2009-11-12

Adolescent Interest in Alcohol Responsibility Messages: The Message Matters

Kevin Kimball John
Brigham Young University - Provo

ADOLESCENT INTEREST IN ALCOHOL RESPONSIBILITY MESSAGES: THE MESSAGE MATTERS

by

Kevin Kimball John

A thesis submitted to the faculty of

Brigham Young University

in partial fulfillment of the requirements for the degree of

Master of Arts

Department of Communications

Brigham Young University

December 2009

ABSTRACT

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Kevin K. John

Department of Communications

Master of Arts

Adolescents are especially vulnerable to image-based messages, which place them directly in line with the lifestyle messages presented in numerous alcohol advertisements. Research has shown that teenagers encounter alcohol advertisements from a variety of sources, prompting concern over the consequences of exposure and the risks associated with teen drinking. Warning messages contained within these alcohol advertisements are often vague in their wording and targeted to promote responsible drinking among adults, making them wholly inadequate for teen deterrence.

This thesis explores the problems with current alcohol responsibility messages when dealing with teens, and proposes the development of new, modified messages, that are more direct and consequence-based. The Elaboration Likelihood Model of persuasion was used to describe teen processing of alcohol warning messages, and eye-tracking technology was used to determine how this processing can be examined visually.

The purpose of this research was to aid in the development of new messages that have been modified by type size, type contrast, and message content (a 2x2x2 factorial design).

Results indicated that modifying message content to include direct language and a consequence enhances visibility and attention to alcohol responsibility messages. Larger type and higher contrast can be applied to the message to further enhance visibility, but the change in attention for these factors was shown to be minimal and nonsignificant. Overall, the greatest power lies in changing the message itself, irrespective of all other variables.

ACKNOWLEDGMENTS

Initially, I must thank my Heavenly Father for the gift of His Son, and for the guidance of the Holy Ghost, which has enabled me to accomplish everything leading up to this point in my life.

I am especially grateful for my wonderful parents who have set an example for me, inspired me, and sacrificed so much for me to have the opportunity to gain an education. I am forever in their debt.

My wife has stood patiently by my side throughout the majority of this thesis, and I am thankful for her love, understanding, and unflinching support.

I am also grateful to Dr. Steven Thomsen, who inspired my interest in media effects research and eye-tracking, Dr. Mark Callister, who challenged me to become a scholar, and Dr. Sarah Coyne, whose friendship and guidance I have enjoyed through multiple projects.

A special thank you also goes out to Dr. Kevin Stoker, and the other members who sat on the scholarship board as I was admitted into the Mass Communication program. I would never have had the opportunity to continue my education without the blessing of your generosity. Thank you.

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CHAPTER 1

Introduction

Adolescence is a vulnerable time for youth. Social consciousness becomes more prominent in a teenager's mind, and food, clothing, and entertainment choices develop into statements of individual identity (Peter & Olsen, 2007). Pair these qualities with an estimated spending power of more than $189 billion per year (eMarketer, 2007), and the teenage audience becomes a lucrative market for advertisers to tap. Advertisers target teenagers in hopes of attracting potential customers now, while simultaneously establishing a sense of brand loyalty with them for the future (Kamery, 2004; Raphel, 1993; Story & French, 2004). Concern arises, however, when advertisements that attract the attention of teenagers tout products deemed detrimental to their health. An example of this scenario can be seen in the marketing of unhealthy foods to children and adolescents, which has raised significant ire from parents and nutritional groups alike (Public Health Institute, 2004; Story & French, 2004; Veracity, 2006).

Given their propensity toward increased social consciousness, teenagers find themselves especially susceptible to image-based messages (Fox, Krugman, Fletcher, & Fischer, 1998). Unfortunately for teens, this places them squarely in the sights of many alcohol advertisements, which often rely upon creating a specific image or ideal for customers to aspire to (Strasburger 1995, ch.4). Teenagers encounter these alcohol advertisements in a variety of media, including popular magazines and television stations (CAMY, 2002); therefore, it is vital to understand what impact this exposure has on the teen viewer, and how teenagers interpret the responsibility/cautionary messages commonly contained in these advertisements.

The focus of this thesis lies expressly in the realm of magazine advertisements. Specifically, this research relies upon eye-tracking technology to determine how participants view and cognitively process responsibility messages embedded in alcohol advertisements, with the expressed goal of using this information to create updated, more effective messages. Along the way various avenues of existing research were explored, with a detour into the realm of persuasive theory. Ultimately, a more effective message was developed, and implications for the study of persuasive theory became clear. This process, from beginning to end, is explained in detail throughout this thesis.

Chapter 2 of this thesis covers a review of the applicable literature concerning adolescents, alcohol, and responsibility messages. Also included in this chapter is a review of the Elaboration Likelihood Model of persuasion (Petty, & Cacioppo, 1986a), and its application to adolescent processing of alcohol responsibility messages. Chapter 3 outlines this thesis' research direction, with specific descriptions and terminology surrounding the eye-tracking method of research. The end of this chapter contains the research hypotheses. Chapter 4 is an explanation of the methodology used to explore the hypotheses, and outlines this thesis' role in a larger research project. Chapter 5 outlines the results of the statistical analyses introduced in the methodology chapter, featuring tables and figures to aid in reporting. Chapter 6 draws conclusions based upon the research described in the literature review and the findings described in the results chapter. This thesis' contribution to the Elaboration Likelihood Model is also discussed, along with limitations and suggestions for future research. Chapter 7 contains the references list, with all applicable appendices following.

CHAPTER 2

Literature Review

> Alcoholic beverages—which include beer, wine, wine coolers, and hard liquor—have been among the most widely used substances by American young people for a very long time. In 2002 the proportions of 8th, 10th, and 12th graders who admitted drinking an alcoholic beverage in the 30-day period prior to [a] survey were 20%, 35%, and 49%, respectively. (Johnston, O'Malley, & Bachman, 2003, p. 30)

These statistics, and ones similar to them, are of particular concern when one examines the abundant record of negative consequences resulting from early teenage involvement with alcohol—consequences which can lead to potentially harmful or fatal behavior. Gruber, DiClemente, Anderson, and Lodico (1996) found that early alcohol use by adolescents was characterized by alcohol *abuse* later in life, as well as "alcohol-related violence, injuries, driving under the influence of alcohol and drugs, and alcohol and drug-related absenteeism from school and work" (p. 298). Children who begin consuming alcohol at ages as young as 12 years old also carry an increased risk of transitioning to other drugs in later adolescence (Gruber et al., 1996, p. 298). In addition to these factors, a variety of studies have also linked adolescent alcohol use to depression and suicidal behavior (Deykin, Levy, & Wells, 1987; Kaplan, Landa, Weinhold, & Shenker, 1984; Robbins & Alessi, 1985; Strasburger & Brown, 1998), sporadic condom use, sexual intercourse and pregnancy (DiClemente, 1992; Epstein & Tamar, 1984), risky sexual behavior (Mezzich et al., 1997), sexually transmitted diseases (Shafer & Boyer, 1991) automobile crashes (CAMY, 2002), violent behavior (Choquet, Menke, &

Manfredi, 1991), and homicides (American Medical Association, 2003). The mixture of alcohol and adolescence is clearly a dangerous one, and all reasonable attempts should be made to ensure that adolescents understand the risks and consequences associated with alcohol consumption. But what of advertisements that actively promote the consumption of alcohol without referencing the risks of consumption, especially when considering the vulnerable teen audience?

Alcohol manufacturers state that they "are strongly committed to responsible marketing and advertising policies directed at adults," pointing instead to parents and peers as those with the most influence over adolescents (Cosgrove-Mather, 2003). Many manufacturers have also taken voluntary steps to include responsibility messages that address the risks of drinking. However, complex issues remain both in the marketing of alcoholic beverages and in the use of responsibility messages when dealing with teens. These concepts will be discussed in the following two sections.

The Exposure Issue

Research has shown that an adolescents' likelihood of using (or intending to use) alcoholic beverages is greater with increased exposure to alcohol advertisements (Atkin, 1993; Grube, 1995; Grube & Wallack, 1994; Madden & Grube, 1994; Martin et al., 2002; Strasburger, 1993). While alcohol manufacturers assert that they do not target teens, most researchers agree that teens are nevertheless exposed to alcohol advertisements from a variety of sources, and in a number of popular publications. The Center on Alcohol Marketing and Youth [CAMY] claims that alcohol advertising dollars intentionally follow youth audiences, reporting that:

> …ten magazines with a youth audience of more than 25%—*Vibe*, *Spin*, *Rolling Stone*, *Allure*, *Car and Driver*, *Maxim*, *Glamour*, *Motor Trend*, *In Style*, and *Sports Illustrated*—accounted for nearly one-third of alcoholic beverage advertising in 2001 in measured magazines. (CAMY, 2002, p. 10)

Additionally, of all the money spent on alcohol advertising in 2001, more than half was spent on advertising in 24 magazines with a youth readership percentage greater than 15.8% (the percentage of adolescents in the U.S. that are 12-20 years old) (CAMY, 2002, p. 1). Numerous other sources cite similar concerns with exposure and adolescents (e.g., Chen, Grube, Bersamin, Waiters, & Keefe, 2005; Collins, Ellickson, McCaffrey, & Hambarsoomians, 2007; Ellickson, Collins, Hambarsoomians, & McCaffrey, 2005; Garfield, Chung, & Rathouz, 2003; Jernigan, Ostroff, & Ross, 2005; Jernigan, Ostroff, Ross, & O'Hara, 2004; Jones, & Donovan, 2001; Unger, Johnson, & Rohrbach, 1995)

Garfield et al. (2003) reported findings that support exposure research, adding that the publication choices of the beer and liquor industries seem especially suited to the readership tastes of the adolescent. Garfield et al. (2003) suggested that government leaders, and those within the alcohol industry, should develop methods to regulate advertising in publications that reach a significant adolescent audience. Others in their field are likely to agree.

In the future, as the alcohol industry continually adjusts its marketing strategy to expand outside of magazine, television, and radio advertisements (Hurtz, Henriksen, Wang, Feighery, & Fortmann, 2007), it will be interesting to see how alcohol advertising practices change, or do not change, in kind. It is the duty of any advertising department to become familiar with the demographic statistics of a potential publication or program

prior to investing a significant amount of money on advertising space; thus ensuring that advertisements reach the department's target market. CAMY noted that 25 of the alcohol brands involved in its study spent the entirety of their advertising budget on youth-oriented magazines (CAMY, 2002, p. 1). This fact, combined with the statistics reviewed in this section, portends a feeling of skepticism toward the alcohol industry's claim that adolescents are not targeted in their advertising.

Adolescents and Responsibility Messages

One step that the alcohol industry has taken, both to inform individuals and to deter adolescents, is to voluntarily include responsibility messages in many of their advertisements. Typically these warnings consist of a variation on the phrase "drink responsibly" (this is in addition to federally mandated warning messages on all alcoholic containers sold in the U.S. [*Federal Register*, 1989]). These efforts, however, are not immune to the skepticism mentioned previously, and available research is somewhat conflictive on the effectiveness of such messages (Barlow & Wogalter, 1993; Blood & Snyder, 1992; Fox et al., 1998; MacKinnon & Lapin, 1998; Slater, Karan, Rouner, Murphy, & Beauvais, 1998; Smith, 1990). Evidence suggests that responsibility messages are acceptable when attempting to bring about awareness and understanding for alcohol related issues (Clapp, Lange, Russell, Shillington, & Voas, 2003; Pinkleton, Austin, & Fujioka, 2001), but often lack the power to change an individual's behavior (Austin, Pinkleton, & Fujioka, 1999; Wechsler et al., 2003). Other research, on the other hand, notes that responsibility messages *can* be used effectively, and suggests that such messages should be implemented on a larger scale (Babor et al., 2003; Saffer, 2002).

