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Value-Affirmative and Value-Protective Processing of Alcohol Education Messages That Include Statistical Evidence or Anecdotes[1]

This study of persuasion processes in a value-relevant context tests effects of the presence or absence of statistical evidence and the presence or absence of anecdotal evidence, crossed across three base messages regarding different alcohol use issues. Results suggest that a variant of central processing as described by Petty and Cacioppo (1986) was used: Involvement predicted greater message-relevant responses only when the message was congruent with recipients' own values regarding alcohol use. Among recipients for whom the message was value-congruent, messages with statistical evidence were rated more persuasive, more believable, and better written; anecdotal evidence had no effect. Among recipients for whom the message was value-discrepant, messages with anecdotal evidence were rated more persuasive, more believable, and (marginally) better written, and statistical evidence had no effect. Path analyses also suggest that peripheral-processing strategies are employed when the message is value-discrepant, and central-processing strategies are used when the message is value-congruent.

Research on persuasion processes is sketchy at best concerning messages that address norms and values. A meta-analysis of what research there is on the topic suggests that evidence quality, or argument strength, makes relatively little difference to recipients of such messages (Johnson & Eagly, 1989). The implications of this finding in applied contexts are distressing. Health communicators, for example, typically attempt to influence values and beliefs regarding normative and substance abuse behaviors. If Johnson & Eagly's

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findings extend to contexts such as these, they put a finer point on applied communication challenges: Conventional strategies for building argument strength in a message may be of limited utility. From a theoretical vantage point, such findings are equally intriguing: How, in fact, do message recipients deal with evidence in their processing of a persuasive message addressing values—so as to avoid influence from such evidence?

In this study, we examine college students' responses to alcohol education messages of varying evidentiary quality. Our purpose is to better understand how recipients selectively process such evidence, in the context of a message directed at behavioral norms and values. We also examine the role of involvement with the message topic and message congruence or discrepancy with recipients' own values in influencing responses to the message. In so doing, we seek to extend theoretical and applied thinking regarding the processing of messages that address norms and values.

Argument Strength

When someone sets out to construct a persuasive message, considerable effort typically goes into trying to make the message content as persuasive as possible. Rhetorical strategies are weighed, evidence sorted, arguments built. Oddly enough, however, persuasion researchers have extensively studied almost everything about a persuasive message except the content of the message itself. Most persuasion research concentrates on factors extrinsic to the message, such as source characteristics (e.g., expertise, trustworthiness, and attractiveness) or recipient characteristics (e.g., prior knowledge and valence of existing beliefs with respect to the message topic; see, for instance, Cacioppo, Petty, & Sidera, 1982; McCroskey, 1969; see O'Keefe, 1990, for a review; Wood, 1982; Wood & Kallgren, 1988). Persuasion research concerning messages typically focuses on structural issues, such as order and sidedness of arguments, rather than on the nature of the arguments themselves (Insko, 1962; see Jackson & Allen, 1987, for a review; McCroskey, 1969). Leading contemporary theorists in persuasion and attitude change research agree that "the general neglect of the information contained in a message . . . is probably the most serious problem in communication and persuasion research" (Fishbein & Ajzen, 1981, p. 359). Petty and Cacioppo (1986, p. 31) comment that "one of the least researched and least understood questions in the psychology of persuasion is: What makes an argument persuasive?"

Nonetheless, varying argument strength or argument quality has proven theoretically and empirically productive in elaboration likelihood model (ELM) research. A classic set of findings suggested that argument quality had an influence on the processing of a persuasive message when recipient

involvement was high but not when it was low. In other words, when the recipient was motivated to process the message with some care, stronger arguments were influential. When such motivation was absent, little attention was paid to the arguments in the message and argument quality mattered little (Petty & Cacioppo, 1984).

In an extensive meta-analysis of research on the role of involvement in persuasion, Johnson and Eagly (1989) found that this pattern did not always hold. When involvement was manipulated by using messages that did or did not address topics that had direct personal consequences for the reader, Petty and Cacioppo's (1984) results tended to be replicated. Johnson and Eagly referred to such messages as being outcome-relevant. However, when messages addressed topics that were relevant to values and beliefs (value-relevant messages), rather than to personal consequences, the high-involvement condition did not result in greater effectiveness for messages with strong arguments.

Johnson and Eagly (1989) offered some plausible explanations for this finding. They pointed out that value-relevance is closely akin to the concept of ego involvement as discussed by Sherif and his colleagues in work on social judgment theory (Sherif, Kelly, Rodgers, Sarup, & Tittler, 1973). In the case of value-relevant involvement, there may be an assortment of psychological mechanisms employed to protect beliefs and values important to an individual's identity. Arguments, however strong, may be ignored, misinterpreted, or otherwise dismissed. Of course, this argument is relevant only to the case in which the message challenges recipient values. The value-congruent alternative is not addressed.

Petty and Cacioppo (1986) offer their own somewhat comparable discussion of what they call biased processing. However, they expect that biased processing will be inhibited by strong arguments, because strong arguments are more difficult to counterargue. Johnson and Eagly's (1989) meta-analytic findings, however, suggest that counterarguing alone does not explain how message recipients defend their beliefs and values. We are left, then, with the problem of understanding empirically as well as speculatively how this defense takes place.

Objective Versus Empirical Argument Strength Differences: Using Statistics and Anecdote

ELM researchers have, then, studied the role of argument strength in the persuasion process. However, some persuasion researchers have criticized the ELM studies for their empirical, perhaps tautological conceptualization

of argument strength (e.g., Mongeau & Stiff, 1993). As Petty and Cacioppo (1986) themselves acknowledge, "In our own studies, we too have ignored the specific qualities that render some arguments cogent and others specious. . . . We have postponed the question of what specific qualities make arguments persuasive by defining argument quality in an empirical manner [by determining through pretest which versions of an argument members of a population find weak or compelling]" (p. 32). Clearly, it would be very difficult to trace how message recipients cope with message arguments when those argument differences are unspecified.

Identifying and operationalizing objective criteria for argument strength, however, is challenging. After all, messages have an almost endless array of dimensions. Rhetoricians describe an array of techniques that a persuasive communicator may employ, but few of these have been subjected to empirical study (Vancil, 1993). One exception, however, is research on the persuasive influence of evidence. Persuasive messages typically employ some kinds of evidence to buttress an argument. Reviews of this literature suggest that evidence, when reasonably well referenced, does enhance the persuasive effect of a message (see Reinard, 1988).

