beliefs toward drinking alcohol had a significant impact only on believability of the label.

**Table 2.** Effects of Alcohol Warning Label Information and Covariates on Label Believability and Attitudes

Within-cells regression					
Multivariate Results: Within-cells regression					
	<i>Wilks' <math>\Lambda</math></i>	<i>F</i>	<i>d.f.</i>	<i>p</i> <	
	.874	9.21	4,530	.001	
t-values for within-cells regression					
Covariates					
Dependent variables		Prior attitudes toward drinking alcohol		Prior beliefs toward drinking alcohol	
Believability of the label		-3.14 <sup>a</sup>		2.82 <sup>a</sup>	
Attitude toward the label		-4.63 <sup>a</sup>		0.52	
Multivariate analysis of covariance					
Multivariate results: Effect of alcohol warning labels and covariates on label believability and attitudes					
	<i>Wilks' <math>\Lambda</math></i>	<i>F</i>	<i>d.f.</i>	<i>p</i> <	
	.815	7.12	8,530	.001	
Dependent variables		<i>F</i>	<i>d.f.</i>	<i>p</i> <	$\hat{\omega}^2$
Believability of the label		12.69	4,266	.001	.147
Attitude toward the label		6.77	4,266	.001	.078

<sup>a</sup>*p*<.01

<sup>b</sup>*p*<.05

While the covariates were found to have a significant impact on the dependent variables (with the exception of prior beliefs → attitude toward the label), the question remains as to whether or not the covariates served to mediate the effect of the different warning labels on label believability and attitudes. As indicated in Table 2 (in comparison to Table 1), this was not the case. In fact, after adjusting the treatment means for the covariates, the differential effects of the alcohol warning labels were still significant and effect sizes (i.e.,  $\hat{\omega}^2$  estimates) increased. Therefore, while the covariates had an independent effect on label believability and attitude toward the label, they did not mediate the impact of the different alcohol warning labels on these dependent variables.

**Regression Analyses** The purpose of the regression analyses was to determine what variables influenced attitude toward the label and label believability for each separate warning label. In the case of attitude toward the label, prior attitudes toward drinking, the belief statement specific to the warning label analyzed, and label believability were examined for their impact on attitude toward the label. Although beliefs #2 and #3 were mandated to be included in the same warning label (see warning label #2, Exhibit 1), they vary as to the “action” specified in the label [Ajzen and Fishbein 1980]. In particular, impairment in driving a car and operating machinery (belief #2) differ from health problems (belief #3). Therefore, beliefs No. 2 and #3 were separately measured for use in regression with believability and attitudes toward warning label #2.

As shown in Table 3, label believability had a significant effect on attitude toward the label for each warning. In addition, prior attitudes toward drinking alcohol sig-

**Table 3.** Effects of Prior Attitudes and Beliefs Toward Drinking Alcohol and Label Believability on Attitude Toward the Label

Warning label	Independent variables*	Regression results for attitude toward the label*		
		<i>b</i>	<i>Beta</i>	<i>Adjusted R<sup>2</sup></i>
1. Birth defects	Prior attitudes toward drinking	-.057	-.069	.355
	Belief #1: Birth defects	.342	.023	
	Label believability	.227	.586 <sup>a</sup>	
2. Driving a car, operating machinery, health problems	Prior attitudes toward drinking	-.174	-.153	.338
	Belief #2: Driving a car, operating machinery	.078	.029	
	Belief #3: Health problems	-.120	-.032	
	Label believability	.270	.558 <sup>a</sup>	
3. Hypertension, liver disease, cancer	Prior attitudes toward drinking	-.176	-.214 <sup>b</sup>	.414
	Belief #4: Hypertension, liver disease, cancer	.466	.085	
	Label believability	.316	.590 <sup>a</sup>	
4. Dangerous in combination with other drugs	Prior attitudes toward drinking	-.079	-.094	.388
	Belief #5: Dangerous in combination with other drugs	.012	.005	
	Label believability	.271	.612 <sup>a</sup>	
5. Is a drug and may be addictive	Prior attitudes toward drinking	-.218	-.196 <sup>b</sup>	.624
	Belief #6: Is a drug and may be addictive	-.293	-.102	
	Label believability	.341	.767 <sup>a</sup>	

\*A complete listing of variables used in the regression analysis can be found in the Method Section. Beliefs #2 and #3 were separately measured due to the varied messages included in Warning Label #2. Sample sizes for Labels 1 through 5 are as follows: 51, 58, 55, 54, and 55, respectively.