The truth may lie somewhere in the middle, with multiple researchers citing the inadequacy of current responsibility messages and the need for updated or regulated ones. Researchers have specifically noted that existing responsibility messages are too small relative to competing text, inadequate in their message, and lacking in specificity (Fox, Krugman, Fletcher, & Fischer, 1998; Hill, Thomsen, Page, & Parrott, 2005; Krugman, Fox, Fletcher, Fischer, & Rojas, 1994). Parker-Pope (1997) noted that care must be taken when determining the language of a warning message because, if the message presents the product as "forbidden fruit," the message itself may backfire, ultimately making the product appear more alluring to adolescents—a concept referred to as the *boomerang effect* in several sources (Henriksen, Dauphinee, Wang, & Fortmann, 2006; Hornik, 2006; Hyland & Birrell, 1979; MacKinnon & Lapin, 1998; Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007; Snyder & Blood, 1992). Snyder and Blood (1992) determined that, instead of providing notes of caution, alcohol warnings may actually cause young adults to perceive more benefits than risks from drinking alcohol.

Often it is difficult to get adolescents to focus on warning messages. Fox et al. (1998) found that adolescent attention to a Miller Lite responsibility message was lower than that which was typical for government-required textual cigarette warnings; for context, when shown a particular Joe Camel cigarette ad, nearly 25% of students never fixated on the warning message, despite looking at the ad for an average of 16 seconds (Fox et al., 1998, p. 67). Krugman et al. (1994) suggested that, in order for responsibility messages to be effective, viewer attention needs to last long enough for comprehension to occur, which speaks to the need for revamped, more noticeable responsibility messages. Even after attention is gained, however, concern must be paid toward how adolescents

cognitively process the content of these responsibility messages, because simply seeing the message is not enough to reinforce current behavior or to prompt behavioral change—a concept which merits a more in-depth look. The following sub-section is devoted to an explanation of the Elaboration Likelihood Model [ELM] (Petty, & Cacioppo, 1986a), a theoretical model which, when applied to the current research, adds context to adolescent processing of these messages.

The Elaboration Likelihood Model and Responsibility Messages

A responsibility message is, at its core, an attempt at persuasion. The message serves as a caution against the potential consequences of an action or, in the case of alcoholic beverages, an overindulgence. The persuasive element lies in the message's attempt to dissuade the individual from the harmful behavior. The ELM provides a means of studying the cognitive processes of individuals as they are faced with these persuasive messages, helping to quantify what is often a multifaceted progression. In short, the ELM is a dual-process model (similar in function to the Heuristic-Systematic Model [Chaiken, 1980; Chaiken, 1987; Chaiken, Liberman, & Eagly, 1989; Zuckerman, & Chaiken, 1998]), which assumes that individuals process information through one of two differing routes—the *central* route or the *peripheral* route (Petty & Cacioppo, 1986a, 1986b; Petty & Wegener, 1999). Either route can ultimately lead to a change of attitude (the goal of all persuasions), but the manner, power, and duration of this change can vary greatly depending on which route is used.

The Central Route. Central processing is typically associated with deeper cognitive thought, or in other words, cognitive exertion and evaluation of the argument(s) contained within a message. An individual who processes a message centrally is likely to

exercise critical and elaborative thinking, weighing the pros and cons of the message or issue at hand. The term *elaboration* (as seen in the ELM title) specifically applies in this instance, implying that central processing involves more than just exposure and reaction to a message. Instead, the central processing individual will assess the message based on content, and then go further by possibly evaluating other relevant factors outside of the original message (Petty & Wegener, 1999). Central processing may prompt the individual to formulate many of his or her own thoughts in response to the message, creating a mental dialogue of sorts. This elaboration, along with the possibility for attitude change, is tempered by the individual's *motivation* and *ability*, factors which will be explained shortly.

The Peripheral Route. Peripheral processing differs from central processing in that the individual may use any number of heuristics or cues to arrive at a conclusion (typically expending less cognitive effort than the central processing individual [Petty & Cacioppo, 1986a, 1986b]). For example, if a message provides five major arguments of support, the central processing individual will consider the validity of each argument, while the peripherally processing individual may process two or three, and then draw conclusions based on that sample of the arguments. Or, as highlighted by Petty and Cacioppo (1984), the individual may draw conclusions based on the sheer number of arguments, deciding that the overall message must be correct due to the amount of supporting items presented, and giving limited thought to the validity of the actual arguments (i.e., "With this much evidence supporting it, the message must be accurate"). These shortcuts need not bear any relation to the virtues of the message, and can be prompted by factors outside of the message itself. For example, an individual may

choose to believe that a message is correct due to the attractiveness (or perceived expertise) of the source, instead of focusing on the merits of the message (Booth-Butterfield & Welbourne, 2002). This is a peripheral process because it is undertaken with limited regard for the message. Peripheral processing can also occur due to classical conditioning (Cacioppo, Marshall-Goodell, Tassinary, & Petty, 1992; Cacioppo, Priester, & Berntson, 1993; Staats & Staats, 1958), self-perception (Bem, 1965, 1972), source identification (Kelman, 1958), established heuristics (Chaiken, 1987), or even "mere exposure" (Bornstein, 1989; Zajonc, 1968; Zajonc & Markus, 1982). The list of cognitive processes that can exist within the peripheral route are countless; so, in an attempt to clarify, peripheral processes are those based on anything other than a careful assessment of the message itself.

Ability and Motivation. Central and peripheral processes exist because human beings are, as Taylor (1981) described, "cognitive misers," lacking the capability to fully process every message encountered in daily life. It becomes necessary, then, for individuals to prioritize which messages will receive the majority of their cognitive resources. The factors of ability and motivation were mentioned previously. Ability refers to an individual's competence when attempting to elaborate on a subject or message: i.e., prior knowledge, experience, cognitive capability, repetition, confidence level, distraction, time, message complexity, etc. (e.g., Cacioppo, & Petty, 1989; Freund, Kruglanski, & Shpitzajzen, 1985; Hafer, Reynolds, & Obertynski, 1996; Kruglanski & Freund, 1983; Petty, Wells, & Brock, 1976; Wood & Kallgren, 1988; Wood, Rhodes, & Biek, 1995). Motivation refers to how driven the individual feels to elaborate on that subject or message: i.e., self-interest, desire to process, applicability, accountability, need

for cognition, severity of consequences, etc. (e.g., Cacioppo & Petty, 1982; Cacioppo, Petty, & Morris, 1983; Chaiken, 1980; Harkins & Petty, 1981; Harkins, & Petty, 1987; Petty & Cacioppo, 1979; Petty, Cacioppo, & Goldman, 1981; Tetlock, 1983). Any of these factors can be either situational (external) or personal (internal) (Petty & Cacioppo, 1986a; Petty & Wegener, 1999), and each influences where the individual stands on the *elaboration continuum*, ultimately determining which processing route will be used (Booth-Butterfield & Welbourne, 2002; Petty & Wegener, 1999).

Within the higher end of the elaboration continuum reside individuals who have high ability and high motivation. These individuals assess the persuasive message "...in relation to knowledge that they already possess, and arrive at a reasoned (though not necessarily unbiased) attitude that is well articulated and bolstered by supporting information (the 'central route' to judgment)" (Petty & Wegener, 1999, p. 42). At the lower end of the continuum lie those with lower/restricted ability or motivation. These individuals "...will be less likely to engage in thoughtful evaluation of the message; instead, [their] attitude toward the message will be based on less thoughtful, peripheral route processes" (Booth-Butterfield & Welbourne, 2002, p. 156).

Route choice is ultimately the result of total message-relevant cognitive effort expended, and is *not* bound by certain types of thinking (known as the *quantitative effect*; see Petty, 1997). For example, although source attractiveness may typically be used as a means of peripheral processing, in a case where that attractiveness is relevant to the message (like a cosmetic product), it may actually be used as an argument in support of the message by the central processing individual. Thus, one should not be quick to pigeonhole certain methods as always central or peripheral (Petty, 1997; Petty &

Wegener, 1999). It is also very likely that an individual may reach the same conclusion through either route of persuasion (central or peripheral). However, the ELM suggests that there are important implications in terms of attitude change, depending on which route is chosen (Booth-Butterfield & Welbourne, 2002; Petty & Cacioppo, 1986a, 1986b; Petty, Priester, & Briñol, 2002; Petty & Wegener, 1999).

Attitude. Regardless of whether an individual uses the central or peripheral processing route, the potential for attitude change remains. The ELM suggests that individuals at the higher end of the elaboration continuum (high ability/high motivation) are most likely to employ central processing techniques. Accordingly, these individuals are also most susceptible to attitude change via the central route, rather than by peripheral cues (because they need information to feed their cognitive processes). Likewise, individuals at the lower end of the elaboration continuum (low ability/low motivation) are most likely to employ peripheral processing techniques, and are, consequently, most likely to be persuaded through peripheral cues (because the peripheral route implies limited message-relevant cognition, thus preventing attitude change via the central route) (Booth-Butterfield & Welbourne, 2002; Petty & Wegener, 1999).

The magnitude and duration of attitude change can be predicted, based upon which processing route is chosen. Attitudes that are formed via the central processing route should be consistently stronger (i.e., more resistant to counter-persuasion) than those formed through the peripheral route (Petty & Cacioppo, 1986b). This added strength has been attributed to a number of factors, including greater attitude accessibility due to cognitive exertion; increased attitude salience due to message-relevant thinking (Petty & Cacioppo, 1986b); enhanced confidence, which makes the individual more

likely to act on the attitude; (Petty & Cacioppo, 1986b; Petty, Haugtvedt, & Smith, 1995); and increased recall of message-relevant information, due to cognitive exertion (Chaiken, Pomerantz, & Giner-Sorolla, 1995; Petty, Haugtvedt, Smith, 1995). These factors ensure that central processing leads to attitudes that are more predictive of future behavior and more resistant to change than attitudes altered via the peripheral process (Petty & Cacioppo, 1986b; Petty, Haugtvedt, & Smith, 1995). This is not to say, however, that enduring attitude changes cannot take place through peripheral processing.

Attitude changes made via the peripheral route are generally weaker than those made via the central route (Petty & Cacioppo, 1984; Petty & Wegener, 1998), but this does not mean that the peripheral route is powerless in terms of attitude change. While peripherally formed attitudes "should not be as resistant to counter-attempts at persuasion, should be less predictive of behavior, and should persist for shorter periods of time" than their central counterparts (Booth-Butterfield & Welbourne, 2002, p. 159), they still harbor the power to change attitude. Specifically, Petty and Cacioppo (1986a) found that attitude accessibility can be improved by repetition of peripheral cues, thus enhancing recollection of the associated attitude and cues, and advancing attitudes toward persistence (e.g., Cacioppo & Petty, 1989; Johnson & Watkins, 1971; Weber, 1972). Building on this idea are the findings that simple rehearsal of one's attitudes can amplify the associated attitudes' persistence (Zanna, Fazio, & Ross, 1994), and that by making a cue more cognitively accessible, and tying that cue to an associated attitude, one can foster attitude persistence (Sengupta, Goodstein, & Boninger, 1997). An attitude must be more than persistent, though, if it is going to endure attack or criticism. As Petty and Cacioppo (1986a) stated:

> The resistance of an attitude to attack is conceptually distinct from the temporal persistence of the attitudes. Thus, some attitudes may be highly persistent, but only if they are not challenged. Likewise, it is possible for some attitudes to be very resistant to change, but only in the short term. (p. 190)

Peripheral attitude change is based on repetition and utilization of cues, with the best case scenario being the development of persistent ideas which remain susceptible to counter-persuasion, due to the lack of a solid, cognitive foundation (Petty & Wegener, 1999). The best method for enduring persuasion consistently falls within the central processing route, for that is the road to long-term, persistent, persuasion-resistant change—or in other words, the type of change needed to dissuade adolescents from drinking alcoholic beverages.

