THE INFLUENCE OF TEXT FRAMING AND PICTURE VALENCE ON BROWSING
BEHAVIOR, ATTITUDE AND RISK ASSESSMENT

A Thesis
Presented
to the Faculty of
California State University, Chico

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Interdisciplinary Studies:
International Cognitive Visualization

by
Sandra Becker
Summer 2013
THE INFLUENCE OF TEXT FRAMING AND PICTURE VALENCE ON BROWSING BEHAVIOR, ATTITUDE AND RISK ASSESSMENT

A Thesis
by
Sandra Becker
Summer 2013

APPROVED BY THE DEAN OF GRADUATE STUDIES AND VICE PROVOST FOR RESEARCH:

____________________________________
Eun K. Park, Ph.D.

APPROVED BY THE GRADUATE ADVISORY COMMITTEE:

______________________________
Neil H. Schwartz, Ph.D.
Graduate Coordinator

Wolfgang Schnotz, Ph.D., Chair

______________________________
Neil H. Schwartz, Ph.D.

______________________________
Michael Ennis, Ph.D.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Tables</td>
<td>v</td>
</tr>
<tr>
<td>List of Figures</td>
<td>vi</td>
</tr>
<tr>
<td>Abstract</td>
<td>vii</td>
</tr>
<tr>
<td><strong>CHAPTER</strong></td>
<td></td>
</tr>
<tr>
<td>I. Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Background</td>
<td>1</td>
</tr>
<tr>
<td>Problem Statement</td>
<td>3</td>
</tr>
<tr>
<td>II. Literature Review</td>
<td>9</td>
</tr>
<tr>
<td>Introduction</td>
<td>9</td>
</tr>
<tr>
<td>Text- Picture Processing</td>
<td>11</td>
</tr>
<tr>
<td>Framing Theories</td>
<td>17</td>
</tr>
<tr>
<td>Persuasive Communication</td>
<td>28</td>
</tr>
<tr>
<td>The Present Investigation</td>
<td>34</td>
</tr>
<tr>
<td>III. Methodology</td>
<td>43</td>
</tr>
<tr>
<td>Design</td>
<td>43</td>
</tr>
<tr>
<td>Participants</td>
<td>43</td>
</tr>
<tr>
<td>Experimental Materials</td>
<td>45</td>
</tr>
<tr>
<td>Procedure</td>
<td>52</td>
</tr>
</tbody>
</table>
# Table of Contents

## CHAPTER IV. Results

- Data Source ................................................................. 54
- Influences of Demographic Information ....................... 56
- Analysis of Effects on Dependent Measures .............. 58

## CHAPTER V. Discussion

- Limitations of the Present Investigation .................. 72
- Conclusion ................................................................. 73

## References .................................................................. 77

## APPENDICES

- A. Online Sampling Locations ...................................... 96
- B. Short Recruitment Text .............................................. 99
- C. Elaborate Recruitment Text ...................................... 101
LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Objective and research questions of the present investigation</td>
<td>8</td>
</tr>
<tr>
<td>2. Theoretical predictions for expected main effects</td>
<td>38</td>
</tr>
<tr>
<td>3. Theoretical predictions for expected interaction effects</td>
<td>41</td>
</tr>
<tr>
<td>4. Item ratings for the experimental pictures</td>
<td>49</td>
</tr>
<tr>
<td>5. Pearson bivariate correlation matrix of all dependent measures</td>
<td>58</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Site Map of Experimental Website</td>
<td>46</td>
</tr>
<tr>
<td>2. Picture Valence Positive</td>
<td>48</td>
</tr>
<tr>
<td>3. Picture Valence Negative</td>
<td>48</td>
</tr>
<tr>
<td>4. Levels of Text Frame</td>
<td>51</td>
</tr>
<tr>
<td>5. Example of Experimental Product Page: Product Line</td>
<td>52</td>
</tr>
<tr>
<td>6. Importance of protection gear by age in years</td>
<td>57</td>
</tr>
<tr>
<td>7. Interaction effect between Picture Valence and Involvement on Behavioral Intention</td>
<td>60</td>
</tr>
<tr>
<td>8. Browsing Behavior at the level gain text comparing negative and positive Picture Valence</td>
<td>61</td>
</tr>
<tr>
<td>9. Interaction effect of Text Frame and Picture Valence on Behavioral Intention</td>
<td>63</td>
</tr>
</tbody>
</table>
ABSTRACT

THE INFLUENCE OF TEXT FRAMING AND PICTURE VALENCE ON BROWSING BEHAVIOR, ATTITUDE AND RISK ASSESSMENT

by

Sandra Becker

Master of Arts in Interdisciplinary Studies:
International Cognitive Visualization
California State University, Chico

Summer 2013

In an online experiment, 207 volunteers were randomly exposed to a web banner on an experimental website (comprised of a text and picture) promoting the use and importance of protection gear in the context of motorcycling. The text was framed in terms of gains or losses. The picture valence was framed depicting either a positive or negative outcome. Therefore, the web banner emphasized the benefits of riding protected (in combination with depicting a positive or a negative outcome) or the risks of riding unprotected (in combination with depicting a positive or a negative outcome). We hypothesized that the fit between an individual’s involvement with and the framing function of the target behavior determines the persuasive effectiveness of the web banner as measured by product attitude, normative beliefs, browsing behavior and behavioral intention. Analyses revealed that our hypotheses were partially supported.
CHAPTER I

INTRODUCTION

Background

Motorcyclists in the U.S.A. are more at risk than any other traffic participants as they represent 16% of total fatalities in road accidents but only 1% of traffic (National Highway Traffic Safety Administration, 2011). In other words, an American motorcyclist is 34 times more likely to be involved in a fatal accident than a car driver (National Highway Traffic Safety Administration, 2011). In the year 2000, the U.S. Department of Transportation investigated injuries relative to motorcycle accidents revealing that 98% of the multiple vehicle collisions and 96% of single vehicle accidents resulted in an injury of the motorcycle rider (USDOT, 2000). Despite these objectively high risks, motorcycle registration has increased around 75% in the past 10 years (Morris, 2009).

Research has shown that wearing protective clothing can reduce abrasions and lacerations around 37% which account for the most frequently reported injuries of motorcycle riders (USDOT, 2000). As no apparel or gear is enforced by a federal law in the U.S., apart from some States that require the use of helmets, it is of utmost importance to stress the need of protection gear for improving the safety of riders.

It is therefore indispensable to conduct research on health communication to find ways to effectively stress the importance of preventive actions relative to high risk
behaviors such as motorcycle riding. According to Gerend and Shepherd (2007), “health communications play an important role in shaping people’s decision to engage in a particular behavior” (p. 745). Framing theories have proven to be a strong paradigm for understanding and investigating the cognitive processes that people use when they examine information, make judgments, and draw inferences about the world (Rothman, Bartels, Wlaschin, & Salovey, 2006; Rothman, Kelly, Hertel, & Salovey, 2003; Rothman & Salovey, 1997). Consequently, the premise of this investigation is that framing theories employ a high potential for tailoring the contents of a health message to the cognitive processing strategies of the human mind.

It was the goal of this investigation to design a web banner that promotes the use and importance of protection gear in the context of motorcycling. Such a web banner is of dual interest for the knowledge of society as it could potentially educate a large audience about the necessity of wearing protective garments during high risk or extreme sport activities. On the other hand, insights about the design of such web banners are equally interesting for marketers who intend to persuade people to show a certain behavioral intention- namely the intention to learn about and to consequently purchase protection gear.

To date, it has not been systematically investigated how to effectively communicate safety measures relative to any sort of preventive apparel in the context of high risk activities. Further, it is important to remark that while framing theories have been found to direct decision making processes (Gerend & Shepherd, 2007; Rothman & Salovey, 1997; Kahneman & Tversky, 1981), their implications have only been
investigated with regard to health-related choices tested in hypothetical decision scenarios (Gray, 2008; Rothman, Bartels, Wlaschin, & Salovey, 2006). Therefore, this investigation directly addresses the demand to test framing theories outside the scope of experimental laboratory settings (Rothman, 2004).

It is the agenda of the present investigation to enrich the understanding of both, the theoretical and the applied side. While serving the needs of marketers to find the most appropriate way to approach their (potentially new) customers, this study also aims at enlarging scientific knowledge and at closing existing gaps in the field of framing theories.

Problem Statement

Problems of defining the target behavior

In order to determine the most effective framing manipulation for the target behavior, it is crucial to psychologically construe the behavioral function of “wearing protection gear” (O’Keefe & Jensen, 2007). Rothman and Salovey (1997) propose to differentiate two types of health behaviors (prevention vs. detection behaviors) as a means to investigate if a health behavior is considered a safe or risky course of action. Here, the authors explain that the salient function of a prevention behavior is to provide a relatively certain, desirable outcome (such as using sunscreen or flu vaccination). This definition, however, is difficult to apply to prevention behaviors that can have substantial short-term costs despite their preventive nature, for example in the case of choosing to wear protective apparel during motorcycle riding. Hence, the definition provided by
Rothman and Salovey (1997) that preventive health behavior entail little risks with regard to safe consequences relative to their preventive functions seems inappropriate. Therefore, we agree with O’Keefe and Jensen (2007) who remarked that the term “risk” is quite ambiguous as a general reference point for the classification of behaviors.

This critique is in line with findings from the “prospect theory” (Kahneman & Tversky, 1979) suggesting that in order to predict whether an individual will engage in a behavior, it must be determined how that person perceives the certainty or uncertainty of risks relative to the chance of a pleasant or unpleasant outcome of the health action.

For defining the target health behavior “wearing protection gear” this means that here the course of action is clearly preventive, while it must also be acknowledged that the health behavior is mutually inclusive to the risks of riding. Here, it is impossible to predict if an individual is more likely to focus on the positive consequences of riding protected or, instead, if an individual is more inclined to focus on the negative consequences induced by the risks of riding. This demonstrates why the categorization into health prevention and health detection behaviors—according to Rothman and Salovey (1997) — is problematic; this definition disguises if an individual perceives “safe” or “risky” aspects of a health behavior (O’Keefe & Jensen, 2006).

Problems in framing paradigms

The health situation in which an individual decides whether to purchase and wear uncomfortable and constraining apparel in order to avoid uncertain (but much more severe) future risks creates an avoidance-avoidance conflict (Cox & Cox, 2001). For
promoting such and similar behaviors, gain-framed messages have been found to significantly better promote an individual’s decision to engage in a preventive behavior (Rothman et al., 1993). Accordingly, the authors explain that positively framed appeals stress the “desirable consequences of compliance” with a behavior (O’Keefe & Jensen, 2006, p.3). Yet, the effectiveness of positively framed messages in the realm of prevention behaviors were not always supported (Bartels, Kelly & Rothman, 2010; Blanton et al., 2001; Robberson & Rogers, 1988; Meyerowitz & Chaiken, 1987).

To better understand the underlying mechanisms of risk and safety construal within the domain of prevention behaviors, O’Keefe and Jensen (2007) conducted a meta-analysis and reviewed 93 studies that had investigated framing effects relative to prevention behaviors. Here, the authors were not able to support the view that gain or positive framed appeals relative to prevention behaviors affect psychological and behavioral outcomes in a consistent and predictable way across all populations.