<sup>a</sup>*p* < .01

<sup>b</sup>*p* < .05

nificantly (and negatively) affected attitude toward the label in the case of the warning on hypertension, liver disease, and cancer and the warning on the addictive nature of alcohol. This means that the more favorable the respondents' attitudes toward drinking, the *less favorable* they were to warnings that alcohol increases the risk of hypertension, liver disease, and cancer and that alcohol is a drug and may be addictive.

Table 4 examines the impact of prior attitudes toward drinking and belief statements specific to each warning on label believability. The results indicate that prior attitudes toward drinking had a significant (and negative) impact on label believability for the birth defects, driving impairment, and drug combination warnings. That is, the more favorable the respondents' attitudes toward drinking, the *less* they *believed* the birth defects, driving impairment, and drug combination warning labels. Responses to specific belief statements regarding alcohol consumption were found to significantly influence label believability in the case of alcohol-related disease (i.e., hypertension, etc.) and addiction warnings.

## Discussion

### Conclusions and Implications for Public Policy

Three primary conclusions can be drawn from our study. First, and as expected, the results for the differential effects of the alcohol warning labels on label believability indicate that the birth defects and drinking impairment warnings are perceived as significantly more believable than the other alcohol warning labels. Factors that may have contributed to these findings include not only the publicized nature of the driving impairment and birth defect risks [cf. Gordis 1988], but also the personalization and credibility of information contained in these warnings [McGuire 1976; Petty and Cacioppo 1986]. For example, the birth defects warning is the only one found to have the words "Surgeon General" in the warning (see Exhibit 1). By utilizing a credible source, the persuasive impact of a message can

**Table 4. Effects of Prior Attitudes and Beliefs Toward Drinking Alcohol on Label Believability**

Warning label	Independent variables*	Regression results for label believability		
		<i>b</i>	<i>Beta</i>	<i>Adjusted R<sup>2</sup></i>
1. Birth defects	Prior attitudes toward drinking	-1.000	-.462 <sup>a</sup>	.212
	Belief #1: Birth defects	3.966	.102	
2. Driving a car, operating machinery, health problems	Prior attitudes toward drinking	-.603	-.257 <sup>b</sup>	.116
	Belief #2: Driving a car, operating machinery	1.124	.203	
	Belief #3: Health problems	1.571	.206	
3. Hypertension, liver disease, cancer	Prior attitudes toward drinking	.050	.032	.066
	Belief #4: Hypertension, liver disease, cancer	3.312	.319 <sup>b</sup>	
4. Dangerous in combination with other drugs	Prior attitudes toward drinking	-.601	-.319 <sup>b</sup>	.083
	Belief #5: Dangerous in combination with other drugs	.444	.083	
5. Is a drug and may be addictive	Prior attitudes toward drinking	-.406	-.162	.096
	Belief #6: Is a drug and may be addictive	1.858	.287 <sup>b</sup>	

\*A complete listing of variables used in the regression analysis can be found in the Method Section. Beliefs #2 and #3 were separately measured due to the varied messages including in Warning Label #2. Sample sizes for labels 1 through 5 are as follows: 51, 58, 55, 54, and 55, respectively.

<sup>a</sup>*p*<.01

<sup>b</sup>*p*<.05

be improved [Petty and Cacioppo 1986; Sternthal, Dholakia, and Leavitt 1978]. In the case of the driving impairment warning, it is the only warning that is personalized (i.e., “impairs *your* ability to drive a car”) to help enhance the personal relevance of the risk information. To understand these effects with certainty, however, *manipulations* of credibility (e.g., “Surgeon General’s Warning” vs. “Government Warning”) and personalization (e.g., “impairs *your* ability” vs. “impairs *one’s* ability”) are needed. Regarding the other three warnings (i.e., hypertension, liver disease, cancer; drug combination; addiction), the relatively lower believability scores may be due to their controversial nature (e.g., cancer), that they are not widely known (e.g., cancer; addiction), are overlooked or ignored (e.g., drug combination), or have only recently received attention (e.g., hypertension) [cf. Gordis 1988; Prial 1988].