Two frequently employed types of evidence are the statistical and the anecdotal. Recent research has indicated that some messages using such evidence are more persuasive than messages that do not (Baesler & Burgoon, 1994). Though there has been controversy over which of these forms of evidence is the more persuasive, both tend to enhance persuasion (e.g. Kazoleas, 1993; see Baesler & Burgoon, 1994; Reinard, 1988, for reviews).[2] Baesler and Burgoon argued that comparisons between the two frequently confounded the narrative vividness of the two types of evidence and found that statistics were especially effective when vivid—that is, written in clear, direct, and nontechnical language and imbedded in text that has a lively rather than a dry presentation style. It may also be useful to distinguish between anecdotal evidence as exemplars, as used in research on decision-making heuristics, and the effects of incorporating an anecdote or story as an evidentiary tactic. Exemplars, which present information about individual cases, may be effective largely because they serve as a pseudosample from which message recipients generalize (Brosius & Bathelt, 1994; Tversky & Kahneman, 1971). Anecdotes, however, may if they are effective be effective for different reasons: Narrative presentations are readily processed and recalled (Hamill, Wilson, & Nisbett, 1980; Kazoleas, 1993; Mandler, 1984), and the example of what happens to an individual may provide a sense of recognition and plausibility absent from more abstract accounts. Statistical evidence and inclusion of an anecdote stand in sharper contrast than statis-

tical evidence and use of multiple exemplars, which both call on inferential processes. Anecdotes—in the form of a brief narrative, rather than as examples without narrative elaboration—and statistical evidence, then, may be used to vary or manipulate argument strength in an objective rather than an empirical way.

Criterion Variables and Hypotheses

ELM researchers typically measure cognitive responses, or the thoughts recipients report having while processing the message, to analyze the processing strategies employed. These responses are typically distinguished in terms of such dimensions as target (a focus on message arguments or presentation features or peripheral cues), origin (responding to message content directly or generating thoughts based on one's own experience sources external to the message), and polarity (Cacioppo, Harkins, & Petty, 1981). Research evidence suggests that these cognitive elaborations mediate the persuasive effects of messages (see Petty & Cacioppo, 1986, for a review). On the whole, however, existing ELM research sheds limited light on how value-relevant messages, such as many health communications, are processed. Johnson and Eagly's (1989) meta-analyses tell us more about ELM findings that do not generalize to the value-relevant context than they do about processing mechanisms in the value-relevant context. It is therefore important to ask some basic questions about how message recipients process value-relevant messages and how this processing varies as a function of the degree of value-relevance. In so doing, it is also important to clarify some concepts and terminology that will be used in this article. *Value-involvement* refers to the degree to which the message recipient holds a position either consistent or inconsistent with the values espoused in the message. *Value-extremity*, in contrast, refers to the degree to which the recipient holds values in a single direction—either congruent or discrepant with the values advocated in the message. A message, then, is *value-congruent* or *value-discrepant* with respect to the values held by any given recipient. Recipients, in turn, can be expected to process a value-discrepant message in ways that will tend to defend their existing values: Such a strategy will be referred to as *value-protective*. Similarly, recipients can be expected to process a value-congruent message so as to affirm and reinforce their existing values: Such a strategy will be referred to as *value-affirmative* (see Slater, in press, for a conceptual discussion of such strategies).

Research Question 1: When recipients process a value-relevant message, (a) which categories of cognitive responses predominate, (b) to what

extent are the numbers of responses in these categories a product of value involvement, and (c) do these responses vary by type depending on value extremity (that is, the valenced direction of involvement)?

The research question primarily driving this study concerns how people process types of evidence when their beliefs and values about the topic are reasonably well entrenched. The bottom line on persuasion typically is belief change. In the context of value-relevant messages, however, one would expect little, if any, belief change from a single message exposure experience. However, Johnson and Eagly's (1989) meta-analysis indicates that the greater the involvement in the value-relevant message (that is to say, the greater the value-relevance of the message), the less the belief change. Therefore, we might expect to replicate this result:

Alternate Hypothesis 1a: Amount of belief change is negatively related to extremity of values relevant to the message topic.

It may be, though, that the effects of involvement are not consistent between value-affirmative and value-protective message recipients. The studies meta-analyzed in Johnson and Eagly (1989) apparently tended, in many cases, primarily to challenge recipient values, which would confound value-relevance with value-discrepancy or biased processing. If value-congruent recipients are not already at a measurement ceiling with respect to their beliefs, we might find that belief change and degree of value congruence with the message topic are positively related. Thus the following:

Alternate Hypothesis 1b: Amount of belief change (when prior beliefs are not at some ceiling level) is positively related to degree of congruence of values with the message topic.

Johnson and Eagly (1989) also found some tendency for stronger arguments to enhance persuasion but not enough, generally, to overcome the dampening effects of value-relevance on persuasion. This conclusion returns us to our original question concerning what message recipients actually do in processing such evidence. Strong evidence, the ELM proposes, should be either accepted or counterargued if recipients are motivated to process a message's arguments. We might expect that value-relevance may elicit relatively vigorous counterarguing, if the message is both relevant and value-discrepant, or vigorous positive elaborations if relevant and value-congruent. If this is the case, one would expect more responses pertinent to message arguments:

Hypothesis 2: Presence of stronger message evidence in value-relevant messages will increase the number of responses to message arguments.

The number of responses of a given type, such as responses to value-relevant message arguments, is important in that it helps us understand processing style and predicts the durability of any persuasive effects (see Petty & Cacioppo, 1986). Of course, the valence or direction of such responses—whether people respond favorably or unfavorably to various aspects of the message—is also crucial in persuasion effects. Response valence, though, is typically not an important issue in ELM research, presumably because in most ELM studies it is conceptually trivial. After all, one would expect response valence to be a function of prior beliefs and the extent to which the message is discrepant with those beliefs. However, in this study, response valence is of interest. It is possible that statistical evidence or anecdote may influence response valence independently of discrepancy. We can avoid the trivial issue of valence differences based on discrepancy by comparing effects on evidence type on value-congruent and value-discrepant respondents separately:

Research Question 2a: Do statistical evidence or anecdotes influence the valence of message-argument responses among (a) value-congruent and (b) value discrepant recipients?

Research Question 2b: Do statistical evidence or anecdotes influence the valence of responses regarding message presentation among (a) value-congruent and (b) value discrepant recipients?

There is still another set of criteria with which to assess the effect of evidence on the processing of value-relevant messages. The ELM posits, and provides substantial evidence for concluding, that persuasive effects of messages are mediated by the cognitions generated during message reception (Petty & Cacioppo, 1986). However, other mediators may also play a noteworthy role. Recent research has noted that perceptions of message believability and message quality are to a considerable extent independent of source credibility and may have an independent influence on persuasive effect at least under some circumstances (Austin & Dong, 1994; Slater & Rouner, 1994).