Consequently, it is unclear in the realm of framing research how health messages must be expressed in order to be maximally persuasive. As outlined, relative to the function of the target behavior “wearing protection gear”, it would be misleading to predict that gain framed appeals will be more effective in motivating individuals to wear protection gear (Rothman & Salovey, 1997). Accordingly, we formulated the research question to identify whether gain or loss framed and positively or negatively framed messages significantly differ in their persuasive effectiveness relative to the target behavior.
Identifying moderators for framing effects

To date, research results have failed to unambiguously explain the underlying mechanisms of health behaviors that would consistently predict framing effects. As a result, different researchers increasingly address the need of identifying moderating variables that can explain differences in effects of framed messages (Broemer, 2002). Particularly important for understanding the effects of health messages are people’s own experiences with and their perspective on a health behavior (Rothman, Bartels, Wlaschin, & Salovey, 2006). Here, one important factor is involvement, as differences of involvement have been found to reflect upon different processing strategies as well as an individual’s response with an issue or message (Meyers-Levy & Maheswaran, 2004; Chaiken & Maheswaran, 1994; Greenwald & Leavitt, 1984). Based on the idea that involvement influences reactions to health behaviors, it was argued that when an individual is highly involved in a health behavior, the knowledge about the potential risks increases, making the individual more loss aversive (Rothman, Bartels, Wlaschin, & Salovey, 2006). In line with this reasoning, the authors predict that loss frame appeals would be more persuasive than gain framed ones. However, another study that particularly addressed the impact of involvement relative to preventative behaviors, obtained a gain-framing advantage when people were highly involved in the investigated safety issue (Millar & Millar, 2000). As a reaction to these ambiguous findings, we formulated a second research question to investigate the interaction between message frames and levels of involvement on persuasive effectiveness.
To summarize, the present investigation followed the general notion that the persuasiveness of a web banner depends on how compatible a health message\(^1\) is with the way a recipient of the message thinks and reasons about the health behavior. Consequently, this study was designed to investigate this threefold relationship as the target behavior, the forms and functions of a health message, and the individual to which a health message is addressed must be clearly characterized and understood in order to ensure that the safety appeal is maximally persuasive.

The objective of the study and both research questions are summarized in table 1.

\(^1\) The term “health message” will from here onward refer to the combined information of text and picture as presented on the experimental web banner; unless it is clearly indicated that we refer to the general notion of health communication information in its general sense.
Table 1

**Objective and research questions of the present investigation**

<table>
<thead>
<tr>
<th>Framework for the present investigation</th>
<th>Consideration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective</td>
<td>1) Identifying the most effective framing manipulation for a web banner comprised of a text and a picture that is maximally persuasive in communicating the importance of wearing protection gear.</td>
</tr>
<tr>
<td>Research questions</td>
<td>1) Do gain and loss framed messages/ positively and negatively framed messages significantly differ in their persuasive effectiveness?</td>
</tr>
<tr>
<td></td>
<td>2) Will there be a significant interaction between different message frames and involvement on persuasive effectiveness?</td>
</tr>
</tbody>
</table>
CHAPTER II

LITERATURE REVIEW

Introduction

Health communication research addresses the complex and challenging task to communicate relevant health information with the overall aim of promoting public and individual health by preventing diseases and causing awareness about safe as well as unsafe choices (Dillard & Pfau, 2002). Here, health communications strategies often rely on persuasive messages to create effective appeals intended to inform the society in general and to motivate people to adopt healthy behaviors in particular (Gallagher & Updegraff, 2012). The effectiveness of such messages depends on how health behavior recommendations and health outcomes are presented, how the presented information is processed cognitively and if this process elicits a change in a person’s attitude and behavior (Perloff, 2010).

As there is no universal theory or framework that explains all factors involved in motivating an individual to make a safe choice and to consequently act accordingly, the following literature review outlines different models and theories borrowed from cognitive psychology as well as persuasive communication research.
First, we will outline how the cognitive human processing system derives and integrates meaning from information presented as a combination of texts and pictures. Here, we describe cognitive interactions of text-picture processing based on the Integrated Model of Text Picture Comprehension and summarize research findings relative to the effects of congruent as well as incongruent message processing.

Second, we introduce prospect theory in order to explain the cognitive processes during decision making and risk choices. Then, we show how framing theories are based on these insights and outline how different framing functions and settings can predictably change the reference point of an individual about a health issue. Additionally, we will point to investigations designed to empirically assess how health messages must be framed and what factors have been found to influence the motivation to engage in a healthy behavior.

Last, we introduce the Elaboration Likelihood Model that can help to explain how people engage in and elaborate on persuasive health messages as the understanding of these processes can help to tailor relevant health information to particular audiences. We introduce the Theory of Reasoned Action and the Theory of Planned Behavior to show how this persuasive process can be related to how people form intentions to engage in health behaviors. These theories of attitude and behavior change will show what factors can ultimately predict if and under what circumstances an individual will successfully be persuaded to engage in a healthy and safe behavior or learn about and purchase protection gear.
Text-Picture Processing

Persuasive messages, e.g. as found in the news media, health campaigns and on websites, are frequently presented as a combination of visual and verbal forms (Dillard & Pfau, 2002). Hence, it is important to understand the cognitive processing strategies a message receiver employs while exposed to verbal and pictorial information formats simultaneously.

Integrated Model of Text Picture Comprehension

The Integrated Model of Text Picture Comprehension (ITPC) was first introduced by Schnitz and Bannert (2003) and combines theories of information processing (Baddeley & Hitch, 1974; Attkinson & Shiffrin, 1971), a theory of different cognitive subsystems (Paivio, 1986), the idea of multiple mental representations in text and picture comprehension (Kosslyn, 1994; van Dijk & Kintsch, 1983), as well as ideas from the theory of multimedia learning (Mayer, 2001). The model was extended by Schnitz (2013), now integrating neuropsychological models of word recognition and reading (Ellis & Young, 1996).

The most important premise of the model at hand is that it clearly differentiates two basic forms of external representations based on different sign systems: descriptions and depictions. According to Schnitz and Bannert (2003), descriptive representations consist of symbols, have no similarities with their referent, and carry meaning exclusively based on conventional rules and agreement (such as mathematical expressions, physical formulas, and texts). On the other hand, depictive representations
consist of icons and are clearly associated with their referent by similarity and structural commonality (such as photos, drawings, models, maps, line graphs).

Based on these representational principles, Schnottz and Bannert (2003) describe that text and picture comprehension is accordingly determined by different mental processes, namely along a descriptive and a depictive branch of representation, eventually leading to the integration of both forms.

Following this theoretical framework proposed for learning and understanding texts and pictures together or separately (Schnottz & Bannert, 2003); Schnottz (2013) distinguishes and expands the framework of the multiple memory systems of the ITPC model. Here, surface structure processes transfer phonological or graphemic (verbal) and visual or acoustic (non-verbal) into the auditory or visual working memory.

The processing of descriptive information is based on the analysis of symbol-structures, starting from sub-semantic processing to semantic processing where text surface representations are comprised into propositional representations according to the information’s semantic content. These deep structure processes are derived from the analysis of acoustic non-verbal features and graphemic lexical patterns (Schnottz, 2013). During the semantic deep structure processing, verbal information (spoken or written) is therefore first processed in the descriptive subsystem followed by the depictive subsystem, when the mental model is constructed and inspected by conceptual organization.

In working memory, processing of depictive information is based on analog structure mapping where perceptive connections are established based on semantic
selection strategies (Schnotz, 2005). Here, visuo-spatial as well as sound patterns are processed and integrated into a mental model (Schnotz, 2013). Therefore, pictures are first processed in the depictive subsystem followed by the descriptive subsystem (Schnotz, 2013).

These interactions during the integration of information enable a learner to comprise a unitary organization of the presented text and the picture. This integration process derives and combines information at each step until propositional representations and mental models are formed for both sources of external information (Schnotz, 2002). This construction is guided by and depends on the extent to which the learner perceives and understands the relationships between the two elements, and is driven by a schema mapping process involving top-down and bottom up processing (Schnotz & Bannert, 2003).

According to Schnotz (2013), it should be noted that if a picture is combined with a written text, all information has to enter working memory through the visual register. This causes a split of attention that can lead to unproductive search processes as only one kind of information can be attended to at one moment in time. Schnotz (2013) remarks that spatial contiguity “is a way to minimize the loss of information due to split of attention and allowing ‘approximately simultaneous’ availability of pictorial and verbal information in working memory” (Schnotz, 2013, in press). Additionally, the author notes that for learning processes involving pictures and texts the form of the visualization will determine the successful mental model construction. This suggestion was based on findings by Schnotz and Bannert (2003) who studied task-appropriate and
task-inappropriate visualizations and proved that learning was only enhanced by a picture if its form was task-appropriate.

When combining texts and pictures for purposes of persuasive communication one cannot easily assume that recipients will actively engage in and scrutinize over message contents. Research trying to reveal and explain cognitive patterns during persuasive processes has shown that many variables can influence attention processes and the amount of message elaboration; for example context, recipient, and message related factors (Dillard & Pfau, 2002). However, all things being equal, in the following we regard different processing effects relative to the message contents, as a text and a picture may but do not necessarily have to be congruent in their semantic depictions.

Effects of congruent message contents

If a text and a picture relate to the same contents and are semantically congruent in what they express, the ITPC model suggests that during deep structure processing the semantic components of the propositional representation should easily map onto the mental model, and in turn, the mental model constructed from perceptual structures should be coherent with the information from propositional representations. According to the model, the search processes in forming integrated knowledge structures based on coherent verbal and visual information should therefore be minimal.

Such meaning congruence of several sources of information does not only impact information integration but has been shown to affect processing fluency (Reber, Winkielman, & Schwarz, 1998). According to processing fluency accounts, stimuli that can be easily processed are generally evaluated in positive terms and result in more
favorable attitudes to the stimuli at hand (Reber, Schwartz, & Winkielman, 2004; Winkielman, Schwarz, Fazendeiro, & Reber, 2003). These fluency-based affective reactions have been summarized by the above mentioned authors as the “hedonic fluency hypothesis”, that is, the general principle that people prefer easily processable stimuli.

According to this concept, people prefer what they experience as fluent, or what they feel can be processed fluently. Topolinski and Starck (2009) tried to address and measure the relationship between feelings of fluency as well as positive feelings and found that higher levels of fluency of the stimuli were not necessarily perceived by their participants (i.e. could not be explicitly reported) but clearly led to higher ratings in liking.

Consequently, researchers have also examined the influence of semantic coherence and processing fluency on judgment formation and decision making. For example, Schwarz (2004) found that people tend to associate fluency with truth while disfluency is more likely to be connected with untruth. Going a step further, researchers applied the above mentioned findings to marketing research. For example, Labroo, Dhar, and Schwarz (2008) showed that people prefer products (they presented a bottle of wine with a frog on its label) that are perceived more easily because they are primed with a semantically related concept (here, a frog).

On the other hand, research that addressed congruency relative to marketing strategies found that “congruent objects are not very noteworthy and therefore are unlikely to prompt extensive cognitive elaboration” (Meyers-Levy & Tybout, 1989, p.40).
Effects of incongruent message contents

If a text and a picture that were combined in an integral fashion are not semantically coherent, the ITPC model predicts that the resulting cognitive processes are more effortful as the incongruent semantic structure of the picture must be mapped onto the mental model. According to Schnotz (2013), such additional cognitive efforts impede with the learning progress.

However, this state of cognitive inconsistency could potentially be meaningful in settings of persuasive communication in which not so much the learning outcomes are decisive. Instead, one could argue, that the irritation of attention processes can determine an intriguing persuasive message.

Festinger (1957) originally described the psychophysiological response to incongruent stimuli as “cognitive dissonance”, referring to such a distressing mental state evoking negative affect. He explains that this tension has the potential to trigger a human need or desire to reduce or overcome this unpleasant cognitive conflict. Accordingly, many studies report that incongruity draws greater attention to stimuli than congruity, thus increasing the likelihood of more detailed processing (Meyers-Levy & Tybout, 1989; Houston, Childers, & Heckler, 1987). By applying this principle of cognitive dissonance to consumer research, Heckler and Childers (1992) showed that the memory of an advertisement is superior in a discrepant situation. In other words, incongruence might challenge the inadvertent consumer to resolve the incongruence, thereby prompting elaborate rather than shallow processing of advertisement content (Maheswaran & Chaiken, 1991). To summarize, it is the “reconciliation [and reprocessing of the stimulus
that] might serve to strengthen certain associative connections and thereby result in improved recall” (Heckler & Childers, 1992, p. 489).

It has been shown that congruent messages produce positive affect and can result in more favorable attitudes towards products, whereas incongruence within a message yields the potential to increase attention and memory of the message contents. These findings indicate important implications for the design and the effectiveness of persuasive health messages.

In the next section, we will first outline framing theories and the technical considerations to change a message frame. Then, we will show that the message receiver and therefore the individual’s relative disposition towards the health issue, also yield important implications for determining the effectiveness of a health message.