Surprisingly, however, the birth defects warning is found to be significantly more favorable than all other warnings (including the driving impairment warning). It appears that while the students *believed* the driving impairment risks in the label to a greater extent than other risks, they did not *like* being told these risks. A conflict may exist for students between their beliefs regarding driving impairment and limits on their driving freedom. An alternative explanation is that some sort of scripted behavior is taking place. That is, students may believe the risk, but are arguing that they already know this information and have seen it many times before.

It should be mentioned that while *relative* differences are found across the warning labels, *all* labels are perceived as believable (i.e., above the scale midpoint) and evoke a favorable response (i.e., above the scale midpoint on attitude toward the label). Based on these results, policymakers should consider the use of all five warnings examined in our study. In fact, many have advocated the use of all five alcohol warning labels in a rotating fashion on packaging and in advertising [cf. “Alcohol Warning: Impact is Debated,” 1989; Colford 1990; Gordis 1988].

A second conclusion from our study can be drawn from the covariance analyses conducted. That is, while prior attitudes and beliefs toward alcohol consumption have an influence on label believability and attitudes, they do not mediate the effect of the different warning labels on label believability and attitudes. Therefore, it appears that prior attitudes and beliefs toward drinking have an independent influence on the acceptance and persuasion resulting from alcohol warning label information.

The specific influences on label believability and attitude toward the label are examined in our study through regression analyses for each warning label. This examination serves as the basis for our third conclusion. Specifically, while label believability serves to influence *attitude toward the label* for each warning (as predicted by persuasion theory), prior attitudes toward drinking are found to be negatively related to attitudes toward warnings of hypertension, liver disease, cancer, and addiction. That is, those who enjoy drinking seem to have a negative attitude toward labels detailing the *long-term* hazards of alcohol consumption and abuse. This is in contrast to significant (and negative) effects of prior attitudes toward drinking on *label believability* for *specific instance* hazards of alcohol consumption and abuse (i.e., the birth defect, driving impairment, and drug combination warnings). In sum, those with more favorable attitudes toward drinking seem to *disbelieve* specific instance hazards of alcohol consumption and abuse, while appearing to *dislike* the long-term risks of alcohol consumption and abuse.

These above results suggest a “defensiveness” on behalf of those who enjoy drinking and imply that alcohol warning labels may fall on “blind eyes” and “deaf ears” of those who may need the warnings the most. This problem is quite similar to that found with cigarette warning labels and is, in part, why cigarette warning labels and other “health information” have had little noticeable market impact [Pol-

lay 1989]. Based on the present study, the possibility also exists for the believability and attitudes toward alcohol health warnings specified in other formats (e.g., alcohol awareness ad campaigns) to be influenced by the strength of initial beliefs and attitudes toward drinking. The study results also underscore the importance of research examining warning label effects for those in different stages of drug and alcohol abuse [Bozinoff, Roth, and May 1989; DePaulo, Rubin, and Milner 1987], as well as for other affected population groups (e.g., pregnant women, the elderly).

#### Future Research and Public Policy Directions

Our results should be viewed in the context of the presently mandated warning labels on alcoholic beverages and the university student sample used in the study. No doubt, with other population groups, the salience of the alcohol warning labels is likely to differ. Our respondents viewed their randomly assigned label under the present conditions in which the warning label appears on the side of the container and is not shown in accompanying advertisements. However, there have been recent criticisms over whether people will even notice the labels [Elliott 1989], arguments over state rights to strengthen the labels [Ferguson 1990], and nationwide surveys favoring warnings on both containers *and* advertisements [Freedman 1989].

Numerous research opportunities exist for the study of alcohol warning labels. For example, research is needed varying warning label legibility (e.g., type face, contrast), configuration (e.g., size, design), degree of threat (e.g., "You can go to jail (vs. die) if you drive after drinking"), exposure repetition, and effectiveness when embedded in advertisements. Additional research opportunities include the manipulation of source credibility ("Surgeon General Warning" vs. "Government Warning") and personalization (e.g., "impairs *your* ability to drive a car") of label content.