Summary and Application of the Elaboration Likelihood Model

The Elaboration Likelihood Model is a complicated paradigm to understand in one sitting; therefore, before continuing on, it may help to see the model's core principles portrayed visually (see *Figure 1*).

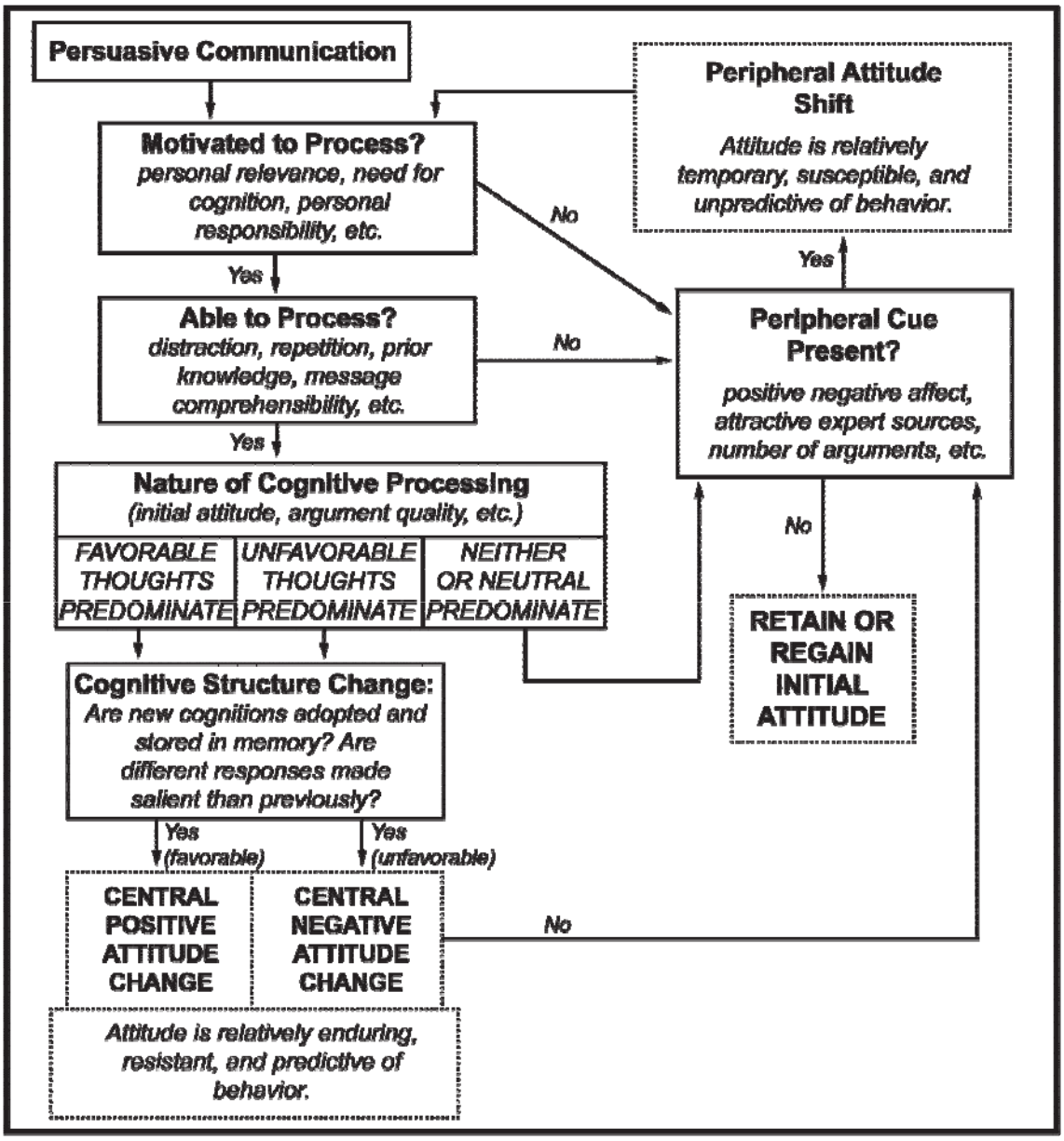

Figure 1. Illustrated Depiction of the Elaboration Likelihood Model
(Adapted from Petty, Kasmer, Haugtvedt, & Cacioppo, 1987)

Figure 1 portrays the ELM in a well-organized form, showing the central route on the left, the peripheral route on the right, and the choices that link the routes in between. An individual remains on the central route through a series of mental affirmations (i.e., whether he or she feels motivated and able to process, whether positive or negative thoughts are formed about the message, and whether those thoughts are accepted and

stored into memory). If the individual's answer at any point along this continuum is "no," then he or she runs the chance of switching to the peripheral route. Continued mental elaboration (either positive or negative) is what allows an individual to persist along the central route. Mental apathy guarantees peripheral cognition.

So what does this mean for alcohol responsibility messages and adolescents? Using the principles outlined throughout this section, it is apparent that effective alcohol responsibility messages will be those that prompt adolescents to centrally process, containing a clear, applicable, and direct message—anything less will lack the power for persistent attitude reinforcement or change. Previously in this thesis, conflicting research was shown as to the effectiveness of current responsibility messages, and a need was recognized for revised messages (see Austin et al., 1999; Babor et al., 2003; Barlow & Wogalter, 1993; Blood & Snyder, 1992; Clapp et al., 2003; Fox et al., 1998; MacKinnon & Lapin, 1998; Pinkleton et al., 2001; Saffer, 2002; Slater et al., 1998; Smith, 1990; Wechsler et al., 2003). This thesis aimed to improve current responsibility messages in hope of discovering what variables enhance message visibility and cognition the most among adolescents (three main variables were tested, which will be explained in the next section). Existing research in the field of tobacco warning messages provides evidence that modified messages can prove to be very effective in prompting cognitive effort (a hallmark of central processing), and one study in particular focuses on the valuable link between message and behavior.

Hammond, Fong, McDonald, Cameron, and Brown (2003), in their exploration of recently updated Canadian cigarette warning labels (which have been altered to feature graphic depictions of the consequences of smoking), found that nearly all participants

(91%) reported exerting “some effort” in reading and processing the updated messages (p. 393), also demonstrating a "thorough knowledge of their content" (p. 391). Perhaps most importantly, however, is the strong positive association that Hammond et al. (2003) found between message processing and intention to quit smoking. By utilizing a method of measuring cognitive processing, Hammond et al. (2003) were able to show that cognitive processing of the warning messages was predictive of smoker cessation behavior during follow-up research. In their own words:

> Smokers who read, thought about, and discussed the new labels at baseline were more likely to have quit, made a quit attempt, or reduced their smoking three months later, after adjusting for intentions to quit and smoking status at baseline. (Hammond et al., 2003, p. 391)

Ultimately, 10.8% of participants quit smoking at the follow-up interview, while 24.3% reported reducing their cigarette use in the same period (Hammond et al., 2003). These findings point to the power of central processing in terms of a message's overall persuasiveness. The individuals in the Hammond et al. (2003) study exemplified the role of central processing in persuasion, in that those who actively processed the warning messages (meeting the various criteria of ability, motivation, etc.) were those most likely to heed the warning and alter their smoking habits. These effects were also shown to be persistent, at least within the scope of the 3-month research time period, and previous research on the ELM suggests that these attitudes would be fairly resistant to counter-persuasion—thus illustrating the progression from cognition, to central processing, to attitudinal change.

CHAPTER 3

Research Direction: Eye-Tracking

Central processing will prove key to this study's purpose in modifying current alcohol responsibility messages. Further application of the Elaboration Likelihood Model, with expressed regard to eye-tracking, is presented in the discussion chapter of this thesis. For now, the risks of adolescent involvement with alcohol, along with the inadequacies of current alcohol warning labels, necessitated a methodology that allowed insight to be gained not only into what teenagers see in an alcohol advertisement, but also what they remember, and how they interpret what they saw—which allows for the creation of warning messages more conducive to central processing. Thomsen and Fulton (2007), echoing the findings of Krugman et al. (1994) and other previously mentioned researchers, highlighted the need for revamped responsibility messages, offering a variety of design and placement suggestions for effective message design. Thomsen and Fulton (2007) also addressed the need for future studies to explore which message formats attract the most attention, and to examine how messages such as "drink responsibly," and "enjoy our product in moderation," are interpreted by adolescents (p. 33). This research aimed to pick up where Thomsen and Fulton (2007) left off, replicating a portion of their previous study while expanding the design to explore the effects of type size, type contrast, and message content, in reference to message recall. Eye-tracking was the method of choice for Thomsen and Fulton (2007) and has been used in several other studies that seek to discern the center of one's visual attention (Fox et al., 1998; Krugman et al., 1994; Rayner, 1998; Rayner, Miller, & Rotello, 2008; Rosbergen, Pieters, & Wedel, 1997; Wedel & Pieters, 2000; Williams et al., 2005). In this study's

exploration of adolescent attention to alcohol warning messages, eye-tracking will be central to discerning where participants invest the most visual attention.

Eye-tracking is also referred to as *scan path analysis* because what is truly being examined is the movement of the human eye across a page or screen (which, when depicted visually, creates a line or path). As individuals view an advertisement, their center of visual attention (or fovea) shifts, depending on which part of the advertisement they examine. The *foveal* range of vision represents the central 2 degrees of visual attention, with the *parafoveal* range expanding out 5 degrees in any direction. It is important to note that visual acuity drops outside of the foveal range (and drops dramatically outside of the parafoveal range into the *peripheral*), thus, individuals tend to position the fovea over the area of greatest interest to them (Rayner, 1998).

Eye-tracking systems rely upon the fovea, as well as other traits of visual attention such as *saccades* and *fixations* (also referred to as gaze points), in order to infer cognitive processing of images and messages. Saccades are rapid movements of the eye which occur as visual attention moves from point to point (i.e., reading), or as attention shifts across a pathway when viewing an image (Rayner, 1998). Numerous studies have surmised that cognitive processing is suppressed or suspended during saccades (Boer & Van Der Weijgert, 1988; Rayner, 1998; Van Duren, 1993; Van Duren & Sanders, 1995). Fixations represent moments when the eye stops long enough to focus on a particular element or feature on a page or screen (Rayner, 1998). How long a fixation lasts is referred to as *dwell time* or *gaze duration*. Fixations are often measured in milliseconds, with a typical duration of around 100-200 milliseconds. Rosbergen, Pieters, and Wedel (1997) defined gaze duration as the "sum of fixation durations on a stimulus element or

on the stimulus as a whole" (pp. 305-6). Christianson et al. (1991) and Rosbergen et al. (1997) believe that gaze duration is representative of visual attention. Additionally, Krugman et al. (1994) discerned a positive relationship between dwell time and accurate recall of tobacco advertisement warning messages, implying a link between gaze duration and cognitive processing. Fletcher et al. (1995) found similar results with both tobacco and non-tobacco advertisements, implying a comparable link. Cognitive processing is believed to occur from fixation through dwell time, and is acknowledged as complete when visual attention shifts to a separate or new element (Fox et al., 1998; Just & Carpenter, 1980; Rayner, 1977, 1978).

In addition to fovea, saccades, and fixations, many eye-tracking systems are capable of recording pupil dilation and contraction. Numerous sources have noted links between pupil size and physiological arousal (Burgoon, Kelley, Newton, & Keeley-Dyreson, 1989; Partala, Jokiniemi, & Surakka, 2000; Wingate, Hood, Shi, & Phan, 1998), as well as cognitive interest or processing (Cacioppo & Tassinary, 1990; Hess & Polt, 1964; Partala & Surakka, 2003; Peavler, 1974). In some ways, pupil dilation and contraction can be interpreted in a similar fashion as galvanic skin tests or heart rate change measures, which are both physiological determinants of cognitive processing or arousal. As such, pupillary data gathered during the testing phase of this research will add invaluable insight into the real-time cognitive processes of participants while they view the ads.