Framing Theories

Framing theory and the concept of framing bias suggest that how something is presented influences the choices people make. Therefore, this framework is particularly useful in determining which contents must be presented in what format to create effective health messages (Gerend & Cullen, 2008; Gerend & Shepherd, 2008; Gerend & Shepherd, 2007, O’Keefe & Jensen, 2007; Rothman & Salovey, 1997). In that respect, the characteristics of the decision maker and the to-be promoted behavior also moderate the influence and effectiveness of the framed messages (Rothman et al., 1993) and will therefore also be addressed in the following section.
Prospect Theory

The foundations for understanding that the representation of a decision problem affects the consequent decision making process has been laid by Kahneman and Tversky’s (1979) “prospect theory”.

The most important finding in their research is that the change of the reference point of a problem situation with objectively equivalent information systematically affects the behavior of individuals (Kahneman, 2011; Kahneman & Tversky, 1981; Kahneman & Tversky, 1979). In other words, factually equivalent material can be presented differentially to individuals such that they encode it as either a gain or a loss from this reference point.

In their research, the authors manipulated the value function of information so that decision outcomes were presented in such a manner to either accentuate the positive or negative aspects of the outcomes of the decision task. To investigate, what has been called the “principle of description invariance”, the authors typically manipulated experimental materials so that the same outcomes were described in positive and in equivalent negative terms. For example, if a person was told to choose between ground beef described as being 80% lean, then logically, the same probabilistic alternative was described when stating a 20% fat content (Kahneman & Tversky, 1984). With such manipulations, the authors demonstrated that a shift of the framing perspective alters the perspective on the outcomes of a decision situation and consequently makes peoples choices and preferences not only predictable but also controllable.
Further, the authors developed their well-known model of risk choices (Tversky & Kahneman, 1981; Kahneman & Tversky, 1979) in order to show that human decision making is inherently non rationale and is predictably subjected to the perceived certainty or uncertainty of a problem outcome. The model describes that the prospect of a loss has far greater impact on decision making than does the prospect of an equivalent gain. Here, the choice values have been found to follow an S-shaped curve in the responses regarding risk choices or other probabilistic alternatives involving uncertainty.

The term prospect theory refers to the phenomena describing that the outlook of greater gain is perceived as less valuable than the prospect of even a modest loss, as it far predominates the prospect of that comparable modest gain. In their experimental manipulations, Tversky and Kahneman (1981) used paradigms offering participants two alternatives; one relatively risky and one relatively non-risky option in order to systematically examine the reactions. They were able to prove their framework in many studies and conclude that people are willing to avoid risks when they consider the potential gains or benefits as a reference point, but that people react in a risk-seeking way when presented with uncertain options (Kahneman, 2003). In the context of health communications this effect has been replicated and showed that patients are willing to select greater risks if the decision regards saving a life or reducing suffering (Rothman & Savoley, 1997; Thompson & Cusella, 1991).

The framing effect

Based on prospect theory, “framing” corresponds to the notion that objectively equivalent information can be presented or expressed in different ways. This
means that frames are used to include, exclude, and emphasize aspects of a created reality. Entman (1993) states that frames:

- define problems—determine what a causal agent is doing and costs and benefits, usually measured in terms of cultural values;
- diagnose causes—identify the forces creating the problem;
- make moral judgments—evaluate causal agents and their effects; and
- suggest remedies—offer and justify treatments for the problem and predict their likely effects (p. 55).

The psychological reactions to framed information have proven to consistently differ, and are referred to as framing effects (Kahneman & Tversky, 1984; Tversky & Kahneman, 1981). Gain-framed information emphasizes benefits and induces an approach behavior, whereas loss-framed information stresses potential costs and induces an approach reaction based on an avoidance mechanism of the potential negative consequences (Shen & Dillard, 2007; Lee & Aaker, 2004). Accordingly, the probabilistic alternatives of a behavior determine whether a gain or a loss framed appeal will more effectively motivate people to take actions (Gerend & Shepherd, 2007; Rothman, Bartels, Wlaschin, & Salovey, 2006; Rothman & Salovey, 1997).

Framing effects relative to health communication

It is the essence of framing to “making things look better or worse by making some aspect of the situation more salient than others” (Kühberger, Schulte-Mecklenberg, & Perner, 1999, p. 219). This general framing construct can be applied for communicating health relevant information. Accordingly, “health [messages] can be framed in terms of the benefits of engaging in a particular behavior, or in terms of the costs of failing to engage in the behavior” (Sherman, Mann, & Updegraff, 2006, p. 165). Relative to the prospect theory (Kahneman & Tversky, 1979), this implies that potential
losses are more motivating than potential gains when risky actions are contemplated, whereas gain frames are more motivating for low-risk behaviors. Schneider et al. (2001) summarized the decision-making process under risks:

When people are given a choice between two options, one with a certain and one with an uncertain outcome, gain-framed information elicits a preference for the more certain, low-risk option. In contrast, loss-framed information shifts preferences toward the probabilistic, more uncertain option to combat the aversion and anxiety produced by contemplating certain losses. (p. 257).

Along a similar train of thought, Rothman et al. (1997) proposed to organize health behaviors into detection and prevention categories in order to test framing effects respectively. Following the above described logic about how people construe risks, the assumption is that gain framed appeals are of significant persuasive advantage over loss framed appeals in the domain of prevention behaviors and that loss framed information is more persuasive for disease detection behaviors (Salovey, Schneider, & Apanovitch, 2002; Rothman & Salovey, 1997; Salovey, Rothman, & Rodin, 1998; Banks et al., 1995). This postulate supported a variety of research findings: loss framed messages were more persuasive for detection behaviors (Apanovitch, McCarthy, & Salovey, 2003; Schneider et al., 2001; Rothman et al., 1993; Meyerowitz & Chaiken, 1987) and gain framed messages were more persuasive for prevention behaviors (Detweiler et al., 1999; Rothman et al., 1993).

Nonetheless, empirical findings were not always able to support the categorical distinction into detection and prevention behaviors and found different framing manipulations to be effective (Bartels, Kelly & Rothman, 2010). For example,
Meyerowitz and Chaiken (1987) investigated breast self-examination behavior, Robberson and Rogers (1988) tried to promote exercising to increase self-esteem, and Blanton et al. (2001) promoted the use of condoms; all based on framing manipulations. Although all these investigations concerned the promotion of health prevention behaviors, they all found loss frames to significantly affect behavioral intentions.

Consequently, the current suggestion in approaching framing effects is that researchers must look beyond the notion of prevention and detection categories (Bartels, Kelly, & Rothman, 2010; Latimer et al., 2007) in order to find other predictors that explain when individuals perceive risks, threats, or uncertainty in a health behavior (Gerend & Sias, 2009). This indicates a shift in the approach to investigating framing effects as the risk-construal must be directly based on the individual that will be confronted with the respective health decision.

**Involvement**

Empirical research has shown that the “variation in how people think about the risks associated with [a behavior] can affect their response to framed appeals” (Bartels, Kelly, & Rothman, 2010, p. 822). Accordingly, researchers also tried to investigate an individual’s relationship with a health behavior as this could explain the underlying motivation of a person for why and how they make corresponding health decisions. One factor that could potentially moderate the relationship between framed messages and a health behavior is the level of involvement with the health issue (Rothman et al., 1993). Krugman (1965) explained that involvement does not
mean attention, interest, or excitement but the number of conscious ‘bridging experiences’,
connections, or personal references between an individual and the stimulus [...] with low
involvement one might look for gradual shifts in perceptual structure, aided by repetition,
activated by behavioral-choice situations, and followed at some time by attitude change. With
high involvement one would look for the classic, more dramatic, and more familiar conflict of
ideas at the level of conscious opinion and attitude that precedes changes in overt behavior
(Krugman, 1965, p. 355).

There seems to be a consensus in the literature of cognitive psychology and
health communication that high and low involvement is believed to differ relative to
personal relevance and importance of the issue for a person. The consequences for these
two levels of involvement can reflect in different levels of processing, affective reactions,
attention, attitudes, and behaviors (Greenwald & Leavitt, 1984). Greenwald and Leavitt
(1984) describe that the effectiveness of advertising messages is moderated by audience
involvement and consequently the authors introduce four different levels of involvement,
namely pre-attention, focal attention, comprehension and elaboration. The authors proved
that each involvement category systematically differed in attention processes, levels of
processing, and cognitive elaboration. However, the authors remark that this laboratory
based method may be difficult to directly apply to a natural advertisement setting.

Relative to health communication research, it has been argued that the level of
involvement may reflect upon different risk perceptions thus, mediating the effectiveness
of framing effects (Rothman et al., 1993). For example, it is argued that involvement
increases the knowledge about the risks and thus making participants more risk seeking
(Rothman, Bartels, Wlaschin, & Salovey, 2006, p.207). In line with this, it was found that
negatively framed messages are more persuasive than positively framed ones when issue
involvement is high (Maheswaran & Meyers-Levy, 1990). Another investigation presented results from the only study that ever investigated involvement relative to promoting a prevention behavior and found that gain framed appeals did more effectively motivate highly involved individuals to engage in the health behavior (Millar & Millar, 2000). Therefore, the factor issue involvement offers promising, yet to date, inconclusive insights to understanding of framing effects may be moderated (Rothman et al., 1993).

Another approach to re-consider mixed findings of framing effects was offered by Levin, Schneider, and Gaeth (1998) who differentiated framing manipulations according to three different techniques: risky choice framing, attribute framing, and goal framing. Here, the authors intended to rule out that mixed findings are based on unstandardized operationalization and thus provided a framework to structure varying types of frames. It must be remarked, however, that although their structuring clearly defines different kinds of framing manipulations quite precisely, the authors do not address how these interact with certain psychological variables.

**Goal Framing**

As health-related choices involve persuasive communication determined to encourage healthy life styles (Gray, 2008), goal framing is particularly useful for creating effective health messages based on verbal appeals. Here, individuals are always encouraged to engage in the same healthy behavior (e.g. wearing protection gear) which remains the same across framing conditions. Therefore, regardless of the framing manipulation, goal framing always promotes the benefit of an action. However, even under the construct “goal framing” the same behavior can still be presented by
emphasizing the same or different consequences (Rothman et al., 1993). As an example, a goal framing manipulation depicting different consequences can, on the one hand, encourage a healthy way of life by accentuating the benefits through acquiring a behavior while, on the other hand, discourage unhealthy choices by emphasizing the losses or costs though not acquiring a behavior.

Attribute Framing

Levin, Schneider, and Gaeth (1998) defined a second kind of framing manipulation referred to as attribute framing. Here, a single attribute of an object or situation is described by emphasizing either the positive or negative aspects of a choice situation (for example by depicting different outcomes). One example of inducing either positive or negative affect could be the presentation of affect laden stimuli as the background image (Levin, Anglin & Camey, 1987). According to Levin, Schneider, and Gaeth (1998) attributes can be framed by shifting their valence. That means that information is put in a positive or a negative light, causing different decision making processes to operate. Another explanation is that here priming could constrain and thus determine the arrangement and interpretation of the message (Alba & Hasher, 1983; Bartlet, 1932). This means that the positive and negative information pieces serve as contextual cues employed in making inferences about the message; leading individuals to derive meaning that is not necessarily in the message.

Schwarz and colleagues proved with a vast amount of research how such triggered affective states can influence information processing, subsequent decisions, and reactions, (Pfister & Böhm, 2008; Schwarz & Clore, 2003; Rusting, 1998; Forgas, 1995;
Schwarz & Bless, 1991) and coined this phenomenon the “affect-as-information hypothesis”. The authors explain that people rely on their emotional state to judge a situation based on a feeling or emotional state caused by an unrelated stimulus. Therefore, a judgment about stimuli is not simply based on its rational features but is also driven by people’s intuitive reaction (Schwarz, 1990). In other words, the affect-as-information hypothesis can determine people’s likes and dislikes about a product, stimuli, or object based on the notion that:

All of the images in people’s minds are tagged or marked to varying degrees with affect. An individual’s “affect pool” contains all of the positive and negative markers associated (consciously or unconsciously) with the images (Slovic, Peters, Finucane, & MacGregor, 2005, p. 36).

