

WARNING LABELS AND EMOTION: THE EFFECT OF FEAR ON
LIKELIHOOD OF USE AND PRECAUTIONARY INTENT

by

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Research in the warnings literature has investigated several factors that may affect motivation to comply with the information contained in warnings. However, little research in this area has examined the role that emotion may play in motivating behavior. Three studies were conducted to determine whether participants had an emotional response to warning labels, and, if so, whether the activated emotions were related to behavioral intentions. In Study 1 ($N = 202$), participants were asked to imagine themselves in specific situations in which they needed to use particular products. They were then presented with actual warning labels from common consumer products. Both before and after presentation of the warning, participants were asked to rate the extent to which they felt specific emotions and their behavioral intentions. For the majority of the products, surprise and fear increased after exposure to the warning labels. In addition, fear predicted likelihood of use for 9 of the 12 products. In Study 2 ($N = 200$), the general

framework of the Extended Parallel Process Model (Witte, 1992) was used in an attempt to manipulate fear responses to the warning labels. Four warning labels were created by varying severity of the consequences (low, high) and efficacy of the precautionary instructions (low, high). Participants exposed to the high severity/high efficacy warning label reported higher levels of fear than those in the other three conditions. Fear was negatively correlated with likelihood of use, but positively correlated with precautionary intent. Study 3 ($N = 256$) was conducted in an effort to replicate the findings of Study 2 and determine whether the findings would generalize when the four warning labels were paired with a different consumer product. Participants in the high severity conditions reported higher levels of fear than those in the low severity conditions. Again, fear was negatively correlated with likelihood of use and positively correlated with precautionary intent. Possible reasons for the different effects of severity and efficacy on the fear responses for Studies 2 and 3 are explored. Implications of the findings, study limitations, and directions for future research are discussed.

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CHAPTER I

INTRODUCTION AND LITERATURE REVIEW

Understanding the way people respond to and process warning information is an area of research that has grown substantially over the last several decades. The increase in product liability cases over the years has drawn attention to issues surrounding warning presence and effectiveness. Courts have made it clear that manufacturers have a duty to warn consumers about the potential harm that can occur when products are used (or misused). As a result, most consumer products now contain warning labels, and a great deal of research has focused on identifying the factors that influence whether warnings are noticed and attended to. Less studied, however, are factors that can affect whether people comply once warning information has been processed.

Even if warning information is noticed, read and understood, people may choose to not heed warnings for several reasons. One line of research has focused on the factors that can have an effect on people's motivation to follow precautionary instructions. The main factors investigated in this area include hazard perception, costs of compliance, social influence, and familiarity/previous experience. Surprisingly, however, the role emotion may play in motivating behavior has received little attention. One of the main functions of emotion is to motivate behavior (Bradley, 2000; Izard, 1993, 2009; Zeelenberg, Nelissen, Breugelmans, & Pieters, 2008). Given this, investigating the way

emotion may influence compliance could provide valuable insight into understanding what motivates precautionary behavior. The research presented in this dissertation will make a contribution to the warnings literature by examining the way emotion influences behavioral intentions related to warnings. Before the current research is discussed in more detail, a review of the relevant warnings and emotion literature is presented.

Warnings: An Introduction

Warnings are “safety communications used to inform people about hazards so that undesirable consequences are avoided or minimized” (Wogalter, 2006b, p. 3), and they serve four main functions. The first is to inform people about important safety information so they can make informed decisions regarding use of the product. The second is to influence behavior in a way that promotes compliance with precautionary measures. The third function, born from the second, is to reduce or prevent the occurrence of all potential adverse events. The fourth function of a warning is to remind people about hazards they may already be aware of by aiding in the recall of information that may be temporarily inactive at the time a product is being used (Wogalter).

In an attempt to ensure that warnings are effective in serving their intended purposes, guidelines outlining the types of information that should be included when constructing a warning have been created. The American National Standards Institute (ANSI) has developed a set of standards that applies to warning signs and labels (the Z535 standards). While application of these standards is voluntary, their use is prevalent because U.S. courts view it as “the minimum standard manufacturers should meet in

warning about hazards” (Peckham, 2006, p. 438). The standards outline two main components for warning labels and signs. The first is a *signal word panel*, which contains the signal word (e.g., danger, warning, or caution) that indicates the level of hazard associated with the product; the standards define each of these terms and describes when they should be used. The second component is the *message panel*. Its purpose is to communicate the type of hazard posed by the product, the consequences of the hazard, and ways the hazard can be avoided (Peckham, 2006; Wogalter, 2006b).

To identify the hazards associated with the use of a consumer product, manufacturers will often conduct a *hazard analysis*. The purpose of the hazard analysis is to identify the potential dangers that may arise from foreseeable use and misuse of a product, and to determine how these dangers can be avoided or reasonably controlled. According to the hazard control hierarchy, warnings are the third line of defense in addressing the dangers associated with consumer products because they are not always reliable and/or effective in preventing potential hazards (Laughery & Hammond, 1999; Wogalter, 2006b).