Given these many research opportunities, however, it is the examination of alcohol warning effectiveness when embedded in advertisements that first deserves our attention. This is because the recently proposed "Sensible Advertising and Family Act of 1990" (House Bill No. 4493), sponsored by Representative Joseph Kennedy and Senator Albert Gore (cf. Colford 1990), would require health warnings on all alcohol beverage advertisements in both broadcast and print media. Questions regarding this proposed legislation are: Exactly how effective will these health warnings be when embedded in alcohol advertising? And under what conditions will the health warnings be effective when embedded in alcohol advertising? Longitudinal research could help answer these questions and provide useful data on the proposed alcohol warnings in advertising. A second approach (as used in the present study) would be to examine the believability of and attitudes toward the embedded alcohol health warnings, while controlling for previous beliefs and attitudes toward drinking, as well as for different brand and product-type factors. Experimental manipulation of the other variables mentioned as research opportunities (e.g., exposure repetition, threat degree, warning content, format, source effects) should also be examined in the context of the proposed health warnings in alcohol advertising. It should be kept in mind, however, that for the alcohol warnings to be effective in practice, not only are coordinated promotional campaigns needed, but for government agencies to make every attempt to gauge the impact of such campaigns on stages of information processing and persuasion.

#### Notes

1. Readers are referred to the different steps found in McGuire's [1969, 1976, 1980] Response Hierarchy (i.e., presentation, attention, comprehension, acceptance, yielding, retention, and behavior)

that serve as potential objectives in assessing the effectiveness of alcohol (and other) warning label information. Given adequate presentation and attention to the five warning labels in our study (see "Procedure"), and enhanced comprehension of the warning labels due their specificity (see Exhibit 1) and relatively low complexity (i.e., an average of 18 words in length versus warnings averaging 77 words in length that *were* comprehended in Funkhouser 1984), we elect to focus on acceptance and yielding as key information processing steps in the study. No doubt, other information processing steps will serve as focal points in future research of alcohol warning label information.

## References

- Abelson, Robert P. (1976), "Script Processing in Attitude Formation and Decision Making," in *Cognition and Social Behavior*, John S. Carroll and John W. Payne, eds., Hillsdale, New Jersey: Lawrence Erlbaum, 33–46.
- Ajzen, Icek and Martin Fishbein (1980), *Understanding Attitudes and Predicting Social Behavior*, Englewood Cliffs, New Jersey: Prentice-Hall.
- Alcohol Beverage Labeling Act of 1988 (Public Law 100–690), 27 USC 201–211 (November 18, 1988).
- "Alcohol Warning: Impact is Debated," *The New York Times*, November 15, 1989, C1, C6.
- "Alcohol Warning Labels," Hearings before the Subcommittee on the Consumer, Senate Commerce, Science and Transportation Committee, August 10, 1988. Washington, D.C.: U.S. Government Printing Office.
- Asam, Edward H. and Louis P. Bucklin (1973), "Nutritional Labeling for Canned Goods: A Study of Consumer Response," *Journal of Marketing*, 37, 32–37.
- Baron, Reuben M. and David A. Kenny (1986), "The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations," *Journal of Personality and Social Psychology*, 51(6), 1173–1182.
- Beltramini, Richard F. (1988), "Perceived Believability of Warning Label Information Presented in Cigarette Advertising," *Journal of Advertising*, 17(1), 26–32.
- Bettman, James R., John W. Payne, and Richard Staelin (1986), "Cognitive Considerations in Designing Effective Labels for Presenting Risk Information," *Journal of Public Policy & Marketing*, 5, 1–28.
- Bhalla, Gaurav and John L. Lastovicka (1984), "The Impact of Changing Cigarette Warning Message Content and Format," in *Advances in Consumer Research*, Vol. 11, Thomas Kinnear, ed., Provo, Utah: Association for Consumer Research, 305–310.
- Bozinoff, Lorne, Victor Roth, and Colin May (1989), "Stages of Involvement with Drugs and Alcohol: Analysis of Effects of Drug and Alcohol Abuse Advertising," in *Advances in Consumer Research*, Vol. 16, Thomas K. Srull, ed., Provo, Utah: Association for Consumer Research, 215–220.
- Cialdini, Robert B., Richard E. Petty, and John T. Cacioppo (1981), "Attitude and Attitude Change," *Annual Review of Psychology*, 32, 357–404.
- Colford, Steven W., "Industry Leaders Vow to Battle Bill," *Advertising Age*, April 9, 1990, 1, 64.
- Comprehensive Smokeless Tobacco Health Education Act of 1986 (Public Law 99–252), 15 USC 4401–4408.
- Daly, Patricia A. (1976), "The Response of Consumers to Nutrition Labeling," *The Journal of Consumer Affairs*, 10, 170–178.
- DePaulo, Peter J., Mary Rubin, and Brenton Milner (1987), "Stages of Involvement with Alcohol and Heroin: Analysis of the Effects of Marketing on Addiction," in *Advances in Consumer Research*, Vol. 14, Melanie Wallendorf and Paul Anderson, eds. Provo, Utah: Association for Consumer Research, 521–525.
- deTurck, Mark A. and Gerald M. Goldhaber (1989), "Effectiveness of Product Warning Labels: Effects of Consumers' Information Processing Objectives," *The Journal of Consumer Affairs*, 23(1), 111–126.
- Dyer, Robert F. and Thomas J. Maronick (1988), "An Evaluation of Consumer Awareness and Use of Energy Labels in the Purchase of Major Appliances: A Longitudinal Analysis," *Journal of Public Policy & Marketing*, 7, 83–97.
- Elliott, Stuart, "Warning: Alcohol to be Stamped with Fine Print," *USA Today*, November 13, 1989, 7B.

