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VERBALIZING OR VISUALIZING METAPHORS?

THE MODERATING EFFECTS OF PROCESSING MODE AND TEMPORAL

ORIENTATION

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE
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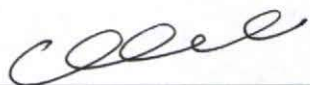
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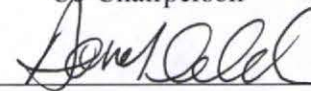
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ABSTRACT

Metaphors are extensively used in interactive healthcare communications. Although the superiority of metaphors over literal messages is usually explained by enhanced elaboration, little is understood with regard to whether metaphors invite readers to mentally visualize healthcare messages. It also remains unknown if different metaphor formats (abstract *versus* concrete) activate different processing mechanisms. In addition, there has been no attempt to examine the combination of metaphors and other healthcare communication strategies.

This dissertation contributes to this body of knowledge by providing a comprehensive framework focused on two different metaphor formats (abstract *versus* concrete). In a series of studies, this dissertation demonstrates that concrete metaphors, when compared with abstract metaphors, are usually processed via higher imagery processing. As a result, concrete metaphors are often more effective than abstract metaphors. However, abstract metaphors are more effective in encouraging behavioral persistence. In addition, congruency between metaphor format and processing instructions/temporal orientation priming enhances message effectiveness. After a certain period of time, the effect of congruency between metaphor format and temporal orientation priming fades away for risk perception, but it remains fairly strong for behavioral intention. This dissertation contributes to the theory of metaphors and has important marketing research and managerial implications.

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CHAPTER 1 INTRODUCTION

The Internet, with its “seemingly endless opportunities to inform, teach, and connect” (Silberg et al. 1997, p. 1244), has become one of the most important healthcare communications channels. As a result, thousands of healthcare messages become accessible to individuals. For example, the Americans for Nonsmokers' Rights website refers to cigarettes as “one weapon that kills from both ends,” because secondhand smoke kills. QuitNet reminds you that “[t]he Nicodemon is stealing you blind,” the money in your pocket as well as your physical well-being. Then, a message from New York State Health Department encourages you to break free from crystallized nicotine control. More interestingly, the TRUTH website encourages you to infect the truth about nicotine addiction to your friends, because “knowledge is contagious.” Common to all of these messages is the use of metaphors (see Figure 1).

A metaphor is defined as “a literally false, declarative assertion of existential equivalence that compares two concepts or things, where one concept, called the primary concept, is claimed to be another, the secondary concept” (Hunt and Menon 1995, p. 82). Nowadays, there is an increasing enthusiasm and recognition for the potentials and development of metaphors within the marketing arena (Durgee and Chen 2006), especially within the marketing communications domain. For example, Leiss, Kline, and Jhally (1986) maintain that metaphors are the very heart of the basic communication form used in modern advertising. Within the healthcare context, Rutherford (2000) observed the extensive use of indirect appeals such as metaphors in

anti-smoking commercials. The increased attention to metaphors in the marketing communications field may be partially, if not entirely, due to the well-documented superior effects of metaphoric advertising appeals (*versus* literal appeals) on message comprehension (Phillips 1997; Morgan and Reichert 1999), information recall and persuasion (Gray and Snyder 1989; Pawlowski, Badzinski, and Mitchell 1998; McQuarrie and Phillips 2005; Kardes 1988; Toncar and Munch 2001). Various theories have been proposed to account for such superiority. Among these theories (see McGuire 2000 for a thorough review), elaboration theory has been the most widely accepted. According to the elaboration theory, advertising messages with metaphors increase the depth of message processing, therefore, they are more likely to be associated with enhanced persuasion (Kardes 1993; Gray and Snyder 1989; McQuarrie and Mick 1996; Toncar and Munchy 2001). The elaboration theory, although it has been instrumental in understanding the effects of metaphors, is limited in that: 1) it has not incorporated mental imagery as part of the explanation despite the centrality of imagery to metaphor comprehension (Marschark, Katz, and Paivio 1983; Paivio and Clark 1986; Gibbs and Bogdonovich 1999; Walsh 1990); and 2) it has not examined the possibility of varied processing mechanisms for different types of metaphors. In an attempt to fill these gaps, the first objective of this dissertation is to uncover the underlying processing mechanisms for different metaphor formats (i.e., abstract *versus* concrete metaphors).

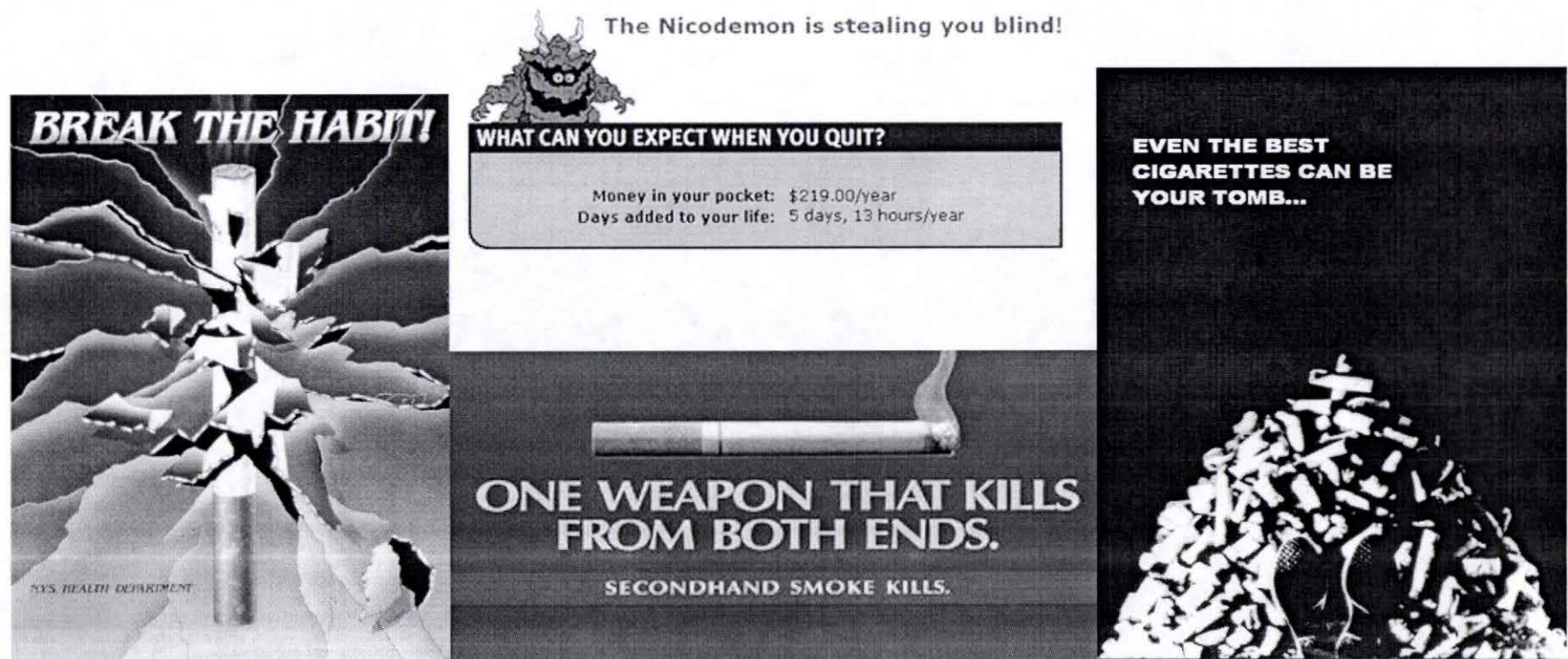
This dissertation also follows recent findings suggesting that communication effectiveness is influenced not only by the message content, but also by the fluency

with which one processes the message (e.g., Schwarz 2006; Petrova and Cialdini 2005; Thompson and Hamilton 2006; Lee and Aaker 2004). Such effects have been demonstrated in regard to the use of imagery appeals (Petrova and Cialdini 2005), comparative advertising (Thompson and Hamilton 2006), and message framing (Lee and Aaker 2004). However, prior research has yet to explore the possibility of creating fluency experiences by blending metaphors (i.e., abstract *versus* concrete metaphors) with other healthcare communication techniques (i.e., processing instructions or temporal orientation priming). Closing these theoretical gaps, this research also examines: 1) the congruency effect between metaphor format (i.e., abstract *versus* concrete metaphors) and processing instructions (i.e., low- *versus* high-imagery instructions) on attitude and persuasion, and 2) the congruency effect between metaphor format (i.e., abstract *versus* concrete metaphors) and temporal orientation priming (i.e., long-term *versus* short-term priming) on attitude and persuasion. The conceptual framework developed by this dissertation is illustrated in Figure 2.

In what to follow, Chapter 2 provides a review on metaphors and exploration of the significance and importance of the topic. Chapter 3 explores the processing mechanisms of abstract *versus* concrete metaphors and the effect of metaphor format on attitude and persuasion (Study 1). Chapter 4 investigates the effects of congruency between metaphor format (i.e., abstract *versus* concrete metaphors) and processing instructions (i.e., low- *versus* high-imagery instructions) on attitude and persuasion (Study 2). Chapter 5 examines the effects of congruency between metaphor format

(i.e., abstract *versus* concrete metaphors) and temporal orientation priming (i.e., long-term *versus* short-term priming) on attitude and persuasion (Study 3a). Chapter 6 analyzes the effect congruency between metaphor format (i.e., abstract *versus* concrete metaphors) and temporal orientation priming (i.e., long-term *versus* short-term priming) on behavioral persistence, as well as the persistence of the positive concurrency effects (Study 3b). Finally, Chapter 7 provides a discussion of implications, limitations and future research directions that pertain to this area of study.

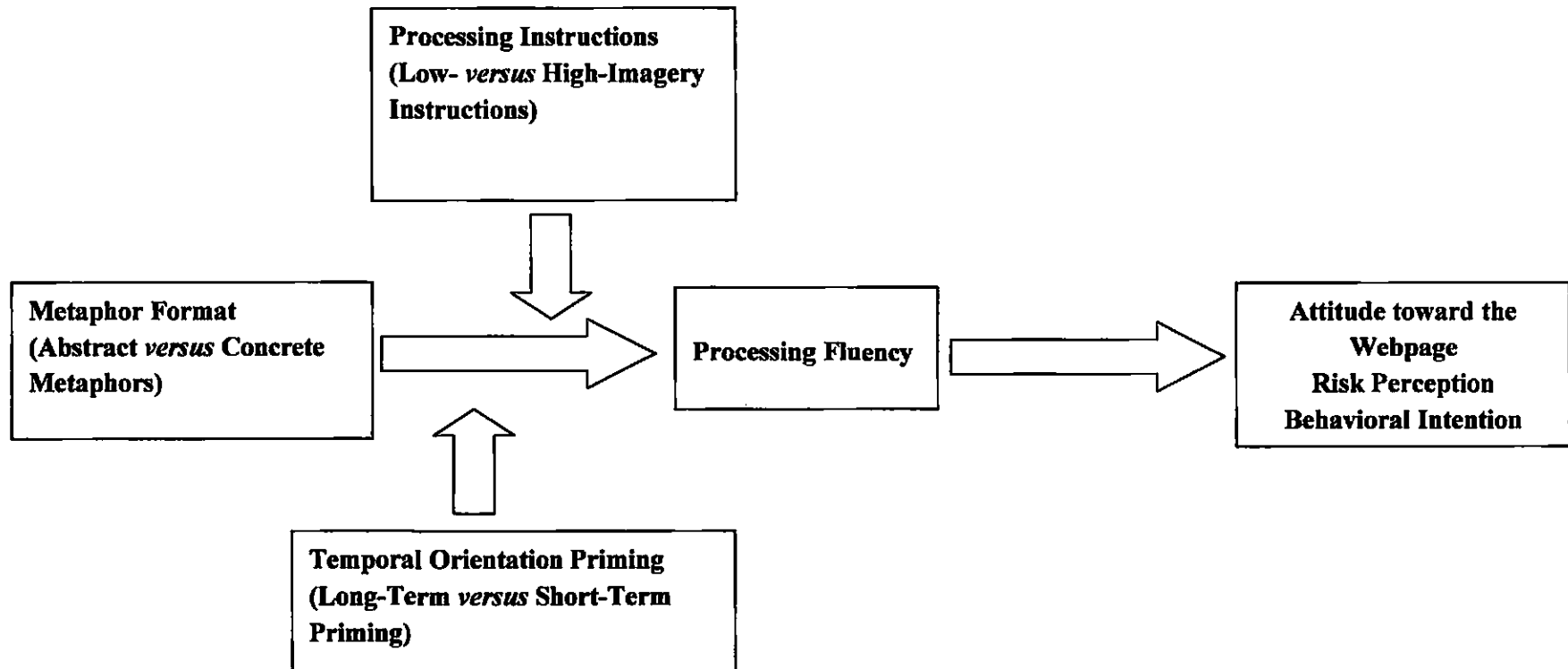
Figure 1 Metaphors in Healthcare Communication



The figure consists of four separate anti-smoking advertisements arranged in a collage. Each advertisement uses a different metaphor to convey the dangers of smoking.

- Top Left:** Features the headline "BREAK THE HABIT!" in a bold, italicized font. The background shows a jagged, cracked surface with a lit cigarette standing upright in the center, as if it's breaking through the cracks. At the bottom left, it says "NYS. HEALTH DEPARTMENT".
- Top Center:** Features a small, cartoonish devil character with horns and a mischievous grin. To its right is the text "The Nicodemon is stealing you blind!". Below this is a box with the heading "WHAT CAN YOU EXPECT WHEN YOU QUIT?" and two lines of text: "Money in your pocket: \$219.00/year" and "Days added to your life: 5 days, 13 hours/year".
- Bottom Center:** Features a single lit cigarette lying horizontally. Below it is the text "ONE WEAPON THAT KILLS FROM BOTH ENDS." and "SECONDHAND SMOKE KILLS.".
- Right:** Features the headline "EVEN THE BEST CIGARETTES CAN BE YOUR TOMB..." in a bold, sans-serif font. The background is dark, and at the bottom, there is a pile of cigarette butts and ash, with a human skull partially visible within the pile.

Figure 2 Conceptual Framework



CHAPTER 2 UNDERSTANDING METAPHORS

2.1 What is a Metaphor?

A metaphor is defined as “a literally false, declarative assertion of existential equivalence that compares two concepts or things, where one concept, called the primary concept, is claimed to be another, the secondary concept” (Hunt and Menon 1995, p.82). A metaphor relies upon the drawing of implications grounded in the perceived analogies of structure between two objects belonging to different domains (Ortony 1979; Dugree and Chen 2006). When a metaphor is created, similar attributes of phenomena are identified to form an analogy, whereas dissimilar attributes are identified to produce a semantic anomaly (MacCormac 1985). As these dissimilar attributes may be grammatically deviant when taken literally (MacCormac 1985; Stern 2000; Dugree and Chen 2008), a metaphor represents expressions that deviate from expectations, involve unorthodox word usage or violate some norm or convention (McQuarrie and Mick 1996).

Simply put, metaphors are artful deviations that invite a comparison of two objects by suggesting the conceptual similarities between them, even though the two come from different domains (McQuarrie and Mick 1996; Toncar and Munch 2001; McQuarrie and Phillips 2005; Mothersbaugh, Huhmann, and Franke 2002). As such, metaphors are designed to encourage the reader to experience one thing (the subject of the metaphor, also referred to as *the primary concept*) in terms of another (the object of the metaphor, also referred to as *the secondary concept*) (Lakoff and

Johnson 1980; Hunt and Menon 1995). For example, a recent anti-smoking message reads “Nicotine: # 1 Serial Killer.” This metaphor invites a comparison between nicotine and a serial killer. In this example, nicotine is the primary concept of the metaphor, while a serial killer is the secondary concept.

2.2 The Role of Metaphors in Marketing Communications

The metaphor, as a communication message factor, stands at the heartbeat of modern marketing communications. In the words of Proctor, Proctor, and Papasolomou (2005, p. 55), “[c]entral to much of modern day advertising in glossy magazines is the use of the metaphor.” Leiss et al. (1986) contend that metaphors are the very heart of the basic communication form used in modern advertising. Supporting these claims, Leigh (1994) reported that 74% of magazine advertisements used rhetorical figures such as metaphors in their headlines. More recently, Phillips and McQuarrie (2002) found that rhetorical figures, metaphors, in particular, were a staple of magazine advertising from 1954 to 1999 and that the occurrence of metaphors has increased over time.

In investigations of the effects of metaphors, researchers have discovered that metaphorical appeals have persuasive advantages over literal appeals (McQuarrie and Phillips 2005). These persuasive advantages are usually reflected by increased attention, information recall, and more favorable attitudes (Gray and Snyder 1989; Pawlowski, Badzinski, and Mitchell 1998; McQuarrie and Phillips 2005; Kardes 1988; Toncar and Munch 2001). For example, it has been demonstrated that

advertising messages with metaphors increase attention and elaboration of the message. Therefore, individuals tend to spend more time processing the advertising messages (Kardes 1993; Gray and Snyder 1989). Further, as metaphors represent an artful deviation from expected expressions (McQuarrie and Mick 1996), the element of surprise and novelty evokes curiosity and interest from the audience. As a result, metaphors will enhance recall and lead to more favorable attitude (Heckler and Childers 1992; McQuarrie and Mick 1999; Ang and Lim 2006). In sum, as Ward and Gaidis (1990) put it, promotional metaphors, which are usually artistic, sophisticated and memorable, influence consumers' beliefs and affect.

2.3 A Taxonomy of Metaphors

A review of the metaphor literature suggests that limited marketing research has examined different types of metaphors (see Stern 1990; Morgan and Reichert 1999 for a few rare exceptions). Given that this dissertation seeks to examine metaphor processing mechanisms by drawing the connection between metaphors and imagery, it appears necessary to understand a taxonomy of metaphors, namely, abstract *versus* concrete metaphors. McCabe (1988) differentiates between abstract and concrete metaphors based on the degree to which the secondary concept of a metaphor is tangible and can be directly experienced.

According to McCabe (1988), abstract metaphors involve secondary concepts that cannot be experienced directly. They are based on something intangible. Concrete metaphors rely on secondary concepts that are tangible and can be experienced

directly through the sensory links. For example, a recent anti-smoking message reads “tobacco companies are selling death to people.” This metaphor draws a comparison between “cigarettes” and “death.” A comparison like this is very different from a comparison with an object that has a real presence (e.g., a time bomb). Although an individual may have memories or experiences with death, it’s very unlikely that the concept of death can be directly associated with five senses, that is, seeing, hearing, smelling, touching, and tasting. The secondary concept of this metaphor, although very elegant and sophisticated, is intangible and has limited linkages to sensory experiences. Metaphors such as this one are called abstract metaphors.

In contrast, concrete metaphors apply secondary concepts, which are tangible and have sensory linkages. Consider the headline of a poster created by the World Health Organization that reads “Even the best cigarettes can be your tomb” (see Figure 1). This message concretizes the dangers and deadliness of smoking by using a tomb as the secondary concept. Compared with the deadliness of smoking, a tomb is a more concrete and tangible object. Hence, this metaphor can be categorized as a concrete metaphor.

Despite the renewed importance of metaphors in the marketing discipline, there has been little empirical research on abstract *versus* concrete metaphors to aid the theorists in formulating a comprehensive account on the effects of metaphors. Morgan and Reichert (1999), as a rare exception, examined the comprehensibility of abstract *versus* concrete metaphors in advertising appeals. Using experimental designs, they discovered that relative to abstract metaphors, concrete metaphors were more easily

comprehended by individuals. However, it remains unknown as to which metaphor format (abstract or concrete) is more effective in delivering healthcare messages.

2.4 Summary

This chapter provides a basic explanation and review of several metaphor-related research areas. Metaphors are artful deviations that invite a comparison of two objects by suggesting the conceptual similarities between them, even though the two come from different domains (McQuarrie and Mick 1996; Toncar and Munch 2001; McQuarrie and Phillips 2005; Mothersbaugh, Huhmann, and Franke 2002).

Metaphors can take on various forms, such as abstract and concrete. This literature review suggests that despite the centrality of metaphors in marketing communications, research on a taxonomy of metaphors (i.e., abstract *versus* concrete metaphors) is limited. Using the literature reviewed in Chapter 2 as a foundation, Chapter 3 explores the underlying processing mechanisms of different types of metaphors.

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CHAPTER 3 PROCESSING METAPHORS

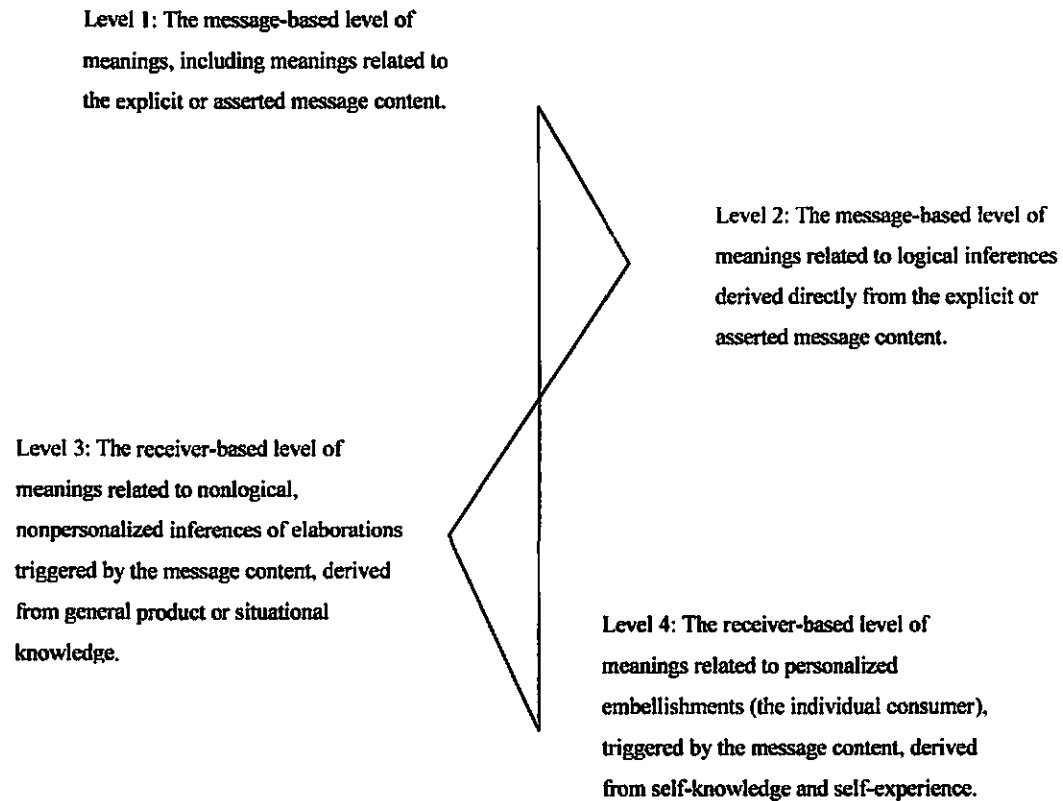
3.1 A Processing Mechanism of Metaphors – Elaboration Theory

The existing academic work on metaphors has proposed multiple explanations to account for the positive effect of metaphors on persuasion. Elaboration theory, or the “attention explanation” in the words of McGuire (2002), has been the most widely accepted (McQuarrie and Mick 1996; Toncar and Munch 2001). Essentially, elaboration theory argues that indirect persuasion attempts like metaphors invite further elaboration of the message (Kardes 1988; Toncar and Munch 2001; McQuarrie and Phillips 2005). This effect is further enhanced by the fact that individuals often need to solve the deviations and incongruity in metaphors in order to comprehend the message. The increased elaboration, as a result, is associated with enhanced information learning and more positive attitudes (Kardes 1988; Mick 1992; Toncar and Munch 2001).

