

Evaluating Smokers' Reactions to Advertising for New Lower Nicotine Quest Cigarettes

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Quest cigarettes are a relatively new (2003) product that has been marketed as a way for smokers to gradually reduce the nicotine they receive from cigarettes in order to, according to marketing materials, become nicotine free. However, despite lower levels of nicotine, Quest cigarettes do not have reduced tar levels and, thus, still pose health hazards. This study evaluated beliefs about Quest cigarettes following exposure to a single print advertisement among 200 regular smokers who had never heard of the brand itself. Descriptively, smokers made several specific false inferences about Quest cigarettes after exposure (i.e., lower in tar, healthier, less likely to cause cancer). Two individual-differences variables, need for cognition and perceived vulnerability, moderated smokers' health beliefs about Quest cigarettes.

Keywords: smoking, cigarettes, advertising, message processing

With increasing public awareness of the health risks of smoking, some tobacco companies began developing and marketing "light" cigarettes that purportedly lower the tar and/or nicotine levels in cigarettes, presumably to reduce the adverse health effects of smoking (U.S. Department of Health and Human Services, 2000). Many smokers switch to such cigarettes rather than quit (Shiffman, Pillitteri, Burton, Rohay, & Gitchell, 2001), perceive that the cigarettes marketed by such advertisements are safer or healthier than so-called "regular" cigarettes (Hamilton et al., 2004; Kozlowski, Goldberg, & Yost, 2000; Shiffman, Pillitteri, Burton, & Marino, 2004; Shiffman et al., 2001), and misinterpret the information regarding tar yields displayed on such cigarette packages (Cohen, 1996).

A relatively recent (2003) addition to this class of cigarettes is Quest cigarettes (manufactured by Vector Tobacco, Inc., and marketed in eight states as of early 2006; see www.questcigs.com). Quest cigarettes (both nonmentholated and mentholated) are manufactured with three progressively lower nicotine levels (0.60, 0.30, 0.05 mg) and marketed as allowing smokers to "step down" nicotine levels to enjoy "nicotine-free smoking." However, Quest

cigarettes do not have progressively less tar (10 mg) across steps and thus likely still pose health risks (see Thun & Burns, 2001). Given evidence that many smokers misinterpret the information contained in marketing campaigns for such light cigarettes (Kozlowski et al., 2000), it is important to understand how smokers perceive this newly marketed low-nicotine cigarette.

This study examined the moderating effects of two individual-difference variables germane to how persuasive communications are processed—motivation to process persuasive communications and need for cognition—on inferences smokers made about Quest cigarettes after they were exposed to a single Quest print advertisement. Need for cognition is a stable individual-difference variable that reflects the degree to which people enjoy thinking about complex issues (Cacioppo & Petty, 1982), and it has been shown to moderate responses to persuasive communications (see Cacioppo, Petty, Feinstein, & Jarvis, 1996). Motivation to process was operationalized in this study as perceived personal vulnerability to the health effects of smoking (see Halpern, 1994). Motivation to process a persuasive communication has been defined as the degree to which people are motivated to think critically about that communication, and it is typically indexed by the degree of self-involvement with the issue at hand in the communication (Petty & Wegener, 1999). Perceived personal vulnerability to smoking was therefore seen as especially germane for how information in Quest cigarette advertisements (which purport to help smokers reduce the nicotine from smoking) is processed. Hypotheses were based on prior research on the processing of persuasive communications, including tobacco-related advertising (Steward, Schneider, Pizarro, & Salovey, 2003; see also Shadel, Niaura, & Abrams, 2001), and on the elaboration likelihood model, from which the constructs of need for cognition and processing motivation are drawn (Cacioppo et al., 1996; Petty & Wegener, 1999). In particular, we hypothesized that smokers lower in perceived vulnerability (for whom smoking is of lower personal relevance and who are thus lower in motivation to process) and lower in need

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for cognition (who do not enjoy thinking about issues) would be more likely to make false inferences about Quest cigarettes (because they would have thought least critically about the information contained in the advertisement).