When a hazard is detected, the optimal solution is to eliminate it (Wogalter, 2006b). If possible, manufacturers will alter the product design so the hazard no longer exists. However, eliminating potential hazards is not always possible. For example, eliminating the potential hazard of cutting one’s fingers while using a table saw is not possible without rendering the product useless for its intended purpose. In cases such as these, the next step in the hazard control hierarchy is to guard the user from the potential hazard (Wogalter). The goal of guarding is to lower the likelihood that the user will come

in contact with the potential hazard. In continuing with the example used above, one brand of table saw now has a safety feature that utilizes an electrical detection system capable of recognizing when the blade comes in contact with a human body; when contact occurs, the blade is stopped within 3-5 milliseconds, and the motor is shut down (SawStop, n.d.).

When a hazard cannot be eliminated through design or guarded against, warnings are used. As mentioned previously, warnings are ranked lowest¹ on the hazard control hierarchy because they are not a dependable way of protecting the user from harm. “Depending on the circumstances, the person at risk may not see or hear a warning, may not understand it, may not believe it, or may not be motivated to comply with it” (Wogalter, 2006b, p. 4). While warnings are not infallible, they are an important part of the hazard control hierarchy and are frequently utilized to inform consumers about potential harm. Because warnings are so widely used, much research has been devoted to identifying the factors that result in an effective warning. This research will be discussed in more detail below.

Product Liability and the Duty to Warn

The decisions of product liability cases over the past several decades have made it clear that product manufacturers have a duty to provide consumers with warnings and instructions that supply the information necessary for consumers to make an informed

¹ Warnings are ranked lowest on the hierarchy for products that remain on the market. However, there is a fourth level of the hazard control hierarchy that involves removing the product from the market when eliminating, guarding against, and warning about potential hazards does not effectively prevent harm (Wogalter, 2006b).

choice regarding whether or not they want to use a product, and if so, how to go about using the product safely (Madden, 1999). Even when products are properly designed and manufactured, companies may still be held liable for injury resulting from consumer misuse of the product. If the consumer misuse is reasonably foreseeable by the manufacturer, and the misuse can potentially result in an unreasonable risk of injury, then the manufacturer must include a warning sufficient to deter the hazard (Madden, 1999, 2006). Foreseeable misuse is usually gauged by the “common conduct standard” which holds the manufacturer liable for damage when the consumer acts “within a commonly known area of conduct” (Madden, 1999). For example, “a kitchen chair used by a consumer to reach a high shelf was found to be in foreseeable use when the backrest failed to support her weight, causing injury” (*Phillips v. Kimwood*, 1951, as cited in Madden, 2006, p. 586). In addition, manufacturers must anticipate the environment in which consumer products will be used and warn consumers of the possible risks that may occur in such an environment.

Thus, to use one widely appreciated example, the manufacturer of clothes must foresee that the wearer may, unwittingly, bring the garment into contact with cigarettes, stove burners, or other sources of ignition. The manufacturer will be liable for any injury occasioned by the garment’s unreasonable flammability in such a setting, notwithstanding the fact that bringing the fabric into contact with an ignition source is surely not the intended use of the product. It is, nevertheless, a foreseeable misuse. (Madden, 1999, p. 323)

Because manufacturers are held responsible for harm that results when a product is “dangerous to the extent beyond which would be contemplated by the ordinary consumer who purchases it” (Madden, 1999, p. 317-318), manufacturers are not obligated to warn consumers about products or environmental conditions that are

obviously hazardous (Wogalter, 2006b). The logic behind the obvious hazard standard is that the purpose of warnings is to supply information about potential risks that would otherwise be unknown to the consumer; therefore, providing a warning about an obvious hazard would be redundant and would not add to the overall safety of the user (Madden, 2006). Some examples of products/environmental conditions for which manufacturers have not been held liable for injury due to the obvious nature of the hazard include slingshots, BB guns, darts, kerosene used by industrial workers, and diving from a roof into a four-foot-deep swimming pool (Madden, 1999). This view is embodied in a quote by the judge presiding over *Jamieson v. Woodward & Lothrop* (1957): “A manufacturer cannot manufacture a knife that will not cut or a hammer that will not mash a thumb or a stove that will not burn a finger. The law does not require him to warn of such common dangers” (as cited in Madden, 1999, p. 320). So, while manufacturers have the duty to warn the consumer against potential harms associated with the use or misuse of a product, this duty is limited to situations in which (a) the manufacturer knows, or should know, that the absence of a warning could result in a significant or unreasonable potential for harm; and (b) the potential danger is beyond that which would be imagined by the ordinary consumer.

Once it is determined that the manufacturer has a duty to warn product users, and some type of warning and/or instruction information has been supplied, the question then becomes one of adequacy (Madden, 1999). The issue of warning adequacy has recently become prominent in product liability cases in the United States and other countries (Wogalter, 2006b). Evaluating the adequacy of warning information involves assessing

both the form and content of the warning or instructions (Madden, 2006). The form of the warning must be sufficient to “catch the attention of the reasonably prudent man in the circumstances of its use” (Madden, 2006, p. 587), and the content of the warning must sufficiently “convey to the ordinary reader the nature and extent of the danger, or otherwise put, the pertinent hazard and the means for its avoidance” (p. 587). Warning adequacy can also be evaluated using the four main functions of warnings described above (Wogalter, 2006b).