Elaboration theory is grounded upon Kardes’s (1988) consumer inference model. According to Kardes (1988), when encountering indirect advertising messages (e.g., metaphors), an individual needs to spontaneously generate inferences to comprehend the messages. This process increases the cognitive elaboration involved in the attitude formation process. At the same time, such self-generated claims are known to be more accessible and favorable. Because, presumably, self-generated claims disguise the intent to persuade, therefore, they are less subject to counterarguments (Lee and Olshavsky 1995).

Elaboration theory, according to Toncar and Munch (2001), may also be understood within the levels of subjective comprehension (LSC) framework proposed by Mick (1992, see Figure 3). Mick (1992) suggests that there are four levels of comprehension. The first two levels are: 1) message-based level of meanings, including meanings related to the explicit or asserted message content (Level 1), and 2) the meanings related to logical inferences derived directly from the explicit or asserted message content (Level 2). These two levels involve message-based and surface-level processing because “the meaning that consumers give a message closely mirrors the literal meaning of the text used to deliver the message” (Toncar and Munch 2001, p. 56). Level 3 and 4 are reader-based and reflect deeper comprehension levels. They may reflect meanings that relate to non-logical, non-personalized inferences or elaboration triggered by the message content, derived from general product or situational knowledge (Level 3) or even meanings that relate to personalized embellishments triggered by the message content, derived from self-knowledge and self-experience (Level 4). These four levels of comprehension reveal that message processing is not a “monolithic, unitary process where only one meaning is correct” (Wittrock 1981, p. 251). The LSC framework suggests that compared with surface levels of advertising-language comprehension, deep levels of comprehension are associated with more positive attitudes, as well as enhanced information recall.

Figure 3 Four Levels of Subjective Comprehension in Terms of Meaning Generated (Mick 1992)



By applying the LSC framework to the processing mechanism of metaphors, it can be expected that relative to literal advertising messages, metaphors will tend to be processed in a deeper manner (Toncar and Munch 2001). First of all, the two surface levels of comprehension are believed to rely on explicit or direct message claims. Alternatively, the metaphor, with its implicit nature, is associated with two deep levels of comprehension (level 3 and level 4). Secondly, it is noted that an individual needs to self-generate inferences (Kardes 1988; 1993) or subjective interpretations (McQuarrie and Phillips 2005) to comprehend metaphors. This suggests that metaphors tend to be processed via receiver-based rather than message-based levels of comprehension. In sum, the elaboration theory formulates that metaphors motivate consumers to activate deep levels of comprehension, in which individuals engage in generating inferences from implicit content. Thus, the increased elaboration leads to more favorable attitude and enhanced information recall.

Although the elaboration theory provides an excellent framework to understand metaphor-related phenomena, it tends to overlook the role of imagery despite its centrality to metaphor comprehension (Marschark, Katz, and Paivio 1983; Paivio and Clark 1986; Gibbs and Bogdonovich 1999; Walsh 1990). Therefore, one might wonder whether: 1) metaphors activate imagery processing, and 2) the mode of processing varies depending on metaphor format (abstract *versus* concrete metaphors). To answer these questions, the following section continues by differentiating the two main processing modes: low- *versus* high-imagery processing.

3.2 The Mode of Processing

3.2.1 Low- versus High-Imagery Processing

MacInnis and Price (1987) conceptualize two information processing modes: low- versus high-imagery. As suggested by MacInnis and Price (1987), the fundamental distinction between low- and high-imagery processing lies in the extent to which the process involves one or more sensory linkages. Low-imagery processing represents the processing of symbols, which involves processes such as encoding (retrieving) information into (from) a knowledge schema. It appears to be more detached from the sensory experience. The absence of sensory dimensions of information in working memory makes these low-imagery processes less concrete (more abstract) than high-imagery processes. In contrast, high-imagery processing is activated as a sensory experience, which may include smell, taste, sight, sound and touch (Richardson 1983). Therefore, it involves a concrete representation of ideas, feelings and memories, and it permits the direct recovery of past experiences in the working memory (MacInnis and Price 1987).

3.2.2 The Processing Modes for Abstract versus Concrete Metaphors

As noted earlier, there are two modes of processing, namely, low- versus high-imagery processing. As McQuarrie and Phillips (2005) point out, metaphors do not belong to a homogeneous category, and different kinds of metaphors may invoke different processes. However, elaboration theory appears to be limited to low-imagery

processing, because the underlying LSC framework (Mick 1992) emphasizes the knowledge schema on product, situation or self. Although the level 4 of the LSC framework mentions self-related experiences, which relate to high-imagery processing, the idea remains underdeveloped. This gives rise to an intriguing question: Do metaphors activate imagery processing? Indeed, relevant literature has suggested the centrality of imagery in understanding metaphors. A review of metaphor comprehension literature suggests that imagery processes are important in the comprehension of metaphors (Marschark, Katz, and Paivio 1983; Paivio and Clark 1986; Gibbs 1994; Walsh 1990). For example, Bottini et al. (1994) contend that metaphor appreciation selectively activates cognitive components such as episodic memory and mental imagery. In fact, empirical data from neurolinguistic research have shown that metaphoric sentences, compared with literal sentences, generate increased activity in parts of the brain associated with imagery (Bottini et al. 1994; Burgess and Chiarello 1996).

In sum, prior research has consistently underscored the role of imagery in processing metaphoric messages. Therefore, mental imagery accounts for the processing of some, if not all, metaphors. These observations necessitate the incorporation of imagery as part of the metaphor processing mechanism. To do so, this dissertation draws upon two models of metaphor comprehension (Miller 1979) and two forms of conceptual mappings of metaphors (Gibbs and Bogdonovich 1999).

According to Miller (1979), metaphor comprehension involves the application of two conceptual models, namely semantic and image models. A semantic model requires the reader to evaluate the incoming information against the background of his/her existing knowledge schema, and then selectively integrates the new information into his/her knowledge structure. On the other hand, an image model involves the construction of an image, which contains not only those attributes normally associated with mental imagery but also all the mental processes that can construct a record of a passage of text and the representation of a scene. One distinction is that whereas semantic models are selective, image models are constructive. It follows that whereas the selective process results in a collection of possible states, the constructive process results in a single representation of a scene. Because it would be difficult to maintain an image for each possible state, it is likely that semantic models are more abstract than image models.

The two modes of comprehension can be further illustrated by two forms of conceptual mappings used to understand metaphors: knowledge-based mapping and image-based mapping. Metaphors are created to understand one thing (the primary concept) in terms of another (the secondary concept). According to Gibbs and Bogdonovich (1999), there are two types of conceptual mappings that will occur to transform the knowledge concerning the secondary concept to that of the primary concept. Knowledge-based mapping is the mapping of the more complex knowledge regarding the secondary concept (e.g., relational features), and image-based mapping

is the mapping of concrete perceptual images. Consider the following example for knowledge-based mapping – “Tobacco companies sell health risks.” To understand the message, an individual often transfers evaluative comments about health risks (e.g., potential danger) to cigarettes. It seems difficult to transfer physical attributes of health risks (shape, color, or smell) to cigarettes. Consider the following example that illustrates how image-based mappings work:

Consider the mappings that arise from one metaphor “My wife...whose waist is an hourglass.” This expression describes a superimposition of the image of an hourglass onto the image of a women’s waist by virtue of their common shape. As with conventional metaphor, the metaphoricity is not in the words themselves but in some conceptual mapping. However, the mapping here is from the middle of an hourglass onto the women’s waist; only that part of the hour glass corresponds to the women’s waist (Gibbs and Bogdonovich 1999, p. 39).

The above metaphor does not make sense until one mentally generates the image of an hourglass. Thus, this metaphor relies on image-based mappings to draw inferences between the primary concept and the secondary concept. To further illustrate, in their research, Gibbs and Bogdonovich asked participants to use either knowledge-based mappings or image-based mappings for an object (e.g., nest of swallows). They found that knowledge-based mappings led to more evaluative comments (e.g., cute, beautiful birds, place of birth, home, shelter, and security), while image-based mappings resulted in more sensory-related associations (e.g., twigs, straw, mud, chirping, and singing).

Both theories suggest that metaphor comprehension occurs in two modes, one is knowledge-based and the other is image-based. This distinction may equate to low- versus high-imagery processing modes. This leads us to another question: “When are metaphors processed via a low-imagery mode, and when are they processed via a high-imagery mode?” According to Miller (1979), contents of a semantic model (low-imagery mode) are more abstract than an image model (high-imagery mode). Further, Gibbs and Bogdonovich (1999) found that concrete metaphors were processed mainly through image-based mapping (high-imagery mode) rather than knowledge-based mapping (low-imagery mode). Bearing these thoughts in mind, this dissertation extends the elaboration theory and proposes the following processing mechanism of metaphors: *Metaphors, as implicit messages, enhance the depth of processing. Nevertheless, the nature of processing (low- versus high-imagery) varies depending on metaphor format. Abstract metaphors tend to be processed via a low-imagery processing mode, while concrete metaphors tend to be processed via a high-imagery processing mode.* Figure 4 illustrates the proposed processing mechanism for abstract versus concrete metaphors.

In sum, two kinds of processing mechanisms are expected for abstract versus concrete metaphors. The processing mode for abstract metaphors is low-imagery in nature, which is reflected by the integration of incoming information into the existing knowledge schema. The processing mode for concrete metaphors is high-imagery in nature, which is demonstrated by the activation of sensory links and the recovery of

past events. Further, the extant research suggests that high (*versus* low) imagery processing can have powerful effects on attitudes (Escalas 2004; MacInnis and Price 1987; Bone and Ellen 1992), risk perception (Carroll 1978; Gregory, Cialdini, and Carpenter 1982; Sherman et al. 1985; Petrova and Cialdini 2005), and behavioral intention (Bone and Ellen 1992; Schlosser 2003). For example, Bone and Ellen (1992) documented evidence suggesting that high-imagery appeals lead to more favorable attitude towards the brand than low-imagery appeals. A study by Sherman et al. (1985) revealed that easy-to-imagine (*versus* difficult-to-imagine) symptoms increased perceived risks associated with the disease. Further, high-imagery (*versus* low-imagery) processing positively influences behavioral intention, as individuals' expectations about their own behavior depend in part on their ability to envision themselves performing a given behavior (Anderson 1983; Bone and Ellen 1992; Schlosser 2003). Bearing these thoughts in mind, I formally hypothesize that:

H1: Compared with abstract metaphors, concrete metaphors will be processed via higher imagery processing and generate more imagery thoughts.

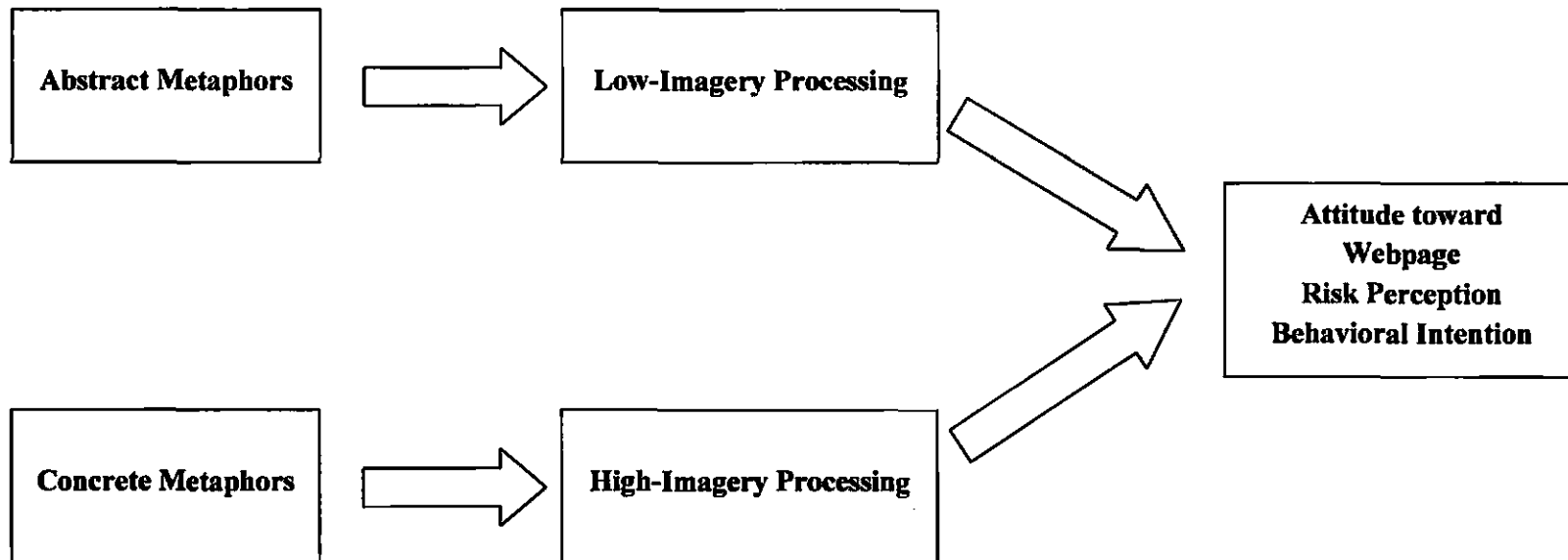
H2: Compared with abstract metaphors, concrete metaphors will result in more positive attitude toward the webpage, increased perception of risk associated with smoking and lower cigarette trial intention.

3.3 Study 1

3.3.1 Overview

Study 1 tested the information processing mechanism of abstract *versus* concrete metaphors and the effect of metaphor format on attitude towards the webpage, smoking risk perception and cigarette trial intention. With these purposes in mind, study 1 featured a 2 metaphor format (abstract *versus* concrete metaphors) one-factor between-subjects experimental design. Prior to Study 1, a pool of metaphoric healthcare messages were collected and examined by two independent coders. Only those messages that were consistently categorized as either abstract or concrete metaphors retained for the study.

Figure 4 Processing Mechanisms of Abstract versus Concrete Metaphors



3.3.2 Participants

Study 1 recruited undergraduate college students from a major American university. This decision was driven by the importance of college students as the target of anti-smoking healthcare communications. To date, research among college students continues to report a high rate of smoking regardless of the decrease in the smoking found among adolescents. To elaborate, studies reported that almost 30 percent of students reported smoking within the past 30 days, and 40 percent of students reported smoking within the past year (Everett et al. 1999; Johnston, O'Malley, and Bachman 2001; Rigotti et al. 2000). College students, while experiencing a transitional stage from adolescence to adulthood, tend to experiment and initiate behaviors like smoking (Stromberg, Nichter, and Nichter 2007; Bachman et al. 1997; Schulenberg et al. 1996). As a result, the college years appear to be a time of increased risk for smoking initiation and movement into regular patterns of use (Bachman et al. 1997; Chassin et al. 1992). Given this, Study 1 examines the effects of healthcare communication messages on college students' attitude toward the communication webpage, their risk perception associated with smoking and future cigarette trial intention. Focused on the effects of metaphors in healthcare communications, this dissertation targets college students who are either non-smokers or occasional smokers, but not regular smokers. In Study 1, 56 undergraduate business students from a major American university participated in the experiment.

Participants were later screened to exclude regular smokers, which resulted in a sample of 50 subjects (male = 62%; nonsmokers = 94%; occasional smokers = 6%).

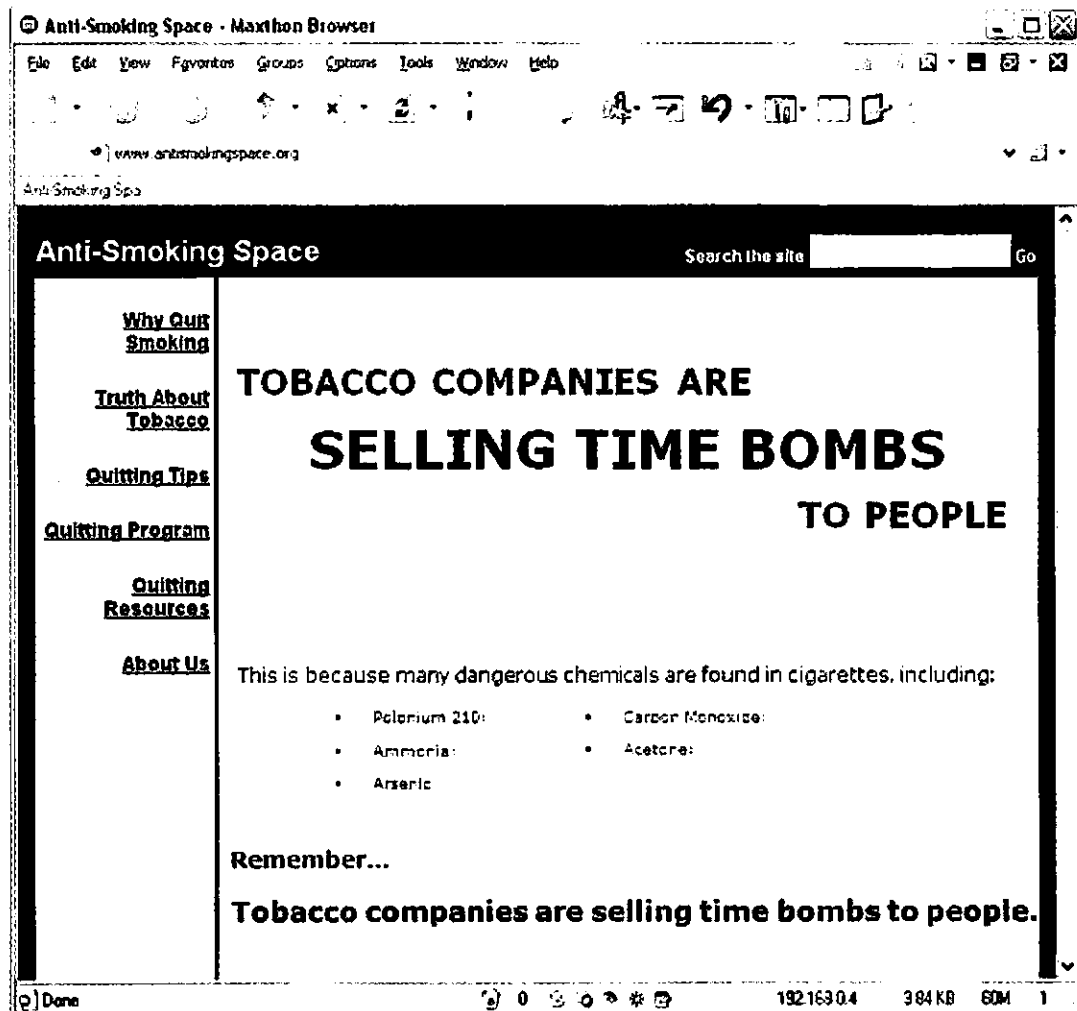
3.3.3 Stimuli and Procedures

The manipulation of metaphor format was carried out by a hypothetical anti-smoking webpage. Participants were told that the anti-smoking website was sponsored by a healthcare organization and that the website was under construction and would soon be online. The design and information of the experimental web pages were similar to each other, except that the headlines of these web pages varied for manipulation purposes. In particular, in the abstract metaphor condition, the headline read “Tobacco companies are selling risk to people,” while in the concrete metaphor condition, the headline read “Tobacco companies are selling time bombs to people” (see Figure 5). The stimuli (i.e., risk and time bomb) are similar in terms of meaning, for example, both of them imply a certain degree of uncertainty regarding a future negative event, while they are different in terms of concreteness. In an earlier pre-test, the effectiveness of the above manipulation was examined. The pre-test results showed that the webpage containing a concrete metaphor was rated to be significantly more vivid than the webpage with an abstract metaphor ($M_{\text{AbstractMetaphor}} = 4.47$ and $M_{\text{ConcreteMetaphor}} = 6.58$, $t(37) = 3.85$, $p < .00$). The pre-test also diagnosed a few confounding factors. As expected, the results indicated that metaphor format manipulation (abstract *versus* concrete metaphors) did not significantly impact the

experimental web pages' information credibility (Alden, He and Chen, forthcoming) and the participants' situational involvement (Park and Hastak 1994) ($p > .46$). Finally, the stimuli were rated as quite credible with the average rating above 6 on a 9-point scale. All measures in the pre-test employed nine-point scales.

In Study 1, all participants completed the 20-minute task in a computer lab to earn partial course credit. They first visited a webpage of a hypothetical anti-smoking site, in which the metaphor format manipulation was carried out. After exposure to the manipulation, all subjects were directed to complete an online survey. Imagery processing was measured using three items (e.g., "I visualized the information that I just saw on the webpage"; Thompson and Hamilton 2006; Keller and McGill 1994; Babin and Burns 1997). The four-item scale used by Menon, Block, and Ramanathan (2002) was adapted to measure attitude toward the webpage. Smoking risk perception was gauged by three items used by Andrews et al. (2004) and future cigarette trial intention was tapped by three items (e.g., "In the future, you might smoke one puff or more of a cigarette"; Andrews et al. 2004; Pechmann et al. 2003; Pierce et al. 1996). All measures employed seven-point scales. Finally, subjects answered questions about their gender, age and smoking status. Scale reliabilities ranged from .71 to .96. The items were averaged to obtain composite scores for the main constructs (see Appendix A).

Figure 5 Example of Stimuli: Concrete Metaphor (Study 1)



3.3.4 Results

Manipulation Checks. First, the effectiveness of the metaphor format manipulation was examined. As desired, the webpage containing a concrete metaphor was rated to be significantly more vivid than the webpage with an abstract metaphor ($M_{\text{AbstractMetaphor}} = 3.99$ and $M_{\text{ConcreteMetaphor}} = 4.98$, $t(48) = 2.64$, $p < .01$). Then the subjects' recall of the webpage headline was coded by two independent judges who were blind to the manipulation (inter-coder reliability = .90). Analysis of these data showed that in the abstract metaphor condition, 70% of the participants correctly recalled the headline as "tobacco companies are selling risk to people," while in the concrete metaphor condition, 85% of the participants correctly recalled it as "tobacco companies are selling time bombs to people." Therefore, the metaphor format manipulation was successful.