Method

Participants

We recruited a sample of 200 regular smokers using a shopping mall intercept strategy in 14 states (in which Quest cigarettes are not marketed). The sample was 51.0% female ($n = 102$) and 87.5% Caucasian ($n = 175$), 9.0% African American ($n = 9$), and 3.5% ($n = 7$) other reported ethnicities. The average age of participants was 33.8 years ($SD = 11.7$), and 56.0% had a high school (or GED equivalent) education. They smoked an average of 16.9 cigarettes per day ($SD = 10.8$) and had a mean score of 4.6 ($SD = 2.3$) on the Fagerstroem Test for Nicotine Dependence (FTND; Heatherton, Kozlowski, Frecker, & Fagerstroem, 1991). Only 8.0% ($n = 16$) of the sample reported that they had heard of Quest cigarettes prior to this study; no participants had ever tried Quest cigarettes. The reported results were essentially the same when we excluded from the analyses individuals who had heard of Quest cigarettes; thus, we used the full sample of 200 participants. Following completion of all study procedures, we provided individuals with \$20 for their participation.

Procedures and Measures

Participants viewed a single Quest cigarette print advertisement for 30 s and then answered questions in the following categories.¹

Demographics. Participants indicated their age, gender, and education.

Smoking and quitting history. Participants completed the FTND and indicated the number of cigarettes smoked per day, type of cigarette currently smoked (ultralight, light, regular), and past history of smoking low-nicotine cigarettes (no, yes). They also completed an 11-point motivation to quit item (0 = *not at all interested*, 10 = *very interested*) and a 4-point item assessing intention to quit in the next 3 months (1 = *definitely will not*, 4 = *definitely will*).

Beliefs about Quest cigarettes. A set of eight questions assessed beliefs about Quest cigarettes. Participants responded to all items on a 5-point scale (1 = *definitely untrue*, 5 = *definitely true*): Quest cigarettes (a) "are lower in nicotine than regular cigarettes" (true item), (b) "are lower in tar than regular cigarettes" (false item), (c) "are less addictive than regular cigarettes" (false item), (d) "are less likely to cause cancer than regular cigarettes" (false item), (e) "have fewer chemicals than regular cigarettes" (false item), (f) "are healthier than regular cigarettes" (false item), (g) "make smoking safer" (false item), and (h) "help people quit smoking" (false item). The first item was designated as true on the basis of the explicit statement in the Quest ad regarding reduced nicotine. The remaining items were designated as false on the basis of information in the ad indicating that tar levels (associated with the harmful effects of smoking) are not reduced and that Quest cigarettes are not intended to assist smokers with quitting.

We constructed two scales from the false inference items (Items b–h) on the basis of the results of a factor analysis of these items with varimax rotation that yielded two factors with eigenvalues ≥ 1.0 and that accounted for 70.5% of the variance in scores on the scale. We constructed a Quest Health Beliefs scale by summing responses to Items d, f, and g (coefficient $\alpha = .86$; possible range of scores = 3–15), where higher scores represented a greater belief in the health benefits of Quest cigarettes (i.e., making more false inferences about the safety of Quest cigarettes; $M = 8.7$, $SD = 2.9$). We constructed a Quest Objective Beliefs scale by summing responses to Items b, c, e, and h (coefficient $\alpha = .788$; possible range of scores = 4–20). Higher scores reflected a greater belief in objective facts about Quest cigarettes (i.e., making more false inferences about objective facts

Table 1
Final Model Results of Multivariate Regression Analyses for Each Dependent Measure

Dependent measure	<i>B</i>	β	<i>t</i>	<i>p</i>
Quest health beliefs ^a				
Constant	−0.828		−0.174	.862
Perceived vulnerability	0.923	0.786	2.129	.034
Need for cognition	0.394	0.780	2.607	.010
Interaction term	−0.038	−1.277	−2.731	.007
Quest objective beliefs ^b				
Constant	6.997		1.414	.159
Perceived vulnerability	0.498	0.423	1.107	.270
Need for cognition	0.191	0.377	1.216	.225
Interaction term	−0.015	−0.516	−1.065	.288
Quest nicotine belief ^c				
Constant	−0.744		−0.496	.621
Perceived vulnerability	0.356	0.976	2.610	.010
Need for cognition	0.133	0.844	2.789	.006
Interaction term	−0.010	−1.140	−2.410	.017

Note. For all *t* tests, $df = 196$.