Warning Effectiveness

The widespread use of warnings to prevent harm, coupled with a manufacturer’s legal duty to warn about potential hazards, has resulted in a literature dedicated to identifying the components necessary for creating an adequate and effective warning, as well as understanding the way in which people process warning information. The type and amount of information found on a warning label can vary greatly depending on the product, and the content of the warning will most likely depend on its purpose. Some warnings are intended to simply inform the consumer of potential hazards associated with the product and its use (e.g., notifying people about the possible side effects of taking a medication), while others aim to change behavior (e.g., instructing people to wear protective eyewear when using the product). Because warnings can serve different purposes, there is not one standard by which to measure warning effectiveness.

While warning effectiveness has generally been defined in terms of behavioral compliance (e.g., Dingus, Wreggit, & Hathaway, 1993; Wogalter, Allison, & McKenna,

1989; Wogalter, Kalsher & Racicot, 1993) or behavioral intentions (e.g., Wogalter, Kalsher, & Rashid, 1999), effectiveness can also be measured using a number of other variables. For example, Argo and Main (2004) have broadened the definition of warning effectiveness to include five separate dimensions: attention, reading and comprehension, recall, judgments, and behavioral compliance. These five dimensions closely follow the stages of the communication-human information processing (C-HIP) model proposed by Wogalter, DeJoy, and Laughery (1999).

The updated C-HIP model (Wogalter, 2006a) provides a framework for organizing the warnings literature in a meaningful way by dividing the processing of warning information into several different stages. The first component of the model focuses on the source of a warning message (e.g., the manufacturer) and the channel by which it is transmitted (e.g., product labels, user manuals). The second component of the model focuses on how warning information is processed by the receiver. This component of the model is comprised of several substages: attention switch, attention maintenance, comprehension, attitudes and beliefs, motivation, and behavior. It is these substages that have received the most attention in the warnings literature.

Attention switch refers to the ability of a warning to attract the receiver's attention away from competing stimuli in the environment. Some of the factors shown to influence attention switch include size of the warning relative to its context, color, the use of symbols, and warning location (Wogalter, 2006a). Attention maintenance refers to the warning's ability to maintain the receiver's attention long enough for the information to be encoded. Factors shown to affect attention maintenance include brevity, symbols,

legibility, letter case, font, and formatting (Wogalter, 2006a).² The comprehension stage of the model is concerned with whether the receiver understands the meaning of the warning message. Some of the factors that can affect comprehension include subjective understanding of signal words, understanding of symbols, and an individual's background knowledge (Wogalter, 2006a).³

“Beliefs and attitudes refer to an individual's knowledge that is accepted as true” (Wogalter, 2006a, p. 57), regardless of whether it is actually true. This stage of the model emphasizes beliefs and attitudes that are particularly applicable when a person is confronted with warning information. Some of the important factors at this stage include hazard perception, familiarity, previous experience, and personal relevance (Wogalter). The motivation stage of the model focuses on the factors that influence the likelihood that the receiver will be prompted to carry out a particular behavior. Some important factors that can influence a receiver's motivation include costs of compliance, severity of injury, social influence, and stress (Wogalter, 2006a).⁴ The last stage of the model revolves around the receiver's behavior. Because one of the main goals of warning information is for the receiver to comply with any safety precautions prescribed, the behavior stage is

² For a thorough overview of the factors that influence both attention switch and maintenance, see Wogalter and Vigilante (2006).

³ For an overview of factors that influence comprehension and retention, see Hancock, Bowles, Rogers, and Fisk (2006).

⁴ For an overview of the factors that can influence beliefs/attitudes and motivation, see Riley (2006).

one of the most important measures of whether or not a warning is effective (Wogalter, 2006a).⁵

According to the C-HIP model, a warning is effective if, once it has successfully reached the receiver, it (a) attracts attention, (b) maintains attention, (c) is understandable, (d) is consistent with the receiver's current beliefs and attitudes (if it is not consistent, beliefs and attitudes must be altered before behavioral compliance is likely), (d) motivates the receiver to carry out the safety behaviors outlined in the warning, and (e) results in the intended safety behaviors. While the ultimate measure of warning effectiveness is behavioral compliance, compliance only occurs if processing at each of the activated stages of the model is successful (Wogalter, 2006a). For this reason, it makes sense to have some type of warning effectiveness measure for each of the different stages (e.g., the warning is effective if it attracts attention, is understandable, is successful in motivating behavior, etc.). When viewed in this way, warning effectiveness can be defined in a variety of ways and measured using several different variables.

Motivation Research in the Warnings Literature

As mentioned previously, a warning is often considered effective when it results in compliance with safety precautions. To influence behavior, the receiver must be motivated to comply. Motivation refers to the "forces acting on or within an organism to initiate and direct behavior" (Petri, 1996, p. 3). The concept of motivation is essential to the study of behavior, as it provides an explanation for what causes behavior (Petri). For

⁵ For an overview of the factors that have been investigated with regard to behavior, see Silver and Braun (1999) or Kalsher and Williams (2006).

example, when attempting to understand why a person behaved one way in a particular situation, but differently in a similar circumstance, focus is often placed on motivational factors. Motivation is generally measured indirectly and is inferred through changes in behavior (Petri).