- Ferguson, Tim W., "Prop. 65 Populism is on the Prowl, but Don't Cry Wolf," *The Wall Street Journal*, March 6, 1990, A19.
- Fishbein, Martin and Icek Ajzen (1975), *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*, Reading, Massachusetts: Addison-Wesley.
- Freedman, Alix M., "Rebelling Against Alcohol, Tobacco Ads: Consumers Back Curbing Pitches, Not Products," *The Wall Street Journal*, November 14, 1989, B1, B11.
- Funkhouser, G. Ray (1984), "An Empirical Study of Consumers' Sensitivity to the Wording of Affirmative Disclosure Messages," *Journal of Public Policy & Marketing*, 3, 26–37.
- Gordis, Enoch, Director of the National Institute on Alcohol Abuse and Alcoholism, testimony on alcohol warning labels before the Subcommittee on the Consumer, Senate Commerce, Science, and Transportation Committee, August 10, 1988, Washington, D.C.: U.S. Government Printing Office, 24–26.
- Greenwald, Anthony G. (1968), "Cognitive Learning, Cognitive Response to Persuasion and Attitude Change," in *Psychological Foundations of Attitudes*, Anthony G. Greenwald, Timothy C. Brock, and Thomas M. Ostrom, eds., New York: Academic Press, 147–170.
- Jacoby, Jacob, Robert W. Chestnut, and William Silberman (1977), "Consumer Use and Comprehension of Nutrition Information," *Journal of Consumer Research*, 4 (September), 119–128.
- Lehto, Mark R. and James M. Miller (1986), *Warnings: Fundamentals, Design, and Evaluation Methodologies*, Volume 1, Ann Arbor, Michigan: Fuller Technical Publications.
- Lenahan, R.J., J.A. Thomas, D.A. Taylor, D.L. Call, and D.I. Padberg (1973), "Consumer Reaction to Nutritional Labels on Food Products," *The Journal of Consumer Affairs*, 7, 1–12.
- Lightner, Candy, "Does Marketing of Alcoholic Beverages on Campuses Encourage Abuse? Yes—Causes Drunk Driving, Academic Failure," *Los Angeles Times*, May 6, 1984, section V, 3.
- Lipman, Joanne, "Alcohol Firms Retain Campus Presence," *The Wall Street Journal*, October 6, 1989, B3.
- Mackie, Valerie, "Whole World is Watching U.S. Alcohol Ad Debate," *Advertising Age*, February 11, 1985, 70.
- Magner, Denise K., "Alcohol-Related Problems Have Not Decreased on Most College Campuses, Survey Indicates," *The Chronicle of Higher Education*, November 9, 1988, A35, A37.
- McAuliffe, Robert (1988), "The FTC and the Effectiveness of Cigarette Advertising Regulations," *Journal of Public Policy & Marketing*, 7, 49–64.
- McGuire, William J. (1969), "The Nature of Attitudes and Attitude Change," in *The Handbook of Social Psychology*, Vol. 3 (2nd ed.), G. Lindzey and Elliot Aronson, eds., Reading, Massachusetts: Addison-Wesley, 136–314.
- (1976), "Some Internal Psychological Factors Influencing Consumer Choice," *Journal of Consumer Research*, 2 (March), 302–319.
- (1980), "The Communication-Persuasion Model and Health-Risk Labeling," in *Product Liability and Health Risks: Banbury Report 6*, Louis A. Morris, Michael B. Mazis and Ivan Barofsky, eds., Cold Spring Harbor, New York: Cold Spring Harbor Laboratory, 99–122.
- McNeill, Dennis L. and William L. Wilkie (1979), "Public Policy and Consumer Information: Impact of the New Energy Labels," *Journal of Consumer Research*, 6 (June), 1–11.
- "Media Advisory" (1988), U.S. Senate Governmental Affairs Committee.
- Morris, Louis A., Michael Ruffner, and Ronald Klimberg (1985), "Warning Disclosures for Prescription Drugs," *Journal of Advertising Research*, 25, 25–32.
- Olson, Jerry C., Daniel R. Toy, and Philip A. Dover (1982), "Do Cognitive Responses Mediate the Effects of Advertising Content on Cognitive Structure?," *Journal of Consumer Research*, 9 (December), 245–262.
- Petty, Richard E. and John T. Cacioppo (1986), *Communication and Persuasion: Central and Peripheral Routes to Attitude Change*, New York: Springer-Verlag.
- Pollay, Richard W. (1989), "Filters, Flavors . . . Flim-Flam, Too! On 'Health Information' and Policy Implications in Cigarette Advertising," *Journal of Public Policy & Marketing*, 8, 30–39.
- Popper, Edward T. and Keith B. Murray (1989), "Communication Effectiveness and Format Effect on In-Ad Disclosure of Health Warnings," *Journal of Public Policy & Marketing*, 8, 109–123.
- Prial, Frank J., "California Considers Cancer Warning on Alcohol," *The New York Times*, May 25, 1988, C12.