Dependent Measures. H1 predicted that concrete metaphors would be processed via higher imagery processing and generate more imagery thoughts than abstract metaphors. As expected, participants engaged in higher imagery processing in the concrete metaphor condition than in the abstract metaphor condition ($M_{\text{AbstractMetaphor}} = 3.90$ and $M_{\text{ConcreteMetaphor}} = 4.59$, $t(48) = -1.74$, $p < .05$). Two independent judges who were blind to the experimental treatment coded the subjects' thoughts (inter-coder reliability = .86). The discrepancies were resolved through discussion. Use of higher imagery processing was indicated by generation of a greater

number of imagery thoughts, or thoughts related to images, scenes and activities (e.g., “I have had family members have smoking related illnesses,” “It (‘time bomb’) gave me a strong mental image about how bad smoking is”; Keller and Block 1996; Keller and McGill 1994; McGill and Anand 1989). Consistent with our expectations, participants in the concrete metaphor condition generated more imagery thoughts than those in the abstract metaphor condition ($M_{\text{AbstractMetaphor}} = .57$ and $M_{\text{ConcreteMetaphor}} = 1.26$, $t(48) = -2.21$, $p < .04$). As such, H1 was supported.

According to H2, messages with concrete metaphors (*versus* abstract metaphors) would lead to more positive attitude toward the webpage, increased risk perception associated with smoking and lower cigarette trial intention. Confirming our predictions, the planned contrasts results showed that compared with abstract metaphors, concrete metaphors were associated with significantly more favorable attitude toward the webpage ($M_{\text{AbstractMetaphor}} = 3.45$ and $M_{\text{ConcreteMetaphor}} = 4.38$, $t(48) = -2.34$, $p < .03$), significantly stronger beliefs about smoking risks ($M_{\text{AbstractMetaphor}} = 5.46$ and $M_{\text{ConcreteMetaphor}} = 6.37$, $t(54) = -2.27$, $p < .03$), and lower cigarette trial intention ($M_{\text{AbstractMetaphor}} = 1.97$ and $M_{\text{ConcreteMetaphor}} = 1.63$). The mean difference for cigarette trial intention, however, was not statistically significant ($p > .18$). Therefore, H2 was only partially supported. The descriptive statistics of dependent variables are reported in Table 1.

Table 1 Descriptive Statistics of Dependent Variables (Study 1)

Dependent Variable	Metaphor Format	N	Mean	SD
Imagery Processing	Abstract Metaphor	23	3.90	1.27
	Concrete Metaphor	27	4.59	1.51
Imagery Thoughts	Abstract Metaphor	23	.57	.73
	Concrete Metaphor	27	1.26	1.35
Attitude toward the Webpage	Abstract Metaphor	23	3.45	1.29
	Concrete Metaphor	27	4.38	1.50
Smoking Risk Perception	Abstract Metaphor	23	5.46	1.68
	Concrete Metaphor	27	6.37	1.15
Cigarette Trial Intention	Abstract Metaphor	23	1.97	1.49
	Concrete Metaphor	27	1.63	1.22

3.4 Conclusion

Study 1 tested the information processing mode of abstract *versus* concrete metaphors and the effects of metaphor format on attitude towards the webpage, smoking risk perception and cigarette trial intention. The results indicated that compared with abstract metaphors, concrete metaphors were processed via higher imagery processing. Concrete metaphors (*versus* abstract metaphors) were associated with more favorable attitude towards the webpage and stronger beliefs about smoking risks. However, the expected effect of metaphor format on cigarette trial intention was not supported.

Study 1 contributes to the marketing literature in several ways. Previous studies have proposed that the elaboration theory explains why metaphoric messages enhance message effectiveness relative to literal messages (Mick 1992; Kardes 1988; Toncar and Munch 2001). However, the processing mechanism of different types of

metaphors has yet to be unidentified. In addition, although prior research suggests that concrete metaphors are more easily comprehended than abstract metaphors (Morgan and Reichert 1999), it has not shown whether abstract *versus* concrete metaphors have different impacts on message effectiveness. Bridging these theoretical gaps, Study 1 uncovered that the nature of information processing varied for different types of metaphors. Concrete metaphors tend to activate high-imagery processing, while abstract metaphors often induce low-imagery processing. Study 1 also revealed that due to the superiority of high-imagery processing over low-imagery processing, concrete metaphors were generally more effective than abstract metaphors.

One limitation is that Study 1 used a message headline to manipulate metaphor format. While this approach served our theoretical goal, consumers will usually encounter metaphors that appear in the both the message headlines and the message contents. A second limitation is that the effect of metaphor format on cigarette trial intention was not supported. Seeking to address these limitations and further explore how the processing mechanism of abstract *versus* concrete metaphors may inform healthcare marketers in delivering metaphorical messages, Study 2 investigates the effect of congruency between metaphor format and processing instructions (low-*versus* high-imagery instructions) on attitude toward the webpage, perception of risk associated with smoking, cigarette trial intention and the “state of flow.” Study 2 addresses the limitations of Study 1 by: 1) incorporating metaphors into both the message headlines and contents, and 2) improving the instrument of cigarette trial

intention. In addition, Study 2 identifies a boundary factor – processing instructions, which moderates the effect of metaphor format on message effectiveness. The following chapter begins by discussing the theoretical development of the hypotheses to be tested in Study 2.

CHAPTER 4 DELIVERING METAPHORS

4.1 Processing Fluency Theory

Recent research suggests that communication effectiveness is influenced not only by the message content, but also by the fluency with which one processes the message (e.g., Schwarz 2006; Petrova and Cialdini 2005; Thompson and Hamilton 2006; Lee and Aaker 2004). It is with this insight that an interesting construct, namely, processing fluency, is conceptualized. Processing fluency refers to the experienced ease or fluency of ongoing processing (Jacoby, Kelley, and Dywan 1989; Whittlesea 1993; Unkelbach 2007; Reber, Winkielman, and Schwarz 1998; Winkielman and Cacioppo 2001). It reflects the dynamic aspects of information processing with the understanding that judgments are affected not only by “what comes to mind,” but also by “how things come to mind” (Winkielman and Cacioppo 2001, p. 989). Processing fluency may be induced by a variety of stimuli ranging from repeated exposure (e.g., Janiszewski and Meyvis 2001; Lee 2001), to enhanced contextual clarity (Reber, Winkielman, and Schwarz 1998), to message framing (Lee and Aaker 2004). More importantly, processing fluency also results from congruency between 1) the information and organization of information, and 2) the type of processing being done (Bettman, Payne, and Staelin 1986).

The effects of processing fluency on attitude and persuasion have been well-documented under both healthcare and non-healthcare contexts (Begg, Anas, and

Farinacci 1992; Reber, Winkielman, and Schwarz 1998; Unkelbach 2007; Lee and Aaker 2004; Janiszewski and Meyvis 2001). First, the effect of processing fluency on attitude has been found in numerous studies (e.g., Reber, Schwarz, and Winkielman 2004; Winkielman and Cacioppo 2001; Unkelbach 2007; Lee and Aaker 2004; Janiszewski and Meyvis 2001). To illustrate, Winkielman and Cacioppo (2001) maintain that a highly fluency processing experience is usually positively marked due to an intrinsically fulfilling aesthetic experience induced by processing fluency. Supporting this, Reber, Zimmermann, and Wurtz (2004) contend that aesthetic experience is a function of the perceiver's processing dynamics: The more fluently the perceiver can process an object, the more positive his or her aesthetic response is. Such an aesthetically enjoyable or "feeling right" experience of processing fluency, according to Lee and Aaker (2004), may be transferred to subsequent attitude toward the message.

Second, numerous studies have supported the persuasive advantages of processing fluency. For example, Thompson and Hamilton (2006) empirically supported the positive effect of matching advertising format to consumers' information processing mode on message persuasiveness. Through a series of experiments, they discovered that comparative advertising was more persuasive when consumers were instructed to apply a low-imagery processing mode (comparing attributes and features), whereas non-comparative advertising was more

persuasive when consumers were encouraged to apply a high-imagery processing mode.

Similarly, Petrova and Cialdini (2005; see also Rigney and Lutz 1976) observed that adding non-experiential information (e.g., numerical rating, statistical information, and difficult concepts) into an advertising message reduced the positive effect of imagery appeals. This is because the non-experiential information interrupted the imagery fluency, or processing fluency. McGill and Anand (1989) found that the persuasiveness of a message was enhanced when subjects were instructed to use their imagination and the products had a positive description of concrete (as opposed to abstract) attributes. Within the healthcare context, Briñol and Petty (2006) identify processing fluency as one of the fundamental processes leading to healthcare message persuasion, which is reflected by perceptual and even behavioral change. Hertwig, Pachur, and Kurzenhäuser (2005) reported some preliminary evidence on the effect of processing fluency on risk judgment. In sum, a review of the existing literature suggests that congruency between metaphor format and processing mode will lead to more favorable attitude and enhanced persuasion due to processing fluency. Taken together, it can be predicted that compared with concrete (abstract) metaphors, abstract (concrete) metaphors will lead to more favorable attitude and greater persuasion when low-imagery (high-imagery) processing is made salient. Thus, I formally hypothesize that:

H3: When low-imagery processing mode is cued, abstract metaphors (*versus* concrete metaphors) will result in more positive attitude toward the webpage, increased smoking risk perception and lower cigarette trial intention.

H4: When high-imagery processing mode is cued, concrete metaphors (*versus* abstract metaphors) will result in more positive attitude toward the webpage, increased smoking risk perception and lower cigarette trial intention.

H5: Processing fluency will mediate the effect of congruency between metaphor format and processing mode on attitude toward the webpage, smoking risk perception and cigarette trial intention.

4.2 The “State of Flow”

The “state of flow” describes people’s interaction with computers (Hoffman and Novak 1996; Csikszentmihalyi 1990). The “state of flow” is defined as a state of mind that may sometimes be experienced by people who are deeply involved in some activities, which completely captivate a person temporarily. When one is in flow, time seems to stand still and nothing else seems to matter (Novak, Hoffman, and Yung 2000; Hoffman and Novak 1996). Or in the words of Csikszentmihalyi (2000, p. 36), the “state of flow” may feel like a “unified flowing from one moment to the next, in which he is in control of his actions, and in which there is little distinction between self and environment, between stimulus and response, or between past, present and future.” Consequently, self-consciousness disappears, and the consumer’s sense of time becomes distorted, leading to great intrinsic gratification (Hoffman and Novak 1996).

According to Csikszentmihalyi (2000), the “state of flow” contains the following characteristics: 1) a balance between challenges and skills, 2) focused attention, 3) loss of self-consciousness, 4) perceived control over the situation, and 5) intrinsic enjoyment. Hoffman and Novak (1996, p. 57) formulate that the “state of flow” in the computer-mediated environment is also characterized by “a seamless sequence of responses facilitated by machine interactivity.” When an individual is navigating the web, he/she will be deeply engaged or even lost in the virtual environment, and as a result, he/she becomes detached from the immediate physical environment. Following Hoffman and Novak’s (1996) seminal work, website interactivity is usually identified as the key antecedent to the “state of flow” in interactive environments. Yet, very few studies have investigated whether website contents may facilitate or interrupt the “state of flow.” For example, it remains unclear what types of messages will provoke the “state of flow,” and thus enhance communication effectiveness (Smith and Sivakumar 2004; Sicilia, Ruiz, and Munuera 2005). Luna, Peracchio, and Juan (2002), as a rare exception, tested the effect of congruency between website contents and structures with a visitor’s culture on the “state of flow.” They contended that culturally congruent websites were more easily processed by consumers than culturally incongruent websites. Cultural congruence led to increased perceived control, clearer demands, and a higher degree of focused attention, which then initiated and enhanced the “state of flow.” This intriguing notion implies that ease of processing, or processing fluency, mediates the relationship between cultural

congruency and the “state of flow.” Further, recent research has suggested theoretical and empirical similarities between processing fluency and the “state of flow” (Aaker and Lee 2006; Lee and Aaker 2004).

A closer examination of the key characteristics of processing fluency yields further support for such a link. For example, according to Reber, Zimmermann, and Wurtz (2004, p. 366), processing fluency facilitates “error-free processing, or the availability of appropriate knowledge structures to interpret the stimulus.” As such, processing fluency increases the perceived control over the situation by activating relevant knowledge or skills to meet the demand of the task. Further, it can be expected that fluent processing experience leads to a fluent navigating experience. Finally, as noted earlier, similar to the “state of flow,” processing fluency is intrinsically fulfilling. Taken together, it appears reasonable to argue that processing fluency can be identified as an antecedent to the “state of flow.” As noted earlier, congruency between metaphor format (abstract *versus* concrete) and processing mode (low- *versus* high-imagery) enhances attitude and persuasion via the facilitation of processing fluency. Hence, I formally hypothesize that:

H6: When a low-imagery processing mode is cued, abstract metaphors (*versus* concrete metaphors) will result in a more intense “state of flow.”

H7: When a high-imagery processing mode is cued, concrete metaphors (*versus* abstract metaphors) will result in a more intense “state of flow.”

H8: Processing fluency will mediate the effect of congruency between metaphor format and processing mode on the intensity of the “state of flow.”

4.3 Study 2

4.3.1 Overview

The purpose of Study 2 was to investigate the congruency effect between metaphor format and processing instructions on attitude toward the webpage, smoking risk perception, cigarette trial intention and the “state of flow.” Given this purpose, Study 2 featured a 2 metaphor format (abstract *versus* concrete metaphors) X 2 processing instructions (low- *versus* high-imagery instructions) between-subjects factorial design.

In Study 2, 117 undergraduate business students from a major American university participated in the experiment. Similar to Study 1, participants were screened to exclude regular smokers, which resulted in a sample of 96 subjects (male = 52%; nonsmokers = 95%; occasional smokers = 5%).

4.3.2 Stimuli and Procedures

The manipulation of metaphor format was carried out by a hypothetical anti-smoking webpage. In Study 1, only the message headlines were altered to manipulate metaphor format. In Study 2, both message headlines and content was used as part of the metaphor format manipulation. For example, in the abstract metaphor condition, the message read:

TOBACCO COMPANIES SELL HEALTH RISKS

Every time people purchase a pack of cigarettes, they actually bring home health risks. Every time people smoke a cigarette, they actually inhale health risks. Smoking kills. It's only a matter of time...
Remember, tobacco companies sell health risks.

In the concrete metaphor condition, the phrase - "health risks" was replaced by "time bombs," and the rest of the message remained the same (see Figure 6).

The second between-subjects factor was processing instructions. The manipulation of low- *versus* high-imagery processing was carried out using direct instructions. This approach has been frequently adopted by prior research due to its effectiveness in activating a certain type of information processing mode (e.g., McGill and Anand 1989; Keller and McGill 1994; Keller and Block 1996; Thompson and Hamilton 2006). In Study 2, half of the participants received the following instructions to engage in low-imagery processing:

We do request that you read the information on the webpage carefully. Try your best to use reason and logic as you get a sense of what is being presented. DON'T let your imagination get the better of you. Rather, try to objectively understand the content of the webpage.

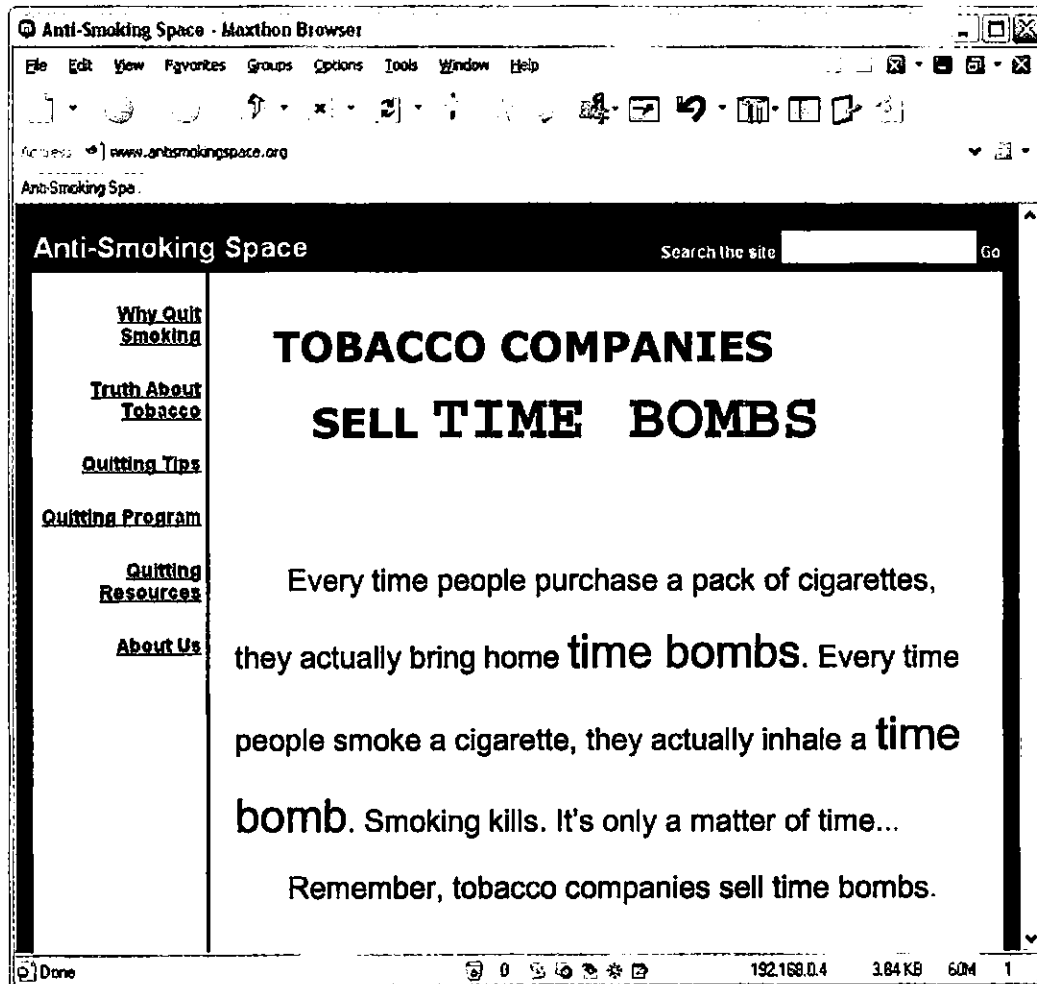
The other half of the participants received the following high-imagery processing instructions:

We do request that you read the information on the webpage carefully. Try your best to use imagination as you get a sense of what is being presented. DON'T let your logical thinking get in the way. Rather, utilize the power of imagination to help you visualize the situation described in the message.

The procedure of Study 2 was very similar to Study 1. The measures for attitude toward the webpage and smoking risk perception were the same as Study 1. To improve the cigarette trial intention measure, two additional items - i.e., "Would you smoke if your best friend dared you?" and "Do you think that you will smoke at

any time during next year?” Pechmann and Shih 1999) were added to the three-item measure used in Study 1. Study 2 introduced two additional constructs - processing fluency and the “state of flow.” Processing fluency was gauged using four items on ease of processing (Lee and Aaker 2004; Thompson and Hamilton 2006). The “state of flow” was directly measured using a two-item scale following a narrative description of flow developed by Novak, Hoffman, and Yung (2000). This approach has been validated by numerous studies (Chen, Wigand, and Nilan 1999; Novak, Hoffman, and Yung 2000; Sicilia, Ruiz, and Munuera 2005). All measures employed seven-point scales. Scale reliabilities ranged from .79 to .95. The items were averaged to obtain composite scores for the main constructs (see Appendix A).

Figure 6 Example of Stimuli: Concrete Metaphor (Study 2)



4.3.3 Results

Manipulation Checks. First, the effectiveness of metaphor format manipulation was examined using a seven-point vividness scale (Petrova and Cialdini 2005). As desired, the webpage containing a concrete metaphor was rated to be significantly more vivid than the webpage with an abstract metaphor ($M_{\text{AbstractMetaphor}} = 3.71$ and $M_{\text{ConcreteMetaphor}} = 4.46$, $t(94) = -3.21$, $p < .01$). Then, the subjects' recall of the webpage information was coded by two independent judges who were blind to the manipulation (inter-coder reliability = .92). Analysis of these data showed that in the abstract metaphor condition, 67% of the participants correctly recalled that the message contained "health risks," whereas in the concrete metaphor condition, 90% of the participants correctly recalled that it contained "time bombs." Therefore, the metaphor format manipulation was successful.

Second, to examine the manipulation of processing instructions, the participants were asked to recall the instructions that they had received prior to reading the webpage. As desired, the participants in the low-imagery instructions condition were more likely to recall that they were asked to be objective while reading the webpage ($M_{\text{LowImageryInstructions}} = 5.81$ and $M_{\text{HighImageryInstructions}} = 3.24$, $t(94) = 6.90$, $p < .001$). The participants in the high-imagery instructions condition were more likely to recall that they were told to visualize everything on the webpage ($M_{\text{LowImageryInstructions}} = 3.67$ and $M_{\text{HighImageryInstructions}} = 5.38$, $t(94) = -4.36$, $p < .001$). Thus, the processing instructions manipulation was also successful.

Dependent Measures. To test H3-H8, a 2 metaphor format (abstract *versus* concrete metaphors) X 2 processing instructions (low- *versus* high-imagery instructions) full-factorial MANOVA was performed on attitude toward the webpage, smoking risk perception, cigarette trial intention and the “state of flow.” Multivariate analysis revealed that a two-way interaction effect involving metaphor format and processing instructions was significant (Wilks’ λ : $F(4, 89) = 4.76, p < .01$). No other multivariate effect was significant. Further univariate analyses showed that the interaction effect between metaphor format and processing instructions was significant on attitude toward the webpage ($F(1, 92) = 4.89, p < .04$), smoking risk perception ($F(1, 92) = 4.57, p < .04$), and the “state of flow” ($F(1, 92) = 16.57, p < .001$). However, the same interaction effect was not significant on cigarette trial intention ($p > .88$). Further planned contrasts were then undertaken to examine H3-H8. Figure 7-9 provide a visual display of these significant interaction effects. The treatment means are reported in Table 2.

According to H3, when a low-imagery processing mode is cued, abstract metaphors (*versus* concrete metaphors) will be associated with more positive attitude toward the webpage, increased risk perception associated with smoking and lower cigarette trial intention. Contrary to the prediction, t-test results did not yield any significant mean difference between abstract *versus* concrete metaphors in the low-imagery instructions condition. As such, H3 was not supported. H6 posited that when a low-imagery processing mode was cued, abstract metaphors would result in

more intense “state of flow” than concrete metaphors. As expected, the planned contrasts results showed that when a low-imagery processing mode was made salient, compared with concrete metaphors, abstract metaphors led to significantly more intensified “state of flow” ($M_{\text{AbstractMetaphor}} = 3.36$ and $M_{\text{ConcreteMetaphor}} = 2.47$, $t(52) = -2.01$, $p < .03$). Therefore, H6 was supported.