In addition to the factors cited in the previous section (costs of compliance, severity of injury, social influence, and stress), many other variables have been considered in an attempt to better understand what motivates people to comply with warning precautions. While Wogalter (2006a) distinguishes between the factors that influence attitudes/beliefs and those that influence motivation, other researchers have applied many of the same factors to both stages. One example is hazard perception. This is a variable that can influence a person's beliefs/attitudes about a product, as well as a person's motivation to comply with the outlined precautions (DeJoy, 1999a; DeJoy, 1999b; Riley, 2006). For example, when hazard perception is high, this perception may provide a person with the information necessary to either form attitudes/beliefs about the product or change existing attitudes/beliefs; this perception may also be what motivates a person to follow safety precautions. The focus in this section will be on the presentation of factors that have been investigated in an attempt to better understand what motivates people to comply; however, many of these factors can also influence attitudes and beliefs.

The factors that have received the most attention in the warnings literature with regard to motivation are (a) hazard perception, (b) costs of compliance, (c) social influence, and (d) familiarity. Each of these factors will be discussed in more detail below.

Hazard Perception

Research in the warnings literature has consistently demonstrated that an increase in perceived hazard is associated with an increase in precautionary intent and/or behavior (e.g., Wogalter, Desaulniers, & Brelsford, 1987; Wogalter, Young, Brelsford, & Barlow, 1999). Perceived hazard—also referred to as perceived threat—is generally defined as a function of injury severity (how severe the harm would be if injury were to occur) and likelihood (the probability that injury will occur), and it is thought that these two factors interact multiplicatively (DeJoy, 1999a). In other words, perceived hazard is lowest when both injury severity and likelihood are low, moderate when one of the factors is low and the other is high, and highest when both injury severity and likelihood are high. However, the contribution that each of these factors make to overall perceived hazard can vary depending on the type of threat being evaluated.

The focus on injury severity and likelihood as the two main components of hazard perception investigated in the warnings literature stems from research presented in the risk perception and communication literature. Slovic and his colleagues have extensively investigated how people perceive risk (e.g., Fischhoff, Slovic, Lichtenstein, Read, & Combs, 1978; Slovic, 1987; Slovic, Fischhoff, & Lichtenstein, 1980). This research shows that experts typically base their perceptions of risk on likelihood estimates, whereas non-experts use likelihood information in addition to other qualitative characteristics. While many qualitative characteristics have been considered (e.g., whether people face the risk voluntarily, the amount of control one has over the risk, the catastrophic potential of the risk, how dreaded the consequences are, and how severe the

potential consequences are), Fischhoff et al. (1978) found that “perceived risk judgments could be predicted just as well using the single qualitative variable ‘severity of consequences’ and ignoring perceived benefit and other qualitative scales” (p. 148).

Wogalter et al. (1987) observed that the majority of risk perception studies show that the likelihood of the hazard contributes more to hazard perception than the severity of injury. However, the majority of his research on the perceived hazards of consumer products has found that injury severity explains the majority of variance in hazard perception (e.g., Wogalter, Brelsford, Desaulniers, & Laughery, 1991; Wogalter, Brems, & Martin, 1993; Wogalter et al., 1987). In an attempt to reconcile this disparity, Wogalter et al. (1999) conducted a study that directly compared the products and activities that gave rise to the contradictory findings in the separate lines of research. Slovic, Fischhoff, and Lichtenstein’s (1979) list included 30 products, activities, and technologies, whereas Wogalter et al.’s (1991) list included 72 consumer products (as cited in Wogalter et al., 1999). Participants were given one of the lists and were asked to rate all of the items on several dimensions. In line with previous findings, the results of this study showed that injury severity was the main factor capable of predicting hazard perception for the Wogalter et al. (1991) list, while likelihood of injury was the primary predictor for the Slovic et al. list.⁶

After obtaining these results, Wogalter et al. (1999) offered an explanation as to why injury severity and likelihood of injury play such different roles for these two lists.

Injury likelihood is very low for the kinds of products evaluated in the Wogalter et al. (1999) list, making the use of such probabilistic information difficult. In this case, people’s use of severity information, which is more salient and available,

⁶ Regression analyses were used to determine whether severity and likelihood were significant predictors.

may be entirely rational. However, when injury severity reaches some upper level (i.e., with consequences of very serious injury or death), which is probably the case for many of the items on the Slovic et al. (1979) list, the only remaining uncertainty about the outcome is the likelihood of its occurrence. For example, people's notions about plane crashes or nuclear accidents are generally associated with disaster—there is no question about the severity of the consequences (i.e., death). Therefore, only the probability of the event serves to differentiate the items, and so, in these cases, likelihood would be expected to play a larger role. (Wogalter et al., p. 157)

To further explore this issue, Wogalter et al. (1999) conducted a separate study in which four warning labels were created. The labels varied in terms of injury severity (high, low) and likelihood of injury (high, low). Results showed that products containing the high severity labels were rated as more hazardous than those containing the low severity labels. However, likelihood did not affect perceived hazard. This finding further supports the notion that injury severity is the primary factor influencing hazard perception for consumer products.

In summary, research has demonstrated that precautionary intentions/behaviors increase as perceptions of hazard increase. In addition, hazard perception is largely driven by a person's perception of the potential severity of injury associated with product use. It follows then that the greater the severity of potential harm, the higher the likelihood that a person will comply (or report the intention to comply) with precautions. DeJoy (1999b) argues that perceived threat is the factor that initially provides the motivation for precautionary behavior. While a perceived threat may initially motivate compliance, several other factors may contribute to whether or not compliance behavior actually takes place (Riley, 2006).