It is the goal of this research then, to examine how adolescents view, react, and process alcohol advertisements and the warning messages contained therein. Specifically, a factorial design will be used to examine the main and interaction effects of

responsibility messages whose designs have been manipulated based on three factors: type size, type contrast, and message content. Type size is commonly used as a variable in warning message research, with Truitt et al. (2002) noting that messages with larger type are more effective at attracting viewer attention and tend to foster greater recall scores than messages of average type size. Type contrast has also been explored in a variety of applications, with Sumner (1932) making the pivotal claim that color combinations which fail to differentiate the message from the background will mask message comprehension and understanding. More recent research has shown that high contrast messages are generally located faster than low contrast messages which are not effectively set apart from their background (Brown, 1991; Sanders & McCormick, 1993). The alteration of message content has also been explored in the search for more effective warning messages, as exemplified by the Hammond et al. (2003) Canadian cigarette warning label study summarized in the previous section, and other similar studies focusing on message content and effectiveness (e.g., Andrews, Netemeyer, & Durvasula, 1990; Greenfield, & Graves, 1993; Mayer, Smith, & Scammon, 1991; Mazis, Morris, & Swasy, 1996; O'Hegarty, Pederson, Nelson, Mowery, Gable, & Wortley, 2006; Proctor, Babor, & Xuan, 2005; Strahan, White, Fong, Fabrigar, Zanna, & Cameron, 2002).

Additionally, the factors of type size and type contrast can potentially address the issue of ability (within the frame of the Elaboration Likelihood Model [ELM]), by making the message easier to see and read for the adolescent viewer. Similarly, modified message content can address ability by making responsibility messages that are more clear and direct in their wording. Modified message content can also effect the issue of motivation, when the message itself portends the potential for physical harm or negative

consequences (i.e., the individual may be motivated to comply, in order to avoid the consequence). In sum, type size and type contrast were adjusted in an attempt to enhance ability, and message content was modified in an attempt to enhance ability and solicit motivation on the part of the adolescent viewer (a process that is explained in the following chapter). These efforts were expended with the goal of creating a responsibility message more conducive to central processing, and in response to previously noted criticism that current responsibility messages are too small relative to competing text, inadequate in their message, and lacking in specificity (e.g., Fox, Krugman, Fletcher, & Fischer, 1998; Hill, Thomsen, Page, & Parrott, 2005; Krugman, Fox, Fletcher, Fischer, & Rojas, 1994).

Hypotheses

Eye-tracking technology allows one to record a subject's visual progression as he or she processes a visual stimulus. This study proposes that fixation density patterns and dwell time (observable via eye-tracking) represent empirically measurable manifestations of central processing and related cognitive involvement with persuasive messages. Further, this study assumes that modifications to the key factors of type size, type contrast, and message content (described more thoroughly in the following chapter) will increase visual attention, enhance ability, solicit motivation, and, as a consequence, open the door for central processing. Therefore, the following hypotheses are proposed, which reflect both the main and interaction effects tested for in this study:

Main Effects

H_1. Total fixations will be greater for larger font size, in comparison to smaller font size.

H_2. Total dwell time will be greater for larger font size, in comparison to smaller font size.

H_3. Total fixations will be greater for higher contrast type, in comparison to lower contrast type.

H_4. Total dwell time will be greater for higher contrast type, in comparison to lower contrast type.

H_5. Total fixations will be greater for modified message content, in comparison to traditional message content.

H_6. Total dwell time will be greater for modified message content, in comparison to traditional message content.

Interaction Effects

H_7. Messages containing large type, high contrast, and modified wording will attract the most subject attention (as evidenced by total fixations), when compared to all other variable combinations.

H_8. Messages containing large type, high contrast, and modified wording will attract the most subject attention (as evidenced by total dwell time), when compared to all other variable combinations.

CHAPTER 4

Methodology

The purpose of this research is to examine the effects of manipulating the main variables of type size, type contrast, and message content on adolescent visual and cognitive processing of alcohol responsibility messages—with the ultimate goal of developing a responsibility message that is more effective than current designs. Eye-tracking technology is essential to this process and, as such, the Applied Science Laboratories Eye-Trac 6000 Head Mounted Optics system was used for data capture during this study.

Sample

A convenience sample of 121 adolescents (aged 12 and 13) was assembled from local middle schools, with a portion of volunteers gathered via word of mouth invitation. Permission was gained from the local school district to distribute flyers in two area middle schools. Qualifying subjects, and their parent or guardian, were directed to the eye-tracking lab and briefed regarding their rights as human subjects prior to participation. Only subjects with signed parental consent and personal assent forms were permitted to participate. In exchange for participation in this study, each subject received a $20 gift certificate to Wal-Mart or Target.

Experimental Stimuli

A selection of 14 magazine advertisements were organized, four of which were alcohol advertisements containing a warning message, selected from well known, widely read magazines popular with teenage readers (e.g., *Rolling Stone*, *Sports Illustrated*, *Vibe*, *Spin*, etc.) (see *Appendix A*). Surrounding each of the alcohol responsibility messages

was a defined *lookzone*, invisible during the time of tracking, but visible during post-tracking data analysis. A lookzone is a box which defines the boundary directly surrounding a subject of interest in a visual stimulus (see *Appendix B*). For the purposes of this thesis, lookzones were placed around each warning message present in the 4 alcohol advertisements. Every alcohol advertisement seen during the tracking process contained one warning message. The remaining 10 advertisements did not promote alcohol products (i.e. food, automobiles, clothing, etc.), and were identical for each participant (see *Appendix C*). These non-alcohol advertisements acted as distracters, helping to preserve the purposes of this research until the final debriefing.

Procedure

Data was collected in the Eye-Tracking Lab of Brigham Young University's Communication Department. Only one subject at a time was permitted in the testing room. Participants were asked to sit in a standard office chair, approximately 22 inches from a computer screen. The head-mounted optical device (which fits similarly to the lining of a construction worker's hard hat) was placed on the subject's head. Once the device was fitted, researchers completed the eye calibration process, which involved the subject looking at nine points on a grid. The reflection of the subject's pupil, in relation to the reflection of the subject's cornea, was memorized for each of nine points in a laboratory computer.

Following calibration, subjects were briefed on what to expect during the tracking process, and were then ready to be tracked. Participants were not rushed while viewing any advertisements. Instead, participants were instructed to picture themselves flipping through the pages of a magazine, looking at advertisements. Subjects controlled

advancement by simply saying “next” or “change,” in which case a testing official pressed a button to cycle to the next advertisement. Calibration and tracking required an average of 10 minutes per subject.

Conditions and Factors

Unbeknownst to each subject, every participant was randomly assigned a condition number upon entry into the eye-tracking lab, corresponding to one of eight experimental conditions for this research (see *Appendix D*). Each condition reflected a possible combination of three factors, each of which was measured at two possible levels, resulting in a 2x2x2 factorial design. An explanation of each of the three independent variables follows:

Type Size

The type size of each warning message was adjusted to fit into a “large” or “small” category, dependent upon subject condition. Large type size is defined as being larger than typical for alcohol warning messages, approximating a 12- to 14-point font. Small type is considered similar in size to many current alcohol responsibility messages and is typically smaller than other text found within these advertisements (at approximately 8-point font).

Type Contrast

Type contrast of each warning message was adjusted to fit into a “high” or “low” category, dependent upon subject condition. High type contrast is defined as text that stands out against the color scheme of other elements in the advertisement (i.e., a dark background would receive bright type). Low type contrast, for the purposes of this research, is characterized by a message color which fits with the overall color scheme of

the advertisement, but does not make any significant attempt to stand out (i.e., an advertisement depicting a beach may feature a bright, sand-colored message in a darker portion of the ad). Such practices are occasionally seen in the fine print of advertisements where smaller text remains readable, but may vary in color against the background by only a few shades.

Message Content

The content of each warning message was altered to fit into a "traditional" or "non-traditional" category, again dependent upon subject condition. A traditional message is considered similar to messages currently found in many alcohol advertisements (i.e., "Drink Responsibly," "Live Responsibly," or "Enjoy this Product Responsibly"). Non-traditional messages included more detail about the consequences of drinking than found in typical American alcohol advertisements (i.e., "Binge drinking can cause serious brain damage" or "Drinking can increase your risk for liver cancer"—both messages created for this thesis).

Interaction Effects

In addition to testing the influence of these variables as main effects, a factorial design allowed for the exploration of interaction effects between variables. Interaction data was of particular interest to this study, as it was necessary to determine which combination of variables ultimately attracted the most viewer attention. Details of interaction findings can be found in the results section of this thesis.

Masked Recall

Following the tracking process, participants were taken into an adjacent room where they were shown black-and-white copies of eight advertisements. These

advertisements were identical to the ones seen previously in the eye-tracking room, with all four alcohol advertisements being represented, and a selection of four of the distracter ads. Three different portions of each ad were blacked out or masked (see *Appendix E*). In each alcohol advertisement, the warning message was consistently masked. A researcher then asked subjects to recall what they remember being behind the masked portions for each advertisement. Researchers were not allowed to prompt subjects, unless the subject recalled that there were words behind one of the masked portions, in which case, researchers were only permitted to ask if the subject recalled what the words said. No other prompting occurred.

Krugman et al. (1994) developed a grading system whereby a subject's response to each masking exercise can be quantified as a score. This system was utilized by the researchers, following all data collection, to determine the accuracy and completeness of each participant's response (0 = no recall provided; 1 = response bore no relation to warning message; 2 = general description provided [e.g., "a health warning"]; 3 = accurate and specific description provided[e.g., "a warning that binge drinking causes liver cancer"]).

Debriefing

Immediately following the masked recall, each participant and their parent/guardian was debriefed. Researchers then revealed the purpose of the research in examining adolescent processing and recall of alcohol advertisement messages. Participants and their parent/guardian were then be asked if they had any questions relating to the research project. Once all questions were addressed, participants received the gift card of their choice (Wal-Mart or Target).

CHAPTER 5

Results

Within the measured sample (n = 121), the mean age was 12.64 (SD = .79), with 72 participants being male (59.5%), and 49 being female (40.5%). In terms of ethnicity, 105 participants classified themselves as White (86.8%), with 5 identifying themselves as Hispanic (4.1%), and 11 as Other (10.1%). Total viewing time of alcohol advertisements averaged 8.06 seconds (SD = 4.34), which was slightly lower than the average total viewing time for non-alcohol advertisements at 8.52 seconds (SD = 4.32). A paired samples t test determined this difference to be statistically significant (t = 2.83, df = 120, p = .01), despite the modest .46 second difference. Viewing time based on condition (8 different configurations of alcohol ads) ranged from 7.05 sec (SD = 3.39) (Condition 7[1]) and 9.42 (SD = 5.47) (Condition 3[2]); however, the results of an ANOVA test indicate no statistically significant difference in total time viewed across the groups ($F_{(7, 113)}$ = .41, p = .89). The standard deviations indicate there was a great deal of variation in viewing time within each group.

For statistical analysis, a 2x2x2 Factorial ANOVA was conducted, with a summary of results presented in *Tables 1* and *2*. Using total fixation count as the dependent variable, a significant main effect was found for message content, $F_{(1, 113)}$ = 8.79, p = .01, partial η^2 = .07, but nonsignificant effects for type size, $F_{(1, 113)}$ = .22, p = .64, and type contrast, $F_{(1, 113)}$ = .01, p = .93 (see *Table 1*). Results indicated no significant interaction effects. Using fixation duration as the dependent variable, a significant main effect was once again found for message content, $F_{(1, 113)}$ = 6.69, p = .01, partial η^2 = .06, with nonsignificant effects present for type size, $F_{(1, 113)}$ = .01, p = .93,

and type contrast $F_{(1, 113)} = .01$, $p = .91$ (see *Table 2*). Interaction effects were again not significant.