The possible role of message believability and message quality assessments becomes particularly important when one is trying to piece together explanations of what people do with evidence when their minds are already made up, as one might typically expect in value-relevant contexts. If evidence is truly ignored in the sense of not even being processed, the presence or absence of stronger evidence in a message should make no difference when recipients assess message quality. If stronger evidence instead occasions

greater positive and negative responses to the message, as posited in Hypothesis 2, then we should expect more positive assessments of message quality. After all, even if the evidence forces greater counterarguing, the message recipient will have noted that there were relatively strong arguments against which to counterargue.

There is also a third possibility. Recipients of a value-relevant message may be cognizant of the evidence but may simply not respond to it. If the evidence is congruent with existing beliefs, there may be no pressing reason to focus attention on that evidence. If it is discrepant, evidence might be noted but attention directed elsewhere, such as a rehearsal of one's own beliefs or experience or a critique of the message presentation or source. In the latter case, one would expect to find no effect of evidence on cognitive responses to message argument but a positive effect on evaluation of message persuasive quality. It seems more likely that the presence of evidence will be noted at least minimally than functionally blocked out of awareness.

Hypothesis 3: Stronger evidence (i.e., messages complemented with statistics or anecdote) will increase positive evaluation of message quality.

It is also possible, of course, that the effects of these evidence types will vary depending on whether the recipient's values are congruent or discrepant with the message. Although such differences deserve examination, there is no clear prediction regarding the nature of such differences to venture based on the literature.

Research Question 3: Do message quality evaluations of messages with statistical evidence or anecdotes follow different patterns for value-affirmative and value-protective recipients?

Methods

Design. This study is a 2 x 2 x 3 factorial experiment. The four treatment conditions are messages with statistics and anecdote, statistics only, anecdote only, and neither statistics nor anecdote. The third factor is the three different basic messages used. Involvement and prior values with respect to the messages were measured.

Stimuli. Three basic template messages were constructed, each arguing that alcohol was a harmful presence in society. One focused on health risks, another on economic and career harm, and a third on drunk driving. The templates argued their case based on general claims about society and

subjective observations of the author (which, however, were not detailed, to minimize the risk of creating effective exemplars or minianecdotes). The versions with statistics added specific supportive data for the general claims, attributed to appropriate government agencies and scientific sources. The versions with anecdotes added a one- to two-paragraph narrative account of the destructive influence of alcohol on the life of a specific undergraduate student. Each message was about 500-600 words long and was attributed to an undergraduate journalism major writing an opinion column for a class assignment (see Appendix). The writing style for all messages was relatively lively and constant across conditions. We did this to ensure that the effect of statistical evidence would not be mitigated against by a dry presentation style (Baesler & Burgoon, 1994). Messages were pretested with journalism faculty who determined that they could plausibly have been written by an advanced undergraduate.

Subjects and procedure. The experiment was conducted with 218 undergraduates in introductory communication classes. Participants' mean age was 20 years; 53% were female, 43% male, and 4% did not say. On the average, these students drank three to four times per month, with an average of four drinks per occasion.

Participants received a booklet with (in order of presentation) a series of questions regarding beliefs about the risks of alcohol use, their values with respect to the social desirability and importance of alcohol, a page describing the source, the message itself, standard instructions for open-ended cognitive responses, evaluative assessments of message quality and believability, posttest measures regarding beliefs about the risks of alcohol use, and measures of frequency of alcohol use. The messages were constructed to raise questions about the social appropriateness and acceptability of alcohol use but at no place made reference to any possible sanctions or policy changes that would affect the college student population (or anyone else, for that matter). This was to ensure that an outcome-relevant processing strategy would not be cued (Johnson & Eagly, 1989).

Measurement. An important operationalization issue in this study concerns involvement with a value-relevant topic. Typically, involvement in ELM studies has been manipulated by making outcomes variably relevant to the message recipient. However, manipulating value involvement may be more problematic. There typically is no simple way to make a value-relevant topic more or less relevant to randomly assigned subjects. As Houston and Rothschild (1978) point out, outcome-relevance is situational but value-relevance is enduring and cross-situational. Moreover, in this study we are principally concerned with

gaining insight into how people deal with evidence in a value-relevant message, across a realistic range of value positions. Although it may be possible to construct a tight, controlled value-involvement manipulation, it would come at the cost of ecological validity and might also reduce the quality of the epistemic relationship between value-relevance and our operations.

We therefore chose to permit natural variation in value valence and extremity and simply measured normative values regarding alcohol use. We developed and pretested the personal and social importance of alcohol use, using a 7-item index to measure responses. Likert-type scale items (with a 5-point response range ensuring a neutral option) included "if I were unable to drink anymore, I would feel a personal loss," "alcohol—beer, wine, or liquor—plays an important role in my enjoyment of life," "a social occasion without alcohol is as enjoyable to me as one with alcohol (reverse-coded)," "I really look forward to a drink or two in the evening or on weekends," "something beneficial is missing from social occasions when alcohol is not served," "drinking alcohol is simply part of a normal social life," and "in general, I value the contribution of alcoholic beverages to the quality of my life." The Cronbach's alpha was .88. The index was used to assess valence of values and was recoded into distance from neutral to assess value extremity or value involvement.

One potential problem with this recoding approach is that many more respondents tended to disagree (n = 158) rather than to agree (n = 53) with such statements (an interesting contrast with the fact that most respondents did use alcohol quite frequently).[3] Five subjects were at the neutral point and two did not respond to these items. Therefore, this involvement measure would tend to confound the effects of value involvement and the effects of disagreeing with these value statements. We therefore incorporated the unfolded, valenced measure as a control or covariate whenever we used the folded involvement measure. In this way, we could look at the effects of involvement, controlling for direction of valence. Alcohol use was measured by three items typically used in population alcohol use surveys regarding frequency of alcohol use (1 = *three or more times per day* to 10 = *less than once a year*, with 11 = *I never had alcoholic beverages*); average number of alcoholic drinks per day on days when alcohol is used (open-ended); and the frequency of drinking five or more drinks at a time over the past 12 months (1 = *every day or nearly every day* to 9 = *not at all*, index alpha = .74).

The pre- and posttest regarding the harmfulness of alcohol consisted of four semantic-differential type items (harmful-beneficial, unsafe-safe, not worrisome-worrisome, and not dangerous-dangerous) on a 9-point scale. The Cronbach's alpha was .80. We developed a series of 19 items regarding the

overall quality of the message, again using the semantic-differential type format on a 1-to-9 scale. Exploratory factor analyses using a varimax rotation yielded three factors, each of which was averaged into an index. The first factor concerned the evaluation of message persuasiveness; the semantic-differential ratings for this factor included ineffective-effective, unpersuasive-persuasive, poor evidence-excellent evidence, poorly substantiated-well substantiated, uninformative-informative, and uninteresting-interesting (alpha = .93). The second factor focused on writing quality, incorporating the following ratings: poorly written-well written, poorly organized-well organized, illogical-logical, unclear-clear, and poorly argued-well argued (alpha = .87). The third factor included items based on a believability index created by Beltramini (1988); semantic-differential ratings included unbelievable-believable, untrustworthy-trustworthy, not convincing-convincing, not credible-credible, questionable-unquestionable, and unlikely-likely (alpha = .86).