Costs of Compliance

Even if a person is initially motivated to comply with the precautions outlined on a warning label, costs of compliance—the time required, the effort that must be exerted, the discomfort(s) associated with the precautions—may alter behavior/behavioral intentions. Most of the studies investigating the costs associated with compliance have focused on an increase in the time and effort associated with compliance as the main cost. In a series of studies aimed at identifying the factors that influence warning effectiveness, Wogalter et al. (1987) conducted a field study that directly examined the cost of compliance as a factor that can influence a person's motivation to comply with a warning. In this study, three cost conditions were created (low, moderate, and high).

In all conditions, a sign was posted on the left door of a set of double doors in a campus building. The sign warned people that the door was broken and its use could lead to injury. In the low cost condition, an arrow at the bottom of the sign directed people to use the right door rather than the left. In the moderate cost condition, the arrow directed people to a separate set of doors that was located 50 feet away. In the high cost condition there was no arrow on the sign, but the closest set of doors was located approximately 200 feet away. Compliance was evaluated by observing whether or not people encountering the signs complied with the directive. Results showed that approximately 94% of people complied in the low cost condition, approximately 6% complied in the moderate cost condition, and 0% complied in the high cost condition.⁷ Wogalter et al.

⁷ It is important to note that the high cost condition sign did not include a directive arrow. However, an arrow was included on the moderate cost condition sign and only 6% of people complied. Given this result, the 0% compliance rate observed in the high cost condition is likely due to cost and not the absence of the arrow on the sign.

concluded that “the less time and effort required for compliance by a warning, the more impact it will have on behavior” (p. 611).

Wogalter et al.’s (1987) findings encouraged additional studies aimed at replicating these results. In another study, Wogalter, Allison, and McKenna (1989) had participants complete a task in which they were told that they would be mixing hazardous chemicals (in reality, the “chemicals” were common household substances—water, flour, sugar, cornstarch—altered in appearance by food coloring to increase believability). The experiment varied the cost associated with precautionary behavior by placing the safety equipment (gloves and surgical masks) either in the room where the task was to be completed (low cost condition) or in a room down the hall (high cost condition; this was the same room in which participants completed the consent form). Study results showed that compliance rates were 73% in the low cost condition and 17% in the high cost condition, again demonstrating that compliance decreased as the cost increased.

Dingus, Wreggit, and Hathaway (1993) also looked at how varying cost conditions influenced compliance with precautionary measures. Their first experiment involved posting warning signs that encouraged racquetball players to wear eye protection while playing to prevent serious eye injury.⁸ There were two cost conditions: medium and low. In the medium cost condition, the protective eye equipment was located at a checkout desk 60 feet from the court. In the low cost condition, the protective equipment was located next to the racquetball courts. Results showed that only one participant in the medium cost condition complied with the warning and obtained

⁸ The study also investigated the role of warning content, so some of the warning signs also included five statistical facts about the eye injuries that can result while playing racquetball.

protective eyewear.⁹ Compliance rates were approximately 30% in the low cost condition that included only the warning, and 38% in the low cost condition that included the warning and statistical information. While the compliance rates were much higher in the low cost condition, the rates are still extremely low. These results demonstrate that the time and effort it takes to comply with precautions is only one type of cost. In this case, it is also possible that players chose not to wear the protective eyewear because they believed it would cause discomfort or was unnecessary.

In the second experiment reported in the Dingus et al. (1993) article, participants were sent home with a household cleaner that contained a warning label. In the high cost condition, participants received only the product; in the low cost condition, the protective equipment (gloves and a dust mask) needed to comply with the warning was included.¹⁰ Thus, to comply with the warning, people in the high cost condition would need to locate (and possibly purchase) the protective equipment before using the product. The participants that received the product with the protective equipment were more likely to comply with the precautionary measures. While both of the Dingus et al. experiments examined the influence of factors other than cost on compliance rates, findings showed that “cost of compliance was the greatest single factor contributing to warning label effectiveness in these studies” (Dingus et al., 1993, p. 670).

⁹ The authors included a subset of the sample when reporting the results but did not report the total number of subjects included in the analysis; because they reported only one participant complying in the moderate cost condition, it is unclear what percentage of the sample this was.

¹⁰ This study also examined label type and interactivity as potential factors influencing compliance.

Social Influence

Social influence has also been shown to influence precautionary behavior. Wogalter, Allison, and McKenna (1989) investigated the effect of social influence on compliance rates. Participants were paired with a confederate (in the chemistry task previously described) that either followed or ignored the precautionary instruction. Results showed that when the confederate complied with precautions, the subject was more likely to comply with the precautions regardless of the associated costs. In another study, they placed a sign on the door of an elevator located in a three-story dorm. The sign informed people that the elevator might stick between floors, and advised people to use the stairs rather than the elevator. The confederate either (a) stared at the warning and then walked toward the stairs when the elevator was about to arrive, or (b) stared at the warning until the elevator was about to arrive and then entered the elevator when the door opened. When the confederate complied, 89% of students also complied; when the confederate did not comply, only 27% of students complied.