This means that affect, even when outside consciousness, influences cognitive operations and consequently decisions (Winkielman, Berridge, & Wilbarger, 2005; Zajonc, 2000; Zajonc, 1980). For example, research has shown that negative stimuli elicit physical avoidance reactions, whereas individuals exposed to positive or pleasant stimuli react with approach movements (Coombes, Cauraugh, & Janelle, 2007; Chen & Bargh, 1999). This valence-consistent shift in attribute framing is a robust effect, observed in a large range of experimental environments, with obvious implications for health communication and persuasion (Kahneman, 2011; Kensinger, 2004; Slovic, Finucane, Peters, & MacGregor, 2002; Russell, 1980).

The negativity bias in attribute framing

Supporting the affect as information view, research has shown that negative images elicit greater attention and stronger response than either positive or neutral stimuli
(Hajcak, Dunning, & Foti, 2007; Hajcak et al., 2007; Most, Smith, Cooter, Levy, & Zald, 2007; Cuthbert, Schupp, Bradley, Birbaumer, & Lang, 2000). This greatly supported phenomenon has been labeled negativity bias showing that negative information is more attention-grabbing and persuasive than equivalent positive information (Rothman et al. 1999; Homer & Yoon 1992; Maheswaran & Meyers-Levy, 1990). In line with this, Cacioppo and Berntson (1994) reasoned that negative affect acts as a signal to inform people that they may not be achieving their desired state or goal for a given task. Accordingly, the authors explained that negative affect draws attention to the task at hand, consequently leading people to become more involved in it. Most, Smith, Cooter, Levy, and Zald (2007) state that negative information may receive greater attention as we may be evolutionarily prone to detecting threat in order to ensure survival. Normen (2002) commented on similar findings relative to negative stimuli that here the affective system acts to tense muscles in preparation for action and to alert the behavioral and reflective levels to stop and concentrate upon the problem. The neurotransmitters bias the brain to focus upon the problem and avoid distractions (Normen, 2002, p. 26).

This increase of attention induced by negatively framed messages has also been found by Meyerowitz and Chaiken (1987), who added that negative stimuli are more likely to violate people’s expectations since people are more accustomed to seeing arguments framed in positive terms rather than in their negative counterparts.

To summarize, research regarding framing theories has focused on aspects of the persuasive message itself and in relation to that, identified important variables regarding the recipient of that message, for example a person’s involvement with the
health behavior. Therefore, the research findings outlined above did not only prove the effectiveness of framing manipulations to influence decision outcomes, but also showed that framing manipulations combined with knowledge about the message receiver can ultimately direct cognitive and affective processes during persuasive communication and consequently influence health choices. The following section now turns to the overall goal of a persuasive communication process, namely to ultimately change a receiver’s attitude and behavior regarding a particular subject (Perloff, 2010; Ajzen, 2000).

**Persuasive Communication**

Persuasion has been defined as a “noncoercive attempt to change attitudes or behaviors” (Fogg, Cuellar, & Danielson, 2007, p. 134). Petty and Briñol (2008) explained that attitudes are the most important variable in psychological terms to explain persuasive outcomes, as they refer to general evaluations people have regarding other people, places, objects, and issues. Attitudes are studied as the primary object of influence because of their presumed guiding influence on choice and action. That is, all things being equal, people will decide to buy the product they like the most, attend the university they evaluate most favorably, and vote for the candidate they approve of most strongly (Petty & Briñol, 2008, p. 137).

Eagly and Chaiken (2007) acknowledged that the broad term “attitudes” encompasses many features and variables regarding cognitive evaluation processes, direct attitudes towards objects or situations and also less straightforward tendencies which can differ in valence and intensity. As attitudes are not always directly observable, Eagly and Chaiken (1993) distinguished between two groups of measurements: direct and indirect
ones. Direct measurement methods typically ask participants to state their attitude towards an issue, object, or decision situation by the help of item rating scales or questionnaires. Indirect measurements employ methods with which researchers infer attitudes from behaviors, reactions, or judgments. Here, the difficulty in predicting attitudes from such actions is that there is no “one-to-one correspondence” (Fazio, 1986, p. 205) between the two entities, but that attitudes should merely be employed to help to describe behavior (Perloff, 2010).

We now introduce a model of persuasive communication that has been found to effectively show when and how attitudes are formed and changed.

**Elaboration Likelihood Model**

The Elaboration Likelihood Model (ELM; Petty & Cacioppo, 1986; Petty, Richard, Cacioppo, & Schumann, 1983) is an example of a dual process approach (see also Evans, 2003) describing two ways of how persuasion can take place. Here, two basic routes of cognitive processing are employed (see also Chaiken, 1980). According to several factors regarding message characteristics or individual differences of the receiver, the extent to which a receiver elaborates about a message differs. Ultimately, the extent of engagement in processing the message, will determine the likelihood of being persuaded.

Petty and Cacioppo (1986) understand elaboration as “the extent to which a person thinks about the issue-relevant arguments contained in a message” (p. 128). The ELM suggests that there are two routes to persuasion that reflect the end points of a continuum of elaboration likelihood- namely the two extremes of central or heuristic
processing. To what extend an individual engages in either processing strategy during message engagement depends on various factors.

Petty and Wegener (1999) explained that if a topic, message, or issue is of high relevance, a receiver is more motivated to engage in careful thinking, presumably leading to high elaboration. If a message is not considered to be of relevance, a receiver is more likely to focus on extrinsic features of the communication situation. According to the ELM, the level of involvement is one factor that can determine how an individual processes and engages in a message.

For example, when involvement is high, people are more likely to be motivated to engage in “the cognitive effort required for evaluating the true merits of an issue or product” (Petty, Cacioppo & Schumann, 1983, p.137). This means that a receiver engages in central route processing. Here, a receiver is likely to actively attend to and consequently cognitively elaborate on a persuasive message (Petty & Cacioppo, 1986). According to Petty, Cacioppo, and Schumann (1983), this high elaboration leads the receiver to engage in systematic thinking in order to reflect upon and evaluate the message and focus in detail on its arguments. Accordingly, central route elaboration is primarily based on the quality of the communication consequently causing recipients to compare arguments in the message actively and relative these to their previous knowledge or their experience with the subject in order to form or change their attitude respectively. However, this high level of elaboration only occurs if a person is motivated and able to engage in heuristic processing strategies.
In contrast, when the message relevance is low, the peripheral route is more effective than the central route as a persuasive means, since the receiver is more inclined to focus on heuristic cues provided by the message surface to evaluate the message (Petty & Cacioppo, 1986). Therefore, the persuasion process is not the result of deep elaboration, but occurs by simple inferences of the message’s validity based on simple cues (Petty & Cacioppo, 1986) or heuristic principles (Chaiken, Liberman, & Eagly, 1989) in evaluation of the message. This means that the receiver bases his or her attitude about the message or product on marginal information that is validated quickly and efficiently. Chaiken, Liberman, and Eagly (1989) explain that such simple decision heuristics can be quite diverse. The authors summarize heuristic rules of thumb in order to show that judgements can be based on simple measures such as “Expert’s statement can be trusted”, or “Length implies strength”, or “Consensus implies correctness” as according evaluations can determine the persuasive effectiveness of a message (Chaiken, Liberman, & Eagly, 1989, p. 216-217). Another heuristic is the sympathy of the communicator: when this liking heuristic is employed, liked communicators will be the reference point for the persuasive process (Petty & Cacioppo, 1986). Such message characteristics can affect attitudes without the need to deeply process the message contents or arguments (Petty & Wegener, 1999).

Thus, either the central route or the peripheral route can be evoked in various situations involving different message types, individual differences among receivers, and environmental (or situational) factors. Persuasion can be effective in both routes, although the strength, durability, and resistance of attitudes formed via the two routes
may differ (Petty & Wegener, 1998). According to Lee and Schumann (2004), the ELM is particularly useful “because it provides an explanation and prediction for when different processing strategies are employed when one is exposed to a communication” (p. 61). Therefore, the model provides a solid framework for investigating the persuasiveness of health messages and can help to tailor their contents to different audiences.

In order to establish a framework for this investigation capable of explaining how these changes in attitudes could potentially be measured, we introduce two theories that identified variables in the correspondence between attitudes and behaviors.

**The Theory of Reasoned Action**

The Theory of Reasoned Action (TRA; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) assumes that anything behavioral is intentional and can therefore be predicted by a person’s intention to engage in a behavior. Accordingly, Ajzen and Fishbein (1980) state that the theory explains intentions as described by two different entities: by personal feelings or attitudes towards the behavior in question (behavioral beliefs) and by assumed responses of the personal environment of an individual toward a behavior (subjective norms). They argue that behavioral beliefs are evaluations or judgments regarding an intended behavior. In that sense, an individual considers the possible consequences regarding a particular behavior relative to the perceived probability of an intended outcome. Subjective norms, on the other hand, are described by the authors to refer to the perceived and anticipated reactions and responses of one’s personal environment relative to the intended behavior. This factor is particularly
important in the realm of motorcycle riding as it is often undertaken as a group activity (Elliott, 2010). Therefore, the influence of subjective norms could be an important predictor in the construal of a rider’s self-identity or attitudes towards a health behavior or health product.

Overall, Ajzen and Fishbein (1980) explained that the weight and importance of each component can differ according to situations and individuals. In order to strengthen the link between beliefs and behaviors, Ajzen (1991) revisited the TRA and added predictors and thus, creating a more refined approach in predicting behaviors.

The Theory of Planned Behavior

The Theory of Planned Behavior (TPB; Ajzen, 1991) is also based on the assumption that behavioral beliefs and normative beliefs are the most crucial factors in determining behavior. However, Ajzen (2000; 1991) added by the help of a vast amount of research the factors “perceived behavioral control” and “control beliefs” to the theory. These additional factors were derived from the general notion that an individual may try to perform a behavior but is not able to do so because of feelings of constraints. Perceived behavioral control is defined as an individuals’ perceived ease or difficulty in performing a certain behavior. This factors, thus, could explain why individuals may think that they may or may not reach their goals and thus influence the formation and changes of intentions (Ajzen, 1991). Accordingly, control beliefs determine an individual’s belief about the presence of factors that may facilitate or impede performance of the behavior (Ajzen, 1991).
Recently, the TPB has been applied as a theoretical framework in two studies regarding riding behaviors in the activity of motorcycling (Chorlton & Conner, 2012; Elliott, 2010). Chorlton and Conner (2012) applied the TPB in addition to past behavior, control beliefs, attitudes, moral norm, normative beliefs, and self-identify and were able to explain 60% of the variance in riders’ intention to exceed speed limits. Particularly interesting was their analysis of beliefs, showing that here intenders were distinct from non-intenders relative to safety beliefs.

Elliott (2010) extended the factors as proposed in the framework of the TPB and added social influences, namely group norm and group identity, as well as self-identity factors and affective attitude as potential moderators for predicting speeding intentions. Elliot (2010) noted as a most important finding that the more likely a motorcyclist was to believe that being a “speeder” was an important part of their self-concept, the more likely they were to intend to speed. The author remarks that in order to communicate the importance of safety issues effectively, future research is needed to carefully define and target more cognitive predictors for behavioral intentions relative to behaviors in the realm of motorcycling.

The Present Investigation

The purpose of this study was to investigate the combined effects of involvement, text frame, and picture valence on browsing behavior, behavioral intention, normative beliefs, and product attitude. Together, the dependent measures were employed to describe the overall persuasive effectiveness of each health message
comprised on the web banner. Consequently, we hoped to identify effective health messages proven to significantly encourage interest in appropriate safety measures. From a more theoretical viewpoint, the study aimed to identify if text frame, picture valence, and involvement are important predictors for effectively communicating health information relative to protection gear.

In order to understand and consequently influence the motivation of individuals to engage in the target health behavior (wearing protection gear), it is crucial to determine the characteristics of both: the behavior being promoted (see Chapter I), the decision maker, and the relationship between those two entities (see Chapter II section 3 and 4). Particularly important for choices involving risks, involvement with a health issue has been found to moderate the perspective on a health behavior (Rothman, 1993; Maheswaran & Meyers-Levy, 1990). Maheswaran and Meyers-Levy (1990) found that variations in people’s involvement with an issue influence how information is processed and consequently influences the response. In order to describe how involvement influences the reasoning to engage in a safety behavior, we refer the personality factor “sensation seeking” (Zuckerman, 1994) defined as the readiness “to take physical, social, legal, [or] financial risks for the sake of such experiences” (Zuckerman, 2009, pp. 455-456. Zuckerman (1994) consequently reasons that sensation seekers underestimate or accept risks as the price of the sensation or experience. This character trait therefore describes risk taking tendencies that may account for reasons why individuals are inclined to wear or not to wear protection gear. Accordingly, Zuckerman (1994) describes that motorcycle riders are higher sensation seekers as compared to non-riders
(Zuckerman, 1994; 1979). In line with these findings, we formulated Hypothesis 1 stating that:

**H1:** Individuals who are not involved in the activity of riding a motorcycle will consider protection gear as significantly more important and necessary than individuals who are highly involved in the activity.