H4 predicted that when a high-imagery processing mode was cued, concrete metaphors (*versus* abstract metaphors) would lead to more positive attitudes toward the webpage, increased risk perception associated with smoking and lower cigarette trial intention. Confirming the predictions, in the high-imagery instructions condition, compared with abstract metaphors, concrete metaphors were associated with significantly more favorable attitude toward the webpage ($M_{\text{AbstractMetaphor}} = 3.24$ and $M_{\text{ConcreteMetaphor}} = 4.22$, $t(40) = -3.29$, $p < .01$) and significantly stronger beliefs about smoking risks ($M_{\text{AbstractMetaphor}} = 5.76$ and $M_{\text{ConcreteMetaphor}} = 6.48$, $t(40) = -1.75$, $p < .05$). However, the mean difference for cigarette trial intention was not significant. Hence, H4 was partially supported. Similarly, as expected by H7, in the high-imagery instructions condition, concrete metaphors led to significantly more intense “state of flow” than abstract metaphors ($M_{\text{AbstractMetaphor}} = 1.81$ and $M_{\text{ConcreteMetaphor}} = 3.40$, $t(40) = -4.09$, $p < .001$). Hence, H7 was supported.

Figure 7 Metaphor Format and Processing Instructions Interaction on Attitude toward the Webpage (Study 2)

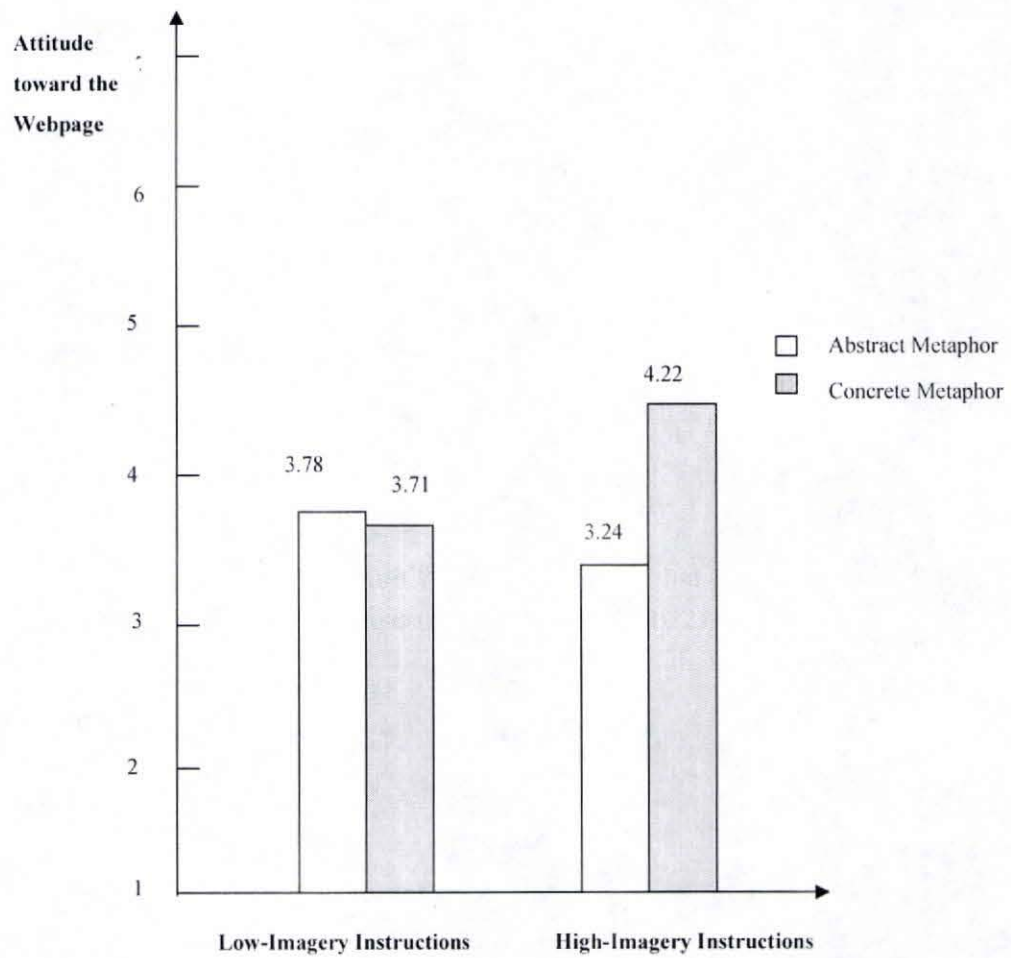


Figure 8 Metaphor Format and Processing Instructions Interaction on Smoking Risk Perception (Study 2)

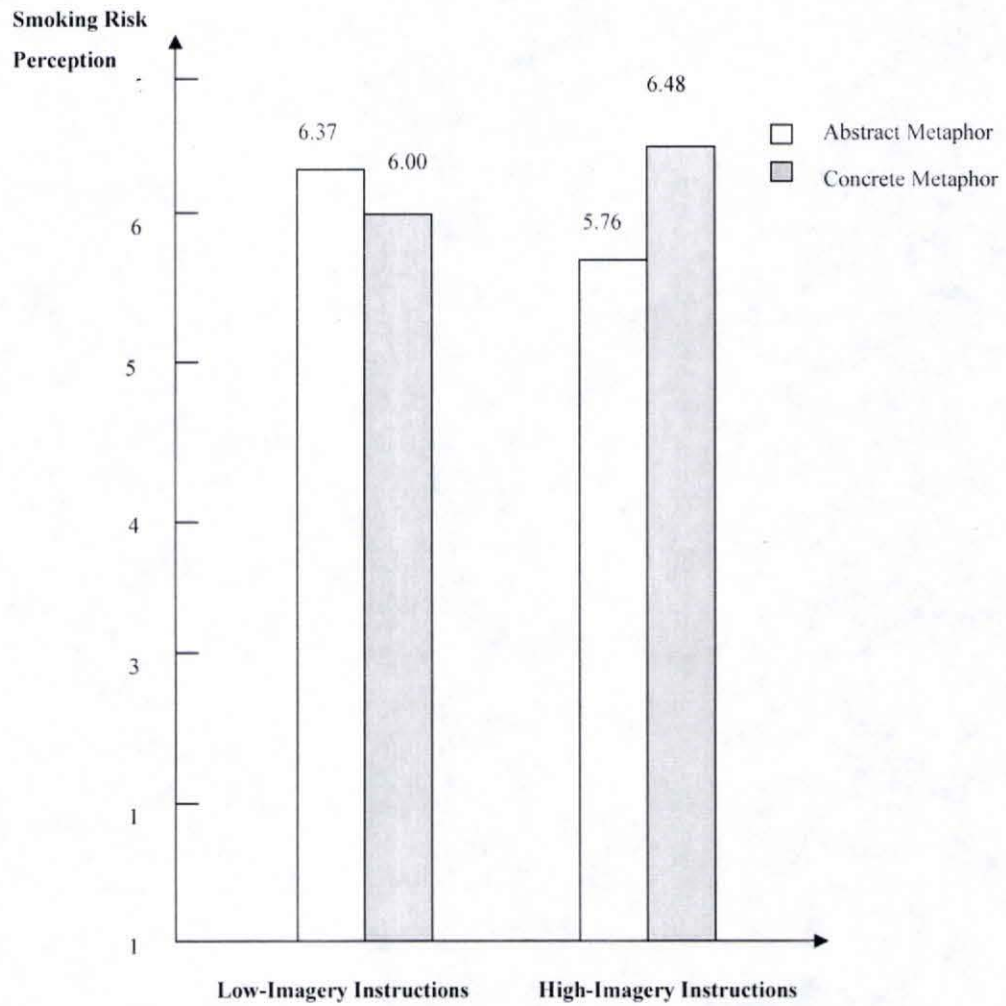
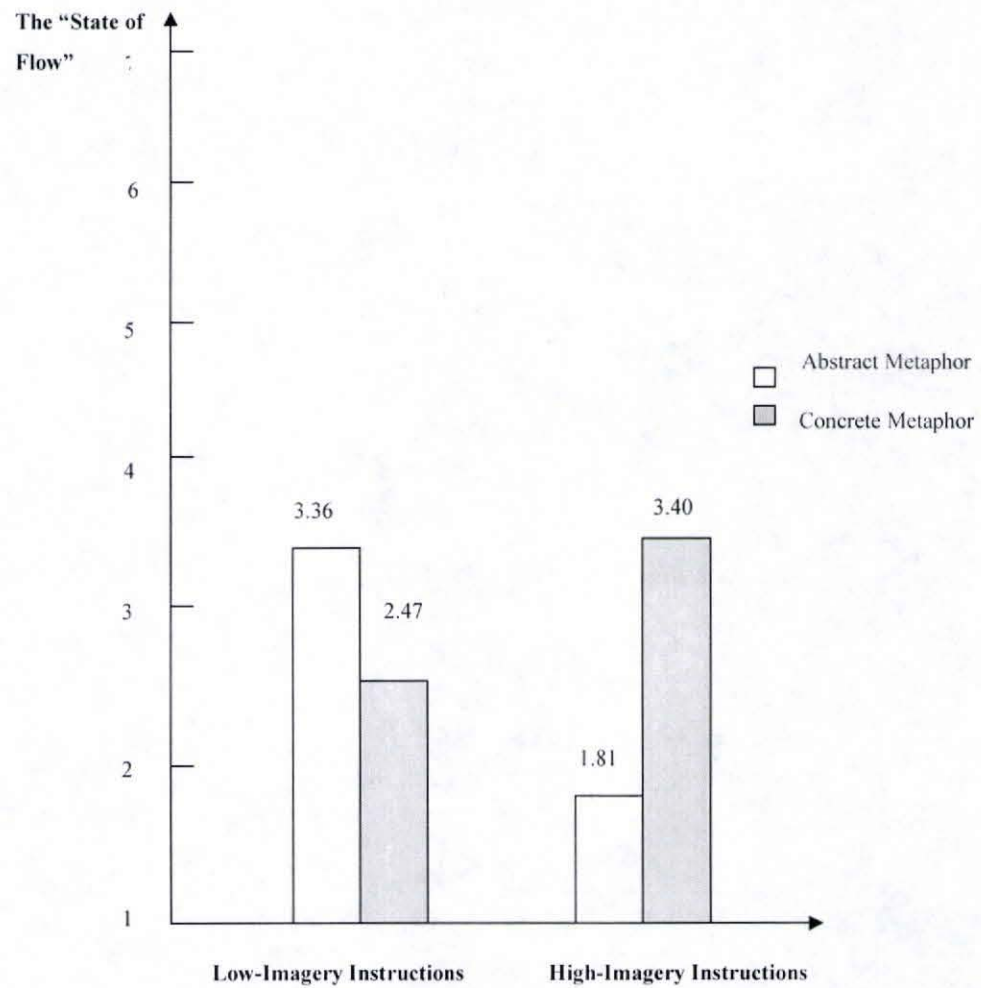


Figure 9 Metaphor Format and Processing Instructions Interaction on the “State of Flow” (Study 2)



Mediation Analyses. To test H5 and H8, a series of mediation analyses were performed to examine whether processing fluency mediates the interaction effects between metaphor format and processing instructions on attitude toward the webpage, smoking risk perception and the “state of flow.” The mediation analysis was not performed on cigarette trial intention given that the interaction effect between metaphor format and processing instructions was not significant on cigarette trial intention. Applying the procedure suggested by Baron and Kenny (1986), three mediating analyses were conducted separately for attitude toward the webpage, smoking risk perception and the “state of flow.” The results of the mediation analyses are reported in Table 3.

As predicted by H5, the first mediation analysis revealed that the interaction effect of metaphor format and processing instructions on attitude toward the webpage was fully mediated by processing fluency. Specifically, the interaction effect between metaphor format and processing instructions was significant on processing fluency (standardized coefficient = .30; $t(94) = 3.06$, $p < .01$). The same interaction effect was also significant on attitude toward the webpage (standardized coefficient = .20; $t(94) = 1.97$, $p = .05$). Finally, when processing fluency was entered as a covariate in the second equation, the interaction effect between metaphor format and processing instructions on attitude toward the webpage became non-significant ($p > .18$), whereas the effect of processing fluency remained significant (standardized coefficient = .21; $t(93) = 1.96$, $p = .05$). This indicated that the interaction effect between metaphor

format and processing instructions on attitude toward the webpage was fully mediated by processing fluency.

The second mediation analysis examined whether the interaction effect of metaphor format and processing instructions on smoking risk perception was mediated by processing fluency. In particular, the analysis showed that the interaction effect between metaphor format and processing instructions was significant on processing fluency (standardized coefficient = .30; $t(94) = 3.06$, $p < .01$). The same interaction effect was significant on smoking risk perception (standardized coefficient = .21; $t(94) = 2.08$, $p < .05$). Finally, when processing fluency was entered as a covariate in the second equation, the interaction effect between metaphor format and processing instructions on smoking risk perception was significant (standardized coefficient = .25; $t(93) = 2.32$, $p < .03$), and the effect of processing fluency was not ($p > .27$). Hence, processing fluency did not mediate the interaction effect between metaphor format and processing instructions on smoking risk perception. Therefore, H5 was only partially supported.

The third mediation analysis examined whether the interaction effect of metaphor format and processing instructions on the “state of flow” was mediated by processing fluency. Specifically, the interaction effect between metaphor format and processing instructions was significant on processing fluency (standardized coefficient = .30; $t(94) = 3.06$, $p < .01$). The same interaction effect was significant on the “state of flow” (standardized coefficient = .38; $t(94) = 3.92$, $p < .001$). Finally,

when processing fluency was entered as a covariate in the second equation, the interaction effect between metaphor format and processing instructions on the “state of flow” remained significant (standardized coefficient = .32; $t(93) = 3.22$, $p < .01$), while the effect of processing fluency was not (standardized coefficient = .19; $t(93) = 1.88$, $p > .06$). This indicated that the interaction effect between metaphor format and processing instructions on the “state of flow” was not mediated by processing fluency. Hence, H8 was not supported.

The third mediation analysis yielded very interesting results in regard to the role of the “state of flow.” To illustrate, given that the effect of processing fluency on the “state of flow” became non-significant when both the interaction term and processing fluency entered the equation, it points toward the possibility that the “state of flow” may in fact play a mediating role. In a very real sense, this implies that a chain-mediation effect exists involving both processing fluency and the “state of flow” on the outcome variables, i.e., attitude toward the webpage and smoking risk perception. Given these results, two additional mediation analyses were performed on attitude towards the webpage and smoking risk perception using processing fluency and the “state of flow” as chain-mediators. The results of the mediation analyses are reported in Table 4. The mediation analysis revealed that the chain-effect occurred on attitude toward the webpage. In particular, the analysis showed that the interaction effect between metaphor format and processing instructions was significant on processing fluency (standardized coefficient = .30; $t(94) = 3.06$, $p < .01$). The effect

of processing fluency on the “state of flow” was significant (standardized coefficient = .28; $t(94) = 1.97, p < .05$). The interaction effect was significant on attitude toward the webpage (standardized coefficient = .20; $t(92) = 2.85, p < .01$). Finally, when processing fluency and the “state of flow” were entered as covariates in the third equation, the interaction effect between metaphor format and processing instructions and the effect of processing fluency on attitude toward the webpage became non-significant ($p > .13$), whereas the effect of the “state of flow” remained significant ($p < .001$). This indicated that the interaction effect between metaphor format and processing instructions on attitude toward the webpage was fully mediated by the “state of flow.” Further, the mediating effect of processing fluency on attitude toward the webpage was fully mediated by the “state of flow.” The same chain-effect was not found for smoking risk perception.

4.4 Conclusion

Study 2 examined the effects of congruency between metaphor format and processing instructions on attitude toward the webpage, smoking risk perception, cigarette trial intention and the “state of flow.” The results showed that when high-imagery processing was made salient, concrete metaphors led to more positive attitude toward the webpage, increased risk perception associated with smoking and more intense “state of flow” than abstract metaphors. When low-imagery processing was cued, abstract metaphors induced more intense “state of flow” than concrete

metaphors. Further, processing fluency was found to mediate the effect of congruency between metaphor format and processing instructions on attitude toward the webpage, but not on smoking risk perception or the “state of flow.” More interestingly, processing fluency and the “state of flow” were found to be chain-mediators of the congruency effect on attitude toward the webpage.

These interesting findings from Study 2 have potential implications for academic researchers, healthcare marketers, and managers. Although prior research has suggested that high-imagery (*versus* low-imagery) processing results in more favorable attitude and enhanced persuasion, this dissertation identifies a boundary condition for the positive effects of high-imagery processing. When metaphor format is inconsistent with processing mode, the message effectiveness may be reduced. This dissertation also contributes to the extant literature by revealing that the effects of congruency between metaphor format and processing mode are mediated by processing fluency. More importantly, the results from Study 2 point toward an empirical connection between processing fluency and the “state of flow.” Although previous studies allude to the conceptual similarities between processing fluency and the “state of flow” (i.e., Lee and Aaker 2004; Luna, Peracchio, and Juan 2002), this dissertation extends these studies by empirically demonstrating this connection. In fact, the findings suggest a chain-effect of congruency between metaphor format and processing instructions, to processing fluency, to the “state of flow,” and to attitude toward the webpage. By identifying a more precise framework that features these

important constructs, this dissertation provides intriguing insight into how academic researchers, healthcare marketers, and managers can maneuver the process-oriented mechanism to enhance message effectiveness.

One limitation of Study 2 is that the hypothesized effects on cigarette trial intention were again not supported. The reason may be that the participants were non-smokers, who had very low cigarette trial intention prior to reading the experimental stimuli; as a result, the data did not obtain sufficient variance on this construct to examine the predicted effects. A second limitation is that the congruency effects on attitude toward the webpage, smoking risk perception and cigarette trial intention were not supported in the low-imagery instructions condition. A third limitation is that while the message stimuli in Study 2 focus on firsthand smoking, there is an increasing concern regarding college students' exposure to secondhand smoke (Ridner 2006). Indeed, in a recent study (Perez 2004), young adults were reported to be at greatest risk of exposure to secondhand smoke. Specifically, the author found that at age 12, 37% of children had been exposed to secondhand smoke, and the percentage increased to 55% by age 20.

Given these limitations, Study 3a seeks to address these issues and introduces another important boundary factor – temporal orientation for metaphor format effects. Temporal orientation was selected due to its close associations with health related behaviors (Harwood 1981; Zimbardo, Keough, and Boyd 1997; Aspinwall 2005; Orbell and Hagger 2006). Specifically, Study 3a investigates congruency between

metaphor format and temporal orientation priming. The message stimuli in Study 3a were devoted to the danger of secondhand smoke. Bearing these general purposes in mind, the following chapter begins by reviewing the relevant literature and discussing the theoretical development of the hypotheses to be tested in Study 3a.

Table 2 Descriptive Statistics of Dependent Variables (Study 2)

Dependent Variable	Processing Instructions	Metaphor Format	Mean	SD	N
Attitude toward the Webpage	Low-Imager Instructions	Abstract Metaphor	3.78	1.30	25
		Concrete Metaphor	3.71	1.25	29
	High-Imagery Instructions	Abstract Metaphor	3.24	.99	21
		Concrete Metaphor	4.22	.94	21
Smoking Risk Perception	Low-Imager Instructions	Abstract Metaphor	6.37	.63	25
		Concrete Metaphor	6.00	1.48	29
	High-Imagery Instructions	Abstract Metaphor	5.76	1.73	21
		Concrete Metaphor	6.48	.70	21
Cigarette Trial Intention	Low-Imager Instructions	Abstract Metaphor	1.96	1.58	25
		Concrete Metaphor	2.10	1.80	29
	High-Imagery Instructions	Abstract Metaphor	1.80	1.67	21
		Concrete Metaphor	1.85	1.69	21
The "State of Flow"	Low-Imager Instructions	Abstract Metaphor	3.36	1.80	25
		Concrete Metaphor	2.47	1.48	29
	High-Imagery Instructions	Abstract Metaphor	1.81	.83	21
		Concrete Metaphor	3.40	1.59	21
Processing Fluency	Low-Imager Instructions	Abstract Metaphor	6.39	.62	25
		Concrete Metaphor	5.78	1.13	29
	High-Imagery Instructions	Abstract Metaphor	5.43	1.45	21
		Concrete Metaphor	6.15	.81	21

Table 3 Results of Mediation Analyses - Processing Fluency as the Mediator (Study 2)

Outcome	Equation Number	Dependent Variable	Independent Variable	Standardized Coefficient	t-value	Conclusion
Attitude toward the Webpage	1	Processing Fluency	Metaphor Format X Processing Instructions	.30	3.06**	Full Mediation
	2	Attitude toward the Webpage	Metaphor Format X Processing Instructions	.20	1.97*	
	3	Attitude toward the Webpage	Metaphor Format X Processing Instructions	.14	1.32	
			Processing Fluency	.21	1.96*	
Smoking Risk Perception	1	Processing Fluency	Metaphor Format X Processing Instructions	.30	3.06**	No Mediation
	2	Smoking Risk Perception	Metaphor Format X Processing Instructions	.21	2.08*	
	3	Smoking Risk Perception	Metaphor Format X Processing Instructions	.25	2.32*	
			Processing Fluency	-.12	-1.10	
The "State of Flow"	1	Processing Fluency	Metaphor Format X Processing Instructions	.30	3.06**	No Mediation
	2	The "State of Flow"	Metaphor Format X Processing Instructions	.38	3.92***	
	3	The "State of Flow"	Metaphor Format X Processing Instructions	.32	3.22**	
			Processing Fluency	.19	1.88	

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Table 4 Results of Mediation Analyses -The “State of Flow” and Processing Fluency as Chain-Mediators (Study 2)

Outcome	Equation Number	Dependent Variable	Independent Variable	Standardized Coefficient	t-value	Conclusion
Attitude toward the Webpage	1	Processing Fluency	Metaphor Format X Processing Instructions	.30	3.06**	Chain-effect occurs.
		The “State of Flow”	Processing Fluency	.28	1.97*	
	2	Attitude toward the Webpage	Metaphor Format X Processing Instructions	.20	2.85**	
		Attitude toward the Webpage	Metaphor Format X Processing Instructions	-.02	-.232	
	3	Attitude toward the Webpage	Processing Fluency	.11	1.18	
			The “State of Flow”	.50	5.19***	
Smoking Risk Perception	1	Processing Fluency	Metaphor Format X Processing Instructions	.30	3.06**	No chain-effect occurs.
		The “State of Flow”	Processing Fluency	.28	2.85**	
	2	Smoking Risk Perception	Metaphor Format X Processing Instructions	.21	2.08*	
		Smoking Risk Perception	Metaphor Format X Processing Instructions	.20	1.76	
	3	Smoking Risk Perception	Processing Fluency	-.15	-1.36	
			The “State of Flow”	.16	1.43	

* p ≤ .05, ** p ≤ .01, *** p ≤ .001.

CHAPTER 5 METAPHORS AND TEMPORAL ORIENTATION

5.1 Temporal Orientation

Temporal orientation is conceptualized as the relative significance individuals attach to the immediate future (short-term) or the distant future (long-term) (Bergadaa 1990; Cottle 1976; Jones 1988; Cotte, Ratneshwar, and Mick 2004). Prior research suggests that individuals who are long-term oriented are more motivated to act in ways to achieve desired future goals. Long-term oriented individuals actively seek opportunities for self improvement (Bergadaa 1990). A long-term orientation, for instance, may be exemplified by a tendency to set goals and chart plans to meet them (Jones 1994). In contrast, individuals who are short-term oriented focus on the present and near future and the pursuit of immediate gains and returns. Short-term oriented individuals react to a situation only if and when it occurs (Brown and Segal 1996). A short-term orientation may be exemplified by a tendency to behave spontaneously (Jones 1994).