Cognitive response coding. Participants were instructed to "list the thoughts that came to your mind while you were reading the passage" immediately after completing the stimulus excerpt. In coding these open-ended responses, we were primarily concerned with distinguishing comments about the quality of message presentation from comments that addressed the issues or arguments raised in the message (Petty & Cacioppo, 1986). We were also concerned, of course, with coding each comment according to polarity—that is, whether the comment was positive (in agreement with the advocated message or complimentary about the message presentation), neutral, or negative. Six teams of two graduate-student coders each were trained on the coding scheme. Intercoder reliabilities (using an approximately 10% subsample of responses) for these teams were very good, with Cohen's kappas ranging from .74 to .83.

Results

Research Question 1 had several parts. The first regarded the relative proportion of argument relevant responses to responses concerning presentation quality. The mean number of argument relevant responses was 3.9 (SD = 2.7) and the mean number of presentation relevant responses was 1.2 (SD = 1.8). Value involvement was not related at statistically significant levels to either number of responses to message argument or presentation, although the relationship to responses to message argument approached significance (responses to message argument (n = 211): involvement beta = .154, t = 1.67, p = .097; responses to presentation: involvement beta = –.1, t = –1.10, p = .27).[4] However, a relationship was found when valence of

involvement was taken into account using subgroup analyses. The extent of this value extremity predicted value-affirmative recipients' responses to message arguments (n = 154, beta = .17, t = 2.14, $p < .05$) but not value-protective recipients' responses (n = 51, beta = .1, t = .71, p = .48). Relationships in the case of responses to message presentation were trivially small.

Hypothesis 1 was proposed in two alternate versions: that amount of belief change would be negatively related to value involvement or that belief change would be positively related to extent of value congruence (positive value extremity). We tested the first version using posttest beliefs concerning risks associated with alcohol use as the dependent variable and the folded value index as a measure of value involvement as the independent variable in a regression equation, covarying for pretest risk beliefs.[5] The test (which also controlled for overall value valence, as discussed earlier) did not support this version of the hypothesis, n = 212, beta = .08, t = 1.28, p = .2. The second version was tested using subgroup analyses for respondents for whom the message was value-congruent. This version was supported, n = 154, beta = .17, t = 2.59, $p < .05$.

Hypothesis 2 proposed that the presence of stronger message evidence should increase the number of responses to message arguments. This hypothesis was not supported (statistical evidence: $F(1, 200) = .58$, anecdotal evidence: $F(1, 200) = .49$, n.s.). The interaction of the evidence treatments with value involvement also did not approach significance.[6] Some posthoc analyses were also conducted. Statistical evidence tended to decrease total comments about the presentation at a marginally significant level ($F(1, 200) = 3.33$, p = .07). Although no effects of evidence on belief change were predicted, given the value-relevant context, it should be noted that no such effects were found (statistics: $F(1, 200) = 1.90$; anecdote: $F(1, 200) = 1.06$, n.s.).[7] The different basic message templates showed significant main effects due to differences in topic focus but nonsignificant interactions with statistical evidence and anecdote, suggesting that effects were reasonably consistent across the three base messages used in the study. This same pattern of main effects due to base messages but no interactions with treatments was found in the other analyses of variance reported below, with minor exceptions as noted. In addition, no statistics by anecdote treatment interaction were found in these or subsequent analyses.

Research Question 2 concerned valence of message responses as influenced by evidence type for value-affirmative and value-protective recipient subgroups. Value-affirmative recipients provided more net positive responses to message arguments, computing response polarity as number of positive minus number of negative responses, when messages included statistical evidence, $F(1, 143) = 5.27$, $p < .05$, see Table 1 for means. Value-

Table 1
Net Polarity of Cognitive Responses: Subgroup Analyses

	Statistical Evidence			
	Value-Affirmative Subgroup Analysis (n = 155)		Value-Protective Subgroup Analysis (n = 52)	
	Present	Absent	Present	Absent
Net polarity of argument-relevant responses	2.33	1.34*	.35	1.54***
	(3.18)	(2.95)	(3.00)	(3.52)
Net polarity of presentation-relevant responses	−.26	−.48	−.27	−.12
	(1.71)	(1.61)	(1.46)	(1.31)
	Anecdote			
	Value-Affirmative Subgroup Analysis (n = 155)		Value-Protective Subgroup Analysis (n = 52)	
	Present	Absent	Present	Absent
Net polarity of argument-relevant responses	1.80	1.88	1.00	.88
	(3.19)	(3.0)	(2.79)	(3.83)
Net polarity of presentation-relevant responses	−.35	−.38	.30	−.72**
	(1.58)	(1.75)	(1.14)	(1.43)

Note. Net polarity is number of positive minus number of negative responses of each type. Standard deviations are in parentheses. Significance tests are for comparison between presence and absence of the treatment within each subgroup (value-affirmative or value-protective) only; subgroups are placed in the same table for ease of comparison.
*$p < .05$; **$p < .01$; ***$p < .001$.

protective recipients, in contrast, provided fewer net positive responses to message arguments when messages included statistical evidence at marginally significant levels, $F(1, 40) = 3.07$, $p = .09$, see Table 1. The effect of anecdotes on valence of argument-relevant responses was trivial for both value-affirmative and value-protective recipients.

The pattern was quite different with respect to subgroup analyses of responses regarding message presentation. Both statistics and anecdote had only trivial influence on such responses for value-affirmative recipients. However, the presence of the anecdotes notably increased positive responses regarding message presentation for value-protective recipients, $F(1, 40) = 10.81$, $p < .01$, see Table 1. Effects of statistical evidence were nonsignificant for this subgroup.[8]

Subgroup analyses have been used to provide a relatively clear and detailed examination of this research question. It should be noted, as would be expected given the pattern of results reported above, that an interaction test for value-affirmative versus value-protective recipients by the statistical evidence treatment was statistically significant for polarity of argument relevant responses ($F(1, 183) = 6.50$, $p < .05$). Similarly, the interaction between value-affirmative and value-protective recipients by the anecdote treatment was significant for polarity of responses regarding message presentation ($F(1, 183) = 4.72$, $p < .05$).