In another series of studies examining social influence, deTurek, Chih, and Hsu (1999) varied confederate behavior in four different ways¹¹. In two separate studies, participants were paired with a “role model” that either (a) complied with the precautionary instruction to wear gloves while using the product, (b) did not comply with the precaution and was not harmed, (c) did not comply with the precaution and was mildly burned, or (d) did not comply with the instruction and was severely burned. In both studies, people were more likely to comply with the warning precaution when the role model complied. The one exception occurred in the condition in which the role

¹¹ Social influence was just one of the factors investigated in these studies.

model did not comply and was severely burned; in this condition, participants were more likely to comply with precautions. Interestingly, participants were *not* more likely to comply when the confederate did not comply and received only a mild skin burn. The authors speculated that this finding could be explained by participants' beliefs that they could avoid harm by being more careful than the role model, or that the harm was not that severe. Regardless of the explanation, this particular finding demonstrates the profound effect that social influence can have on behavior.

The studies examining the role of social influence in motivating compliance behavior show that people are likely to imitate the behavior of others, even when the observed behavior is unsafe. Research in this area has been applied in an effort to increase the likelihood of compliance. For example, deTurck and colleagues (1999) point out that consumer and employee safety can be heightened by utilizing demonstrations that illustrate how to use products safely.

Key role models such as parents, teachers, peers, [and] managers, should be made aware of how to use a product safely. This could be accomplished through school educational programs, in-store demonstrations or displays, videotapes or pictures. Manufacturers could provide training or videos to retailers for in-store demonstrations of proper product use. [...] In addition, it would be feasible for some manufacturers to utilize the role modeling effect in advertisements, public safety announcements and/or packaging displays or inserts. (deTurck et al., 1999, p. 411)

Familiarity and Experience

Various individual differences that may play a role in influencing motivation have been examined in the warnings literature. The factors receiving the most attention in this area have been familiarity and experience. While these terms are often used interchangeably, familiarity and experience are not identical concepts (DeJoy, 1999a).

Experience is generally defined in terms of direct contact with the product, whereas familiarity can be gained through a variety of other means (e.g., exposure to marketing, observing the product being used by others, and experience with similar products). For this reason, “familiarity is typically defined in terms of the individual’s personal knowledge of and/or experience with the product, object or activity in question” (DeJoy, p. 202). Several studies have demonstrated that when people are more familiar with a product, they perceive the product to be less hazardous (e.g., Wogalter et al., 1991; Wogalter et al., 1987) and are less likely to comply (or report intentions to comply) with safety precautions (e.g., Vaubel & Young, 1992; Wogalter, Barlow, and Murphy, 1995; Wogalter et al., 1993).

Research by Godfrey and Laughery (1984) found that people were likely to attend to warning information the first time they used a product; however, when people switch to a different but similar product, they are much less likely to attend to warning information. The authors note that this tendency can be particularly dangerous when the new product is more hazardous than the product with which the user has actual experience. Godfrey and Laughery posit that this effect is due to users perceiving the hazard of using the new product as lower than they likely would have if they were unfamiliar with the product type, which in turn causes them to not notice the warning information.

Goldhaber and deTurck (1988) also found that familiarity and previous experience is related to whether a person will notice warning information and follow safety precautions. In their study, people that owned above-ground pools served as

participants. They were asked to examine an above-ground pool as if they were deciding whether or not to purchase it. Because all participants in this study were familiar with pools, familiarity was defined as the amount of time participants had owned their pool. Those more familiar with the product were more likely to report that they were uncertain as to whether any warning information was posted. These results align with past research demonstrating that warning information is less likely to be noticed by those that are more familiar with a product.

Wogalter, Barlow, and Murphy (1995) have also examined the effect of familiarity on compliance. In addition, the authors attempted to counter the familiarity effect by placing a supplemental directive (a note instructing the reader to view warning information) in various places near or on the product. Once again, the results of this study showed that those more familiar with the product were less likely to comply with the prescribed precautions. However, the results also showed that when a supplemental directive was placed either (a) inside a folded leaflet instructing the participant to open the insert first, or (b) in a place that interfered with use, compliance rates for those familiar with the product went up. This finding suggests that the familiarity effect can be countered by increasing the likelihood that the user will notice the warning information.

DeJoy (1999b) outlined three possible reasons for why the familiarity effect occurs. The first explanation relates to the benign experiences users have with products; “as people use a product without incurring any safety problems, they become less concerned about its dangers and more confident in using the product” (p. 233). The second explanation focuses on habituation, which is the tendency for people to no longer

notice information when they encounter it on a regular basis. This explanation suggests that “people become accustomed to seeing a particular warning message and essentially it recedes into the background” (p. 233). The third explanation revolves around the application of script theory (Schank & Abelson, 1977, as cited in DeJoy, 1999b). This theory explains that “experienced users rely on scripts stored in memory and devote little attention to warning labels, instructions, or other materials” (p. 234).

Taken together, the findings of the studies investigating the influence of familiarity clearly demonstrate that those that are familiar with products are less likely to attend to warning information. As Goldhaber and deTurck (1988) point out:

Consumers who feel they know how to use a product safely, although they may never have processed information related to product safety, will not be motivated to seek safety information so long as they continue to feel certain about how to use the product safely. (p. 31)

Motivation and Emotion

Many (e.g., Bradley, 2000; Izard, 2009, 1993; Zeelenberg et al., 2008) have suggested that one of the major functions of emotion is to motivate behavior. According to Hansell (1989), “the relationship between emotion and motivation is a venerable topic, as is attested by the common Latin root (*movere*, to move) of the words” (p. 431). The study of emotion can be dated back several centuries, and theories of emotion have taken several forms over the years. The purpose of this section is not to provide an exhaustive review of the emotion literature; rather, it is to underscore the importance that has been placed on the role of emotion in motivating behavior.