- Redfield, David, "Does Marketing of Alcoholic Beverages on Campuses Encourage Abuse? No-Ban Might Actually Increase Drinking," *Los Angeles Times*, May 6, 1984, section V, 3.
- Russo, J. Edward (1977), "The Value of Unit Price Information," *Journal of Marketing Research*, 14 (May), 193–201.
- Seessel, Thomas V., "Two Ways to Reduce Underage Drinking," *The New York Times*, January 1, 1988, 16(N), 30(L).
- "Senate Urged to Delay Alcohol Warnings," *The Milwaukee Journal*, August 11, 1988.
- Sensible Advertising and Family Act of 1990 (House Bill No. 4493).
- Sternthal, Brian, Ruby Roy Dholakia, and Clark Leavitt (1978), "The Persuasive Effects of Source Credibility: Tests of Cognitive Response," *Journal of Consumer Research*, 4 (March), 252–260.
- Tenowitz, Ira, "Miller Looks for Lite Touch to Tap Youth," *Advertising Age*, August 1, 1988, 3, 50.
- Ursic, Michael (1985), "Product Safety Warnings: A Legal Review," *Journal of Public Policy & Marketing*, 4, 80–90.
- Winer, B.J. (1971), *Statistical Principles in Experimental Design*, New York: McGraw-Hill.
- Wright, Peter (1979), "Concrete Action Plans in TV Messages to Increase Reading of Drug Warnings," *Journal of Consumer Research*, 6 (December), 256–269.