Table 2
Evaluative Assessments of Messages: Subgroup Analyses

	Statistical Evidence			
	Value-Affirmative Subgroup Analysis (n = 156)		Value-Protective Subgroup Analysis (n = 53)	
	Present	Absent	Present	Absent
Persuasive quality	5.78	5.14*	5.07	5.07
	(1.73)	(1.68)	(1.84)	(1.58)
Writing quality	6.57	6.13*	5.91	5.96
	(1.45)	(1.58)	(1.88)	(1.02)
Believability	6.16	5.60**	5.48	5.50
	(1.44)	(1.45)	(1.89)	(1.32)
	Anecdote			
	Value-Affirmative Subgroup Analysis (n = 156)		Value-Protective Subgroup Analysis (n = 53)	
	Present	Absent	Present	Absent
Persuasive quality	5.58	5.34	5.53	4.59*
	(1.70)	(1.77)	(1.45)	(1.82)
Writing quality	6.51	6.18	6.21	5.65***
	(1.45)	(1.59)	(1.14)	(1.75)
Believability	5.94	5.81	5.94	5.02*
	(1.42)	(1.51)	(1.15)	(1.86)

Note. Scores are on a 9-point scale in which 9 represents the highest quality rankings. Standard deviations are in parentheses. Significance tests are for comparison between presence and absence of the treatment within each subgroup (value-affirmative or value-protective) only; subgroups are placed in the same table for ease of comparison. An additional missing case for the believability ratings for the value-affirmative subgroup reduced the n to 155 for that analysis.
*$p < .05$; **$p < .01$; ***$p < .001$.

For the value-protective recipients only, topic (base message) by treatment interactions were also found in these analyses, but these affected only the main effects that were trivial for these recipients. Topic interacted with anecdotes on valence of message-relevant responses ($F(2, 40) = 4.04, p < .05$) and with statistics on valence of presentation-relevant responses ($F(2, 40) = 3.24, p = .05$). Therefore, the effects reported above were consistent across base messages. The interactions do suggest, however, that value-protective recipients may be, in some contexts, sensitive to idiosyncrasies of messages and the presentation of statistics and anecdote.

Hypothesis 3 stated that statistical evidence and anecdotes would increase perceptions of message quality. As discussed earlier, factor analyses yielded three different indices measuring aspects of message quality: message persuasive quality, writing quality, and believability. Overall results were supportive at statistically significant levels for the effects of statistical evidence for all three dependent variables (persuasive quality: $F(1, 202) = 5.758, p < .05$; writing quality: $F(1, 202) = 4.32, p < .05$; believability: $F(1, 201) = 6.93, p < .01$). Effects for anecdotal evidence were marginally significant for all three depen-

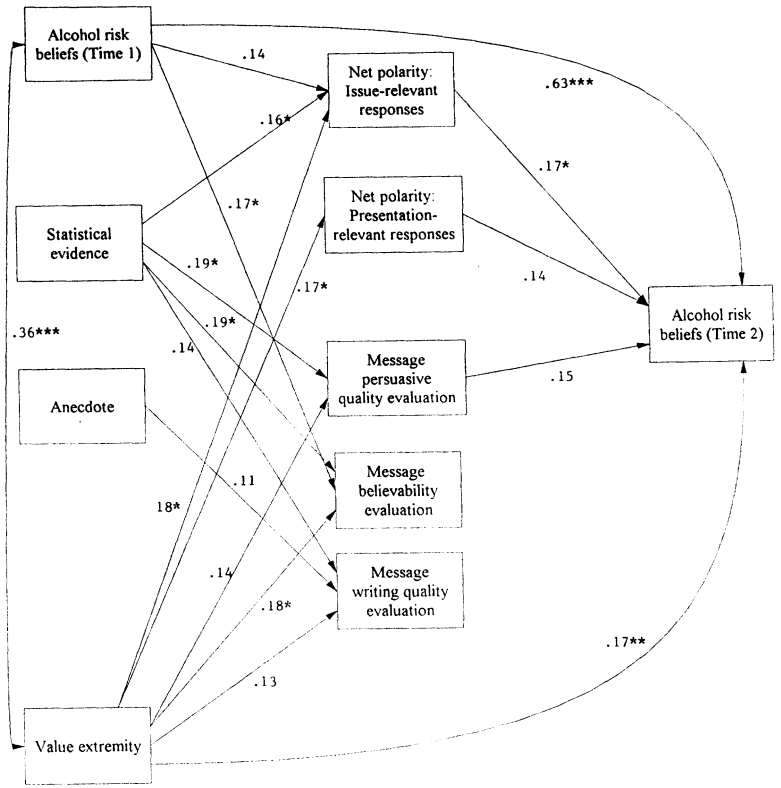

Figure 1: Path Diagram of the Effects of the Variables Predicting Change in Personal and Social Beliefs About Alcohol for Value-Affirmative Message Recipients (n = 154).
*$p < .05$; **$p < .01$; ***$p < .001$.

dent variables (persuasive quality: $F(1, 202) = 3.52, p = .06$; writing quality: $F(1, 202) = 2.71, p = .10$; believability: $F(1, 201) = 2.63, p = .11$).

However, one might expect persons for whom the message was value-congruent to evaluate the evidence differently than those for whom it was value-discrepant. Thus we repeated these analyses on the value-affirmative and value-protective subgroups. Results were both surprising and illuminating. Value-affirmative respondents consistently rated messages with statistical evidence to be of higher quality (persuasive quality: $F(1, 144) = 5.90, p < .05$; writing quality: $F(1, 144) = 3.96, p < .05$; believability: $F(1, 144) = 8.07, p < .01$, see Table 2 for means) than those without statistical evidence. On the other hand, the value-affirmative respondents showed only trivial effects for anecdotal evidence (persuasive quality: $F(1, 144) = .79$, n.s.; writing quality: $F(1, 144) = 1.93$, n.s.;