Table 1

Analysis of Variance for Total Fixations Within the Lookzone

Source	*df*	*F*	η	*p*
Between subjects				
size_type (ST)	1	0.22	<.01	.64
contrast_type (CT)	1	0.01	.00	.93
message (M)	1	8.79	.07	.01
ST x CT	1	0.14	<.01	.71
ST x M	1	0.37	<.01	.54
CT x M	1	0.12	<.01	.73
ST x CT x M	1	0.29	<.01	.59
Error	113			

Table 2

Analysis of Variance for Fixation Duration Within the Lookzone

Source	*df*	*F*	η	*p*
Between subjects				
size_type (ST)	1	0.01	.00	.93
contrast_type (CT)	1	0.01	.00	.91
message (M)	1	6.69	.06	.01
ST x CT	1	0.13	<.01	.72
ST x M	1	0.15	<.01	.70
CT x M	1	0.07	<.01	.80
ST x CT x M	1	0.03	.00	.87
Error	113			

Mean scores for the large type, high contrast, modified message condition were higher than all other conditions, both in terms of fixation count (see *Table 3*) and fixation duration (see *Table 4*). Additionally, modified messages resulted in more fixations and longer dwell time within the lookzone than traditional messages condition in every instance, regardless of type size or type contrast adjustment. These numbers suggest that modified responsibility messages are more effective at fostering longer dwell times than traditional responsibility messages.

Table 3

Mean Scores for Subjects:
Total Fixations Within the Lookzone

Type Size	Type Contrast	Message Content	*M*	*SD*
small	low	traditional	1.42	1.75
		modified	2.40	2.86
	high	traditional	1.38	0.95
		modified	2.22	2.38
large	low	traditional	1.43	0.88
		modified	2.47	2.54
	high	traditional	1.27	1.66
		modified	2.98	2.84

Table 4

Mean Scores for Subjects:
Fixation Duration Within the Lookzone

Type Size	Type Contrast	Message Content	*M*	*SD*
small	low	traditional	0.55	0.74
		modified	0.84	1.03
	high	traditional	0.47	0.34
		modified	0.79	0.86
large	low	traditional	0.48	0.32
		modified	0.83	0.91
	high	traditional	0.45	0.70
		modified	0.93	0.91

Taken together, these results allow for acceptance of the null hypothesis for H_1, H_2, H_3, and H_4, rejection of the null hypothesis for H_5 and H_6, and partial acceptance of the research hypotheses for H_7 and H_8.

Interactions

Results indicate that message content was the only significant determinant of adolescent attention—that is, modified message content resulted in longer dwell time and a greater number of fixations among those who saw the message. The findings for type size and type contrast, while in the direction predicted, were not significant; however, this may be the result of insufficient statistical power within this study, and not indicative of a noninteraction. Profile plots provided in the SPSS output suggested that modest interactions may actually be occurring. This was determined by observing that none of the provided plots produced parallel lines; in all cases the lines intersected. Therefore, it was necessary to conduct a series of post-hoc *t*-tests to determine if the ANOVA results

were overlooking interaction effects that may be present among some of the variable combinations (oversights that, as mentioned previously, may be a function of cell size and limited statistical power).

The first post-hoc test examined the interaction effect between type size and message content, using mean lookzone fixation count as the dependent variable. The results indicated a significant difference ($t = 2.54$, $p = .014$) in fixation count between those who saw the modified messages ($M = 2.73$, $SD = 2.66$) and the traditional messages ($M = 1.35$, $SD = 1.31$) in the large-type condition. The difference for those in the small-type condition was not statistically significant, suggesting a specification effect and, therefore, a modest interaction effect between type size and message content.

This process was repeated using mean lookzone fixation duration (dwell time) as the dependent measure. Results once again indicated a statistically significant difference only among those in the large-type condition ($t = 2.18$, $p = .04$), suggesting a modest interaction effect between type size and message content.

Next, the interaction effect was examined between type contrast and message content, again using mean lookzone fixation count as the dependent variable. Results indicated a significant difference ($t = 2.39$, $p = .02$) in fixation count between those who saw the modified messages ($M = 2.60$, $SD = 2.60$) and the traditional messages ($M = 1.32$, $SD = 1.33$) in the high-contrast condition. The difference for those in the low-contrast condition approached statistical significance ($p = .07$), suggesting the very modest possibility of a specification effect and, therefore, a modest interaction effect between type contrast and message content.

Subsequently, this process was repeated using mean lookzone fixation duration

(dwell time) as the dependent measure. Results once again indicated a statistically significant difference only among those in the high-contrast condition ($t = 2.12$, $p = .04$), suggesting a modest interaction effect between type contrast and message content.

Post-hoc tests confirmed, however, that there were no statistically significant interaction effects between type size and type contrast when mean lookzone fixation count and dwell time were used as the dependent measures—implying that significant interactions exist only when they involve the message variable, and, in the absence of the message variable, all other variable relationships remain nonsignificant. The effect occurs as a consequence of the message or, simply put, the power is in the message.

CHAPTER 6

Discussion and Conclusions

The purpose of this research was to determine how the factors of type size, type contrast, and message content affect the processing of alcohol responsibility messages by adolescents. Results indicated that message content was the most influential factor in determining adolescent attention (evidenced by fixation count and dwell time within the lookzone), with type size and type contrast exhibiting no significant main effects. All interaction effects were found to be non-significant; however, small-scale interactions are present in the directions predicted when measured by both fixation count and fixation duration. Collectively, these findings have important implications when seeking to deter teenagers from alcohol consumption, which will be discussed in the remainder of this section.

Adolescents are inundated with messages from countless media sources on a daily basis. Television shows, books, movies, video games, and the Internet each play a role in the socialization of the modern adolescent. Traditional peer and familial groups also do their part in sending messages to teens, attempting to influence behavior in one way or another. With the sheer number of messages teenagers encounter on a daily basis, it comes as no surprise that many messages fall to the wayside (the victims of cognitive rationing). How then can one reach the adolescent audience with a message of responsibility, while maintaining any hope of influencing attitude (and ultimately, behavior)? The Elaboration Likelihood Model [ELM] suggests that the best processing route for long-term attitudinal change is the central route, but central route persuasion requires cognitive exertion on the part of the individual viewer, which also demands a

certain amount of interest. This places a challenge on the shoulders of the alcohol industry when designing responsibility messages aimed at deterring teens, because such messages must be interesting enough to attract attention, while also containing a clear, understandable, cautionary message.

Mixed Messages for Teens

The traditional "drink responsibly" warning, however, does not include a manifest caution in its message, and understandability suffers because of this. There is no vagueness in the warning's message to drink—indeed, when read at face value, the traditional message actually encourages the reader *to* drink. Instead, the vagueness lies in the warning's invitation to do so "responsibly." Understandability is hampered because there are myriad interpretations of responsible drinking, depending on individual factors, circumstances, etc. In the absence of more direct wording, the message that the alcohol industry is sending to customers remains malleable (excepting the drinking part).

Apply the "drink responsibly" message to the teenage audience, and its shortcomings become even more readily apparent. The language of the traditional warning assumes an audience of legal drinking age, supporting the alcohol industry's claim that they do not target teens. However, previous research points to a variety of teen publications wherein teenagers encounter alcohol advertisements and their associated responsibility messages (despite their intended adult audience). Perhaps the responsibility message for teens to take home is, "when you are old enough to drink, drink responsibly." Nevertheless, even then, the message maintains the vague "responsibly" term, leaving the door open for any number of interpretations. The complications surrounding the traditional responsibility message led this thesis to propose

modified, direct, non-traditional messages; because such messages leave little room for interpretation. A message that reads "drinking can increase your risk for liver cancer" (as used in this thesis), portrays a direct cause-and-effect relationship, along with a potential consequence for the behavior (and considers the factors of ability and motivation, in relation to central processing). Such a message is arguably more appropriate for warning the teen audience because of its direct language, and clearly more appropriate because of its lack of encouragement to drink.

Soliciting Interest/Application

The fact remains, however, that warning messages are often overlooked, especially by teenagers. This thesis addressed this problem with the conclusion that a modified message can generate interest within the adolescent viewer; meaning that, if one's goal is to attract adolescent attention, then changing the message is an effective strategy to use, because it causes adolescents to stop and review what is being stated. This opens the door for the message content to impact the adolescent to both educate and discourage him or her from early drinking. Thus, it is important that the warning message (as mentioned previously) be written clearly and directly, with consequences noted within, because such a message potentially clears the hurdles of ability and motivation, providing the necessary elements for deeper cognition (and the fuel for central processing).

In application, these findings suggest that alcohol companies, if serious about deterring adolescents from drinking, should develop a diverse series of responsibility messages, each containing risks and consequences associated with drinking (i.e., messages similar to this study's "drinking can increase your risk for liver cancer"). These

messages could be cycled routinely, throughout a variety of advertisements, in order to avoid the over-exposure issue now facing the traditional "drink responsibly" message. Furthermore, the factors of type size and type contrast, though producing no significant results in this study, did exhibit limited interaction effects—effects that may have been more apparent had cell sizes been bigger. With this in mind, larger, higher-contrast type, could serve to enhance the effectiveness of the modified messages. The good news for graphic designers and advertisers, though, is that type and contrast adjustments are not necessarily required. The message need not be significantly larger, or overbearing in relation to the rest of the advertisement, to be effective. As long as the content varies from the expected message, the findings of this thesis show that it should attract adolescent attention. The factors of type size and contrast would simply add a minor boost in visibility, at best.

Implications for the Elaboration Likelihood Model

The Elaboration Likelihood Model [ELM] was used in this thesis to describe the manner in which adolescents process the content of a persuasive message. The ELM was also used to show that the goal of the persuader should be to provide the tools necessary for central processing, if the purpose is long term attitudinal and behavioral change. These tools include elements of the message that are left open for elaborative cognition, and also directness and clarity in message, in order to ensure that the factors of ability and motivation do not become an issue. In other words, one must provide all of the ingredients for central processing, and remove possible stumbling blocks in regard to ability and motivation, and then, depending on interest, the adolescent viewer may process the message. The choice to process ultimately remains in the hands of the

viewer, and a peripheral choice is always possible (due to any number of factors), but the persuader can exercise limited control by anticipating and removing elements of the message that may cause the viewers to stop processing. This thesis attempted to account for ability and motivation by ensuring that the modified responsibility messages were simple for teens to understand, while nevertheless containing a direct statement of consequence.

Modified responsibility messages ultimately proved more effective at generating interest than traditionally-worded messages. Additionally, fixation density patterns suggested that modified messages were more likely to be processed centrally than traditional messages, resulting in greater recall and enhanced potential for long-term attitudinal change. This conclusion is drawn because the cognitive progression which drives central processing relies upon input from the source of the message to form the foundation of cognitive elaboration. In other words, fixation density and dwell time are indicative of information retrieval, which feed the cognitive processes behind central processing. Furthermore, the factors of fixation density and dwell time could allow for differentiation between subjects who process centrally and those who process peripherally, due to variations in fixation patterns evident through eye-tracking. Self-report is not required for this differentiation, although recall scores could also be added to the equation, allowing for enhanced accuracy. In sum, it is not unreasonable to suggest that higher scores in fixation density, dwell time, and recall, would provide an effective means of categorizing a centrally processing subject, and differentiating him or her from a peripherally processing subject, due to the discrepancy in scores which should exist.

This thesis raises a number of questions about applying the Elaboration Likelihood Model of persuasion into the realm of empirical observation via eye-tracking. Indeed, what do central and peripheral processes look like? How can these processes be observed? How does one contextualize conclusions in the face of numerous internal and external factors that also influence processing choice? Each of these questions points to the fascinating prospect of studying a persuasive theory visually. The limited focus of this thesis does not allow for such a venture to be explored comprehensively, but the path is wide open to consider the associated complexities of depicting persuasive elements in visual form.