^a Final model $F(3, 196) = 5.455$, $p < .001$. ^b Final model $F(3, 196) = .616$, $p = .606$. ^c Final model $F(3, 196) = 3.729$, $p = .012$.

about Quest; $M = 13.2$, $SD = 2.9$). We labeled Item a the Quest Nicotine Belief item and kept it separate from the above analyses because it was the only *true* inference item (i.e., correctly inferring that Quest cigarettes have lower nicotine levels than regular cigarettes; $M = 3.7$, $SD = 0.9$). The Quest Health Beliefs scale was correlated significantly with the Quest Objective Beliefs scale ($r = .635$, $p < .01$) and with the Quest Nicotine Belief item ($r = .342$, $p < .01$). The Quest Objective Beliefs scale was correlated significantly with the Quest Nicotine Belief item ($r = .558$, $p < .01$).

Need for cognition. We used a nine-item measure of need for cognition (see Manfredi & Bright, 1991). Participants responded to items on a 5-point scale (1 = *a lot like me*, 5 = *not at all like me*). Items were summed to a final scale score ($M = 31.5$, $SD = 5.7$) and scaled so that higher numbers reflected a greater need for cognition or preference for thinking about complex issues (see Cacioppo & Petty, 1982; Cacioppo et al., 1996). This nine-item version of the scale had an alpha of .76 in a prior study (Manfredi & Bright, 1991), and the alpha coefficient in this sample was .62.

Perceived vulnerability. We used three items that asked about smokers' perceived vulnerability to the health harms of smoking (cf. Halpern, 1994): "How much do you think you can smoke without harming your health?" (1 = *none*, 5 = *1 or more packs a day*); "To what extent do you feel that your overall health has been affected by smoking?" (1 = *not at all*, 5 = *very much*); and "How much do you think that quitting smoking could help your health?" (1 = *not at all*, 5 = *very much*). Responses to the first item were reverse scored, and the responses to all three items were then summed to produce a score that reflected the degree to which participants believed that they were vulnerable to the health effects of smoking ($\alpha = .60$); higher scores reflected greater perceived personal vulnerability to the health effects of smoking ($M = 11.0$, $SD = 2.5$).

¹ Given that studies have shown that consumers may spend as little as 7 s attending to advertisements in general (Lohse, 1997), a 30-s exposure time was chosen in order to provide participants more than ample time to view and to think about the advertisement.

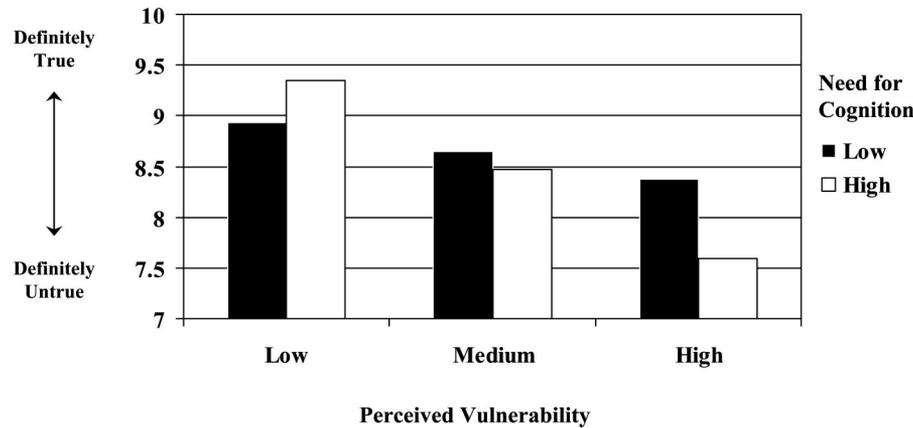


Figure 1. Quest health beliefs as a function of the interaction of perceived vulnerability and need for cognition. The Quest Health Beliefs Scale measured whether participants believed Quest cigarettes are healthier than regular cigarettes.