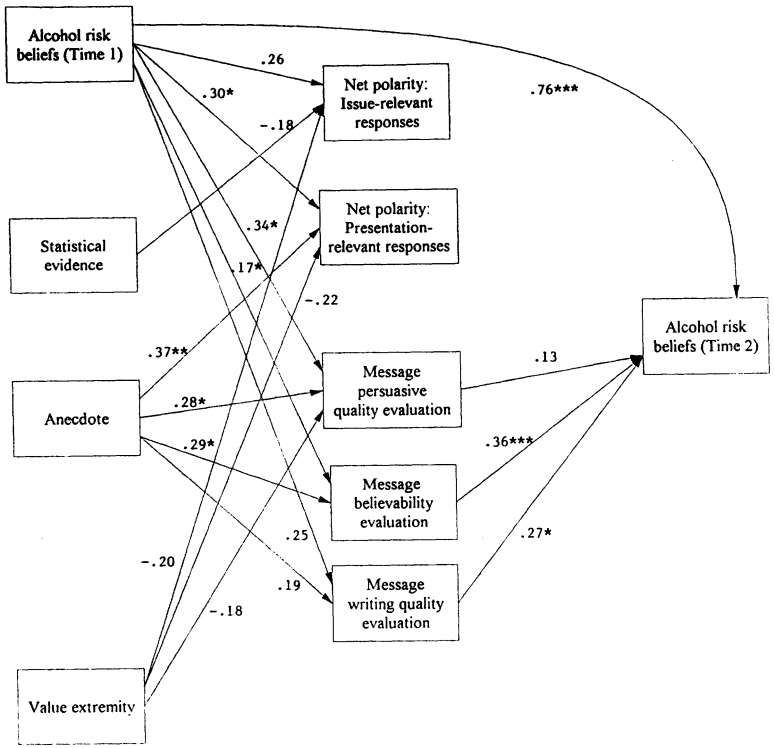

Figure 2: Path Diagram of the Effects of the Variables Predicting Change in Personal and Social Beliefs About Alcohol for Value-Protective Message Recipients (n = 52).
*p < .05; **p < .01; ***p < .001.

believability: $F(1, 143) = .38$, n.s., see Table 2 for means). Just the opposite pattern occurred for the value-protective respondents. Value-protective respondents consistently rated messages with anecdotes to be of higher quality than those without anecdotes included (persuasive quality: $F(1, 41) = 6.39$, $p < .05$; writing quality: $F(1, 41) = 2.99$, $p = .09$; believability: $F(1, 41) = 6.56$, $p < .05$, see Table 2 for means). The value-protective respondents also showed trivial effects for statistical evidence, again the obverse of the value-affirmative respondents (persuasive quality: $F(1, 41) = .04$, n.s.; writing quality: $F(1, 41) = .12$, n.s.; believability: $F(1, 41) = .03$, n.s., see Table 2 for means).

To examine more completely the differences between the value-affirmative and value-protective subgroups, a path analysis was run on each subgroup. Paths to beliefs at posttest include pretest beliefs as a control, so that these paths in fact test influence on belief change. For these path analyses, the t value of > 1.20 served as the criterion for inclusion in the model, to examine

Table 3
Decomposition of Effects in the Path Models

Predictor	Dependent	Value-Affirmative (n = 154)			Value-Protective (n = 52)		
		Dir.	Ind.	Tot.	Dir.	Ind.	Tot.
Alcohol beliefs time 1	Alcohol beliefs time 2	.63***	.08	.71***	.76***	.11	.87***
Alcohol beliefs time 1	Value extremity	.36***		.14*			
Alcohol beliefs time 1	Net issue polarity	.14		.14*	.26		.26
Alcohol beliefs time 1	Presentation polarity				.30*		.30*
Alcohol beliefs time 1	Persuasive quality				.34*		.34*
Alcohol beliefs time 1	Believability	.17*		.17*	.17*		.17*
Alcohol beliefs time 1	Writing quality				.25		.25
Statistical evidence	Issue polarity	.16*		.16*	−.18		−.18
Anecdote	Issue polarity						
Value extremity	Issue polarity	.18*		.18*	−.20		−.20
Statistical evidence	Presentation polarity						
Anecdote	Presentation polarity				.37**		.37**
Value extremity	Presentation polarity	.17*		.17*	−.22		−.22
Statistical evidence	Persuasive quality	.19*		.19*			
Anecdote	Persuasive quality	.14		.14	.28*		.28*
Value extremity	Persuasive quality	.14		.14	−.18		−.18
Statistical evidence	Believability	.19*		.19*			
Anecdote	Believability				.29*		.29*
Value extremity	Believability	.18*		.18*			
Statistical evidence	Writing quality	.14		.14			
Anecdote	Writing quality	.11		.11	.19		.19
Value extremity	Writing quality	.13		.13			
Statistical evidence	Alcohol beliefs time 2		.05	.05			
Anecdote	Alcohol beliefs time 2					.19	.19
Value extremity	Alcohol beliefs time 2	.17***	.07	.24***		.02	.02
Issue polarity	Alcohol beliefs time 2	.17*		.17*			
Presentation polarity	Alcohol beliefs time 2	.14		.14			
Persuasive quality	Alcohol beliefs time 2	.15		.15	.13		.13
Believability	Alcohol beliefs time 2				.36***		.36***
Writing quality	Alcohol beliefs time 2				.27*		.27*

*p < .05; **p < .01; ***p < .001.

the most critical paths and their differences between the two subgroups (see Figures 1 and 2).[9]

The subgroup differences, showing the value-affirmative respondents' higher ratings of the statistical messages and the value-protective respondents' higher ratings for the anecdotal messages, are evident. The relationship between value extremity and message-relevant responses is evident in both groups. Another important difference is highlighted: for value-protective message recipients, belief change is predicted by the message quality evaluation variables and not by cognitive responses; the opposite pattern tends to be true for the value-affirmative processing case, with a statistically significant path from message argument-relevant responses to belief change. The decomposed direct, indirect, and total effects are provided in Table 3.

Discussion

This study is a systematic effort to examine processing of value-relevant messages by both value-affirmative and value-protective recipients. We examine a series of outcomes, including cognitive responses, message quality evaluation, and belief effect. Results provide a wide range of provocative insights regarding the processing of these value-relevant alcohol education messages. These insights include general observations about the processing of value-relevant messages, findings regarding how statistical evidence and anecdotes are differentially processed by value-affirmative and value-protective recipients, and path-analytic findings that help knit the whole picture together.

The processing of value-relevant messages as observed in this study resembles central processing of issue-relevant messages as described in the ELM in some but not all respects (Johnson & Eagly, 1989; Petty & Cacioppo, 1986). Over three times as many responses concerned message arguments rather than such peripheral cues as source and presentation quality. However, unlike the central processing of issue-relevant messages, greater involvement was not consistently associated with greater message-relevant response. Specifically, the amount of value extremity (involvement in a single valence direction) predicted greater message-relevant responses when the message was congruent with recipient values but not when it was discrepant with those values. It seems, then, that value-protective recipients are engaging, to use ELM terminology, in a form of biased processing: They are, in comparison with the value-affirmative respondents, paying less attention to the message arguments. Similarly, we did not find the overall negative relationship between value involvement and belief change reported in the Johnson and Eagly meta-analysis, but we did find a positive relationship for

value extremity among those recipients for whom the message was value-congruent.