As the present investigation aimed to depict protective measures as highly beneficial, we, logically, intended to focus individuals on the potential positive aspects of engaging in the target health behavior. Along the categorization of detective and preventive health behaviors (Rothman et al., 1997), a recent meta-analysis revealed a small advantage for gain-framed appeals for prevention behaviors (O’Keefe & Jensen, 2007). It must be remarked, however, that subsequent analysis revealed relative to the meta-analysis that this effect only occurred in a limited amount of studies on dental health. Therefore, it remains unclear when and for what behaviors gain framed messages will more effectively motivate an individual to engage in a health behaviors. In more general terms, it has been found that gain framed appeals are then more effective, when an individual considers the benefits of the outcome of the health behavior or if the behavior was perceived to be of preventative nature (Apanovich, McCarthy, & Salovey, 2003; Schneider et al., 2001; Detweiler et al., 1999). Consequently, we formulated Hypothesis 2 stating that we expect a main effect for text frame, such as that:

**H2:** Gain framed texts will yield higher measures on persuasive effectiveness than loss framed texts.
Relative to the factor picture valence, we outlined empirical findings proving that negative images elicit greater attention and stronger responses than either positive or neutral stimuli (Hajcak, Dunning & Foti, 2007; Hajcak et al., 2007; Cuthbert, Schupp, Bradley, Birbaumer & Lang, 2000; Most, Smith, Cooter, Levy & Zald, 2007). To buttress this finding, we introduced the negativity bias in order to show that affective reactions can determine reactions to even unrelated stimuli (Coombes, Cauraugh, & Janelle, 2007; Winkielman, Berridge, & Wilbarger, 2005). Additionally, we referred to studies proving that negative information is more attention-grabbing and persuasive than equivalent positive information (Rothman et al., 1999; Homer & Yoon 1992; Maheswaran & Meyers-Levy, 1990). Based on these empirical results, we formulated Hypothesis 3 in expectation of a main effect for picture valence, such that:

H3: Negative picture valence will yield significantly higher measures on persuasive effectiveness than positive picture valence.

All hypotheses regarding expected main effects are summarized in Table 2.
Table 2

*Theoretical predictions for expected main effects*

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Effects of X on Y</th>
<th>Predicted direction of X on Y</th>
<th>Theoretical Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Involvement on Importance of Protection Gear (IPG)</td>
<td>IPG: HI &lt; LI</td>
<td>Sensation seeking (Zuckerman, 1994, 1979)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Involvement</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Rothman, 1993;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maheswaran &amp; Meyers-Levy, 1990)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Prospect Theory</td>
</tr>
<tr>
<td>2</td>
<td>Text Frame on Persuasive Effectiveness (PE)</td>
<td>PE: Text Frame Gain &gt; Text Frame Loss</td>
<td>Goal Framing, Prospect Theory</td>
</tr>
<tr>
<td>3</td>
<td>Picture Valence on Persuasive Effectiveness</td>
<td>PE: Picture Valence Negative &gt; Picture Valence Positive</td>
<td>Affect Transfer Hypothesis, Negativity Bias</td>
</tr>
</tbody>
</table>

By logically following Hypothesis 2 and 3, we expected an interaction effect for picture valence and text frame on persuasive effectiveness. Such cognitive interactions during text picture integration have been outlined based on the ITPC model (Schnotz, 2013; Schnotz & Bannert, 2003). Here, we showed that the model predicts that semantically unrelated stimuli will cause irritation during semantic search processes. Further, we explained that during persuasive communication, these additional search processes can increase attention as well as persuasive effectiveness as explained by cognitive dissonance theory (Festinger, 1957). A number of research findings have revealed that incongruence in semantic relations can increase the memory traces about its
Consequently, and in line with the cognitive dissonance postulate, we expect in Hypothesis 4 that:

**H4:** Persuasive effectiveness will be significantly higher for health messages comprised of a gain text with a negative picture and loss text with a positive picture than for health messages comprised of gain text with a positive picture and loss text with a negative picture.

Further, we introduced the ELM as a baseline for the persuasive setting of this investigation to predict the overall effectiveness of the experimental health messages as explained by different cognitive processing strategies (Petty & Cacioppo, 1986; Petty & Cacioppo, 1983). We outlined above that the level of involvement determines the relevance of a health issue for an individual, leading the recipient to differently elaborate on persuasive messages (Petty & Wegener, 1999; Maheswaran & Meyers-Levy, 1990).

In particular we showed that highly involved individuals tend to scrutinize on arguments more carefully than heuristic cues (Maheswaran & Meyers-Levy, 1990). Consequently, we argue for an interaction effect between the levels of involvement and the levels of text frame. Following the reasoning presented in Hypothesis 2, we formulated Hypothesis 5 stating that:

**H5:** Persuasive effectiveness will be significantly higher for highly involved individuals than for low involved individuals, regarding the interaction with...
text frame. For high involved individuals, gain text will yield higher rating in persuasive effectiveness than loss text.

Conversely, low involved individuals have been found to elaborate more on heuristic cues than arguments presented in a message (Maheswaran & Meyers-Levy, 1990), leading us to consequently expect an interaction effect between levels of involvement and levels of picture valence. Following the reasoning presented in Hypothesis 3, we formulated Hypothesis 6 stating that:

H6: Persuasive effectiveness will be significantly higher for low involved individuals than for highly involved individuals, relative to the interaction with picture valence. For low involved individuals, the negative picture will yield higher ratings on persuasive effectiveness than the positive picture.

All hypotheses regarding expected interaction effects are summarized in Table 3.
Table 3

*Theoretical predictions for expected interaction effects*

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Effects of X and Z on Y</th>
<th>Predicted Direction of X and Z</th>
<th>Theoretical Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Text Frame and Picture Valence on Persuasive Effectiveness</td>
<td>PE: ((\text{Gain Frame Text} &amp; \text{Negative Picture Valence and* Loss Frame Text} &amp; \text{Positive Picture Valence}) &gt; (\text{Gain Frame Text} &amp; \text{Positive Picture Valence and Loss Frame Text} &amp; \text{Negative Picture Valence}))</td>
<td>Cognitive Dissonance, Affect Transfer Hypothesis, Prospect Theory</td>
</tr>
<tr>
<td>5</td>
<td>Involvement and Text Frame on Persuasive Effectiveness</td>
<td>PE: (\text{HI (Text Frame Gain – Text Frame Loss)} &gt; \text{LI (Text Frame Gain – Text Frame Loss)})</td>
<td>Elaboration Likelihood Model, Prospect Theory</td>
</tr>
<tr>
<td>6</td>
<td>Involvement and Picture Valence on Persuasive Effectiveness</td>
<td>PE: (\text{LI (Picture Valence Negative – Picture Valence Positive)} &gt; \text{HI (Picture Valence Negative – Picture Valence Positive)})</td>
<td>Elaboration Likelihood Model, Affect Transfer Hypothesis, Prospect Theory</td>
</tr>
</tbody>
</table>

* summarizes according cells of the interacting factors

These different elaboration routes as introduced by the ELM, in turn, have been shown to differentially form and change the attitude about the persuasive health message. As these attitude changes cannot be measured directly, we introduced two behavioral theories (Ajzen, 1999; Ajzen & Fishbein, 1980) as a means to theoretically
link our independent measures in such a way to the dependent measures, so that they can be employed to predict the effectiveness of the persuasive health message. Together, the TRA and TPB have successfully described and demonstrated that the measures of direct behavior, product attitudes, behavioral intentions as well as subjective norms, shape an individual’s future behavior based on persuasive principles (Ajzen, 2000). Accordingly, we have based our dependent measures on the outlined factors provided by these models in order to investigate persuasive effectiveness relative to the independent variables.
CHAPTER III

METHODOLOGY

Design

The research question at hand was investigated by a between-subject study design consisting of two factors; Picture Valence and Text Frame. The experimental design yielded four experimental cells combined from Picture Valence (positive vs. negative) and Text Frame (gain vs. loss). Consequently, this resulted in four different web banner manipulations which were randomized so that each participant had an equal opportunity of being presented with any one of the four conditions.

Participants

Two-hundred seven volunteers (aged $M = 41.4$, $SD = 15$, excluding one individual who reported to be under 18) were sampled with an online recruitment procedure. All participants agreed with the informed consent statement and fully completed the online study. 96 participants reported to be motorcycle riders (57 females, 39 males), 86 participants reported they did not ride a motorcycle (59 females, 26 males, 1 care not to state), 12 participants indicated that they were planning on riding in the future (5 females, 7 males), and 13 participants reported they were motorcycle passengers (12 females, 1 male).
Recruitment Procedure

We decided to conduct an online study based on the advantage of sampling from a large subject pool in order to contact people from motorcycle communities that would have been difficult to bring to the laboratory (Birnbaum, 2004). Therefore, appropriate forums, social media sites, locally distributed discussion groups, online clubs, newsgroups and classified advertisement websites were identified to directly address motorcycle riders as well as the general public on the web (see Appendix A). Accordingly, three different sampling strategies were developed allowing accessibility for participating to the study via open, invited, and specific sampling (Nosek, Banaji & Greenwald, 2002).

The first method described as open accessibility was employed by posting a short text (see Appendix B) to public electronic bulletin boards in order to sample from a broad pool of participants (e.g. craigslist or twitter). Via specific accessibility we approached presidents of online motorcycle clubs and forums to constrain participation to people who were motorcycle club members (see Appendix C). Here, we asked the responsible team of editors to post the link to the experimental investigation in their forum or to spread the link via their mailing list. Last, invited accessibility enabled participants randomly selected on social media sites to participate in the study, as those platforms require direct contact with their registered members (e.g. facebook).
Experimental Materials

All materials used in this investigation were combined and presented on the experimental website of the study. The materials consisted of two experimental pictures, two experimental texts and eight pages of product descriptions, with the contents of product descriptions kept constant across the experimental conditions. On those pages, only the web banner manipulation was altered. An informed consent form, an instruction page and a pre-questionnaire were presented before the experimental phase of the study. After the experimental phase of the study, participants were presented with two post-questionnaires and a debriefing statement.

The experimental website was used to present the experimental materials to the participants for data collection. To create the experimental website we chose python as the programming language. This ensured that participants could access the experimental website using all major web browsers (Internet Explorer, Google Chrome, Mozilla Firefox etc.) without having to install additional software or plug-ins (Birnbaum, 2004). The experimental website was hosted by a commercial internet provider² to provide maximum control and security over the data but, and at the same time, to allow flexibility for the programming (Birnbauer, 2004, Kraut et al., 2004). To store the database, we used Sqlite as our platform. The designed website consisted of twenty-seven hypermedia pages which are visualized in a site map (see figure 1).

² https://www.digitalocean.com/
Figure 1. Site Map of Experimental Website

Experimental Pictures

The experimental pictures used in this investigation were two realistic pictures, measuring 349 pixels in height by 1353 pixels in width. The affect laden stimuli were employed to illustrate the potential outcomes or consequences of riding a
motorcycle relative to different safety measures (Verlhac, Chappé, & Meyer, 2011, p. 2108).

According to attribute framing (Levin, Schneider, & Gaeth, 1998) the experimental pictures were manipulated to either emphasize the highly potential positive outcome of riding protected, or to emphasize the highly potential negative outcome of riding unprotected. When the graphic depicted a potential positive outcome of riding protected (level of positive picture valence), an open road was illustrated on the right hand side of the image. This scenery provided a far view onto the horizon, showing as much space as peripherally possible from the spectator perspective (see figure 2). A potential negative outcome of riding a motorcycle without protection gear was depicted (level of negative picture valence) by illustrating a narrow hallway leading to a closed double door on the horizon-line of the picture, thus, closing the perspective of the spectator. The empty row of chairs in the front of the door showed a waiting area of an emergency room (see figure 3).