“Both emotion and motivation are fundamentally related to action” (Bradley, 2000, p. 602). Emotions are thought to be multifaceted constructs composed of several components (Larsen & Prizmic-Larsen, 2006). For example, physiological, behavioral/expressive, motivational, cognitive, and subjective/experiential components have been described (Izard, 1993; Roseman, 2001; Scherer, 2001; Zeelenberg, Nelissen, & Pieters, 2007). The motivational component of emotion serves to organize and direct behavior (e.g., Izard, 1993, 2009; Scherer, 2001), and different emotions serve to motivate different behaviors (Roseman, 2001).

Before continuing the discussion, it is important to differentiate between the terms affect and emotion. While these two terms have often been used interchangeably in the literature, they are two distinct concepts. While affect has been used as a general term that includes feelings, moods, and emotions (e.g., Clore, Gasper, & Garvin, 2001; Forgas, 1995, 2001), it has more recently been defined as the valence (good or bad, pleasant or unpleasant, positive or negative) associated with a specific stimulus (Finucane, Peters, & Slovic, 2003; Zeelenberg et al., 2007). Emotion, on the other hand, has not been clearly defined (Bradley, 2000; Izard, 2009; Zeelenberg et al., 2008; Zeelenberg et al., 2007).

The difficulty in finding a definition of emotion that is commonly accepted is likely due to the wide range of emotions that can be experienced (Zeelenberg et al., 2007). The problem of defining emotion is also likely due to the different approaches that have been used to study emotion. While there is not one single definition of emotion that is agreed upon by psychologists, Zeelenberg et al. (2007) outline several common aspects of emotion: Emotions tend to be (a) short-lived, (b) about something or someone, (c)

present when an event or outcome is considered personally relevant, and (d) “cognitively impenetrable”; this means that the experience of emotion is generally not a choice when certain events or outcomes are personally relevant.

The role of affect in influencing judgments and decisions has received considerable attention (e.g., Isen & Labroo, 2003; Slovic, Finucane, Peters, & MacGregor, 2002). However, Zeelenberg and colleagues (2007) propose that “to understand the effect of affect on decision making, one has to go beyond valence and study the effects of specific emotions” (p. 174). They point out that the current trend in decision research is to equate emotion with affect, which reduces the measure of emotion to a value on a positive-negative dimension. Zeelenberg et al. believe that this approach is limited because (a) not all emotions that share the same valence have the same effect on decisions (e.g., fear generally causes an avoidance response, while anger generally causes an approach response), and (b) not all emotions are clearly positive or negative. For these reasons, they believe that, “especially when one is interested in motivational and intuitive processes in decision making, a focus on mere valence of emotions is insufficient” (p. 176). They also hold that when attempting to understand the role of emotion in decision making, the theories of emotion that emphasize the motivational (or goal-based) properties of emotions are best able to explain the effects that emotion has on the decision making process.

The study of emotion is currently dominated by the cognitive approach (Zeelenberg et al., 2008). This approach focuses on the cognitive component of emotion and emphasizes the importance of appraisals in the experience of emotion. An appraisal

is an evaluation of an event or situation (Roseman & Smith, 2001). “Appraisal theories were proposed to solve particular problems and explain particular phenomena that seemed to cause difficulties for alternative models” (Roseman & Smith, 2001, p. 3; for an overview of appraisal theory, see Scherer, Schorr, & Johnstone, 2001). Appraisal theories posit that an emotional experience results when physiological arousal is paired with cognitive appraisals. The focus on appraisals provides an explanation for why two people in the same situation can experience different emotions, as well as why the same person in two separate but similar situations can experience different emotions. Appraisal models are especially useful for researchers attempting to manipulate emotions because they outline the cognitive antecedents that give rise to specific emotions.

Roseman’s (2001) appraisal model posits that there are seven appraisals that directly influence emotion:

(1) Unexpectedness: not unexpected/unexpected (whether the event violates one’s expectations); (2) situational state: motive-inconsistent/motive-consistent (whether the event is unwanted or is wanted by the person); (3) motivational state: aversive/appetitive (whether the event is being related to a desire to get less of something punishing or a desire to get more of something rewarding); (4) probability: uncertain/certain (whether the occurrence of motive-relevant aspects of the event is merely possible or is definite); (5) agency: circumstances/other person/self (what or who caused the motive-relevant event); (6) control potential: low/high (whether there is nothing one can do or something one can do about motive-relevant aspects of an event); and (7) problem type: instrumental/intrinsic (whether a motive-inconsistent event is unwanted because it blocks attainment of a goal or unwanted because of some inherent characteristic). (p. 68)

According to the model, the emotion experienced will be dependant upon the specific combination of appraisals. For example, a fear response is anticipated when an event is expected, motive-inconsistent, uncertain, circumstance-caused, and low in control

potential (the two appraisal categories not mentioned here can take on either value and still result in fear).