Processing differences between value-protective and value-affirmative recipients also proved crucial in understanding the effect of statistical evidence and anecdotes. There were no statistically significant overall effects of evidence type on number of message-argument relevant or presentation-relevant responses to the message. However, there were striking differences in the influence of statistical evidence and anecdotes on valence of message responses between value-protective and value-affirmative recipients. Statistical evidence increased the net polarity of message-relevant responses for the value-affirmative recipients, and, at marginally significant levels, decreased that net polarity for value-protective recipients. This suggests that statistical evidence may be used by value-affirmative recipients to rehearse and reinforce their beliefs but simply tends to elicit counterarguing among value-protective recipients.

Anecdotes, on the other hand, had an effect primarily on the value-protective recipients, who responded significantly more positively to the message presentation when it included the anecdotes. Although the ELM suggests that influence via peripheral cues such as message presentation is relatively weak and short-lived (Petty & Cacioppo, 1986), any message element that is well received by highly resistant audiences is worthy of serious note. In particular, applied educational efforts directed at resistant, high-risk audiences—such as many alcohol and drug education efforts—may be better served focusing on testimonial, narrative accounts. Provision of statistics may be more effective at maintaining positive normative belief patterns among those who already hold the desired beliefs and enact the desired behaviors.

These effect patterns are seen even more clearly in the effects of evidence type on message quality judgments. Recipients did tend overall to rate messages as being of higher persuasive and writing quality as well as more believable in the presence of statistical evidence or anecdotes, although the effect was marginally significant for anecdotes. The picture becomes much clearer, though, in the subgroup analyses on value-protective and value-affirmative recipients. Value-affirmative recipients consistently rated the messages with statistical evidence to be of higher quality across all three quality measures, with no effect for anecdotal evidence. The opposite was true for value-protective recipients, who consistently rated the messages with anecdotes to be of higher quality than those without, with no statistically significant effect for statistical evidence.[10] Clearly, this suggests that value-relevant messages supported with statistical evidence will be better received by the converted than by the heathens; the opposite may be true of value-relevant messages with anecdotes.

Why might this be the case? These results provide some hints. With value-protective recipients, the statistical evidence apparently served only to occasion counterarguing rather than acquiescence. Anecdote, on the other hand, seemed to be processed with some approval by these value-protective recipients. Although anecdote was not associated with the kind of cognitive elaborations associated with lasting belief change, it may be that the processing of narrative does circumvent the tendency to counterargue, and it does mean that some relevant points are likely to be processed and acknowledged (Mandler, 1984; Slater, in press). We should also note, however, that in the social world exposure to value-discrepant and value-congruent messages is typically discretionary and not manipulated as it is in this study. Motivations for processing a value-congruent or value-discrepant message should influence the processing of that message (see Slater, in press, for a discussion).

Type of evidence did not have a direct effect on belief change, which should not be surprising given the value-relevant context and a single message exposure. However, evidence types did influence net polarity of cognitive responses and message evaluations, which were associated with belief change. This suggests, as illustrated in the path analysis, indirect paths of influence on value change even in a single message exposure.

Moreover, other processing differences did emerge between the value affirmative and value-protective recipients in the path analyses. In particular, the path analyses provide further evidence that value-protective message recipients employ a variant on a peripheral-processing strategy, in which impressionistic assessments of message quality have a greater effect on belief change than do substantive responses to the message, and in which anecdotal, narrative evidence is more influential than reports of statistical data. In contrast, value-affirmative message recipients did show evidence for a central-processing strategy, in which statistical data reports did positively influence message-argument relevant responses, which were, in turn, linked to belief effects. It should be noted, too, that similar results have recently been reported by Hale, Lemieux, and Mongeau (1995), in which recipients of a low-fear appeal apparently used central-processing strategies and recipients of a high-fear appeal used peripheral-processing strategies. The parallel, of course, is that the high-fear appeal may engender avoidance strategies analogous to those used by value-protective message recipients.

The peripheral-processing strategies of value-protective recipients may be, however, more complex than those usually described in the persuasion literature. The peripheral routes to persuasion typically discussed for low-involvement message recipients operate because little motivation exists for more cognitively demanding central processing (Petty & Cacioppo, 1986). In this case, central processing apparently does take place but simply occasions

counterargument, mitigating against persuasion. Simultaneously, however, it seems that peripheral, more affective, or general cues (such as narrative anecdote and assessments of message quality) have potential persuasive influence. If this is the case, then the role of peripheral cues must be reconsidered at least in value-relevant message contexts.

The results of this study then both reinforce and extend Johnson and Eagly's (1989) argument that value-relevant processing is distinct from outcome-relevant processing as explored in the ELM literature. In particular, greater involvement is not associated with central-processing strategies when the message is value-discrepant. However, the results also suggest that value-relevant processing is of two types—value-affirmative and value-protective—with the value-affirmative case being similar to outcome-relevant processing. These results also clarify theoretical and methodological uncertainty concerning the role of argument strength and quality in ELM research. These results suggest that objective differences—namely, statistics and anecdote—in how arguments are presented can be important in both central and peripheral processing. The intriguing and intuitively satisfying aspect of these findings is that presumably harder evidence—data with cited sources—is effective in the value-affirmative, central-processing context and softer narrative and anecdotal evidence is more effective in the value-protective, peripheral-processing context. It would be useful to replicate this study with outcome-relevant messages to explore whether these evidence effects generalize to classic central- versus peripheral-processing contexts or may be limited to the value-relevant messages as tested here.

Findings from this single study, of course, must be regarded as suggestive rather than definitive. Generalizability is limited both by the convenience sampling characteristic of most experimental research and by the use of three constructed messages in a fixed effects design. Multiple replications of this study, or better, replication with a large number of randomly selected messages from some definable message population of interest (e.g., all in-press alcohol education curriculum materials from the nation's dozen largest educational publishers) would be necessary to permit confident global assertions regarding differential processing of alcohol education messages as whole, much less regarding differential processing of value-relevant persuasive messages (Jackson & Brashers, 1994; Slater, 1991). However, the design provides a reasonable examination of the theoretical problems and questions outlined and has yielded results with important implications for communication theory and practice. These results should spur greater theoretical attention to the processing of value-relevant messages and the effects of evidence type, as well as further applied work on use of statistics and anecdote in reaching communication audiences.

Appendix

Sample Stimulus

The following stimulus was the message addressing the relationship between drinking alcohol and social problems (one of three base messages used). The statistics inserted as manipulations are bold type, and the anecdote is italicized.

Alcohol: The Wolf in Sheep's Clothing

We have heard how devastating AIDS is, how many of our lives will be touched with loss because of cancer—the pain, the personal tragedies, and the billions of dollars of expense to families, employers, and the taxpayer caused by diseases such as these. But how often have we thought about what is probably a much more dangerous, costly, and widespread disease—alcohol abuse?