Both pictures were evenly processed by GIMP 2.0 (an open-source image processing software), fading the left hand side of the images.
27 university students and 3 university staff members (70 % female, 30 % male, mean age = 23.7, \( SD = 11.1 \)) volunteered to rate the experimental pictures on a 9-point Likert-scale (1 = low, 9 = high) for their levels of arousal, desirability of the illustrated scenario on the picture, positive emotions, negative emotions, graphical aesthetics and how likely they considered it that a person experiencing the scenario on the picture was having a good day. Paired sample T-tests were conducted to evaluate the relative difference of the positive and negative stimuli on these six items. The results showed that the level of arousal, \( t (29) = -1.08, p = .29 \) (two-tailed) was not significantly different for both picture conditions, positive \( (M = 5.03; SD = 2.08) \) and negative \( (M = \)  

---

\(^3\) http://www.123rf.com/

\(^4\) http://www.123rf.com/
5.67; $SD = 2.35$). For all other items the analysis revealed a significant difference in the ratings of both pictures and thus ensured in particular that the picture conditions differed in their perceived positive and negative valence (see table 4 below).

Table 4

*Item ratings for the experimental pictures*

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Label</th>
<th>Mean (SD)</th>
<th>Positive picture</th>
<th>Negative picture</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>How intense is the picture to you?</td>
<td>5.03 (2.07)</td>
<td>5.67 (2.35)</td>
<td>.290</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Does the situation in the picture depict a desirable situation to you?</td>
<td>8.07 (.94)</td>
<td>1.27 (.64)</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Does the picture evoke positive emotions in you?</td>
<td>8.03 (.89)</td>
<td>1.70 (.88)</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Does the picture evoke negative emotions in you?</td>
<td>1.70 (.95)</td>
<td>7.60 (1.57)</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Would a person in the scenario of the picture have a good day?</td>
<td>7.80 (1.24)</td>
<td>1.47 (.90)</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>How aesthetic do you find the picture?</td>
<td>7.40 (1.3)</td>
<td>3.1 (1.88)</td>
<td>.000</td>
<td></td>
</tr>
</tbody>
</table>
Experimental Texts

The experimental texts were two 8-word sentences encouraging the same target behavior of wearing protection gear. Goal framing (Levin, Scheider, & Gaeth, 1998) was the theoretical construct in order to encourage engaging in the same health behavior regardless of the text frame level. According to goal framing manipulations, we manipulated the texts to depict different consequences relative to either encouraging engaging in the target behavior by accentuating the benefits, or discouraging to refrain from engaging in the behavior by expressing the losses that could potentially occur (Levin, Scheider, & Gaeth, 1998). The syntax structure was identical for both text conditions.

When the text depicted a beneficial outcome, a simple activation was used relative to the behavioral action (“with protection gear”). When the text depicted costs as the outcome, a simple negation was used relative to the behavioral in-action (“without protection gear”). Furthermore, the simple activation described the outcome of the behavior as a potential gain (“maximize your ride”), whereas the simple negation described the consequence of not engaging in the behavior as a potential loss (“risk your ride”). A standard font style called Calibri provided by MS Word was used for both text levels. Both texts were shaded in the same dark-grey color value (see figure 4).
Text Frame Gain:

With protection gear, you always maximize your ride.

Text Frame Loss:

Without protection gear, you always risk your ride.

Figure 4. Levels of Text Frame

27 university students and 3 university staff members (70% female, 30% male, mean age = 23.7, $SD = 11.1$) volunteered to rate the experimental texts on a four inch continuous scale. The scale was coded after data collection along one- twentieth of inch- units, providing a total of eighty numerical data points. To evaluate the relative difference of the consequence stressed in both texts, paired sample T-tests were conducted. The analysis revealed that the statements significantly differed in their valence, thus proving to correspond to positive or negative consequence of riding, $t (29) = 25.55$, $p < .001$ (two-tailed). The statement corresponding to the level gain text was rated at ($M = 3.32; SD = .51$) thus depicting a positive consequence relative to wearing protection gear. The second statement, corresponding to the level of loss text, resulted in a much lower rating ($M = .49; SD = .31$) and thus proved to express a more negative consequence relative to not wearing protection gear as compared to the level gain text.
Experimental Product Pages

The contents and illustrations integrated on the experimental Product Pages were created by sampling from an online Motorcycle Protection Gear dealership that provided licensing rights for all materials. The design of the website was created using bootstrap (version 2.1.1.) which provides classical commercial web layout (see figure 5).

![Experimental Product Page](image)

**Figure 5.** Example of Experimental Product Page: Product Line

Procedure

Participants entered the experimental website through a link that was posted with the above mentioned recruitment procedures in selected web locations. At this point, a cookie captured the IP address as an identifier to allow access only for individuals who had not previously participated in the study (Birnbaum, 2004). The link led new participants to the starting page of the online experiment which, from that moment on,
allowed participants to navigate the website at their own pace. This was an essential feature in the design of the experiment, because it allowed collecting precise behavioral data throughout the study (Keller, Gunasekharan, Mayo, & Corely, 2009). First, participants had to agree to the informed consent statement and only then were able to proceed. Next, each participant accessed the instruction page which carefully stressed, in a visually-distinct instructional box on the top of the page, information on the navigation of the website. On the same page, they were also provided with task demands for each phase of the study. Here, particular care was taken to highlight that after the pre-questionnaire, participants were free to immediately proceed to the post-questionnaire or to learn about the product. Then, each participant filled out the pre-questionnaire, which technically required full completion before a participant was able to proceed. Each participant was periodically assigned to one out of the four experimental conditions and was automatically forwarded to the first product page. All participants remained in their assigned web banner condition for the remainder of the experiment, as this ensured that an individual was always exposed to the same web banner condition on each of the experimental product pages. When participants entered the experimental phase of the web study, they had the opportunity to navigate through the hyperlinked web pages or to proceed to the post-questionnaire. Once participants had chosen to navigate to the post-questionnaires, it was technically impossible for them to return to the experimental product pages and had to proceed by completing the required information of each survey. The last page of the experimental website included the debriefing. Here, we thanked all volunteers for their willingness and time to participate.
CHAPTER IV

RESULTS

Data Source

Demographic Variables

Importance of protection gear relative to the activity of riding a motorcycle was assessed by two items on a 7-point Likert-scale (1 = low, 7 = high). The first item enquired the importance of protection gear relative to motorcycling (ranging from not important at all to absolutely important) and the second item assessed how much protection gear was considered to be necessary for a usual motorcycle ride (ranging from no gear at all to as much gear as possible). There was a strong positive correlation between the two variables, $r = .526$, $n = 207$, $p < .001$. These items were added to form a single protection gear attitude measure ($\alpha = .663$).

Involvement in riding was assessed categorically, as individuals indicated how long they had been riding a motorcycle, if they were only passengers or potentially interested in riding in the future, or if they were not interested in riding at all. The level of high involvement included all participants who had indicated to be riders, low involvement concerned participants who did not ride a motorcycle. Participants who indicated that they were planning on riding in the future or indicated being passengers were excluded from analyses with this variable.
Sex indicated an individual’s gender and was assessed categorically. Here, individuals reported if they were male, female, cared not to state or “other”.

**Dependent Variables**

* Browsing behavior was assessed by two measures. One factor measured the total time in seconds an individual spent on all experimental product pages and the other factor measured the amount of pages an individual visited in total while navigating around the experimental website. There was a strong positive correlation between the two variables, $r = .803, n = 207, p < .001$. Both items were transformed into standard scores and based on those, were then combined to form a single browsing behavior measure ($\alpha = .891$).

* Product attitude was measured using three items employed to evaluate the product characteristics relative to safety aspects. Each item was rated on a separate 7-point Likert-scale (7 = high) and assessed if the product was considered to be valuable for improving protection, to what extent the product was considered beneficial for the riding experience and to what extent the product was believed to be useful for the safety while riding. These highly correlated items were added to form a single product attitude measure ($\alpha = .817$).

* Behavioral intention was assessed by two items on a 7-point Likert-scale (7 = very likely) and rated how likely a participant considered it that he or she would learn more about the gear described in the investigation and how likely an individual considered it that he or she would purchase such a type of gear in the future. Both items
(r = .664, n = 207, p < .001) were combined to form a single behavioral intention measure of the product (α = .797).

Normative beliefs were indicated by two items using 7-point Likert-scales. The first item measured to what extent a participant believed that fellow motorcycle riders would approve of the product (7 = strongly approve). Then individuals rated if they believed fellow motorcycle riders would learn more about the product (7 = would absolutely learn more about the product). Both items (r = .659, n = 207, p < .001) were combined to form a single normative beliefs measure relative to the product (α = .795).

Persuasive effectiveness was assessed by combining all dependent measures, namely browsing behavior, product attitude, behavioral intention and normative beliefs, into a single total outcome item (α = .72).

Influences of Demographic Information

An independent-samples T-test was conducted to compare the two involvement categories (high vs. low) for differences in importance of protection gear. Results revealed a significant difference for low involved (M = 6.4, SD = .86) compared to highly involved participants (M = 5.8, SD = 1.2); t (180) = 3.79, p = .008 (two-tailed). The magnitude of the differences in the means (mean difference = .59, 95% CI: .28 to .90) was small (η = .22). A second independent-Samples T-test found significant differences in importance of protection gear comparing males (M = 5.76, SD = 1.27) and females (M = 6.21, SD = .97); t (204) = -2.84, p = .005 (two-tailed). Further, a 2 X 2 Chi-
Square analysis of involvement (high vs. low) by sex revealed no significant difference in the percent of men or women who were riders or non-riders.

A curvilinear regression analysis was conducted to analyze the relationship between age and importance of protection gear and did not find a significant linear ($R^2 = .005$, $F(1, 204) = .96, p = .33$), or quadratic ($R^2 = .02$, $F(2, 203) = 2.09, p = .13$) nor cubic ($R^2 = .02$, $F(3, 202) = 1.41, p = .24$) trend. This analysis shows that the importance of protection gear is not predictable as a function of age. However, the graph reveals a slight tendency to a quadratic trend, indicating that ratings for importance of protection gear slightly increased for individuals between 40 and 50 years of age (see figure 6).

*Figure 6. Importance of protection gear by age in years*
A one-way between-groups analysis of variance was conducted to further explore highly involved individuals for differences in importance of protection relative to each of their total amount of riding years indicated. Here, riders were divided into three groups according to the amount of years they had been involved in riding (Group 1: less than 1 year to 9 years; Group 2: 10 to 21 years; Group 3: 22 to 30 years and above). There was no significant difference amongst the groups indicating that the importance and necessity of protection gear did not significantly differ across different groups of riding experience, $F (2, 93) = .105, p = .90$. In addition, a bivariate correlation was also examined between importance of protection gear and years of riding involvement (scaled numerically) and this low correlation ($r = .032$) was not significant.

Analysis of Effects on Dependent Measures

First, the correlation coefficients ($r$) amongst all dependent measures were calculated (see table 5).

Table 5

*Pearson bivariate correlation matrix of all dependent measures*

<table>
<thead>
<tr>
<th></th>
<th>Browsing Behavior</th>
<th>Product Attitude</th>
<th>Normative Beliefs</th>
<th>Behavioral Intention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Browsing Behavior</td>
<td>.160*</td>
<td>.156*</td>
<td>.296**</td>
<td></td>
</tr>
<tr>
<td>Product Attitude</td>
<td></td>
<td>.546**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normative Beliefs</td>
<td></td>
<td></td>
<td>.664**</td>
<td></td>
</tr>
</tbody>
</table>

Note: N = 207, ** $p < .001$ (two-tailed), * $p < .05$ (two-tailed)
A 2 (Text Frame) by 2 (Picture Valence) by 2 (Involvement) between-groups univariate analysis of variance (ANOVA) was performed to investigate effects on persuasive effectiveness. There was a small main effect approaching significance for involvement, $F(1,174) = 3.66, p = .057, \eta = .144$. The mean scores indicated that low involved participants ($M = 4.64, SD = .101$) scored higher on persuasive effectiveness than highly involved participants ($M = 4.37, SD = .18$).