An individual's temporal orientation is related to one's life experiences such as gender, social class and cultural background (Cottle 1976; Bergadaa 1990; Jones 1988). For example, Cottle (1976) documented evidence suggesting that men tend to be more long-term oriented while women tend to be more short-term oriented. Bergadaa (1990) reported that people in poverty tended to have a short-term orientation. Similarly, there has been evidence suggesting that lower-class and less

educated individuals are more short-term oriented than other groups (Leshan 1952; Bergadaa 1990). Further, Jones (1988) contends that an important reason underlying these distinct temporal orientations is one's cultural background (Jones 1988). Indeed, Cottle (1976) suggests that culture can be categorized based on the relative emphasis placed on short-term and long-term. The influence of culture on time orientation is important because "... perception of time is a part of an individual's culture and... it has an important influence on the individual's world view and subsequent behavior" (Graham 1981, p. 338). It is with these stimulating insights that Hofstede (1991) proposes a cultural dimension on time orientation. This dimension originated from the work of Michael Bond's study of Chinese culture (1987) and was first named Confucian Dynamic, and was later renamed by Hofstede as long-term *versus* short-term orientation. As such, the research on culture mirrors and supports the conceptualization of temporal orientation.

Extant research findings from healthcare and non-healthcare contexts suggest that an individual's temporal orientation has a profound impact on one's beliefs and tendency to engage in particular courses of action (e.g., Graham 1981; Bergadaa 1990; Harwood 1981; Zimbardo, Keough, and Boyd 1997; Aspinwall 2005; Orbell and Hagger 2006). First, temporal orientation and its relationship to consumption have been important themes for consumer research literature (e.g., Cotte and Ratneshwar 1998; Cotte, Ratneshwar, and Mick 2004; Bergadaa 1990; Walsh 1995; Mendoza and Pracejus 1997; Orbell and Hagger 2006; Strathman et al. 1994). Scholarly

investigations have examined the effects of temporal orientation under a variety of consumption contexts, ranging from consumption patterns and product preference (Bergadaa 1990), higher-order consumption decisions such as savings and spending (Walsh 1995) and credit card misuse (Mendoza and Pracejus 1997), to effectiveness of persuasive communications (Orbell and Hagger 2006; Strathman et al. 1994).

Second, temporal orientation appears to have obvious implications for health-related behaviors. Indeed, an increasing body of literature has examined the connection between temporal orientation and health risk perceptions and behavioral changes. For example, extant research shows that long-term oriented people are more likely to engage in health promoting behaviors (e. g., exercising, and practicing safe sex) than those who are more short-term oriented (Harwood 1981; Zimbardo, Keough, and Boyd 1997; Aspinwall 2005; Orbell and Hagger 2006). Further, temporal orientation has been found to moderate the persuasive effect of time-framed healthcare messages that emphasize either positive or negative consequences (Strathman et al. 1994; Orbell and Hagger 2006). Thus, temporal orientation is an important construct to study, both for those attempting to understand the fundamentals of consumer behavior and for those striving to enhance healthcare message persuasiveness.

Traditionally, temporal orientation has been operationalized using an individual difference measure, yet recent theoretical development suggests the possibility of temporarily activating a particular temporal orientation using priming techniques. For example, Cotte and Ratneshwar (1998) suggested that even though

some individuals tend to be more long-term oriented, whereas others may be more short-term oriented, both temporal orientations usually coexist within one individual. Supporting this argument, others have argued that all humans must be at least partially long-term oriented to accomplish any behavior at all (Raynor and Entin 1983). Temporal orientation simply helps to distinguish whether an individual typically looks at the here and now, or at what is yet to unfold (Cottle 1976). Such a chronically stable temporal orientation, however, can be boosted or suppressed using situational priming techniques (Higgins and King 1981; Wyer and Srull 1981). Along the same lines, prior research has suggested that different aspects of the self coexist, and a certain aspect of the self may be activated by a social situation at a given time, made salient through the use of contextual cues (Markus and Kunda 1986; Brewer and Gardner 1996; Aaker 1999; Mandel 2003; Zhang and Mittal 2007; Lee, Aaker, and Gardner 2000; Agrawal and Maheswaran 2005). Thus, this dissertation operationalizes temporal orientation using situational priming techniques.

To connect temporal orientation to the topic of this dissertation (i.e., metaphors), a crucial step is to draw a linkage between temporal orientation and metaphor format (i.e., abstract *versus* concrete metaphors). To examine this possibility, the key question is how the two types of metaphors may alter an individual's perceived temporal distance (long-term *versus* short-term) of the events described in the message. To answer this question, the following section continues by discussing temporal construal theory (Trope and Liberman 2003).

5.2 The Effect of Metaphor Format on Perceived Temporal Distance

According to the Temporal Construal Theory (Trope and Liberman 2003), people construct different representations of the same information depending on whether the information pertains to the near or distant future. In particular, Trope and Liberman proposes that individuals use abstract mental models to represent information about the distant future. These abstract mental models consist of general, superordinate, decontextual, and essential features of events. In contrast, individuals use concrete mental models to present information from the near future. Such concrete mental models tend to include detailed, subordinate, contextual, and incidental features of events. Supporting this proposition, Kardes, Cronley, and Kim (2006) found that the mere presence of a set of target brands encourages individuals to present the brand using concrete mental models, which in turn affects spontaneous preference formation, preference-behavior consistency and product category-identification latency. Based upon the same premise, Trope and Liberman (2003) contend that the reverse causal path of the above model should also hold. That is, information presented in abstract terms (e.g., abstract metaphors) will make an individual envision the action in the distant future, while information presented in concrete terms (e.g., concrete metaphors) will make an individual picture the action in the near future (Trope and Liberman 2003).

Moreover, the information processing mechanisms of abstract *versus* concrete metaphors lend further support to the same argument. As demonstrated in Study 1,

abstract metaphors induce low-imagery processing, whereas concrete metaphors activate high-imagery processing. Compared with low-imagery processing, high-imagery processing often activates a sensory experience, which may include smell, taste, sight, sound and touch (Richardson 1983) and usually involves a direct recovery of past experiences in the working memory (MacInnis and Price 1987). One may expect that mentally visualizing the event in the working memory during high-imagery processing should reduce the perceived temporal distance of the event. Indeed, Carroll (1978) found that when directing individuals to imagine the outcome of an event, they tended to perceive a higher likelihood of the event actually happening than those who were not asked to imagine the event. Similarly, Sherman et al. (1985) showed that exposure to easy-to-imagine symptoms of a disease increased individuals' perceived likelihood of contracting the disease than exposure to nebulous, difficult-to-imagine symptoms. Although these studies examined the likelihood rather than the expected temporal distance of events, it would be plausible to argue that a similar mechanism underlies judgments of temporal distance. That is, high-imagery processing may prompt estimates of closer temporal proximity than low-imagery processing of the same message. Taken together, it can be expected that concrete metaphors (abstract metaphors) may stimulate a reduction (an increase) in the perceived temporal distance of events described in the message. Detailed hypotheses will follow after revisiting processing fluency theory.

5.3 Processing Fluency Theory

As noted earlier, processing fluency is defined as the experienced ease or fluency of ongoing processing (Jacoby, Kelley, and Dywan 1989; Whittlesea 1993; Unkelbach 2007). In Study 2, it was demonstrated that processing fluency would result from congruency between 1) the information and organization of information (i.e., abstract *versus* concrete metaphors), and 2) the type of processing being done (i.e., low- *versus* high-imagery processing). Processing fluency may be induced by a variety of stimuli. For instance, a regulatory fit between an individual's regulatory orientation (e.g., promotion *versus* prevention) and information will lead to more fluent processing of the message, which in turn accounts for the persuasion effects (Lee and Aaker 2004). Supporting this argument, a burgeoning literature has demonstrated the effect of regulatory fit on consumer decision making (e.g., Avnet and Higgins 2003; Zhang and Mittal 2007) and message persuasion (e.g., Lee, Aaker, and Gardner 2000; Lee and Aaker 2004; Pham and Avet 2004). However, these studies usually operationalized regulatory orientation as promotion *versus* prevention strategies. Yet, regulatory orientation, as the basic principle underlying distinct self-regulatory strategies and needs (Higgins 1997), may refer to any goal-related psychological orientation (Aaker and Lee 2006). For example, it may involve either long-term regulatory goals (e.g., family security) or short-term regulatory goals (e.g., winning a ball game or climbing a mountain; Aaker and Lee 2006). Responding to repeated calls for broadening the scope of regulatory orientation (Aaker and Lee

2006), this dissertation examines the regulatory orientation that is focused on the *long-term*, the pursuit of distant rewards and achievement, or alternatively focused on the *short-term*, the pursuit of immediate gains and returns. Following the regulatory fit hypothesis, one may expect that when there is congruency between an individual's regulatory orientation (e.g., long-term *versus* short-term) and communication message (e.g., abstract *versus* concrete metaphors), the ideas conveyed in the message are conceptually more fluent, and hence are more effective.

The first mechanism that may help explain the congruency effect on message effectiveness (e.g., consumer judgments) is related to an "it-just-feels-right" experience proposed by Higgins et al. (2003). An "it-just-feels-right" experience may occur when an individual becomes entirely absorbed in specific tasks that work toward a designated goal (either long-term or short term). Such an experience may occur when an individual receives information or feedback that enables one to progress toward achieving that goal. Consistent with this premise, Higgins and colleagues (2003) suggest that people "feel right" when the information they receive fits with their regulatory orientation. Further, this perception of feeling right can be transferred to the message argument as the result of source confusion (Camacho, Higgins, and Luger 2003; Higgins et al. 2003), and in turn leads to more favorable attitude toward the message and enhanced risk perception.

A second mechanism, by which congruency between regulatory orientation and communication message may lead to greater message effectiveness (e.g.,

behavioral intention), is related to an increase in perceived control over the future behavioral change as a result of processing fluency (Aaker and Lee 2006). Most healthcare messages encourage behavioral changes that require significant willpower (e.g., quitting smoking, avoiding secondhand smoke, or exercising). For the individuals who experience such congruency, those behaviors will seem easier to master. That is, congruency between regulatory orientation (long-term *versus* short-term) and the message correlates with increased confidence and motivation in accomplishing these behavioral goals (Aaker and Lee 2006).

The two mechanisms illustrated above mirror the conceptualization of the “state of flow.” The “state of flow” is defined as an intrinsic fulfilling experience, in which there is a balance between an individual’s skills and challenges at hand, as such one is totally captivated by the ongoing activity (Csikszentmihalyi 2000). The intrinsic fulfilling “state of flow” is conceptually similar to the regulatory fit experience of “it just feel right” (Aaker and Lee 2006; Higgins et al. 2003).

Investigations of regulation fit suggest that due to regulatory fit, every piece of information that an individual receives tends to support and sustain one’s goal, as a result, it leads to increased control over the situation (Aaker and Lee 2006), which reflects a balance between challenge and skills that characterizes the “state of flow.” In short, there is strong conceptual connection between regulatory fit and the “state of flow.”

As noted earlier, abstract (concrete) metaphors may stimulate larger (smaller) temporal distance of events described in the message. In addition, a regulatory fit between temporal orientation (long-term *versus* short-term) and communication message (i.e., abstract *versus* concrete metaphors) will lead to higher processing fluency, and thereafter enhanced message effectiveness and a more intense “state of flow.” Therefore, formally, I hypothesize that:

H9: When long-term temporal orientation is primed, abstract metaphors (versus concrete metaphors) will result in more positive attitude toward the webpage, increased secondhand smoke risk perception and higher intention to avoid secondhand smoke.

H10: When short-term temporal orientation is primed, concrete metaphors (versus abstract metaphors) will result in more positive attitude toward the webpage, increased secondhand smoke risk perception and higher intention to avoid secondhand smoke.

H11: Processing fluency will mediate the effects of congruency between metaphor format and temporal orientation priming on attitude toward the webpage, secondhand smoke risk perception and intention to avoid secondhand smoke.

H12: When long-term temporal orientation is primed, abstract metaphors (versus concrete metaphors) will result in a more intense “state of flow.”

H13: When short-term temporal orientation is primed, concrete metaphors (versus abstract metaphors) will result in a more intense “state of flow.”

H14: Processing fluency will mediate the effect of congruency between metaphor format and temporal orientation priming on the intensity of the “state of flow.”

5.4 Study 3a

5.4.1 Overview

The purpose of Study 3a was to investigate the positive effect of congruency between metaphor format and temporal orientation priming on attitude toward the webpage, secondhand smoke risk perception, intention to avoid secondhand smoke and the “state of flow.” Given this purpose, Study 3a featured a 2 X 2 factorial design. Two treatment factors, metaphor format (abstract *versus* concrete metaphors) and temporal orientation priming (long-term *versus* short-term priming), were manipulated.

In Study 3, 118 undergraduate business students from a major American university participated in the experiment. Participants were screened to exclude regular smokers, which resulted in a sample of 111 subjects (male = 42%; nonsmokers = 83%; occasional smokers = 17%).

5.4.2 Stimuli and Procedures

The manipulation of metaphor format was carried out by a hypothetical anti-smoking webpage. In Study 3a, both message headlines and contents were used as part of the metaphor format manipulation. For example, in the abstract metaphor condition, the message read:

TOBACCO COMPANIES SELL HEALTH RISKS

Every time people smoke a cigarette, they spread health risks to those close to them. Every time people breathe next to smokers, they inhale health risks. Secondhand smoke kills. It's only a matter of time... Remember, tobacco companies sell health risks.

In the concrete metaphor condition, the phrase - "health risks" was replaced by "time bombs," and the rest of the message remained very similar (see Figure 10).

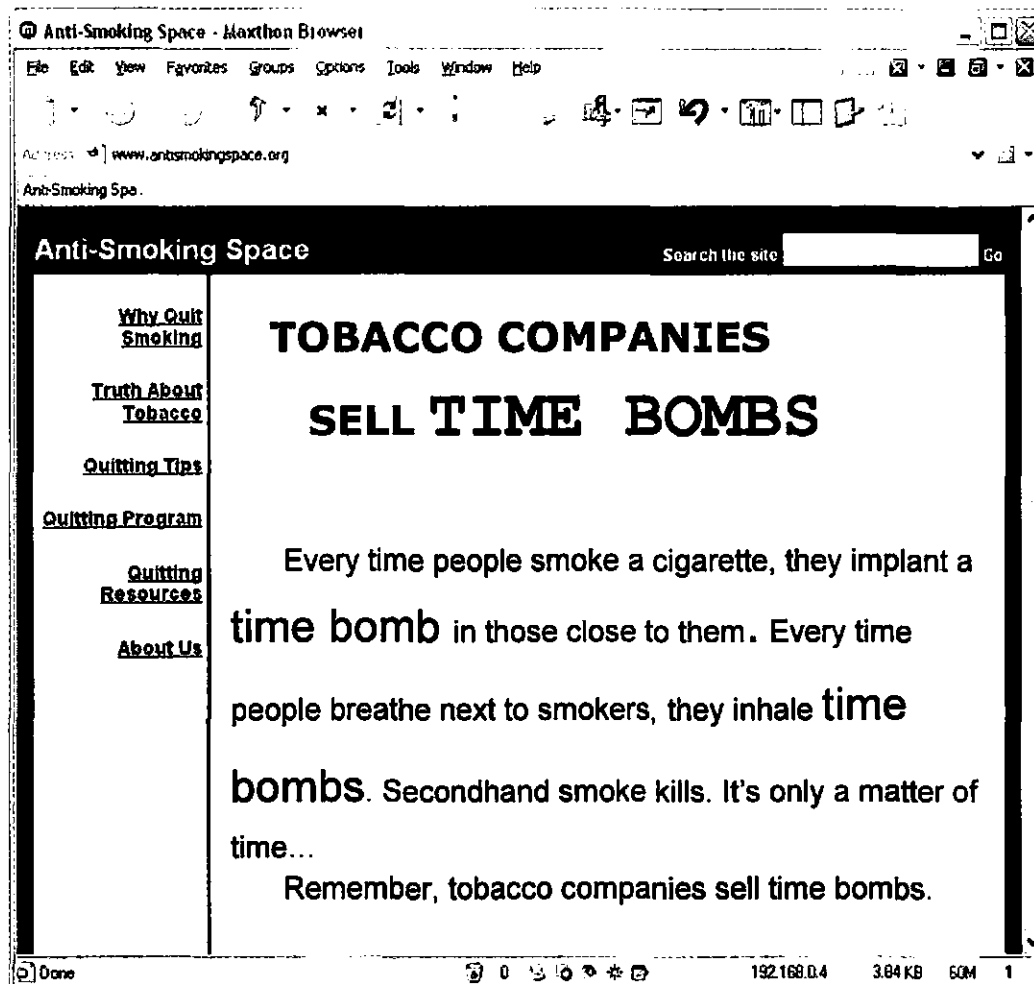
The second between-subjects factor was temporal orientation priming. Similar to prior research (Liu and Aaker 2007; Pennington, Aaker, and Mogilner 2007), this manipulation was carried out by asking participants to envision their life in the near or distant future. In Study 3a, half of the participants received the following instructions to prime the long-term orientation:

In this study, we are interested in people's long-term projection for themselves. Please think about what your life might be like 50 years from now. Then in the box below, please write a brief description of how you envision your life in 50 years (e.g., what might you be like; what might you be doing, etc.). Please note that there are no right or wrong answers here. Please provide honest and sincere answers.

The other half of the participants received the following instructions to prime the short-term orientation:

In this study, we are interested in people's short-term projection for themselves. Please think about what your life might be like next week. Then in the box below, please write a brief description of how you envision your life in the next week (e.g., what might you be like; what might you be doing etc.). Please note that there are no right or wrong answers here. Please provide honest and sincere answers.

Figure 10 Example of Stimuli: Concrete Metaphor (Study 3a)



The procedure of Study 3a was similar to that of Study 1 and of Study 2. The measures for attitude toward the webpage and smoking risk perception from Study 1 and 2 were adapted to secondhand smoke context. Intention to avoid secondhand smoke was measured by six items that gauged the participants' intention to avoid secondhand smoking in the near and distant future. All the other measures were the same as Study 2. All measures employed seven-point scales. Scale reliabilities ranged from .70 to .94. The items were averaged to obtain composite scores for the main constructs (see Appendix A).

5.4.3 Results

Manipulation Checks. First, the effectiveness of metaphor format manipulation was examined. As desired, the webpage containing a concrete metaphor was rated to be significantly more vivid than the webpage with an abstract metaphor ($M_{\text{AbstractMetaphor}} = 4.05$ and $M_{\text{ConcreteMetaphor}} = 4.65$, $t(109) = -2.25$, $p < .03$). Then, the subjects' recall of the webpage information was coded by two independent judges who were blind to the manipulation (inter-coder reliability = .94). Analysis of these data showed that in the abstract metaphor condition, 69% of the participants correctly recalled that the message contained "health risks," while in the concrete metaphor condition, 89% of the participants correctly recalled that the message contained "time bombs." Therefore, the metaphor format manipulation was successful.

Second, to examine the manipulation of temporal orientation priming, the participants were asked to recall the exercise that they had completed prior to reading the webpage. As desired, the participants in the long-term priming condition were more likely to recall that they were asked to describe their life in 50 years ($M_{\text{LongTerm}} = 6.72$ and $M_{\text{ShortTerm}} = 1.67$, $t(109) = 21.35$, $p < .001$). The participants in the short-term priming condition were more likely to recall that they were told to envision their life this week ($M_{\text{LongTerm}} = 2.09$ and $M_{\text{ShortTerm}} = 4.04$, $t(109) = -4.40$, $p < .001$). As such, the temporal orientation priming manipulation was also successful.

Dependent Measures. To test H9-H14, a 2 metaphor format (abstract *versus* concrete metaphors) X 2 temporal orientation priming (long-term *versus* short-term priming) full-factorial MANOVA was conducted on attitude toward the webpage, secondhand smoke risk perception, intention to avoid secondhand smoke and the “state of flow.” Multivariate analysis revealed that a two-way interaction effect involving metaphor format and temporal orientation priming was significant (Wilks’ λ : $F(4, 104) = 6.89$, $p < .001$). No other multivariate effect was significant. Further univariate analyses showed that the interaction effect between metaphor format and temporal orientation priming was significant for all four dependent measures ($p < .05$). Further planned contrasts were then undertaken to examine H9-H14. Figure 11-14 provide visual display of these significant interaction effects. The treatment means are reported in Table 5.