Results

Prior to generating multivariate models for the three Quest belief measures, we considered the demographic variables (gender, age, education), past history of smoking low-nicotine cigarettes, current type of cigarette smoked, motivation to quit smoking, intentions to quit in the next 3 months, and nicotine dependence as potential covariates. However, in the regression equations, none of these variables altered the effects reported below. Thus, we do not consider them further. In three separate models, we regressed all three Quest belief measures on need for cognition scores and perceived vulnerability scores in Step 1 and then entered the interaction of these variables in Step 2. Table 1 presents the final model results of all of these analyses.

Quest Health Beliefs

The final model results were significant. In this final model, the interaction term was significantly associated with Quest health beliefs. Figure 1 illustrates the direction of this interaction effect by plotting predicted Quest health beliefs values from the unstandardized regression coefficients in the final model (low and high values for need for cognition, using the 25th percentile and the 75th percentile, respectively; low, medium, and high values for perceived vulnerability, using the 25th, 50th, and 75th percentiles, respectively). Need for cognition appeared to matter only as scores on perceived vulnerability became higher: Higher levels of perceived vulnerability and higher levels of need for cognition predicted lower levels of Quest health beliefs (i.e., participants made fewer false inferences) compared with all other groups.

Quest Objective Beliefs

The final model was not significant: Neither need for cognition nor personal vulnerability to the health effects of smoking was associated with Quest objective beliefs.

Quest Nicotine Belief

The final model was significant. In the final model, the interaction term was significantly associated with the Quest nicotine belief item.

Figure 2 illustrates the direction of this interaction effect by plotting predicted Quest nicotine belief values from the unstandardized regression coefficients (low and high values for need for cognition, using the 25th and 75th percentiles, respectively; low, medium, and high values for perceived vulnerability, using the 25th, 50th, and 75th percentiles, respectively). Need for cognition seemed to matter only as scores on perceived vulnerability became lower. Participants who were lower in perceived vulnerability and lower in need for cognition made more false inferences about the nicotine levels in Quest cigarettes compared with all other groups.²

Discussion

This study is the first to evaluate how regular smokers responded to a print ad for Quest cigarettes, a newly developed cigarette (2003) marketed as a way to gradually reduce nicotine exposure via smoking cigarettes that are lower in nicotine. Our study is unique in that it evaluated two theory-driven constructs that have been widely evaluated in the general persuasion literature, need for cognition (Cacioppo & Petty, 1982; Cacioppo et al., 1996) and motivation to process (Petty & Wegener, 1999), the latter of which was operationalized in this study as perceived personal vulnerability to the health effects of smoking (see Halpern, 1994). The results reveal that these variables interacted significantly in their association with Quest health beliefs and Quest nicotine beliefs. Overall, as perceived vulnerability to the health effects of smoking increased, participants more correctly inferred

² In a tertiary, descriptive analysis of some of the individual items that composed the scales, approximately 5% of the sample made errors about the nicotine content of Quest cigarettes (i.e., thought that Quest cigarettes are not lower in nicotine), whereas approximately 45% of the sample made errors regarding the tar content of Quest cigarettes (i.e., thought that Quest cigarettes are lower in tar). Conversely, about 60% of participants correctly inferred that Quest cigarettes are lower in nicotine, whereas only about 8% made correct inferences about the tar content of Quest cigarettes (i.e., 35% and 47% were "unsure" about the nicotine and tar content, respectively; see the Method section). These results suggest that despite a lengthy 30-s reading time (see Lohse, 1997), most smokers, on average, made a correct inference about nicotine but also made false inferences about the tar levels of Quest cigarettes, perhaps one of the most health-depreciating ingredients found in cigarettes.