A 2 (Text Frame) by 2 (Picture Valence) by 2 (Involvement) between-groups multivariate analysis of variance was performed to investigate differences across all four dependent measures separately (see table 5). Neither of the multivariate main effects nor interaction effects were statistically significant. As a result, univariate ANOVA effects could not be examined routinely. However, regarding their important practical implications for the investigation, we further examined the univariate ANOVA effects of all dependent measures separately despite the insignificant results from the multivariate analysis of variance.

A 2 X 2 X 2 between-groups factorial ANOVA was conducted to explore the impact of involvement relative to text frame and picture valence on behavioral intention. There was a significant main effect for involvement, $F(1,174) = 4.64, p = .033$, however, the effect size was small, $\eta = .16$. The mean scores indicated that highly involved participants ($M = 4.38, SD = .17$) had lower behavioral intention than low involved participants ($M = 4.91, SD = .18$). There was also a weak significant interaction effect between picture valence and involvement, $F(1,174) = 4.45, p = .036, \eta = .16$ (see Figure 7). Tests of simple main effects of involvement at each level of picture valence indicated
a significant difference only for negative valance, such that behavioral intention increases with negative valence for low involvement with riding ($M = 5.17, SD = 1.58$), but behavioral intention decreases with negative valence for high involvement with riding ($M = 4.12, SD = 1.76$).

*Figure 7.* Interaction effect between Picture Valence and Involvement on Behavioral Intention

Another 2 X 2 X 2 between-groups factorial ANOVA was conducted to explore the impact of involvement relative to text frame and picture valence on browsing
behavior. Only one effect approached significance, a weak interaction between picture valence and text frame, $F (1,174) = 3.53, p = .062, \eta = .14$. Tests of simple main effects of picture valence at each level of text frame found a marginal significant difference for gain text ($p = .066$) indicating an increase in browsing behavior for negative picture valence ($M = .1, SD = .105$) and a decrease of browsing behavior at the level positive picture valence ($M = -.26, SD = .7$). Figure 8 shows the interaction of picture valence with text frame.

*Figure 8. Browsing Behavior at the level gain text comparing negative and positive picture valence*
A third 2 X 2 X 2 between-groups factorial ANOVA was conducted to explore the impact of involvement relative to text frame and picture valence on product attitude. However, neither the main nor interaction effects were statistically significant.

A last 2 X 2 X 2 between-groups factorial ANOVA was conducted to explore the impact of involvement relative to text frame and picture valence on normative beliefs. Again, none of the main or interaction effects were statistically significant.

As our experimental materials were based on product pages about a particular kind of protective apparel for motorcycling, we wanted to ensure for practical reasons that product attitude was not a confounding variable.

Therefore, we additionally conducted a 2 X 2 X 2 between-groups analysis of covariance to compare the effectiveness of text frame and picture valence with involvement on behavioral intention, controlling for product attitude. There was a weak significant interaction effect between picture valence and text frame, $F (1, 202) = 4.09, p = .040, \eta^2 = .15$. Neither of the main effects were statistically significant. The results indicated that when the message was presented with a negative picture, the behavioral intention was significantly higher when paired with a gain text ($M = 4.73, SD = .18$) than with a loss text ($M = 4.5, SD = .18$); however, when the message was presented with a positive picture, behavioral intention yielded significantly higher effects of behavioral intention when paired with a loss text ($M = 4.92, SD = .19$) than with a gain text ($M = 4.4, SD = .19$). Figure 9 shows this interaction.
Figure 9. Interaction effect of Text Frame and Picture Valence on Behavioral Intention
CHAPTER V

DISCUSSION

In the present investigation, we were interested in determining the persuasive effectiveness of different framing manipulations relative to texts and pictures in order to encourage wearing protection gear in the realm of motorcycling. Further, we suggested that an individual’s involvement with the activity of the promoted health behavior could also determine the response to the health message respectively (Rothman, Bartels, Wlaschin, & Salovey, 2006; Millar & Miller, 2000). In order to measure persuasive effectiveness of different health messages, we exposed 207 volunteers to a web banner comprised randomly of a text (gain frame vs. loss frame) and a picture (positive valence vs. negative valence). While exposed to the web banner, all participants were given the opportunity to freely navigate through the product pages describing protective gear. We assessed that out of the entire subject pool, 96 individuals were riders and 86 individuals were neither riders, nor passengers and did not intend to ride in the future and with respect to this we grouped them into high and low involvement categories.

First, we expected that an individual’s involvement with motorcycling would reflect on how important and necessary a person would generally regard protection gear relative to riding (H1). The results of this investigation supported our first hypothesis and revealed that motorcycle riders evaluated the relative importance and necessity of protection gear as comparatively lower than non-riders. These results follow
the assumption that risks and benefits are linked in people’s perceptions and consequently support the notion that “risk and benefit [are] inversely related in people’s minds because an affective feeling is referred to when the risks or benefits of specific hazards are judged” (Finucane, Alhakami, Slovic, & Johnson, 2000, p. 4). Consequently, this implies for our results that riders may focus more on the potential beneficial aspects of the riding outcome (e.g., the joy of riding or the experience of freedom) and thus are less concerned with risks and protection gear. Hence, non-riders may be more inclined to focus on the potential costs and dangers as possible riding outcomes (e.g., accidents or widowed spouses) and thus are more likely to consider protection gear to be of higher importance than non-riders (Finucane, Alhakami, Slovic, & Johnson, 2000). This suggests that riders vs. non-riders fundamentally differ in their motivation to wear protective apparel. The affective reactions caused by judgments of risks and benefits seem to imply that riders are more likely to react risk averse, while non-riders are more likely to react risk seeking relative to health messages advocating to wear protection gear (Sherman, Mann, & Updegraff, 2006; Salovey, Schneider, & Apanovitch, 2002). Such differences in approach/avoidance motivation have to be systematically assessed by future investigations as these would mean compelling potentials for health information campaigns and marketers alike who are interested in tailoring information about protection gear to a particular audience.

We further hypothesized that the framing manipulations relative to the text and the picture would each exert independent influences on the persuasive effectiveness
of the health message (H2 and H3). Neither of the hypothesis was supported revealing that the factors text frame and picture valence do not operate separately.

Regarding the text frame manipulations, neither the gain nor the loss text significantly influenced product attitude, behavioral intention, normative beliefs, or browsing behavior (see H2). These results reflect former findings summarized in two recent meta-analytic reviews reporting that gain or loss framed health appeals do not generally differ in persuasiveness (O’Keefe & Nan, 2012; O’Keefe & Jensen, 2009). This means for the present investigation that text frame as a single factor exhibits no overall difference on persuasiveness. Consequently, we investigated if effects emerge in combination with moderators in order to influence the impact of health information (O’Keefe & Nan, 2012; Rothman et al., 2008).

Concerning the insignificant results of picture valence (see H3), we refer to a study that investigated preferential perception and attention processes of emotional pictures and found that” both pleasant and unpleasant pictures were more attended to than neutral pictures” (Calvo & Lang, 2004, p. 233). In that notion, it seems likely that the manipulation of the two experimental pictures used in this investigation was not far enough apart on either end of the valence continuum that intended to separate the experimental pictures into pleasure and displeasure stimuli. Despite supportive norming results, it is possible that participants did not perceive the loss implications in the negative image nor the beneficial outcomes depicted in the positive image to such an extent, as to generate affective reactions motivating appetitive or defensive behavior (Calvo & Lang, 2004).
The results of the present investigation found significant interaction effects between text frame and picture valence on behavioral intention and browsing behavior. These results are in support of Hypothesis 4 and are particularly important against the backdrop of the insignificant results of the main effects for these two factors. We found that browsing behavior was higher for gain texts when paired with a negative picture rather than a positive one. We also found that behavioral intention was highest for gain texts paired with negative pictures and loss texts paired with positive pictures. This suggests that picture valence might moderate the effectiveness of text frame effects for the persuasiveness of health information. Therefore, this investigation adds to the important research of the functioning of the combination of texts and pictures for health communication that has only been investigated by one other study (see Verlhiac, Chappé, & Meyer, 2011). Our findings are in line with the conclusion by the authors stating that “pictures used to illustrate the [text] play[..] a key role in message processing and attitude change” (Verlhiac, Chappé, & Meyer, 2011, p. 2117).

As it is of utmost importance for marketers and health education programs to understand message characteristics to determine what it is in advertisements or health campaigns that attracts attention and makes them memorable (Dahlén et al., 2005), our findings yield interesting insights in the design of web based health messages.

First, the significant interactions demonstrate that combining picture and text in such a way as to create semantic incoherence in a health message can influence browsing behavior and behavioral intentions regardless of the involvement of an individual with the issue. This corresponds to findings relative to persuasive
communication strategies stating that in order to create an effective persuasive message interactions of two or more factors are required (Chaiken, Liberman, & Eagly, 1989; Chaiken & Eagly, 1983).

Second, these results show that incongruence in the semantic relationship between a text and a picture can directly affect browsing behavior as well as the intention of individuals to learn about and to purchase protection gear. Previous research has explained that the power of this interaction lies in the incongruence between the semantic categories evoking cognitive dissonance (Festinger, 1957). These effects of incongruence in advertisements signal that “there is something going on” and thus intrigue consumers to solve a cognitive puzzle (Meyers-Levy, Louie, & Curren, 1994). A study on brand-incongruent advertising corresponds to our finding and showed that people will engage in more extensive processing to resolve the incongruity of the presented information, thus increasing attention and the motivation to think about the contents as well as the memory of the advertisement (Töm & Dahlén, 2008).

Last, this result was the first of its kind to show that incongruences in visual and verbal information directly reflected in behavioral responses thus suggesting that text-picture combinations can affect the engagement with a website. This means relative to our first two interpretations of the interaction effects that two key psychological processes are attention and information processing for determining reactions to web banners as these have proven to influence decisions and behaviors independent of the involvement of an individual with the promoted health behavior.
In order to identify what underlies the evaluations of health messages and under which conditions message framing is particularly persuasive we argued that the involvement with the investigated health issue could determine the persuasive processing strategy of the health message (H5 and H6).

We were not able to support the hypothesis that high involved individuals would focus more on the text than on the pictures of the health message (H5). This result can be analyzed by pulling on findings from research proving that heuristic processing strategies can co-occur with systematic processing strategies (Chaiken & Maheswaran, 1994). This synchronization of both processing strategies was proven in a more recent investigation and found that individuals with a high personal relevance systematically processed a message, yet simultaneously engaged in heuristic processes when low levels of risk were associated with the issue at hand (Meyers-Levy & Maheswaran, 2004). This could potentially serve as one reason why the text was not more effective than the picture for highly involved individuals. This explanation suggests for future research designed to investigate the effectiveness of health messages relative to riders, to identify personality factors beyond the scope of high involvement as perceived risk has been found to be a critical determinant of how people respond to framed health information (Rothman & Salovey, 1997). Referring to studies on risk related decisions it has been stressed in the literature to particularly acknowledge the dynamics between affect and reason on information handling (Slovic & Peters, 2006; Finucane, Alhakami, Slovic, & Johnson, 2000; Kühberger, Schulte-Mecklenberg, & Perner, 1999). Accordingly, future research should assess in great detail how personal dispositions towards feelings of the certainty or
uncertainty of risks may differ for high involved individuals. In addition, perceptions of how beneficial riding is for each individual and to what extent riding is experienced for example as a joy or a thrill, could also mean fundamental differences in risk perceptions and thus would provide a more detailed account of the generic category “high involvement”. All these personality factors could influence the processing strategies and thus help to explain how to identify important moderators for text frames regarding the effectiveness of health messages.

Another important note relative to the insignificant results of the interaction between text frame and high involvement is that riders are potentially more resistant to modify their beliefs than non-riders regarding general attitudes of riding a motorcycle. This effect, that high involvement is sometimes associated with resistance to (rather than acceptance of) persuasion, has been described relative to investigations considering ego-involvement as a factor in consumers responses (Sherif & Hovland, 1961). Therefore, a rider’s stable belief system may impair otherwise typical processing strategies for highly involved individuals. Accordingly, social identity theories could potentially reveal how personality factors (e.g. self-identity; Elliott, 2010) or prior beliefs may moderate how riders react to new and potentially belief-incongruent information.