Figure 11 Metaphor Format and Temporal Orientation Priming Interaction on Attitude toward the Webpage (Study 3a)

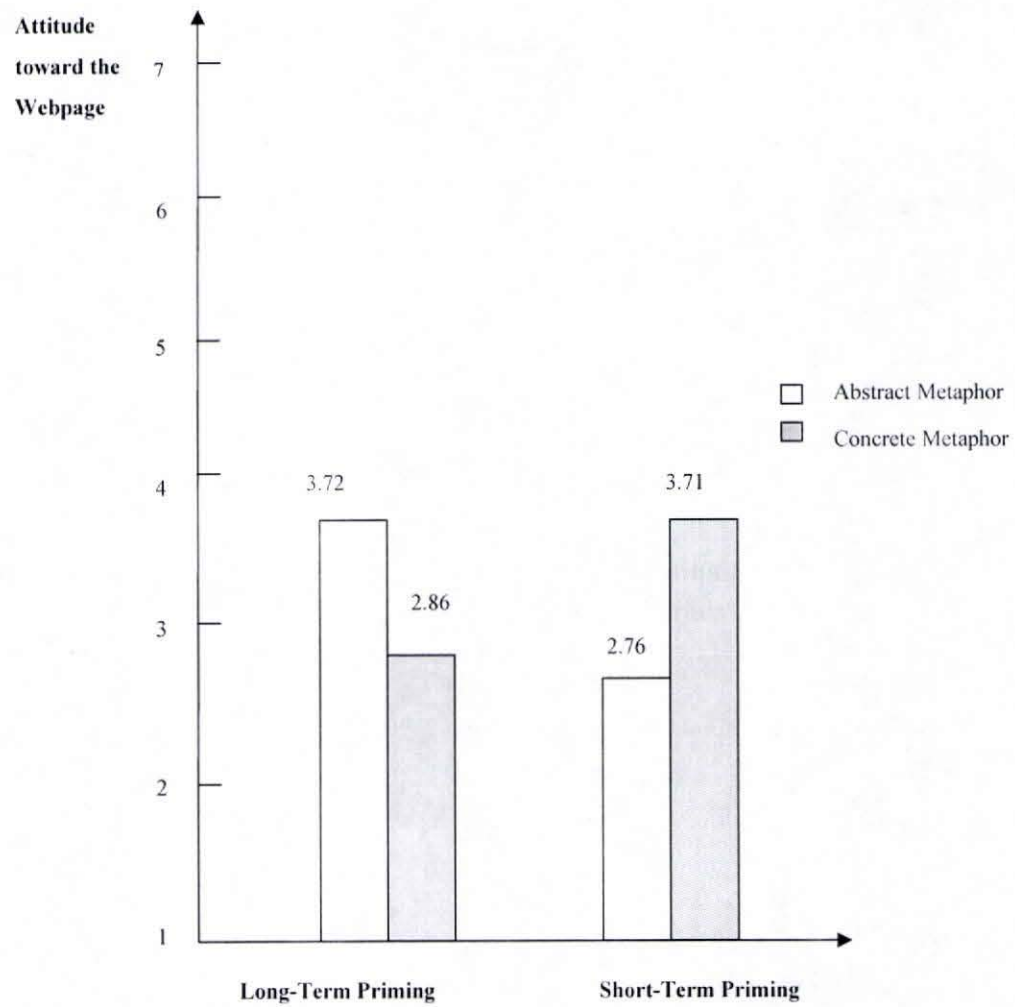


Figure 12 Metaphor Format and Temporal Orientation Priming Interaction on Secondhand Smoke Risk Perception (Study 3a)

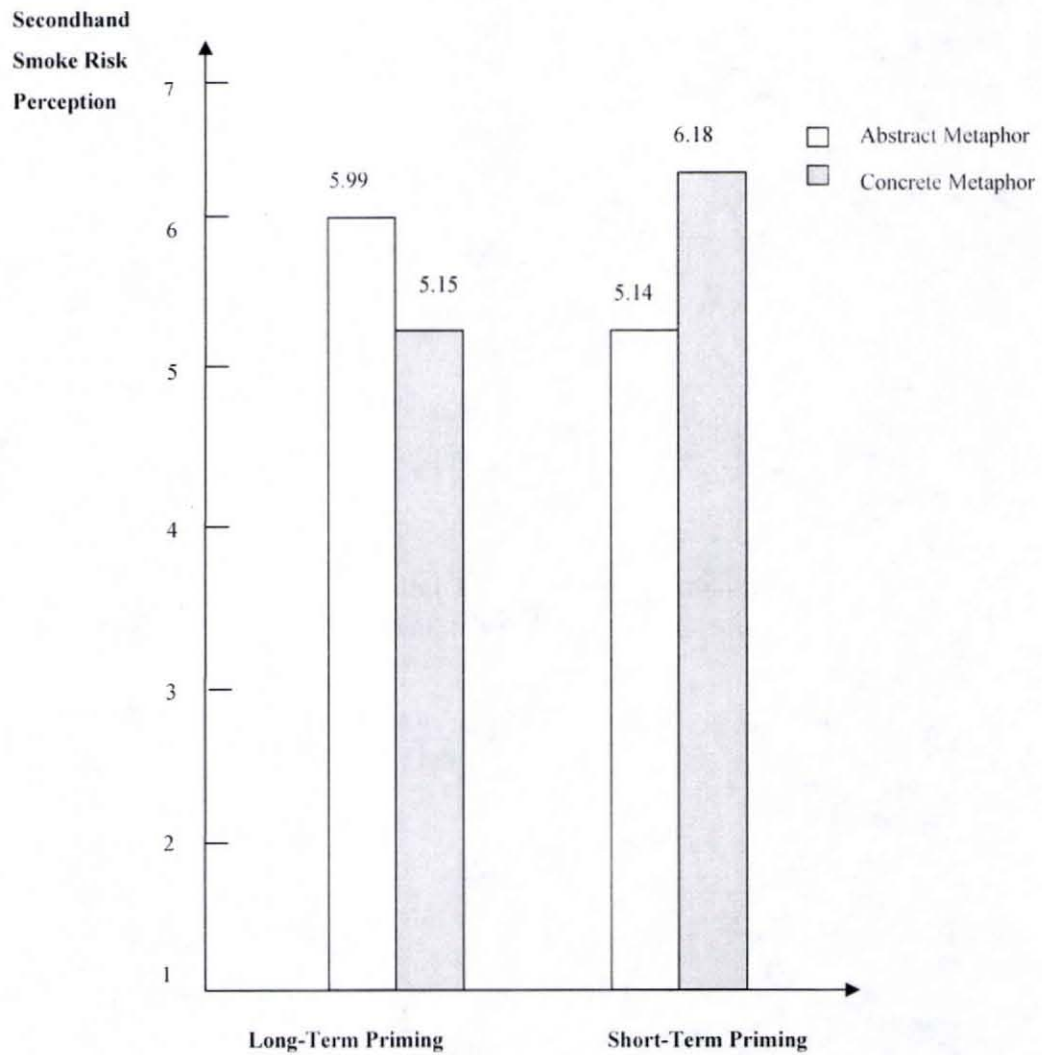


Figure 13 Metaphor Format and Temporal Orientation Priming Interaction on Intention to Avoid Secondhand Smoke (Study 3a)

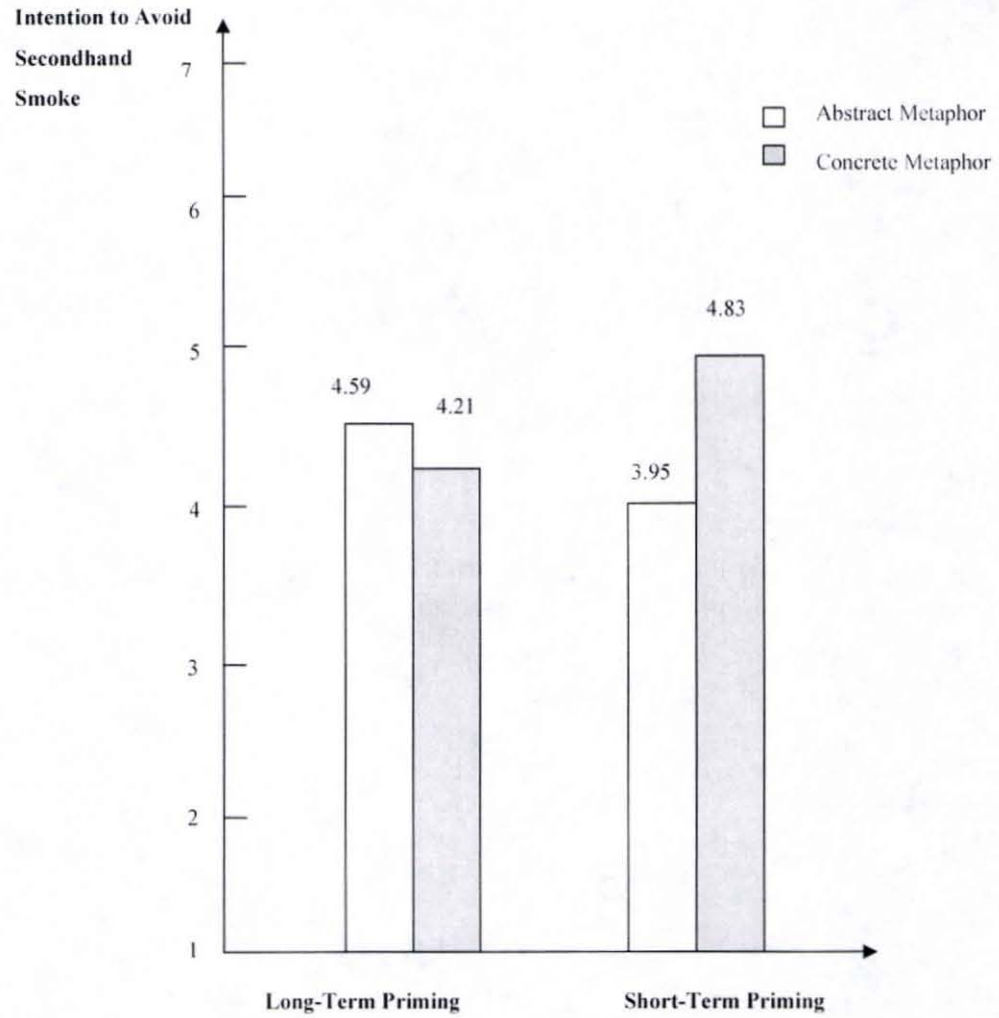
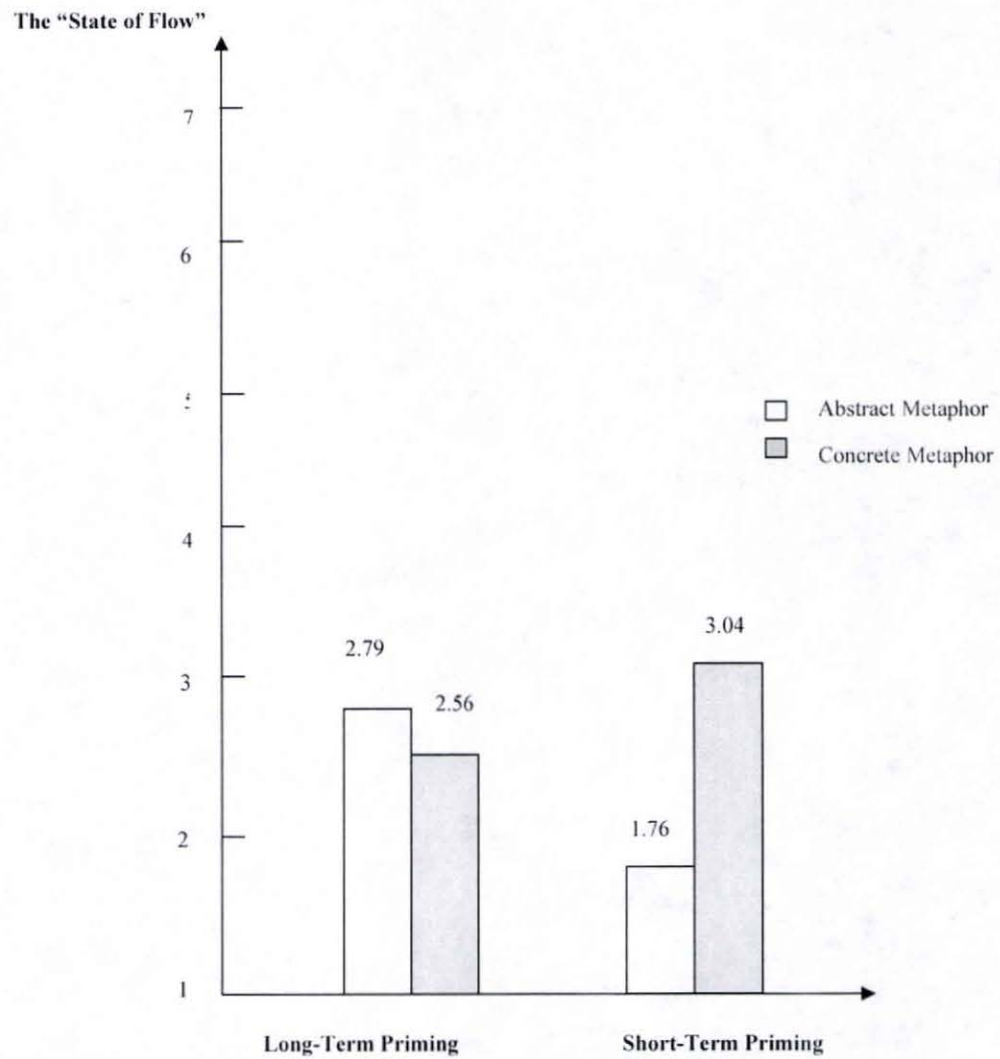


Figure 14 Metaphor Format and Temporal Orientation Priming Interaction on the “State of Flow” (Study 3a)



H9 predicted that when the long-term orientation was primed, abstract metaphors (*versus* concrete metaphors) would lead to more positive attitude toward the webpage, increased risk perception associated with secondhand smoke and higher intention to avoid secondhand smoke. Confirming the predictions, in the long-term priming condition, compared with concrete metaphors, abstract metaphors were associated with significantly more favorable attitude toward the webpage ($M_{\text{AbstractMetaphor}} = 3.72$ and $M_{\text{ConcreteMetaphor}} = 2.86$, $t(52) = 2.57$, $p < .02$) and significantly stronger beliefs about risks associated with secondhand smoke ($M_{\text{AbstractMetaphor}} = 5.99$ and $M_{\text{ConcreteMetaphor}} = 5.15$, $t(52) = 2.31$, $p < .03$). However, the mean difference for intention to avoid secondhand smoke was not significant. Hence, H9 was partially supported. Contrary to H12, in the long-term priming condition, the mean difference between abstract *versus* concrete metaphors was not significant on the “state of flow.” Hence, H12 was not supported.

According to H10, when the short-term orientation was cued, concrete metaphors (*versus* abstract metaphors) would be associated with more positive attitudes toward the webpage, increased risk perception associated with secondhand smoke and higher intention to avoid secondhand smoke. Confirming our expectations, t-test results showed that in the short-term priming condition, compared with abstract metaphors, concrete metaphors were associated with significantly more favorable attitude toward the webpage ($M_{\text{AbstractMetaphor}} = 2.76$ and $M_{\text{ConcreteMetaphor}} = 3.71$, $t(55) = -3.06$, $p < .01$), significantly stronger beliefs about risks associated with secondhand

smoke ($M_{\text{AbstractMetaphor}} = 5.14$ and $M_{\text{ConcreteMetaphor}} = 6.18$, $t(55) = -3.08$, $p < .01$), and significantly higher intention to avoid secondhand smoke ($M_{\text{AbstractMetaphor}} = 3.95$ and $M_{\text{ConcreteMetaphor}} = 4.83$, $t(55) = -2.05$, $p < .05$). Therefore, H10 was supported. H13 posited that when the short-term orientation was cued, concrete metaphors would result in a more intense “state of flow” than abstract metaphors. As expected, the planned contrasts results showed that when the short-term orientation was made salient, compared with abstract metaphors, concrete metaphors led to significantly more intensified “state of flow” ($M_{\text{AbstractMetaphor}} = 1.76$ and $M_{\text{ConcreteMetaphor}} = 3.04$, $t(55) = -4.07$, $p < .001$). Hence, H13 was supported.

Mediation Analyses. To test H11 and H14, a series of mediation analyses were conducted to examine whether processing fluency mediates the interaction effect between metaphor format and temporal orientation priming on attitude toward the webpage, secondhand smoke risk perception, intention to avoid secondhand smoke and the “state of flow.” Following the procedure suggested by Baron and Kenny (1986), four mediation analyses were performed separately for attitude toward the webpage, secondhand smoke risk perception, intention to avoid secondhand smoke and the “state of flow.” The results of the mediation analyses are reported in Table 6.

As predicted by H11, the first mediation analysis revealed that the interaction effect of metaphor format and temporal orientation priming on attitude toward the webpage was partially mediated by processing fluency. Specifically, the interaction effect between metaphor format and temporal orientation priming was significant on

processing fluency (standardized coefficient = .40; $t(109) = 4.55$, $p < .001$). The same interaction effect was significant on attitude toward the webpage (standardized coefficient = .36; $t(109) = 4.02$, $p < .001$). Finally, when processing fluency was entered as a covariate in the second equation, the significance of the interaction effect on attitude toward the webpage was reduced ($t(108) = 2.32$, $p < .02$) and the effect of processing fluency remained significant (standardized coefficient = .37; $t(108) = 4.05$, $p < .001$). This indicated that the interaction effect between metaphor format and temporal orientation priming on attitude toward the webpage was partially mediated by processing fluency.

The second mediating analysis examined whether the interaction effect of metaphor format and temporal orientation priming on secondhand smoke risk perception was mediated by processing fluency. In particular, the interaction effect between metaphor format and temporal orientation priming was significant on processing fluency (standardized coefficient = .40; $t(109) = 4.55$, $p < .001$). The same interaction effect was significant on secondhand smoke risk perception (standardized coefficient = .34; $t(109) = 3.82$, $p < .001$). Finally, when processing fluency was entered as a covariate in the second equation, the interaction effect between metaphor format and temporal orientation priming on secondhand smoke risk perception remained significant (standardized coefficient = .30; $t(108) = 3.09$, $p < .01$), while the effect of processing fluency became non-significant ($p > .30$). This indicated that the

interaction effect between metaphor format and temporal orientation priming on secondhand smoke risk perception was not mediated by processing fluency.

The third mediation analysis revealed that the interaction effect of metaphor format and temporal orientation priming on intention to avoid secondhand smoke was fully mediated by processing fluency. Specifically, the interaction effect between metaphor format and temporal orientation priming was significant on processing fluency (standardized coefficient = .40; $t(109) = 4.55, p < .001$). The same interaction effect was significant on intention to avoid secondhand smoke (standardized coefficient = .20; $t(109) = 2.09, p < .04$). Finally, when processing fluency was entered as a covariate in the second equation, the interaction effect on intention to avoid secondhand smoke became non-significant ($p > .33$), and the effect of processing fluency remained significant (standardized coefficient = .25; $t(108) = 2.49, p < .02$). This indicated that the interaction effect between metaphor format and temporal orientation priming on intention to avoid secondhand smoke was fully mediated by processing fluency. Hence, H11 was partially supported.

The fourth mediation analysis revealed that the interaction effect of metaphor format and temporal orientation priming on the “state of flow” was fully mediated by processing fluency. Specifically, the interaction effect between metaphor format and temporal orientation priming was significant on processing fluency (standardized coefficient = .40; $t(109) = 4.55, p < .001$). The same interaction effect was significant on the “state of flow” (standardized coefficient = .28; $t(109) = 3.00, p < .01$). Finally,

when processing fluency was entered as a covariate in the second equation, the interaction effect on the “state of flow” became non-significant ($p > .06$), and the effect of processing fluency remained significant (standardized coefficient = .24; $t(108) = 2.39$, $p < .02$). This indicated that the interaction effect between metaphor format and temporal orientation priming on the “state of flow” was fully mediated by processing fluency. Hence, H14 was supported.

In Study 2, the findings suggested that processing fluency and the “state of flow” were chain-mediators of the interaction effect involving metaphor format and processing instructions on attitude towards the webpage. To further examine this chain-mediation effect, three additional mediation analyses were conducted separately on attitude towards the webpage, secondhand smoke risk perception and intention to avoid secondhand smoke using processing fluency and the “state of flow” as chain-mediators. The results of the mediation analyses were reported in Table 7. The mediation analysis revealed that the chain-effect occurred on attitude toward the webpage. In particular, analysis showed that the interaction effect between metaphor format and temporal orientation priming was significant on processing fluency (standardized coefficient = .40; $t(109) = 4.55$, $p < .001$). The effect of processing fluency on the “state of flow” was significant (standardized coefficient = .31; $t(109) = 3.38$, $p = .001$). The interaction effect was significant on attitude toward the webpage (standardized coefficient = .36; $t(109) = 4.02$, $p < .001$). Finally, when processing fluency and the “state of flow” were entered as covariates in the third

equation, the interaction effect between metaphor format and temporal orientation priming on attitude toward the webpage became non-significant ($p > .08$) and the effect of processing fluency and the “state of flow” remained significant ($p \leq .001$). This indicated that the interaction effect between metaphor format and temporal orientation priming on attitude toward the webpage was fully mediated by processing fluency and the “state of flow.” The same chain-effect was not found for secondhand smoke risk perception and intention to avoid secondhand smoke.

5.5 Conclusion

Study 3a examined the effects of congruency between metaphor format and temporal orientation priming on attitude toward the webpage, secondhand smoke risk perception, intention to avoid secondhand smoke and the “state of flow.” The results showed that when the long-term orientation was made salient, abstract metaphors (*versus* concrete metaphors) led to more positive attitude toward the webpage and increased risk perception associated with secondhand smoke. When the short-term orientation was cued, concrete metaphors (*versus* abstract metaphors) were associated with more favorable attitude toward the webpage, stronger secondhand smoke risk perception, higher intention to avoid secondhand smoke and a more intense “state of flow.” Further, processing fluency was found to mediate the congruency effects on attitude toward the webpage, intention to avoid secondhand smoke and the “state of flow,” but not on secondhand smoke risk perception. Confirming the Study 2 findings,

the results of Study 3a showed that processing fluency and the “state of flow” were chain-mediators of congruency effect on attitude toward the webpage.

These interesting findings from Study 3a have theoretical implications for several domains. In regard to metaphor format, Study 3a identifies a different contingency factor that moderates the effects of metaphor format. For example, when there is a fit between metaphor format and temporal orientation (e.g., abstract metaphor and long-term priming), the message effectiveness may be enhanced. This suggests that abstract metaphors may be more effective than concrete metaphors if an individual is long-term oriented or primed to be long-term oriented. Extending past research demonstrating that long-term orientation may positively impact pro-health beliefs and behaviors, the present findings showed such effects may be further enhanced by combining the long-term orientation with abstract metaphors.

The Study 3a results also extend the exiting research on regulatory fit. Regulatory fit is an important, yet nascent area of research in the marketing arena. Despite repeated calls to broaden the scope of regulatory fit, prior research within this domain has focused on promotion *versus* prevention regulatory orientation (Avnet and Higgins 2003; Zhang and Mittal 2007; Lee, Aaker, and Gardner 2000; Lee and Aaker 2004; Pham and Avet 2004). This dissertation contributes to this body of knowledge by expanding the concept of regulatory fit and suggesting a more parsimonious account for its effects. In particular, the findings suggested that the analogy of regulatory fit may apply to long-term *versus* short-term regulatory orientation. In

addition, this dissertation is an initial attempt to test the empirical linkage between regulatory fit, processing fluency and the “state of flow.”

In sum, Study 3a revealed the positive effects of congruency between metaphor format (i.e., abstract *versus* concrete metaphors) and temporal orientation priming (i.e., long-term *versus* short-term priming) on risk perception and behavioral intention. These findings point toward two potentially interesting questions: 1) What is the effect of congruency on behavioral persistence? 2) What is the persistence of these positive congruency effects? First, as many health-related behaviors require persistence (e.g., quit smoking), behavioral persistence appears to be an important measure to gauge the effectiveness of healthcare messages. Second, as there is often a delay between message exposure and possible compliance behavior, more persistent and persuasive effects should indicate a greater probability of actual behavioral change. Therefore, examining the persistence of the congruency effects holds managerial significance. Given this, Study 3b was designed to investigate: 1) the congruency effects on behavioral persistence, and 2) the persistence of the congruency effects. Bearing these general purposes in mind, the following chapter begins by reviewing the relevant literature and discussing the theoretical development of the hypotheses to be tested in Study 3b.