Limitations/Future Research

As has been stated numerous times throughout this study, sample size was limited, due to the labor intensive nature of eye-tracking research. A similarly structured study could benefit from a sample size more than double the size used by this thesis, in order to aid in the development of stronger main and interaction effects. Another limitation of this thesis is the fact that, despite every effort being taken to ensure a random sample, the sample was mostly mono-ethnic. This is perhaps mostly due to the demographics of the surrounding area, but the study could nevertheless benefit from a more diverse sample.

Additionally, the eye-tracking lab does not replicate the natural environment for reading. Granted, great care is taken to ensure that participants are comfortable, relaxed, and able to examine each advertisement at their own pace. However the nature of the eye-tracking headset, and the necessity of sitting still during tracking, prevents the process from replicating a completely natural condition. If the results were to be skewed

in either direction, though, it is assumed that participants would look at the advertisements for a *longer* period of time than they would in a naturalistic setting, because participants know that they are being observed, and may be searching to determine the purpose behind the research. Regardless, it suffices to say that the eye-tracking lab is not a natural environment, and thus individual results may be skewed slightly in one direction or another. Future studies may look at ways to better replicate a naturalistic environment, while still maintaining accurate tracking capability.

Finally, as mentioned earlier, this thesis barely scratches the surface of studying the Elaboration Likelihood Model [ELM] (and other theories of persuasion) through eye-tracking technology. In regard to the ELM, future studies could focus on the indicators of central and peripheral processing as depicted visually. Such a venture would prove foundational not only in the field of eye-tracking, but in the field of persuasion as well, and would add invaluable perspective to both.

CHAPTER 7

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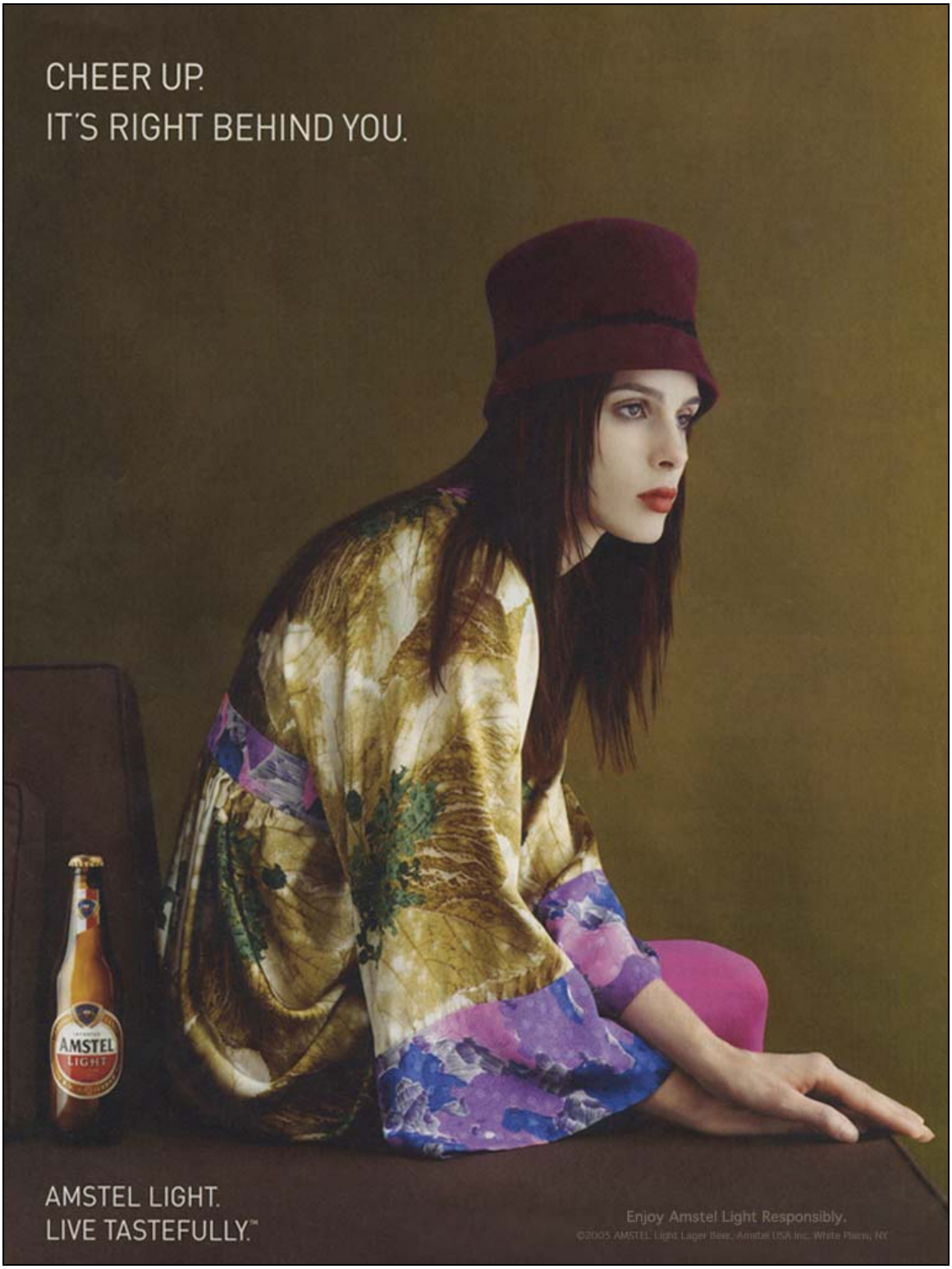
FOOTNOTES

[1] Large type, low contrast, modified message content.

[2] Small type, low contrast, modified message content.

APPENDIX A

Alcohol Advertisements Used

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GIVE CREATIVE DIRECTION
LIFE IS WHAT YOU CHOOSE
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Drink Beck's Responsibly
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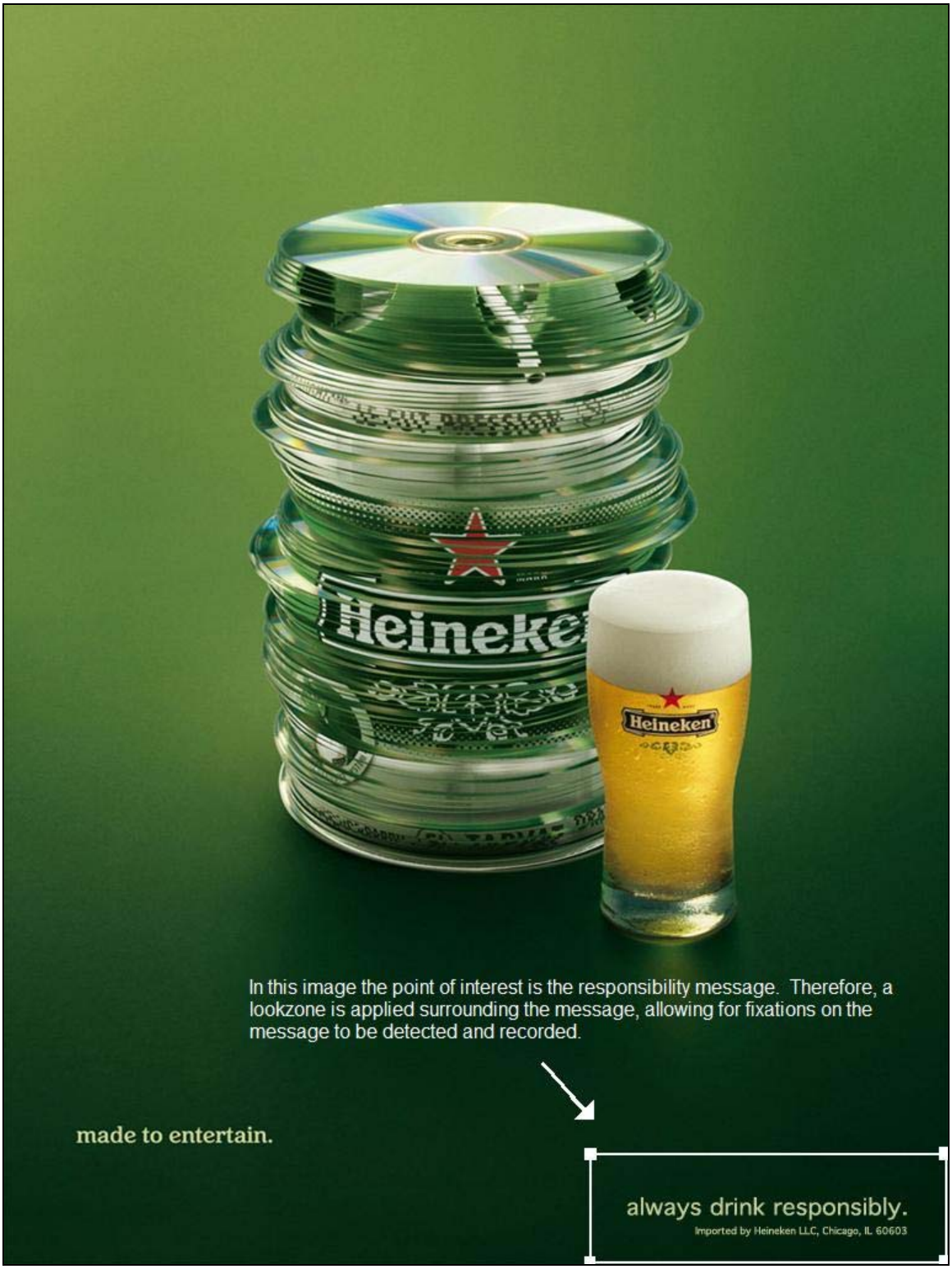
Extra
LA CERVEZA MAS FINA
12 FL.OZ.
Brewed and bottled by
CERVECERIA MODELO, S.A. DE C.V.
MEXICO, D.F.
12 FL.OZ.
scuba
Relax Responsibly.
Imported by Crown Imports LLC, Chicago, IL


Heineken
Heineken
made to entertain.
always drink responsibly.
Imported by Heineken LLC, Chicago, IL 60603