Most of us know of someone who has "a drinking problem" and may have spent time in traffic court, in divorce court, or in the hospital as a result. What we see is just the tip of the iceberg. Moreover, it is not just people who drink "a lot." Look around, and you will see the serious problems that result for people who drink just one or two drinks a day or who just go out drinking on weekends. **Public health experts estimate that between 8% and 15% of adult Americans are alcoholics, and many more suffer from occasional alcohol abuse problems—making alcoholism behind only cardiovascular disease and mental illness in frequency among Americans.**

I have noticed people brag about how much liquor they can hold, how much they like to drink. No one brags about the consequences of his or her drinking behavior. Have you ever considered how many of the problems that you hear about that do not seem to have anything to do with alcohol could be, in fact, really alcohol abuse problems? Family and family values may be a conservative rallying cry, but every thoughtful person, liberal or conservative, would agree that family difficulties are a national problem. Our divorce rate hovers around 50%. Two-parent families, children living with their biological parents, are quickly becoming the exception rather than the rule. Child abuse and molestation are increasingly in the headlines. Do you imagine alcohol has nothing to do with this? **The 1984 National Alcohol Survey found, for example, that among men who drink at all, almost 25% reported at least some occasional resulting problems among family, friends, and co-workers, and 12% reported moderate to severe problems.** When there is a problem in their personal lives, people—especially people with a weakness for alcohol—tend to drink. When people drink, these problems almost always get worse. The drinker suffers. Spouses suffer. Children suffer. Society suffers. Those of us who pay taxes, who support the treatment centers, the jails, the reformatories for many of the products of homes like these suffer, as well. Even people who just drink, say, one to two drinks a day can cause big problems to others.

These problems are sad in the abstract. They are worse when they are part of your own life. Take someone I will call Mark, a roommate of a friend of mine. Mark is a fifth-year senior. Mark considered himself an ordinary, hard-drinking college student, quick to hit the bars and parties—but no alcoholic. After all, he hardly ever drank before dinner, except weekends. His schoolwork maybe was not what it could have been, but he had stayed off academic probation since his sophomore year. That he might actually have a problem did not hit home until his girlfriend—that is, his ex-girlfriend—brought

(continued)

Appendix Continued

assault charges against him. They had an argument, he got upset and gave her a shove, but he was drunk. The judge did not see that as an excuse. Part of the sentence, besides all the community service hours, was some intensive counseling. Mark began to understand how his drinking had contributed to his mediocrity as a student—he had been interested in law school, but his grades had shot that dream down quickly—and had hurt his relationships with women. Most painful of all, he saw that he was not the only one in his family with problems like this, and unless he changed, he would be re-creating those problems not just for himself but for his own children. Further, his problems so far were light, compared with what they could become. "I thought I used booze for fun and good times," Mark has told me. "The fact is, it's helped mess up my life now and messed it up more than I could understand when I was a kid."

It is not just the family. Consider the financial health of the nation, our deficit and our efforts to provide health care and health care reform. Problem drinkers are a major health problem. They not only get into accidents, they get sick more often—directly from alcohol overconsumption as well as from a variety of illnesses related to alcohol consumption. **In fact, recent public health research suggests that nearly one fourth of all hospitalizations in the United States are related at least indirectly to alcohol abuse**. Those bills must be paid, and if you add them up, they probably are no small fraction of our enormous national health care costs.

In addition, our nation's prosperity is based on our productivity: our gross national product. One of the most important determinants of this national wealth is the individual productivity of the American worker—on the assembly line, in the cornfields, in offices. A productive worker is one who shows up on time, ready to work and able and willing to get the job done well. I know of people who come into work groggy from a hangover; who indulge in a beer or two or a couple of martinis over lunch; or who simply do not make it into work at all. **Economists estimate that alcoholic workers are 25% less productive than their sober co-workers**. Multiply this over every company, every farm, every office in the United States. The costs would be vast. All of us pay the price.

We talk about an America with happier children and families, a wealthy America that can provide health care for those who need it, a prosperous America in which we can fulfill our dreams. Maybe we should start thinking about those goals next time we pop a beer or mix a friend a drink.

Notes

1. The authors thank the graduate students in the masters of science program in technical communication for their assistance in measurement design, data collection, and data entry. This research was supported in part by grant AA08756 from the National Institute on Alcohol Abuse and Alcoholism to the first author and by the Colorado State University Center for Research on Writing and Communication Technologies.

2. Studies that compare the two types of evidence competitively have found that although both have persuasive influence, the effect of anecdotal information in some

cases is greater and consistently tends to be better remembered, whereas quantitative information may slow processing and even inhibit recall (Kazoleas, 1993; Koballa, 1986; Witt, 1974). However, the focus of this study is not on a competitive examination of these two types of evidence but rather on associated contingent conditions. Yalch and Elmore-Yalch (1984) also make the provocative argument, with some empirical support, that inclusion of quantitative information is off-putting to all but the most motivated message recipients and pushes recipients to engage instead in greater peripheral processing. Their research, and the other studies they cite in support of this argument, focus on processing of advertisements and other commercial messages in which involvement is likely to be relatively low compared with outcome- or value-relevant contexts. The brevity of most advertisements also makes the processing of quantitative information relatively challenging. The generality of these findings to the persuasive contexts of interest here, then, is problematic at best.

3. This apparent inconsistency suggests that drinking may be behaviorally normative among these college students but that a value-based commitment to alcohol use as a social value is far less normative. Such a pattern is consistent with research evidence that shows alcohol use dropping sharply after graduation for all but a minority of former college students (Johnston, O'Malley, & Bachman, 1994).

4. Again, valence of values was included as a control variable in these regressions.

5. Covarying for pretest scores is statistically preferable to testing difference scores (see Wildt & Ahtola, 1978).

6. We also found no interaction between treatment effects and level of alcohol use.

7. Cases with missing values were deleted in these and subsequent analyses; no more than five cases were missing in any single analysis.

8. Cells of the treatment conditions (statistics versus no statistics crossed with anecdote versus no anecdote) were approximately equally balanced in both the value-affirmative and value-protective subgroups; in particular, the cells were of 13 and 14 participants each for the value-protective subgroup analysis.

9. This relatively liberal criterion for inclusion was used to ensure that the maximum relevant information is provided in the path analyses. These path analyses are being used to present our data in a way that facilitates exploratory examination of complex causal processes (e.g., see Mongeau & Stiff, 1993), not for the purposes of hypothesis testing, which has already taken place. Therefore, a strict inclusion criterion was not needed. The reader is reminded, as always, to interpret nonstatistically significant paths with caution and to recognize that these subgroup analyses use smaller *n*s than is typical in path analyses with large cross-sectional data sets.

10. The stronger overall effects for statistical compared with anecdotal evidence, then, may be due to the larger proportion of value-affirmative recipients in the study population.

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