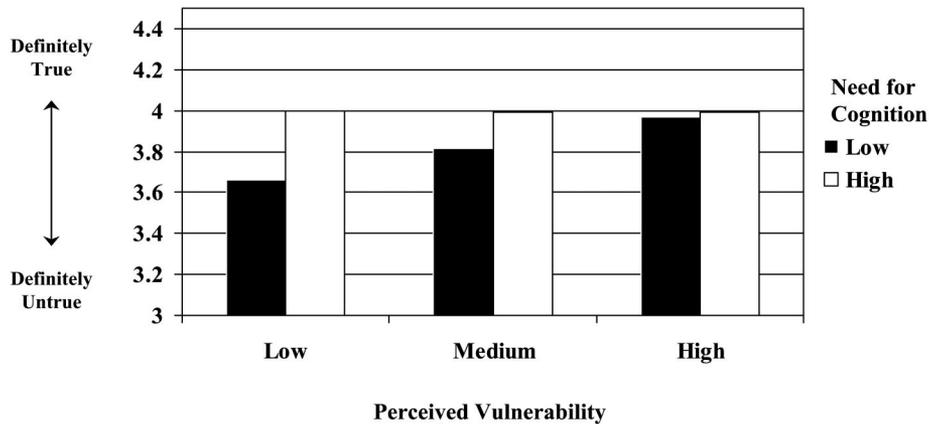


Figure 2. Quest nicotine belief item as a function of the interaction of perceived vulnerability and need for cognition. The item was “Quest cigarettes are lower in nicotine than regular cigarettes.”

that Quest cigarettes were no healthier than regular cigarettes, especially when their levels of need for cognition also increased. This finding is consistent with results from the general persuasion literature that have shown that increased levels of motivation to process a persuasive communication and a tendency to enjoy thinking about issues in general are associated with more critical appraisals of a given persuasive communication (see Cacioppo et al., 1996). For inferences about the Quest nicotine beliefs, level of perceived vulnerability to the health effects of smoking did not seem to matter as long as participants also had a high level of need for cognition: As long as they enjoyed thinking critically about issues in general, they were able to make more accurate inferences about the nicotine content of Quest cigarettes regardless of how personally vulnerable to smoking they felt. However, if they did not enjoy thinking critically about issues, perceived vulnerability exerted an influence on their inferences about the nicotine in Quest cigarettes, especially as they felt less vulnerable to the health effects of smoking. As they felt less vulnerable to the health effects of smoking, they made a greater number of false inferences about the nicotine in Quest cigarettes. This finding is generally consistent with results from the broader persuasion literature that indicate that people who score lower on these measures tend to think less critically about issues (Cacioppo et al., 1996).

Objective beliefs about Quest cigarettes were not associated with either of these individual-differences variables. This supports the use of perceived vulnerability to the health effects of smoking as a proxy for processing motivation in that it was not associated with features of the Quest advertisement that one could presume had less to do with health (i.e., were less personally relevant for health). It also indicates that the degree to which smokers enjoy thinking about issues in general (need for cognition) is not related to the degree to which they evaluate objective facts about Quest cigarettes.

Limitations of this study should be noted. First, all participants viewed the Quest ad, and we did not have a no-advertisement comparison condition. Second, to avoid sensitizing participants to features of the ads, we used a posttest-only design; thus, we were not able to evaluate change in beliefs as a function of ad exposure. It therefore is possible that Quest beliefs might have existed prior to advertisement exposure—that is, these may be general attitudes

and not specific to Quest advertisements. However, our findings show individual differences in the likelihood of false inferences regarding Quest advertisements, which argues against this interpretation. Third, we did not specifically assess how smokers perceived differences among the Quest steps (i.e., doses), nor did we actually give them the opportunity to try Quest cigarettes and measure their preferences regarding these cigarettes. Thus, we cannot say whether viewing Quest ads has any motivational impact on actual behavioral outcomes. Finally, the study was cross-sectional and correlational in design, so we cannot specifically rule out alternative interpretations of the results (e.g., that memory biases accounted for the obtained results; that the individual-differences variables studied would moderate responses to all types of cigarette advertising, not just Quest cigarettes). Overall, much work remains to be done to provide a more formal evaluation of advertisements for new low-nicotine cigarette products. Indeed, despite these limitations and the preliminary nature of this study (i.e., additional research is needed before cigarette advertising policy recommendations can be made), these results reinforce that public health awareness campaigns should continue to strive to increase the perception that any smoking, even smoking low-nicotine cigarettes, can have deleterious health effects—regardless of nicotine content. Similar campaigns focused on light cigarettes have yielded promising results in previous research (see Kozlowski et al., 1999; Kozlowski, Palmer, Stine, Strasser, & Yost, 2001) and could potentially add to the list of strategies that may help smokers resist the persuasive intent of cigarette advertising more generally.

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