Table 5 Descriptive Statistics of Dependent Variables (Study 3a)

Dependent Variable	Temporal Orientation Priming	Metaphor Format	Mean	SD	N
Attitude toward the Webpage	Long-Term Priming	Abstract Metaphor	3.72	1.29	29
		Concrete Metaphor	2.86	1.16	25
	Short-Term Priming	Abstract Metaphor	2.76	1.04	29
		Concrete Metaphor	3.71	1.29	28
Secondhand Smoke Risk Perception	Long-Term Priming	Abstract Metaphor	5.99	1.50	29
		Concrete Metaphor	5.15	1.12	25
	Short-Term Priming	Abstract Metaphor	5.14	1.03	29
		Concrete Metaphor	6.18	1.48	28
Intention to Avoid Secondhand Smoke	Long-Term Priming	Abstract Metaphor	4.59	1.72	29
		Concrete Metaphor	4.21	1.51	25
	Short-Term Priming	Abstract Metaphor	3.95	1.64	29
		Concrete Metaphor	4.83	1.59	28
The "State of Flow"	Long-Term Priming	Abstract Metaphor	2.79	1.64	29
		Concrete Metaphor	2.56	1.34	25
	Short-Term Priming	Abstract Metaphor	1.76	1.07	29
		Concrete Metaphor	3.04	1.29	28
Processing Fluency	Long-Term Priming	Abstract Metaphor	5.78	1.30	29
		Concrete Metaphor	5.16	1.12	25
	Short-Term Priming	Abstract Metaphor	4.93	1.21	29
		Concrete Metaphor	6.31	.97	28

Table 6 Results of Mediation Analyses - Processing Fluency as the Mediator (Study 3a)

Outcome	Equation Number	Dependent Variable	Independent Variable	Standardized Coefficient	t-value	Conclusion
Attitude toward the Webpage	1	Processing Fluency	Metaphor Format X Temporal Orientation Priming	.40	4.55***	Partial Mediation
	2	Attitude toward the Webpage	Metaphor Format X Temporal Orientation Priming	.36	4.02***	
	3	Attitude toward the Webpage	Metaphor Format X Temporal Orientation Priming	.21	2.32*	
			Processing Fluency	.37	4.05***	
Secondhand Smoke Risk Perception	1	Processing Fluency	Metaphor Format X Temporal Orientation Priming	.40	4.55***	No Mediation
	2	Secondhand Smoke Risk Perception	Metaphor Format X Temporal Orientation Priming	.34	3.82***	
	3	Secondhand Smoke Risk Perception	Metaphor Format X Temporal Orientation Priming	.30	3.09**	
			Processing Fluency	.10	1.03	

* p <= .05, ** p <= .01, *** p <= .001.

Table 6 Results of Mediation Analyses - Processing Fluency as the Mediator (Study 3a) - Continued

Outcome	Equation Number	Dependent Variable	Independent Variable	Standardized Coefficient	t-value	Conclusion
Intention to Avoid Secondhand Smoke	1	Processing Fluency	Metaphor Format X Temporal Orientation Priming	.40	4.55***	Full Mediation
	2	Intention to Avoid Secondhand Smoke	Metaphor Format X Temporal Orientation Priming	.20	2.09*	
	3	Intention to Avoid Secondhand Smoke	Metaphor Format X Temporal Orientation Priming	.10	.97	
			Processing Fluency	.25	2.49*	
The "State of Flow"	1	Processing Fluency	Metaphor Format X Temporal Orientation Priming	.40	4.55***	Full Mediation
	2	The "State of Flow"	Metaphor Format X Temporal Orientation Priming	.28	3.00**	
	3	The "State of Flow"	Metaphor Format X Temporal Orientation Priming	.18	1.85	
			Processing Fluency	.24	2.39*	

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Table 7 Results of Mediation analyses - The “State of Flow” and Processing Fluency as Chain-Mediators (Study 3a)

Outcome	Equation Number	Dependent Variable	Independent Variable	Standardized Coefficient	t-value	Conclusion
Attitude toward the Webpage	1	Processing Fluency	Metaphor Format X Temporal Orientation Priming	.40	4.55***	Chain-effect occurs.
		The “State of Flow”	Processing Fluency	.31	3.38 ***	
	2	Attitude toward the Webpage	Metaphor Format X Temporal Orientation Priming	.36	4.02***	
		Attitude toward the Webpage	Metaphor Format X Temporal Orientation Priming	.15	1.73	
	3	Attitude toward the Webpage	Processing Fluency	.29	3.31***	
		Attitude toward the Webpage	The “State of Flow”	.34	4.08***	
Secondhand Smoke Risk Perception	1	Processing Fluency	Metaphor Format X Temporal Orientation Priming	.40	4.55***	No chain-effect occurs.
		The “State of Flow”	Processing Fluency	.31	3.38***	
	2	Secondhand Smoke Risk Perception	Metaphor Format X Temporal Orientation Priming	.34	3.82***	
		Secondhand Smoke Risk Perception	Metaphor Format X Temporal Orientation Priming	.31	3.09**	
	3	Secondhand Smoke Risk Perception	Processing Fluency	.11	1.07	
		Secondhand Smoke Risk Perception	The “State of Flow”	-.03	-.32	

* p <= .05, ** p <= .01, *** p <= .001.

Table 7 Results of Mediation analyses - The “State of Flow” and Processing Fluency as Chain-Mediators (Study 3a) - Continued

Outcome	Equation Number	Dependent Variable	Independent Variable	Standardized Coefficient	t-value	Conclusion
Intention to Avoid Secondhand Smoke	1	Processing Fluency	Metaphor Format X Temporal Orientation Priming	.40	4.55***	No chain-effect occurs.
		The “State of Flow”	Processing Fluency	.31	3.38***	
	2	Intention to Avoid Secondhand Smoke	Metaphor Format X Temporal Orientation Priming	.20	2.09*	
		Intention to Avoid Secondhand Smoke	Metaphor Format X Temporal Orientation Priming	.08	.77	
	3	Intention to Avoid Secondhand Smoke	Processing Fluency	.23	2.19*	
			The “State of Flow”	.10	1.07	

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

CHAPTER 6 PERSISTENCE MATTERS!

6.1 The Effect of Congruency on Behavioral Persistence

Initiating a behavioral change may or may not lead to goal attainment. It is also important to be persistent in enacting the chosen plan so as to attain the goal (Tam 2005). Behavioral persistence is defined as continuing to pursue a target goal despite obstacles that may arise (Bargh et al. 2001; Hall 2007). Behavioral persistence is particularly important in attaining health-related goals, which often require significant willpower. For example, according to the Federal Centers for Disease Control and Prevention, about 40 percent of the smokers in the United States will initiate quitting smoking at least once each year, but fewer than one in 10 will persist. Thus, behavioral persistence appears to be a key criterion in evaluating the effectiveness of healthcare messages.

Study 3a revealed the positive effects of congruency between metaphor format (i.e., abstract *versus* concrete metaphors) and temporal orientation priming (i.e., long-term *versus* short-term priming) on behavioral intention. One may wonder whether the positive congruency effects will also occur on behavioral persistence. Prior investigations of congruency effects on behavioral persistence have yielded conflicting findings. Whereas a few studies on processing fluency and regulatory fit have documented evidence suggesting that congruency leads to greater behavioral persistence (e.g., Bargh et al. 2001; see also Markman et al. 2006), others have failed

to discover such an effect (e.g., Tam 2005; Hall 2007). For example, Bargh et al. (2001, see also Markman et al. 2006) found that this “feeling-right” experience associated with processing fluency and regulatory fit increased behavioral persistence, demonstrated by continuing to work towards a goal even after being interrupted. Similarly, Förster et al. (1998) found that participants who experienced regulatory fit between their regulatory state (i.e., promotion or prevention) and the manner in which the motor action induced them to complete the goal (i.e., with a strategic eagerness/approach orientation or a strategic vigilance/avoidance orientation) were more persistent in accomplishing their tasks than participants who did not experience regulatory fit. However, many other studies that have tried to replicate these research findings have failed (e.g., Tam 2005; Hall 2007). For example, Hall (2007) conducted two studies attempting to demonstrate the positive effect of processing fluency on behavioral persistence, and yet neither study yielded significant results. The bottom line is that the extant research has not reached any conclusive findings concerning the congruency effect on behavioral persistence. This has led to the following research question:

RQ1: What is the effect of congruency between metaphor format and time orientation priming on an individual’s persistence to avoid secondhand smoke?

6.2 The Persistence of Congruency Effects

Study 3a revealed the positive effects of congruency between metaphor format (i.e., abstract *versus* concrete metaphors) and temporal orientation priming (i.e., long-term *versus* short-term priming) on risk perception and behavioral intention. One intriguing question arises from these findings: What is the persistence of these positive effects? Given that there is often a time delay between exposure to communication messages and the actual behavior, researchers have called for advertising research that examines the persistence of advertising effects (Haugtvedt 1989; Grossman and Till 1998). According to these scholars, adopting a longitudinal approach to measure advertising effectiveness (both immediate and delayed measurements) increases generalizability of advertising research to an actual advertising context.

Despite these repeated calls, only a few studies have applied a longitudinal approach to examine advertising effects (e.g., Grossman and Till 1998; Shen and Chen 2007; Mitchell 1993; Muehling and Lacznia 1988; Lee, Lee, and Harrell 2001; Janiszewski and Chandon 2007). Findings from this stream of research suggest that whereas some advertising effects are enduring (e.g., Janiszewski and Chandon 2007; Grossman and Till 1998), others are not (e.g., Shen and Chen 2007; Muehling and Lacznia 1988; Lee, Lee, and Harrell 2001). Researchers have suggested that the persistence of advertising effects is influenced by a variety of antecedents ranging from involvement with the message (Muehling and Lacznia 1988), to applicability of

the contexts to the brand (Shen and Chen 2007), to the goal of evaluation and attitude confidence (Lee, Lee, and Harrell 2001).

To date, limited research has provided insight into the persistence of the effects of congruency between metaphor format and temporal orientation priming on risk perception and behavioral intention. As a few rare exceptions, several studies have offered some preliminary results concerning the persistence of processing fluency effects. For example, Bornstein (1989) found that processing fluency effects were maintained as the delay between exposure and test increases from one minute to up to two weeks. Janiszewski and Chandon (2007) reported that stimulus-specific processing fluency effects persisted with 5-minute or 30-minute delays. However, the above two studies focus on a mere measurement effect (the act of responding to an initial-intent question alters respondents' subsequent evaluations and behaviors Sherman 1980), which considerably deviates from the topic of this dissertation. As such, it is difficult to draw a direct link between the above findings and the question examined here. In sum, prior research has provided little insight on the persistence of effects of congruency between metaphor format and temporal orientation priming. This has led us to the following research question:

RQ2: What is the persistence of effects of congruency between metaphor format and time orientation priming on secondhand smoke risk perception and intention to avoid secondhand smoke?

6.3 Study 3b

6.3.1 Method

The purpose of Study 3b was two-fold: 1) to examine the effect of congruency between metaphor format (i.e., abstract *versus* concrete metaphors) and temporal orientation priming (i.e., long-term *versus* short-term priming) on behavioral persistence, and 2) to investigate the persistence of the congruency effects on secondhand smoke risk perception and intention to avoid secondhand smoke. A review of behavioral persistence literature suggests that persistence may be operationalized based upon the length of time an individual believes that he/she will engage in a certain activity (e.g., Tam 2005). Thus, to investigate RQ1, the data from Study3a were re-analyzed to investigate the two components of intention to avoid secondhand smoke measurements: short-term *versus* long-term intention. The short-term intention was indicated by three items on intention to avoid secondhand smoke in the coming few months, while the long-term intention was measured by three items on lifelong intention to avoid secondhand smoke. To examine RQ2, a week after Study 3a, the same participants were asked to complete the delayed outcome measures (i.e., secondhand smoke risk perception and intention to avoid secondhand smoke). All measures employed seven-point scales. Scale reliabilities from Study 3b (the delayed measures) ranged from .78 to .85.

6.3.2 Results

RQ1: Congruency Effect on Behavioral Persistence. To examine RQ1, a 2 metaphor format (abstract *versus* concrete metaphors) X 2 temporal orientation priming (long-term *versus* short-term priming) X 2 perceived behavioral persistence (long-term *versus* short-term) mixed design MANOVA was performed on intention to avoid secondhand smoke. The results revealed a significant main effect of perceived behavioral persistence (Wilks' λ : $F(1, 107) = 22.69, p < .001$). However, this main effect was qualified by a higher order two-way interaction effect between metaphor format and perceived behavioral persistence (Wilks' λ : $F(1, 107) = 5.26, p < .03$). No other effect was significant. To further examine the two-way interaction effect, planned contrasts results showed that when receiving the abstract metaphor condition, participants were more likely to express intentions to avoid secondhand smoke for a long (*versus* short) period of time ($M_{\text{LongTerm}} = 4.53$ and $M_{\text{ShortTerm}} = 4.02, t(57) = -5.13, p < .001$). The mean difference for the concrete metaphor condition, however, was not significant ($p > .08$).

RQ2: The Persistence of Congruency Effects. To examine RQ2, a 2 metaphor format (abstract *versus* concrete metaphors) X 2 temporal orientation priming (long-term *versus* short-term priming) MANOVA was performed on the delayed measures of secondhand smoke risk perception and intention to avoid secondhand smoke. The results showed that the main effect of temporal orientation was close to significant (Wilks' λ : $F(1, 106) = 2.91, p < .06$). However, this main

effect was qualified by a higher order two-way interaction effect between metaphor format and temporal orientation priming (Wilks' λ : $F(1, 106) = 5.46, p < .01$). No other effect was significant. Further univariate analysis revealed that the interaction effect was only significant on intention to avoid secondhand smoke ($p < .03$), but not on secondhand smoke risk perception ($p > .76$). The treatment means are reported in Table 8. Figure 15 & 16 provide a visual display of the significant interaction effects on delayed measures, together with the immediate effects from Study 3a. Planned contrasts results showed that when exposed to long-term priming, participants who received the abstract metaphor condition in Study 3a expressed higher intention to avoid secondhand smoke than those receiving the concrete metaphor condition even after a one-week time delay ($M_{\text{AbstractMetaphor}} = 4.96$ and $M_{\text{ConcreteMetaphor}} = 4.37$). This effect was marginally significant ($t(52) = 1.47, p < .08$). The same comparison was not significant on immediate measures. In contrast, when exposed to short-term priming, participants who received the concrete metaphor condition in Study 3a expressed higher intention to avoid secondhand smoke than those receiving the abstract metaphor condition even after a one-week time delay ($M_{\text{AbstractMetaphor}} = 4.47$ and $M_{\text{ConcreteMetaphor}} = 5.05, t(55) = -1.96, p < .03$). This indicated that congruency between metaphor format and temporal orientation priming led to persistent behavioral change, but not persistent perceptual change.

6.4 Conclusion

Study 3b was conducted for two purposes: 1) to examine the effect of congruency between metaphor format (i.e., abstract *versus* concrete metaphors) and temporal orientation priming (i.e., long-term *versus* short-term priming) on behavioral persistence, and 2) to investigate the persistence of the congruency effects on secondhand smoke risk perception and intention to avoid secondhand smoke. Analysis showed that when receiving the abstract metaphor condition, participants would be motivated to avoid secondhand smoke for a longer period of time. Even though Study 1 showed that concrete metaphors were often more effective than abstract metaphors, Study 3b results revealed that abstract metaphors were more likely to encourage behavioral persistence than concrete metaphors. This finding provides intriguing insights into the healthcare marketing practice. In essence, it indicates that whereas concrete metaphors might be more effective to promote actions resulting from an immediate impulse (e.g., financial contribution to a healthcare organization), abstract metaphors might better serve the purpose of encouraging behaviors that require persistence (e.g., quitting smoking, dieting).

Moreover, the results on the delayed measures revealed that after an extended period of time, the effect of congruency between metaphor format and temporal orientation priming faded away for secondhand smoke risk perception, but remained fairly strong for intention to avoid secondhand smoke. This finding may be explained by the mechanism of congruency effects. As noted earlier, the mechanism of the

congruency effect on risk perception is that the “feel right” experience associated with regulatory fit is transferred to the argument, due to source confusion (Camacho, Higgins, and Luger 2003; Higgins et al. 2003). The mechanism of the congruency effect on behavioral intention is that regulatory fit increases perceived control over future behavior (Aaker and Lee 2006). The “feel-right” experience may be transient and source confusion may be resolved after the time delay. However, the increase in perceived control over future behavior is more likely to last. As a result, behavioral intentions may remain accessible longer than the judgments used to form these intentions. This finding holds important implications for healthcare marketers.

Health-related information is often ignored due to self-positivity bias (Menon, Block, and Ramanathan 2002; Sanbonmatsu et. al. 1998). Self-positivity bias refers to people’s tendency to perceive that others are at higher risks of misfortune than themselves. Self-positivity bias, as such, tends to warp an individual’s risk judgment, which subsequently hinders positive behavioral intention. Given that congruency between metaphor format and temporal orientation priming can directly and persistently influence behavioral intention, healthcare marketers may be able to circumvent self-positivity bias and directly motivate future health-related behaviors.

Table 8 Descriptive Statistics of Delayed Dependent Variables (Study 3b)

Dependent Variable	Temporal Orientation Priming	Metaphor Format	Mean	SD	N
Secondhand Smoke Risk Perception	Long-Term Priming	Abstract Metaphor	6.20	.70	29
		Concrete Metaphor	6.12	.93	25
	Short-Term Priming	Abstract Metaphor	5.98	.60	29
		Concrete Metaphor	5.81	1.13	28
Intention to Avoid Secondhand Smoke	Long-Term Priming	Abstract Metaphor	4.96	1.51	29
		Concrete Metaphor	4.37	1.45	25
	Short-Term Priming	Abstract Metaphor	4.47	1.31	29
		Concrete Metaphor	5.05	.91	28

Figure 15 Metaphor Format and Temporal Orientation Priming Interaction on Secondhand Smoke Risk Perception (Study 3a & 3b)

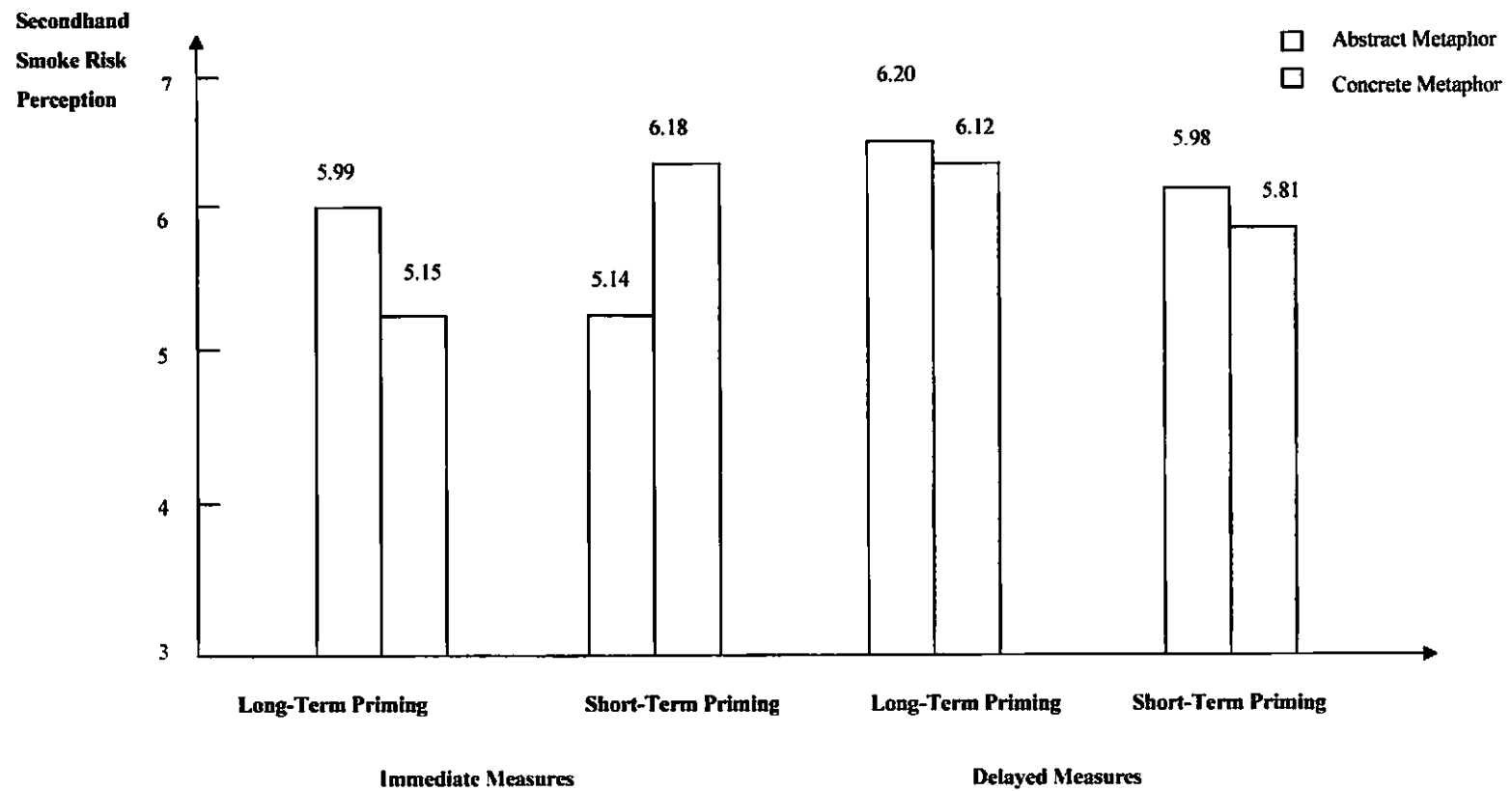
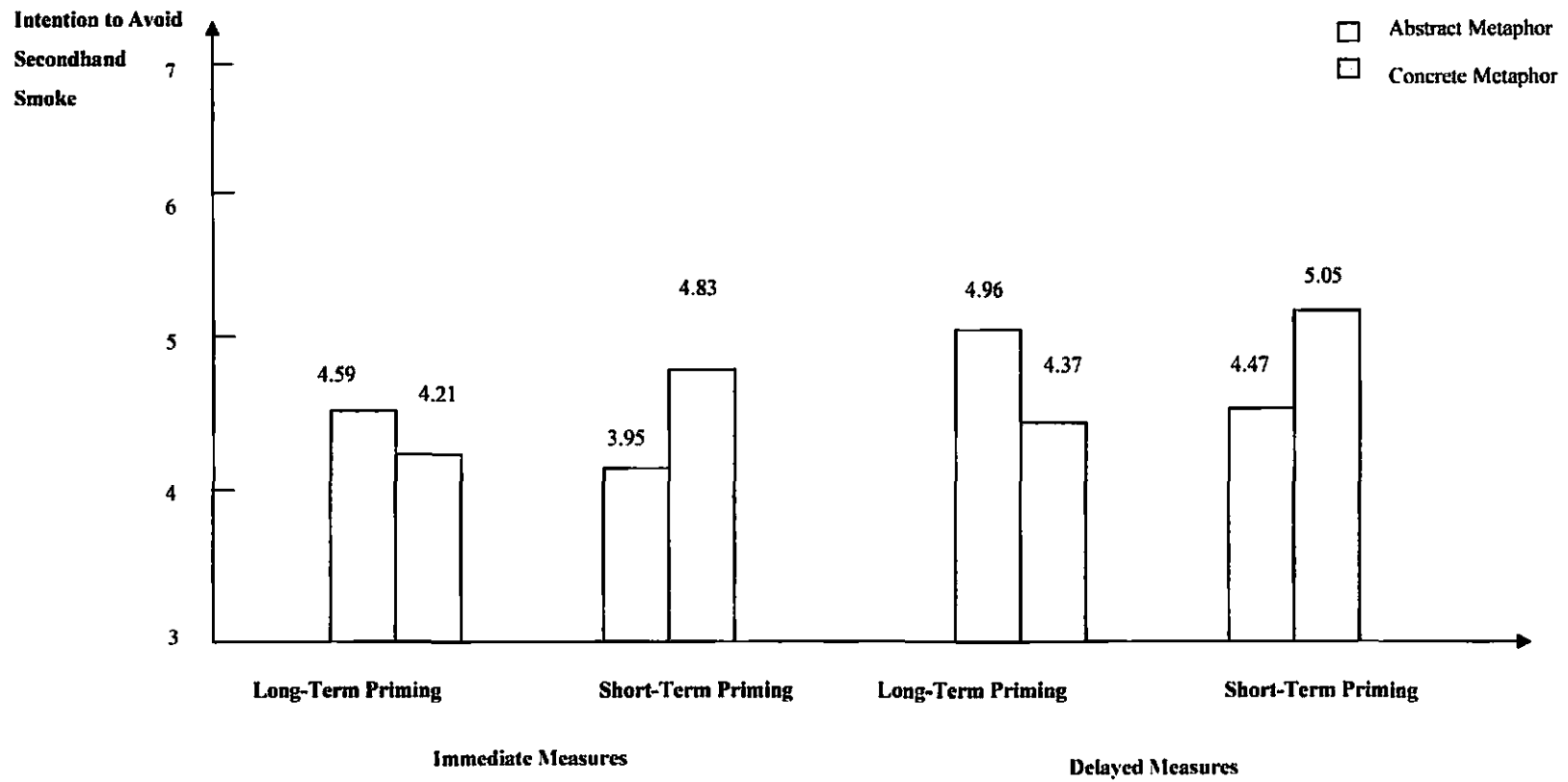


Figure 16 Metaphor Format and Temporal Orientation Priming Interaction on Intention to Avoid Secondhand Smoke (Study 3a & 3b)



CHAPTER 7 GENERAL DISCUSSION

7.1 Theoretical Implications

Human beings, as a spectacular, splendid magnification of life, have been creating metaphors for centuries since the beginning of their existence (Thomas Lewis 1979). Marketers have been using metaphors for decades in a variety of marketing activities (e.g., Zaltman 2003; Rapaille 2001; McQuarrie and Mick 1999; Durgee and Chen 2006). Yet, this long history of practice does not entail a thorough understanding of phenomena related to metaphors. In fact, little is known concerning the processing and usage of two major types of metaphors (i.e., abstract *versus* concrete metaphors).