A last remark concerning the insignificant results of the interaction between high involvement and text frame regards the none-representative gender distribution in the high involvement category. The high involvement category consisted of 59.4% female riders but despite small increases in the number of female riders in the past few years (Morris, 2009) we must acknowledge that our sample does not represent the current
demographic gender distribution of American motorcycle riders. The analysis of
demographic information revealed that females considered protection gear to be
significantly more important than male riders. Relative to the overrepresentation of
female riders in our sample of highly involved individuals this could have potentially
influenced the risk and benefit perception of the promoted health behavior, thus making
the highly involved category overall more risk seeking.

Although the hypothesized interaction between involvement and picture
valence (see H6) was also not supported relative to overall persuasive effectiveness, we
found that non-riders are significantly more persuaded by negative pictures resulting in
an increase of behavioral intentions.

First, this finding supports the assumption that a low level of issue relevance
leads individuals to be persuaded more by heuristic cues than, for example, text or verbal
arguments (Chaiken, Liberman, & Eagly, 1989). Further, we suggest that the negative
images attracted the risk seeking motivation of non-riders and based on this sense of fit,
the effectiveness of the negative images amplified the avoidance-avoidance reaction
which reflected in an increase of behavioral intentions. This explanation corresponds to
findings from Lee and Aaker (2004) who reported that framed appeals where particularly
then more effective when the frames corresponded to the subjective feelings individuals
had towards a health behavior outcome. Last, as non-riders are presumably not often
confronted with the negative consequences of riding (as compared to high involved
individuals) it seems plausible that the respective negative picture triggered more
attention than the positive picture based on the elements of surprise and irritation (Meyerowitz & Chaiken, 1987).

Our findings relative to involvement indicate that it is of utmost importance for marketers to have a clear understanding of their target groups. Therefore, future research should consider addressing how consumers’ factors can be further investigated relative to attention and information processing strategies.

Limitations of the Present Investigation

Now, we want to comment on two limitations of the study, as they provide valuable opportunities for future research. First, it must be noted that the experimental product pages of this experimental study had not been normed and therefore the characteristics of the product and the product descriptions assert unknown influences to the results of the study. This is particularly crucial relative to participants who are highly involved in motorcycle riding as within riding communities’ strong belief sets have been found to determine attitudes and behaviors (Elliott, 2010) and may potentially impair how products are perceived and evaluated. Further, the product characteristics are confounded in the dependent measures as we collected data on browsing behavior, product attitude, normative beliefs and behavioral intention all directly related to the products. Therefore, future studies that intend to employ realistic materials, i.e. based on available products, should consider measuring factors such as brand attitudes (Goodrich, 2010), judgments on and perceived attractiveness of product characteristics (Kang &
Herr, 2006), or product traits (Cox, Cox, & Zimet, 2006) in order to account for their influence respectively.

A second limitation concerns the definition of the dependent measures in this investigation. Here, it is important to remark that framing effects are typically measured relative to hypothetical and experimentally manipulated behavioral outcomes (Gerend & Cullen, 2008). This means that the persuasive effectiveness of a health message is measured by how effectively it affects an individual’s intention to change health behaviors or health habits to safer and healthier means or an individual’s attitude to engage in a health behavior. In sum, the definition of effective health framing appeals regards to motivate individuals to “adopt appropriate health practices” (Bartels, Kelly, & Rothman, 2010, p. 821). In contrast, the present investigation measured the persuasive effectiveness relative to intended changes in patterns of consumer behavior. Therefore it is important to critically differentiate this study from the above described notion, as we were interested to determine the influence of message frames on factors influencing different measures relative to purchasing decisions as well as buying intentions, as these have been found to be the best predictors for buying behavior (Ajzen & Fishbein, 1980). Accordingly, the study’s generalizability is limited to investigations addressing consumer behaviors in the general domain of preventive health products for hazardous activities.

Conclusion

The data presented in this investigation offer a cautionary note to researchers and marketers who might equate the target behavior “wearing protection gear” with other
preventive health behaviors. Wearing protection gear in the realm of motorcycling has been shown to be perceived not simply relative to its safety benefits but can, at the same time, be perceived in terms of its potential risks mutually inclusive to the hazards of riding a motorcycle. This note corresponds to a large body of research that has argued against the misleading and subjective classifications of prevention and detection behaviors as moderators for the effectiveness of message framing effects (Bartels, Kelly, & Rothman, 2010; Gerend & Sias, 2009; Latimer, Salovey, & Rothman, 2007).

To summarize, our first research question addressed the question whether text or valence framed messages differ in their persuasive effectiveness. It was found that combining both factors in such a way as to create incongruence in the semantic coherence of the health message evoked stronger behavioral intentions and an increase in browsing behavior, which we have interpreted by an increase of attention processes. These findings stress the importance of text-picture incongruence for web based sales environments and provide suggestions for studying the processes through which information incongruence impacts consumer attention and responses. Future studies are therefore encouraged to investigate how different levels or intensity of incongruity differently affect attention, information processing and memory, and/or recall of advertisement contents. Further, the effects of (in)congruence in meaning (e.g. unexpectedness, contradiction, mismatch or humor) could be manipulated to evoke and consequently investigate consumers' reactions to product perception or brand attitudes.

The second research question asked whether the persuasive effectiveness of message framing can be enhanced in combination with a personality factor. We proposed
that involvement may mediate psychological processes that are responsible for framing effects (Bartels, Kelly, & Rothman, 2010; Rothman et al., 1993). Therefore, the present results add to investigations trying to reveal different mechanisms that might underlie the effects of message framing to predict their persuasive functioning (Shen & Dillard, 2007). However, the present investigation did not address how these different perceptions regarding the potential risks and outcomes of the health behavior can be effectively amplified by message frames. Future investigations have to fine-grain the broad categorization of involvement and subdivide this factor into several determinants that can help to describe an “individuals´ construal of a behavior and individuals´ dispositional sensitivity to favorable or unfavorable outcomes” (Latimer, Salovey, & Rothman, 2007) in order to effectively demonstrate the impact of framed appeals.

After all, enhancing the health of people as well as marketers profit is only a matter of match as “extant research has shown that for any advertising to be effective there should be a fit between the advertising content, the advertised product, and the target group” (Faseur & Geuens, 2012, p.530).
REFERENCES


*Journal of Communication in Healthcare, 1*, 422–430.


Innovations and advances in health behavior change will arise if interventions
are more theory-friendly. *International Journal of Behavioral Nutrition and
Physical Activity, 1*, 1-7.

gain- and loss-framed messages to promote healthy behavior: How theory can

illness representations: Implications for interventions to promote and sustain
healthy behavior. In L. D. Cameron, & H. Leventhal (Eds.), The self-regulation

systematic influence of gain- and loss-framed messages on interest in and use of
different types of health behavior. *Personality and Social Psychology Bulletin,
25*, 1355–1369.


of message framing on health behavior. *Journal of Experimental Social
Psychology, 29*, 408–433.


<table>
<thead>
<tr>
<th>Name</th>
<th>URL</th>
<th>Sampling technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Facebook</td>
<td><a href="https://www.facebook.com/">https://www.facebook.com/</a></td>
<td>Invited accessibility</td>
</tr>
<tr>
<td>2 LinkedIn</td>
<td><a href="http://www.linkedin.com/">http://www.linkedin.com/</a></td>
<td>Invited accessibility</td>
</tr>
<tr>
<td>3 American Motorcyclist Association</td>
<td><a href="http://www.americanmotorcyclist.com/">http://www.americanmotorcyclist.com/</a></td>
<td>Specific accessibility</td>
</tr>
<tr>
<td>4 Twitter</td>
<td><a href="https://twitter.com/">https://twitter.com/</a></td>
<td>Open accessibility</td>
</tr>
<tr>
<td>5 Craigslist</td>
<td><a href="http://www.craigslist.org/about/sites">http://www.craigslist.org/about/sites</a></td>
<td>Open accessibility</td>
</tr>
<tr>
<td>6 Motorcycle Groups on Bikers Post</td>
<td><a href="http://www.bikerspost.com/">http://www.bikerspost.com/</a></td>
<td>Specific accessibility</td>
</tr>
<tr>
<td>7 Motorcyclists Discussion Groups</td>
<td><a href="http://www.romeoriders.com">http://www.romeoriders.com</a></td>
<td>Specific accessibility</td>
</tr>
<tr>
<td>8 Female Motorcycle Community</td>
<td><a href="http://www.her-motorcycle.com">http://www.her-motorcycle.com</a></td>
<td>Specific accessibility</td>
</tr>
<tr>
<td>9 Motorcycle Blogs and Forum</td>
<td><a href="http://www.motorcyclecruiser.com">http://www.motorcyclecruiser.com</a></td>
<td>Specific accessibility</td>
</tr>
<tr>
<td>10 Women’s motorcyclist organisation</td>
<td><a href="http://www.motormaids.org/ContactUs/Officers.aspx">http://www.motormaids.org/ContactUs/Officers.aspx</a></td>
<td>Specific accessibility</td>
</tr>
<tr>
<td>11 Christian Motorcycle</td>
<td><a href="http://www.cmainternational.org/contact-us.aspx">http://www.cmainternational.org/contact-us.aspx</a></td>
<td>Specific accessibility</td>
</tr>
<tr>
<td>Association</td>
<td><a href="http://www.cornerstonemm.com/">http://www.cornerstonemm.com/</a></td>
<td>Specific accessibility</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>13  Motorcycle Events Ministry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14  Motorcycle Forum</td>
<td><a href="http://www.motorcycleforum.com">www.motorcycleforum.com</a></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B
SHORT RECRUITMENT TEXT

Motorcyclist Study- HELP NEEDED!

Hello,

my name is Sandra and I am a German graduate student working on my Master thesis project at California State University, Chico. Our online study is about motorcycling and we highly depend on the help of participants to finish this study.

I am working on a collaborating project with the California State University and the University Koblenz Landau (Germany). My professor at the California State University, Chico, is called Dr. Neil Schwartz, and he is willing to answer any questions regarding the study or theories involved at any time (nschwartz@csuchico.edu).

In order to complete our study we highly depend on your participation- it would be great if you could help us out by completing this super short study on riding gear (it will take no longer than 20 minutes)!

THANK YOU SO VERY VERY MUCH.

Please copy the link into your browser to begin:
http://198.199.72.110/
APPENDIX C
Dear Editor or President,

My name is Sandra and I am a student conducting a study on risk assessment relative to riding gear. I am looking for posting my link to an online study to have actual riders participate. I would highly appreciate your help in spreading the link to the study. Would it be possible to post a call to participate in the short study in your forum or to send an email around to your club members?

I am a Master Student from Germany conducting an educational study on preventive behaviors to communicate healthy and safe choices. I am working on a collaborating project with the California State University and Universität Koblenz Landau (Germany).

My professor at the California State University, Chico is called Dr. Neil Schwartz, and he is willing to answer any questions regarding the study or theories involved at any time via email or phone (nschwartz@csuchico.edu/ phone (530)-898-4968).

Our current project is aiming to understand how risky choices in particular have to be communicated. Framing theories suggest that an individual’s disposition towards a certain behavior and one’s relative risk assessment relative with it, will determine how people react to texts or pictures employed to motivate safe behavior. The hypothesis is that individuals who consider the activity of riding to be risky, will be more sensitive to negatively oriented texts and pictures, whereas individuals who do not find the activity of riding risky at all, will identify better with positive text and pictures on wearing protection gear and thus, would feel more inclined to commit to the encouraged safety behavior (in our case: wearing protection gear). Accordingly, we have manipulated web banners and we want to investigate if there will be any differences in how much people engage with an experimental website and if their ratings will change relative to which banner they had been exposed to (the contents of the site remain the same across all conditions). As a distractor and to provide a context relative to our measures we nested the experiment in product information on protection gear. We learned that this kind of gear (knee pad and elbow-protectors to wear underneath) is a good way of protection, generally accessible and that riders are moderately familiar with it.

In order to access the study, please copy the link into your browser:
http://198.199.72.110/

If you would like to know more about the study in detail I would be very happy to give you more information about it, via Email or phone (530-680-6891).

Thank you so very much for your consideration and help.
I am looking forward to hearing from you.

Kindest regards,

Sandra Becker