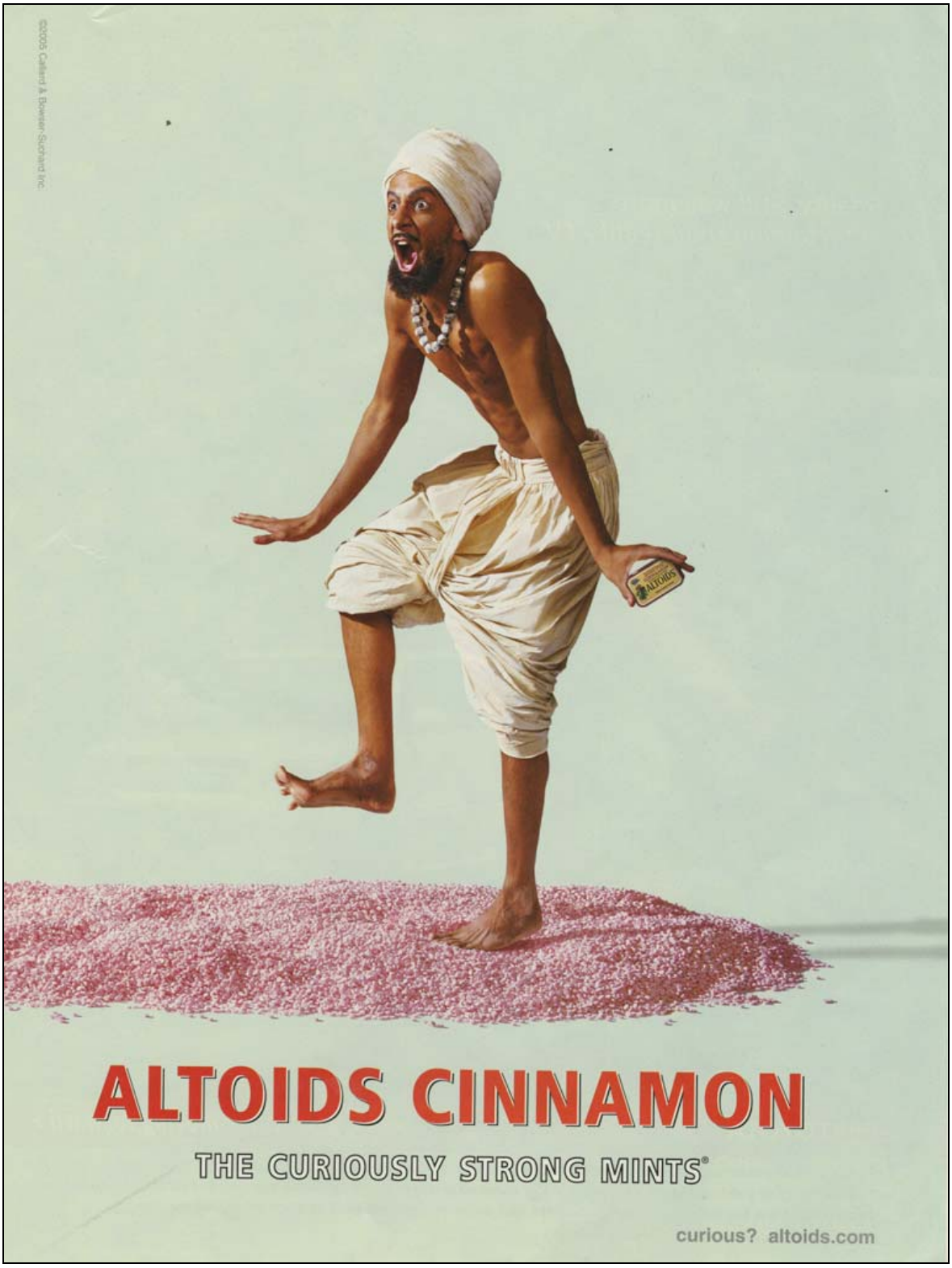
APPENDIX B

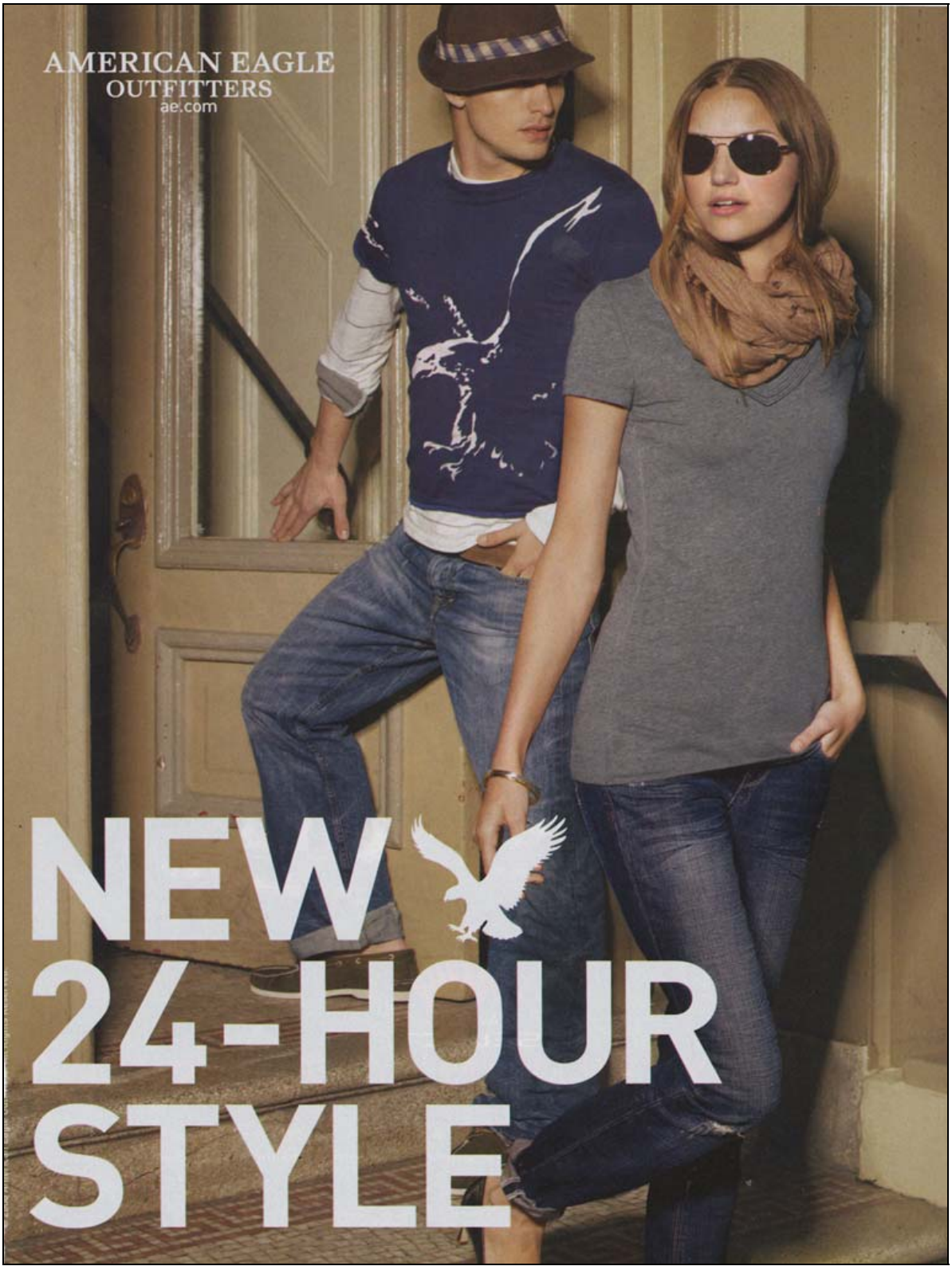
Example of a Lookzone

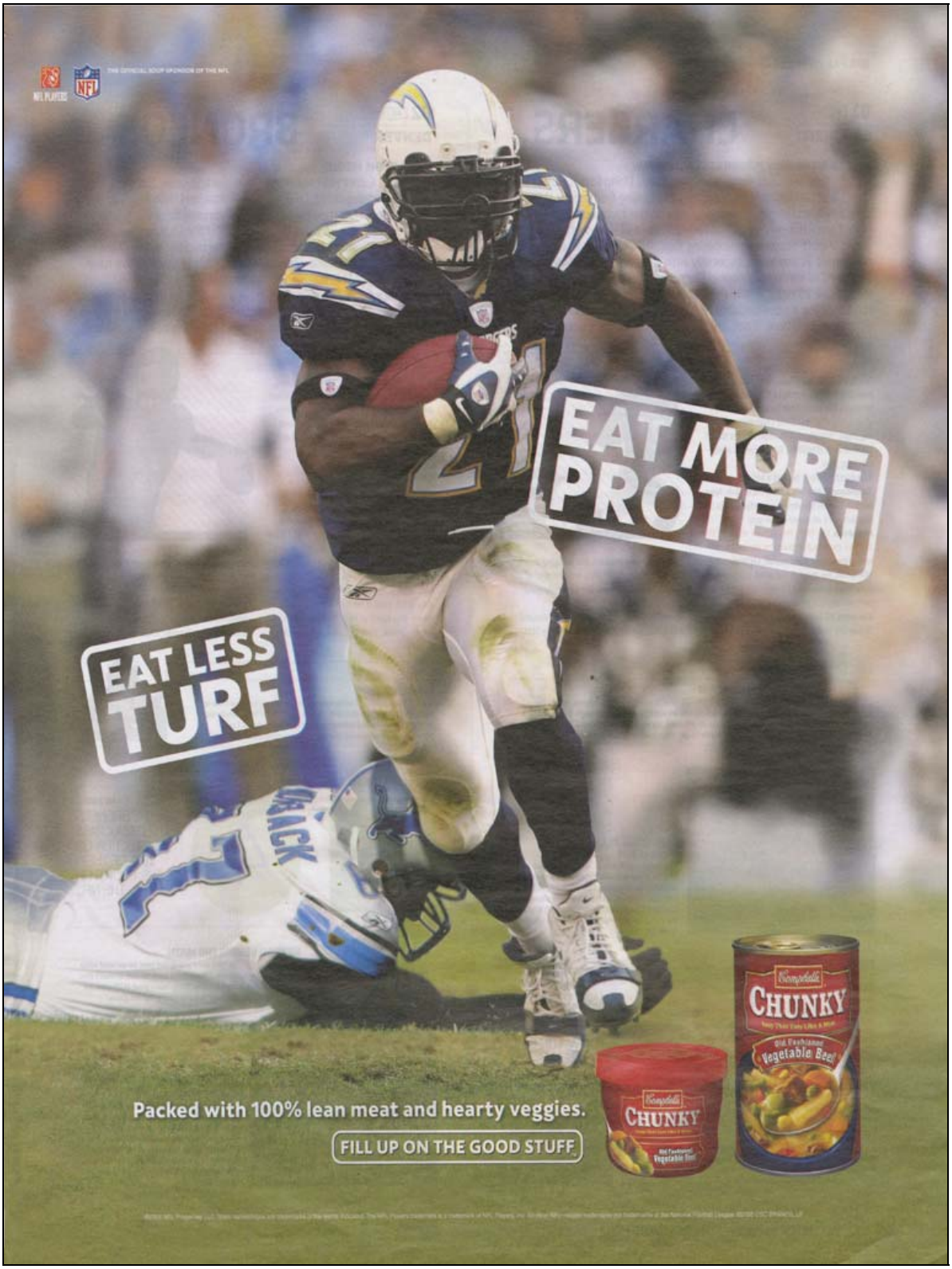


APPENDIX C

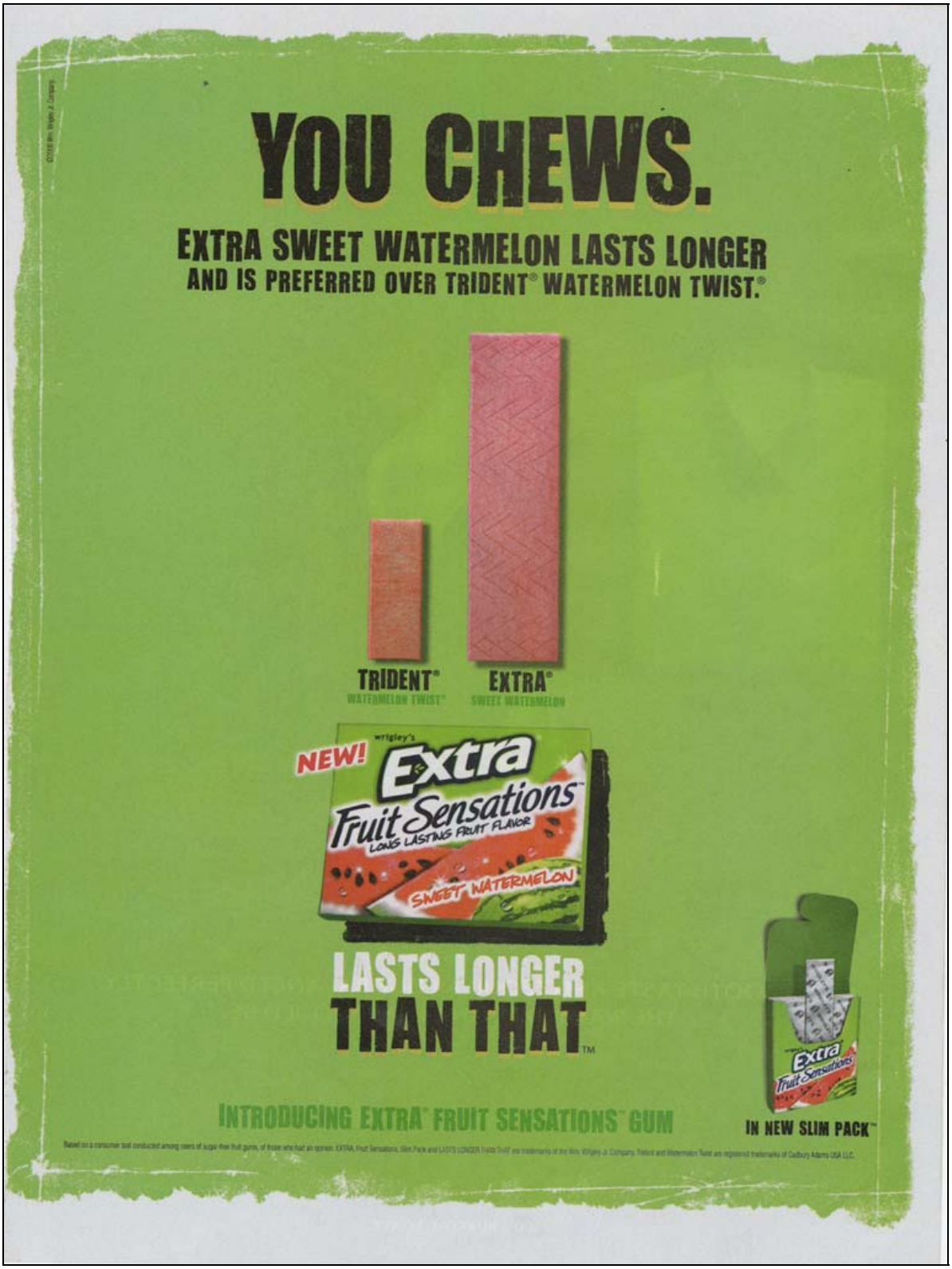
Non-Alcohol Advertisements Used




AMERICAN EAGLE
OUTFITTERS
ae.com
NEW
24-HOUR
STYLE


EAT MORE PROTEIN
EAT LESS TURF
Packed with 100% lean meat and hearty veggies.
FILL UP ON THE GOOD STUFF.
CHUNKY
Vegetable Beef
CHUNKY

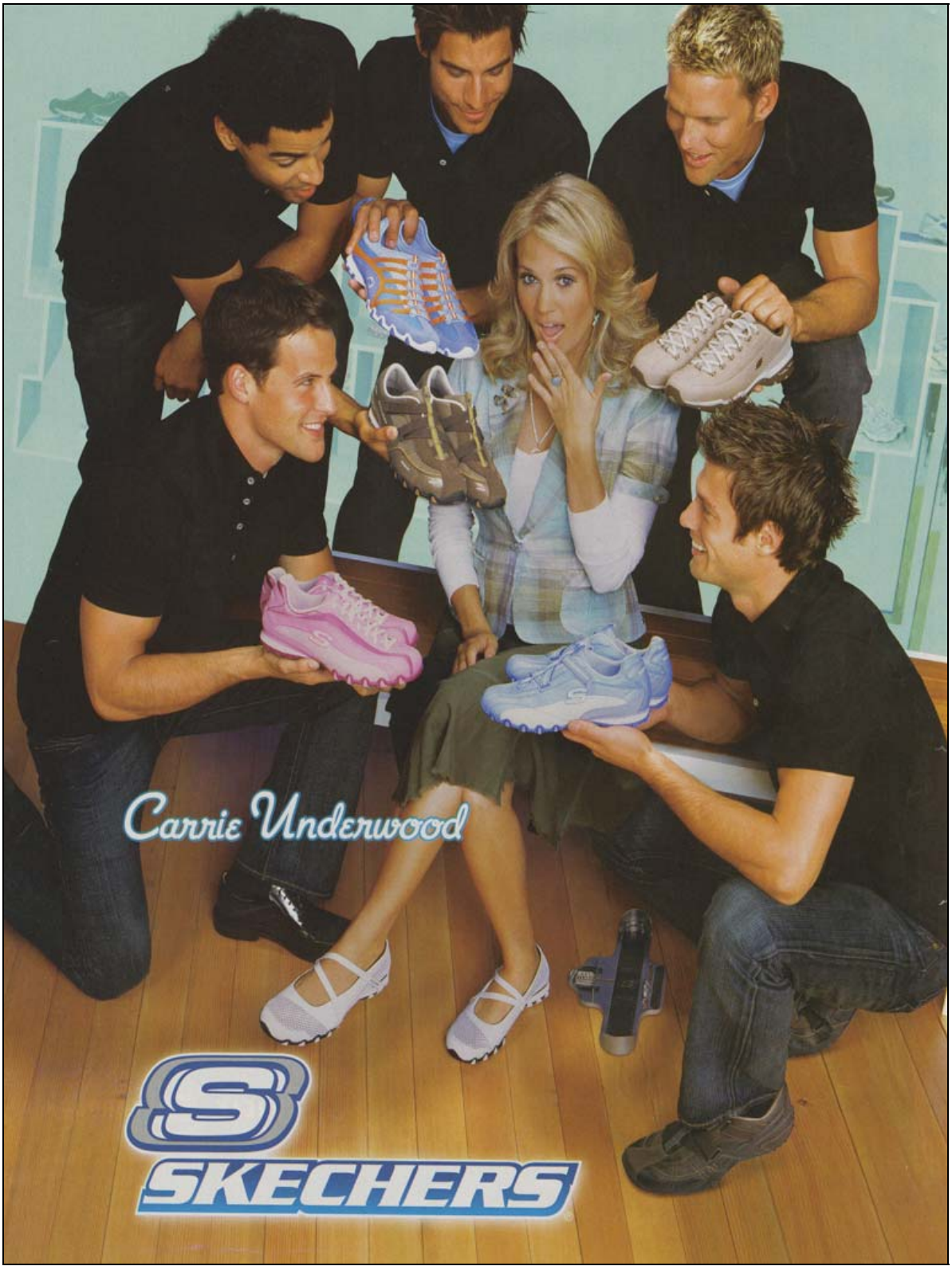

DASANI
sensations™
Mixed Berry
Lightly Carbonated Water Beverage
Natural Flavors
FRUIT GETS
SWEET
ON FIZZ

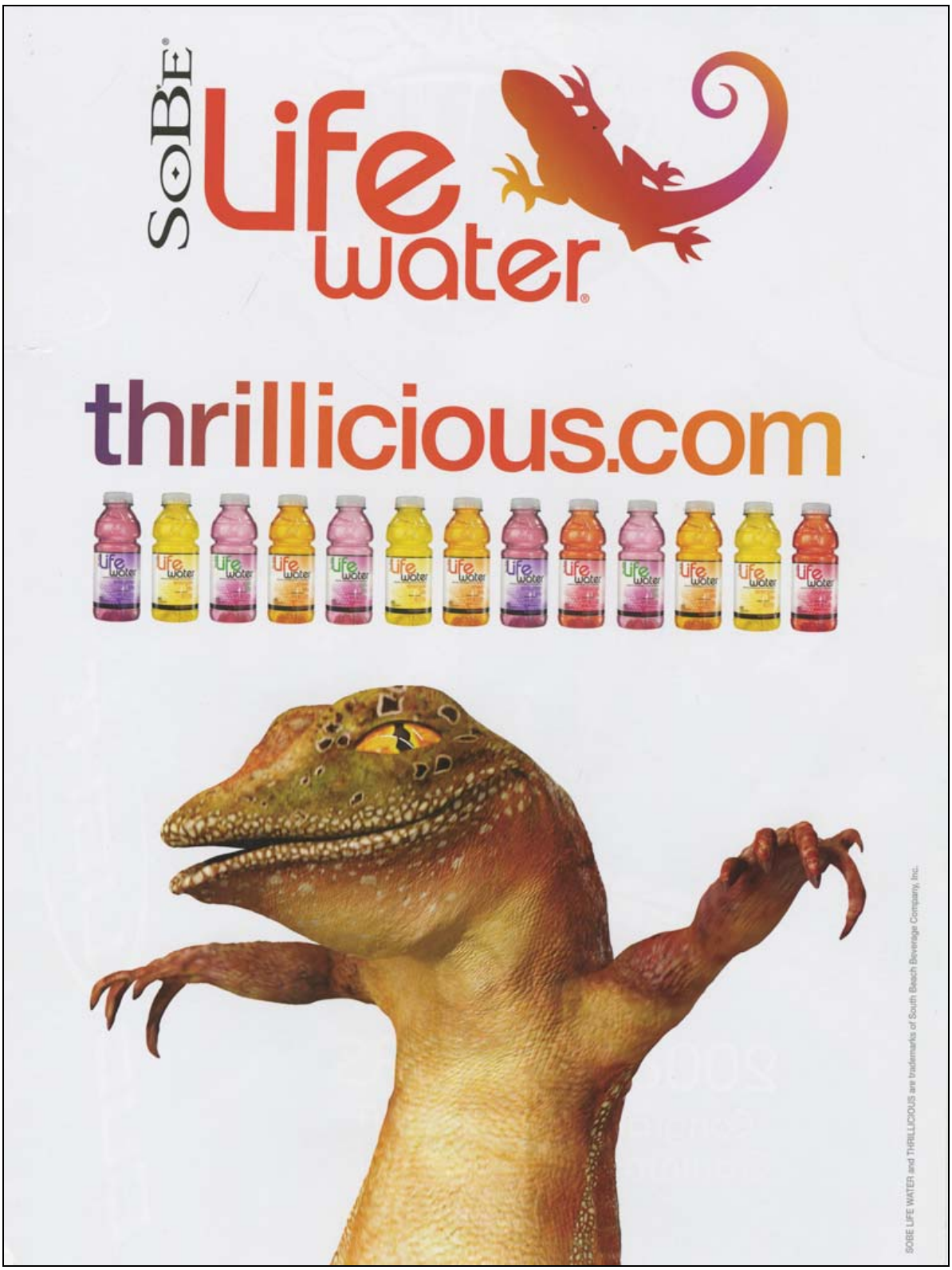

YOU CHEWS.
EXTRA SWEET WATERMELON LASTS LONGER
AND IS PREFERRED OVER TRIDENT® WATERMELON TWIST.®
TRIDENT®
WATERMELON TWIST™
EXTRA®
SWEET WATERMELON
NEW!
wrigley's
Extra
Fruit Sensations
LONG LASTING FRUIT FLAVOR
SWEET WATERMELON
LASTS LONGER
THAN THAT™
INTRODUCING EXTRA® FRUIT SENSATIONS™ GUM
IN NEW SLIM PACK™


Introducing!
Honey Maid
Soft Baked Snack Bars
So soft and chewy they've earned a place in the cookie aisle. Whole grains, the taste of pure honey, and real fruit are baked into every delicious bite.
NEW!
Honey Maid
Soft Baked
Oatmeal Raisin
NEW!
Honey Maid
Soft Baked
Blueberry
©2005 KF Holdings.
Honey Maid for the morning.


On this page:
Marielle Lorenz dress,
Ana Testa make-up,
McDonald's® necklace.
I only crave
what's in style.
Bacon Ranch
Fruit & Walnut
Caesar
Cobb
i'm lovin' it


Old Spice
after shave
pure sport
A cooling after shave from our Pure Sport line.


Carrie Underwood
SKECHERS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thrillicious.com
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APPENDIX D

Condition Configurations

Condition	Type Size	Type Contrast	Message Content
1	Small	Low	Traditional
2	Small	High	Traditional
3	Small	Low	Modified
4	Small	High	Modified
5	Large	High	Modified
6	Large	High	Traditional
7	Large	Low	Modified
8	Large	Low	Traditional

APPENDIX E

Example of Masked Advertisement