Addressing this gap in the literature, this dissertation reported four studies to provide a comprehensive framework focused on the two types of metaphors. Specifically, Study 1 demonstrated that compared with abstract metaphors, concrete metaphors were processed via higher imagery processing, and concrete metaphors were often more effective than abstract metaphors. Study 2 and Study 3a showed that congruency between metaphor format and priming (Study 2: processing instructions; Study 3a: temporal orientation priming) enhanced message effectiveness. Study 3b revealed that abstract metaphors were more likely to encourage behavioral persistence than concrete metaphors. It also demonstrated that after a certain period of time, the

effect of congruency between metaphor format and temporal orientation priming faded away for risk perception, but it remained fairly strong for behavioral intention.

These interesting findings have theoretical implications for several domains. In regard to the metaphor processing mechanism, this dissertation demonstrates that mental imagery plays a central role in how an individual processes metaphors, which extends previous metaphor processing models that focus on knowledge integration (Mick 1992; Kardes 1988; Toncar and Munch 2001). In addition, this dissertation shows that the metaphor processing mechanism varies depending on metaphor format, which accounts for persuasive superiority of concrete metaphors (*versus* abstract metaphors). In sum, the findings from this dissertation further the collective knowledge on the processing and effectiveness of metaphors.

Another important contribution of this dissertation is that it distinguishes between two types of metaphors and suggests that not all metaphors are created equal. Extending prior research, which has showed that concrete metaphors are more easily comprehended than abstract metaphors (Morgan and Reichert 1999), this dissertation uncovers that concrete metaphors are often more effective than abstract metaphors. In addition, this dissertation introduces boundary conditions for the positive effects of concrete metaphors. For example, when metaphor format is inconsistent with processing mode (e.g., concrete metaphors match with low-imagery processing), the message effectiveness will be reduced. When there is a mismatch between message format and temporal orientation priming (e.g., concrete metaphors match with

long-term priming), the message effectiveness will also be reduced. When there is a match, on the other hand, the message effectiveness will be enhanced. All these interesting findings emphasize the importance of distinguishing between abstract and concrete metaphors in theorizing and understanding the use of metaphors in healthcare communications.

This dissertation also explores the effects of abstract *versus* concrete metaphors on different behavioral intention outcomes. The results indicate that whereas concrete metaphors are more effective in promoting immediate behavioral intentions, abstract metaphors are more likely to encourage behavioral persistence. These findings have important theoretical implications. For example, researchers have argued that concrete or vivid communication messages are associated with superior persuasion due to imagery processing (e.g, Escalas 2004; MacInnis and Price 1987; Bone and Ellen 1992, Schlosser 2003). This dissertation suggests that although concrete messages may promote immediate behavioral intentions, they don't warrant behavioral persistence. Abstract messages, on the other hand, by making salient a long-term perspective, may lead to behavioral persistence. One intriguing proposition stemming from these findings is that selection of distinct message strategies (either abstract or concrete) may largely depend on the specific objectives of healthcare campaigns.

In a more general framework, this dissertation provides insight into the consequences of congruency between metaphor format and priming. For example, if

there is a match between metaphor format and the type of processing strategy made salient by priming techniques, the effectiveness of the message will be enhanced. In contrast, if there is a mismatch, the effectiveness will be reduced. Prior research suggests processing fluency theory to account for this congruency effect (e.g., Petrova and Cialdini 2005; Schwarz 2006; Thompson and Hamilton 2006). This dissertation extends the same analogy to a match/mismatch between metaphor format and temporal orientation priming (long-term *versus* short-term). The latter congruency effects have previously been explained by regulatory fit (Avnet and Higgins 2003; Zhang and Mittal 2007; Lee, Aaker, and Gardner 2000; Lee and Aaker 2004; Pham and Avnet 2004). By developing a more general nomological net that features metaphor format, processing instructions, temporal orientation priming and processing fluency, this dissertation bridges these two streams of research – processing fluency and regulatory fit. The findings reveal the empirical connection and similarities between processing fluency and regulatory fit. In fact, this dissertation illustrates that the mechanisms under which processing fluency effects and regulatory fit effects operate are very similar.

This dissertation investigates the long-term effects of congruency between metaphor format and temporal orientation priming on risk perception and behavioral intention. Researchers have expressed concern that measurement of message effectiveness taken immediately after exposure may lack generalizability to actual communication context (Grossman and Till 1998; Haugtvedt 1989). However, limited

research has examined the long-term effects of communication messages. Closing this theoretical gap, this dissertation examines whether the positive congruency effects are enduring or transitory. The findings demonstrate that after a one-week time delay, the congruency effect on behavioral intention remains accessible, whereas the effect on risk perception disappears. The key contribution of this finding is in showing that behavioral intentions tend to be more enduring than judgments used to form those intentions.

Another important domain to which the present findings contribute involves the “state of flow.” To date, very few studies have investigated whether website contents may facilitate or interrupt the “state of flow.” This dissertation advances the knowledge on the “state of flow” by suggesting alternative ways to activate and intensify it. For example, the results suggest that the “state of flow” can be induced by congruency between metaphor format and priming. To account for this effect, the results lend support to a process-oriented model that features processing fluency and the “state of flow.” Specifically, the findings suggest that congruency between metaphor format and priming activates higher processing fluency, which intensifies the “state of flow,” and then leads to more favorable attitude. Thus, this dissertation extends and directs the research on the “state of flow” towards a process-oriented perspective.

7.2 Managerial Implications

Interesting insights and implications can be drawn from this research to guide healthcare marketers in designing healthcare communication messages. First, by developing a more precise model of the processing mechanism related to metaphors, this dissertation advances the collective knowledge concerning how to effectively deliver healthcare messages. Within a healthcare marketing context, both abstract and concrete metaphors appear to hold promise for enhancing the effectiveness of communications designed to improve pro-health attitudes and behaviors. Indeed, Gray, Amos, and Currie (1996) reported that young people around the ages of 12-13 tended to interpret information in a concrete way by painting a picture of a cultural role for smoking in their lives, whereas 15-16 year olds engaged in a more abstract interpretative process. The findings from this dissertation suggest that while concrete metaphors are usually more persuasive in promoting immediate behavioral intentions, abstract metaphors are more effective in influencing behavioral persistence. These interesting findings may help healthcare marketers decide the type of metaphors to use given the target population and healthcare campaign objectives. For example, the results suggest that whereas concrete metaphors may be more effective in promoting actions that often have immediate results (e.g., breast cancer screening), abstract metaphors may better serve the purpose of encouraging behaviors that require persistence (e.g., quitting smoking, exercising).

Second, Proctor, Proctor and Papasolomou (2005) observed that both modern and post modern advertisements represented the symbolic worlds of reality by blending the linguistic (e.g., metaphor, self-referencing) and the non-linguistic (e.g., sensory) elements. Therefore, there is a tendency in the practice of advertising to combine metaphors with imagery eliciting sensory cues (music, visuals and sound effects). By examining the match or mismatch of imagery processing instructions to different kinds of metaphors, this dissertation helps identify ways to optimize the blending of linguistic and non-linguistic advertising elements. For example, the evidence from this dissertation suggests that when concrete metaphors are combined with other imagery-eliciting techniques (e.g., visual, object interactivity, and sound effects), the message effectiveness will be maximized.

Third, this dissertation also provides important insight into how time orientation interacts with metaphor format on message effectiveness. Although evidence for the role of time orientation in influencing health-related judgments and behavioral intentions has been mounting (e.g., Harwood 1981; Zimbardo, Keough, and Boyd 1997; Aspinwall 2005; Orbell and Hagger 2006), this dissertation suggests the opportunity of combining time orientation and metaphor format in delivering healthcare messages. For example, when there is a mismatch between message format and temporal orientation priming (e.g., concrete metaphors match with long-term priming), the message effectiveness will be reduced. When there is a match, on the other hand, the message effectiveness will be enhanced. This indicates that abstract

metaphors may work better if they are combined with other communication tactics that prime long-term orientation. Further, healthcare campaigns targeted toward a population segment with a short-term orientation (e.g., adolescences) are more likely to succeed if concrete rather than abstract metaphors are employed.

Fourth, the world is constantly shrinking echoing the rapid growth in international trade (Holt, Quelch, and Taylor 2004), the possible development of a global consumer culture (Alden, Steenkamp, and Batra 1999) and the emergence of global brands (Steenkamp, Batra, Alden 2003). Therefore, healthcare marketers will be particularly interested in finding out how consumers in the international marketplace respond to healthcare messages containing metaphors. As temporal orientation mirrors an important culture dimension - time orientation (Hofstede 1991), the positive effects of congruency between metaphor format and temporal orientation should assist marketers in answering important strategic questions related to international strategy. For example, the results imply that whereas abstract metaphors might work better in long-term oriented cultures (e.g., China), concrete metaphors might be a better fit for short-term oriented cultures (e.g., U.S.).

Fifth, this dissertation provides evidence on the endurance of the effects of congruency between metaphor format and time orientation. The findings demonstrate that after a one-week time delay, the congruency effect on behavioral intention remains fairly strong, whereas the effect on risk perception fades away. This suggests that the pairing of metaphor format and time orientation can be an effective tool for

healthcare marketers to encourage behavioral intention that lasts long enough for an individual to make the actual behavioral change. In addition, the findings caution healthcare marketers on the transitory nature of communication effects on risk perception. In essence, these findings speak to the importance for healthcare marketers to test their campaign for both immediate and long-term effects to accurately gauge communication effectiveness.

Finally, due to the efficient dissemination, high volume and currency (Gregory-Head 1999; Mckinley, Cattermole, and Oliver. 1999) of online information, the Internet is viewed as the most effective healthcare communication channel. Johnston et al. (2005) suggest that the increased recreational computer use had especially interesting implications for getting public health-related messages to American youth. For example, they found that electronic anti-smoking advertising messages had much higher rates of recall than did print, and these rates appeared to be increasing. The findings from this dissertation were drawn from a computer-mediated research context. As such, healthcare marketers may directly apply these findings in designing interactive healthcare messages. This dissertation examines the “state of flow,” an important construct in computer-mediated environments. The “state of flow” is believed to enhance positive affect, information learning, website stickiness (Hoffman and Novak 1996), and future repeated website visits (Nel et al. 1999; Webster, Trevino, and Ryan 1993). Healthcare marketers will be particularly interested in facilitating the “state of flow” in their website navigators. As such, by

identifying alternative ways to induce the “state of flow,” the present research offers further directions on how to create an optimal website navigation experience.

7.3 Limitations and Future Research Directions

Limitations associated with the current research merit noting, particularly because they afford additional research opportunities. One limitation is that this study used only a fictitious anti-smoking webpage as the stimuli. Using a fictitious webpage was considered necessary to prevent the confounding effects of prior knowledge and experience. Therefore, to fully evaluate the hypotheses under computer-mediated environments, further research may apply a more realistic approach to examine the effects of metaphor format, processing instructions and temporal orientation priming. A second limitation is that the findings are based on are based on laboratory experiments of non-smoking college students, further replications of these results findings among other populations are needed before strategic implications can be drawn. It might be partially due to the selected population that the expected effects on cigarette trial intention were not supported by this dissertation. As such, further replications/extensions may consider recruiting participants from smokers to examine the effects on cigarette trail intention. A third limitation is that even though the experimental stimuli of metaphor format (i.e., risk and time bomb) have achieved the manipulation purpose, they may not be identical in terms of the message valence. However, such difference may be minimized as the stimuli were presented under an

anti-smoking context, which emphasizes danger of smoking to an individual's physical health.

A fourth limitation is that all experiments were conducted among American participants. It remains unknown to what degree these findings can be generalized across different cultural contexts. Given that prior research has suggested a strong link between temporal orientation and culture, this dissertation has offered preliminary insights into the moderating effect of culture on the effectiveness of metaphor format. However, future exploration that examines the effectiveness of metaphor format among individuals from different cultures will be particularly interesting. A fifth limitation is that this dissertation uses direct processing instructions to prime participants' mode of processing and temporal orientation. Although this approach serves the theoretical goal of this dissertation, it does not mirror the actual healthcare communication practice. Given this, further research may apply message executional cues to elicit an individual's processing mode or temporal orientation. For example, in a recent research, high-imagery processing was elicited by inserting short descriptive statements before the description of each attribute (e.g., "you enter the curve, feel the grip of the seat"). Low-imagery processing was induced by adding a matrix displaying product attribute information (Thompson and Hamilton 2006, study 2). A sixth limitation is that the results from Study 2 didn't support the congruency effects under the low-imagery condition. One explanation may be that it is more difficult to cue low-imagery processing using direction instructions than high-imagery processing.

A different explanation may be related to the nature of low- *versus* high-imagery processing. According to Miller (1979), one distinction between low- and high-imagery processing is that low-imagery processing requires an individual to evaluate the incoming information against the background of his/her existing knowledge schema, and then selectively integrates the new information into his/her knowledge structure, whereas high-imagery processing involves the construction of an image, which contains all the mental processes that can construct a record of a passage of text and the representation of a scene. Therefore, low-imagery processing results in mental models that are selective, while high-imagery processing results in mental models that are constructive. It follows that whereas the selective process results in a collection of possible states, the constructive process results in a single representation of a scene. Given this, it seems plausible to argue that low-imagery processing may be associated with higher level of cognitive flexibility and better tolerance for incongruency than high-imagery processing. However, further empirical research is needed to examine these relationships.

Certainly, more work needs to be done before we have a complete understanding of the effect of metaphors. For example, while this dissertation examines verbal metaphors, further research along these lines may replicate these findings on visual metaphors (abstract *versus* concrete), or the combination of verbal and visual metaphors. Further, as many healthcare messages are less effective due to self-positivity bias (Menon, Block, and Ramanathan 2002; Sanbonmatsu et. al. 1998),

further research may examine whether indirect messages such as metaphors may help overcome self-positivity bias and motivate individuals to process healthcare information more carefully. Further research may also introduce other independent variables and moderating factors to test the effects of metaphor format. In sum, metaphors are important phenomena to understand and are effective marketing strategies for researchers and marketers attempting to identify measures that promote preventative or proactive actions toward a healthy lifestyle.

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APPENDIX A MEASUREMENT AND SCALE RELIABILITIES

Study 1

Sample Scale Items (seven-point scale)	Reliability
Metaphor Format Manipulation Check: Vividness Scale	
[does not describe at all...describe perfectly]	
1. concrete	
2. communicating a strong image	
3. clear	.71
4. vague	
5. detailed	
6. vivid	
Imagery Processing [strongly disagree...strongly agree]	
1. I visualized the information that I just saw on the webpage.	
2. Many images came to my mind when I was reading the information on the webpage.	.86
3. I tried to form a mental picture of the information on the webpage.	
Attitude towards the Webpage	
1. not informative/very informative	
2. not interesting/very interesting	
3. not scary/very scary	.80
4. not well-written/very well-written	
Smoking Risk Perception [strongly disagree...strongly agree]	
1. Tobacco is a deadly product in any form.	
2. Tobacco is a dangerous product.	.96
3. Smoking kills people.	
Cigarette Trial Intention [very unlikely...very likely]	
1. In the future, you might smoke one puff or more of a cigarette.	
2. You might try out cigarette smoking for a while.	.87
3. If one of your best friends were to offer you a cigarette, you would smoke it.	

Study 2

Sample Scale Items (seven-point scale)	Reliability
Metaphor Format Manipulation Check: Vividness Scale	
[does not describe at all...describe perfectly]	
1. concrete	
2. communicating a strong image	
3. clear	.79
4. vague	
5. detailed	
6. vivid	
 Processing Instructions Manipulation Check	
[strongly disagree...strongly agree]	
Low-Imagery Instructions:	
You were asked to be objective and logical while reading the Webpage.	
High-Imagery Instructions:	
You were told to imagine or visualize everything on the Webpage.	
 Processing Fluency	
1. difficult to process/easy to process	
2. difficult to understand/easy to understand	
3. difficult to comprehend/easy to comprehend	.92
4. difficult to evaluate/easy to evaluate	
 Attitude toward the Webpage	
1. not informative/very informative	
2. not interesting/very interesting	
3. not scary/very scary	.80
4. not well-written/very well-written	
 Smoking Risk Perception [strongly disagree...strongly agree]	
1. Tobacco is a deadly product in any form.	
2. Tobacco is a dangerous product.	.92
3. Smoking kills people.	

Study 2 - Continued

Sample Scale Items (seven-point scale)	Reliability
Cigarette Trial Intention [very unlikely...very likely]	
1. In the future, you might smoke one puff or more of a cigarette.	.95
2. You might try out cigarette smoking for a while.	
3. If one of your best friends were to offer you a cigarette, you would smoke it.	
4. Do you think that you will smoke at any time during next year?	
5. Would you smoke if your best friend dared you?	
 The "State of Flow"	
 What is "flow"?	
The word "flow" is used to describe a state of mind sometimes experienced by people who are deeply involved in some activity. One example of flow is the case where a professional athlete is playing exceptionally well and achieves a state of mind where nothing else matters but the game; he or she is completely and totally immersed in it. The experience is not exclusive to athletics: Many people report this state of mind when playing games, engaging in hobbies, or working. Activities that lead to flow completely captivate a person for some period of time. When one is in flow, time may seem to stand still, and nothing else seems to matter. Flow may not last for a long time on any particular occasion, but it may come and go over time. Flow has been described as an intrinsically enjoyable experience.	
1. Yes, I am sure I have experienced flow state. / No, I have not experienced it.	.80
2. It was a very intense sensation. / It was not an intense sensation.	

Study 3a

Sample Scale Items (seven-point scale)	Reliability
Metaphor Format Manipulation Check: Vividness Scale [does not describe at all... describe perfectly]	
1. concrete	
2. communicating a strong image	
3. clear	.79
4. vague	
5. detailed	
6. vivid	
 Temporal Orientation Priming Manipulation Check [strongly disagree... strongly agree]	
Long-Term Priming: You were told to provide a brief description of how you envision your life in 50 years.	-
Short-Term Priming: You were told to provide a brief description of how you envision your life in this week.	
 Processing Fluency	
1. difficult to process/easy to process	
2. difficult to understand/easy to understand	
3. difficult to comprehend/easy to comprehend	.94
4. difficult to evaluate/easy to evaluate	
 Attitude toward the Webpage	
1. not informative/very informative	
2. not interesting/very interesting	
3. not scary/very scary	.75
4. not well-written/very well-written	
 Secondhand Smoke Risk Perception [strongly disagree... strongly agree]	
1. Secondhand smoke causes health problems.	.92
2. Secondhand smoke is dangerous	
3. Secondhand smoke kills people.	

Study 3a - Continued

Sample Scale Items (seven-point scale)	Reliability
Intention to Avoid Secondhand Smoke [very unlikely...very likely] <ol style="list-style-type: none"> 1. During the coming few months, you will avoid secondhand smoke at any time. 2. During this semester, you will only go to restaurants that are smoke-free. 3. In the following few months, if one of your friends smokes next to you, you will try to ask him/her not to smoke. 4. During your lifetime, you will always try to keep your living place free from secondhand smoke. 5. From now on, you will only eat at smoke-free restaurants. 6. During your lifetime, you will always politely request your friends not to smoke next to you. 	.90

The "State of Flow"

What is "flow"?

The word "flow" is used to describe a state of mind sometimes experienced by people who are deeply involved in some activity. One example of flow is the case where a professional athlete is playing exceptionally well and achieves a state of mind where nothing else matters but the game; he or she is completely and totally immersed in it. The experience is not exclusive to athletics: Many people report this state of mind when playing games, engaging in hobbies, or working. Activities that lead to flow completely captivate a person for some period of time. When one is in flow, time may seem to stand still, and nothing else seems to matter. Flow may not last for a long time on any particular occasion, but it may come and go over time. Flow has been described as an intrinsically enjoyable experience.

- | | |
|---|-----|
| <ol style="list-style-type: none"> 1. Yes, I am sure I have experienced flow state. / No, I have not experienced it. 2. It was a very intense sensation. / It was not an intense sensation. | .70 |
|---|-----|

Study 3b

Sample Scale Items (seven-point scale)	Reliability
Secondhand Smoke Risk Perception [strongly disagree... strongly agree]	
1. Secondhand smoke causes health problems.	.85
2. Secondhand smoke is dangerous	
3. Secondhand smoke kills people.	
 Short-Term Intention to Avoid Secondhand Smoke [very unlikely...very likely]	
1. During the coming few months, you will avoid secondhand smoke at any time.	
2. During this semester, you will only go to restaurants that are smoke-free.	.81
3. In the following few months, if one of your friends smokes next to you, you will try to ask him/her not to smoke.	
 Long-Term Intention to Avoid Secondhand Smoke [very unlikely...very likely]	
1. During your lifetime, you will always try to keep your living place free from secondhand smoke.	.78
2. From now on, you will only eat at smoke-free restaurants.	
3. During your lifetime, you will always politely request your friends not to smoke next to you.	