Emotion in the Warnings Literature

In her chapter on beliefs, attitudes, and motivation in the *Handbook of Warnings*, Riley (2006) describes motivation as the “set of processes that links beliefs with action (or inaction) comprising a range of emotional and decision factors” (p. 289).

Surprisingly, however, the warnings literature surrounding motivation has not directly considered the role of emotion in motivating behavior/behavioral intentions.¹² While warnings are considered fear-based communications that alert people to potential hazards (DeJoy, 1999b), little research has focused on whether fear (or any other emotion) is experienced by the user when confronted with the warning labels on consumer products. Rather, warnings present information about the potential harm that can occur if warnings are not heeded, and “this type of message framing assumes that the expectation of threatening consequences arouses fear” (DeJoy, p. 237). So while factors that may be strongly related to emotion (e.g., hazard perception) have been examined, the role of emotion in motivating precautionary behavior has not been investigated.

In a study by deTurck, Goldhaber, Richetto, and Young (1992), the effects of fear-arousing warning labels on ratings of affect (good-bad), health, and deception were explored. In this experiment, participants were presented with one of three warning labels for an alcoholic beverage. The three versions of the label were meant to induce low,

¹² One exception to this is research surrounding the effectiveness of alcohol and tobacco warning labels. However, this work is generally included in the health communication literature, which will be discussed in more detail in Chapter 3.

moderate, or high levels of fear. The purpose of the study was to determine whether moderate fear appeals were superior to either low or high fear appeals. Results showed that (a) those receiving the moderate and high fear messages rated the product as significantly more “bad” than those receiving the low fear message, (b) those receiving the moderate fear message rated the product as significantly more “unhealthy” than those in the low fear condition (the high fear condition did not significantly differ from the moderate and low fear conditions), and (c) those in the high fear condition rated the warning information as significantly more “deceptive” than those in the low and moderate fear conditions. However, the authors did not ask participants to report on the extent to which they experienced fear; rather, they created warning labels that they considered low, moderate, or high in terms of their fear evoking properties. While this study is the only one to the author’s knowledge in the warnings literature to explicitly investigate the effects of fear on attitudes related to warning labels, it did not examine the effect of fear on behavioral intentions.

Current Research

The current research aims to investigate what role (if any) emotion plays in decisions regarding a person’s intention to use a product and/or take precautionary measures. Three studies were conducted to examine the effect of emotion on behavioral intentions. The goal of the first study was to explore the relation between emotional arousal and behavioral intention. The aim of the second study was to manipulate the amount of fear experienced by participants when reading a warning label to examine how

varying levels of fear influence behavioral intentions. The third study served to replicate and extend the findings of the second study by pairing the created warning labels with a new product. In all three studies, participants were presented with situational scenarios and product warning labels, and were asked to answer several questions related to emotion and behavioral intentions.

Most studies in the warnings literature that examine behavioral intentions use dependent measures associated with safety behavior (e.g., likelihood of complying with precautions and intended carefulness). In addition to these traditional measures, the research reported here includes a measure of behavioral intention that is rarely utilized in the warnings literature—the receiver’s intention to use the product. Many of the studies conducted to date take a consumer perspective and focus on how to adequately inform consumers of the risks associated with using a product and ways in which the risks can be controlled. Very few studies (e.g., Heaps & Henley, 1999; Laughery, Vaubel, Young, Brelsford, & Rowe, 1993; Silver, Leonard, Ponsi, & Wogalter, 1991) have focused on how the warning information and instructions may alter a consumer’s intention to purchase or use the product. This, of course, is a major concern for manufacturers.

Manufacturers are often worried that providing detailed warning messages may lead to a reduction in sales (Cox, 2006; Laughery et al., 1993). This concern creates a conflict of interest. While manufacturers have a duty to inform consumers of potential hazards, they also want to sell their products. The handful of studies that have examined how warning information affects a person’s intention to use/purchase a product have provided mixed results. For example, Heaps and Henley (1999) found that explicit

mention of a product's hazardous agent and worst possible consequences did not result in lower likelihood of use ratings. On the other hand, Laughery et al. (1993) found that providing explicit consequence information caused participants to report being less likely to purchase the product. In a study by Silver et al. (1991), purchase intentions could be predicted using product familiarity and attractiveness of the product package; in this study, hazard related information did not contribute to predicting purchase intentions. While the effects of factors such as explicitness and familiarity on likelihood to use/purchase products have been investigated, the role of emotion in influencing these intentions has not been studied. For this reason, the current studies will include likelihood of using the product as one of the main dependant measures of interest.

CHAPTER II

STUDY 1

In this study two main questions were addressed. First, do participants have an emotional reaction to the warning labels presented in this study? If so, which emotions are activated by the information contained in the warning labels? Second, is there a relation between emotional arousal and likelihood of using the product? If so, what is the nature of these relations, and can they be used to predict the likelihood that a person will use the product? For example, when emotional arousal is high, are participants more or less likely to use the product, and can likelihood of using the product be predicted by the activated emotion(s)? To answer these questions, participants were asked to read several scenarios and product warning labels, and then provide responses to self-report measures of emotion and behavioral intention. Because the role of emotion has not been explicitly explored in the warnings literature, this study serves as a starting point for investigating how emotion influences consumer behavior with regard to warning labels.

As mentioned in the previous chapter, appraisal models are particularly useful when researchers are attempting to manipulate emotion. Because it was anticipated that manipulating emotion would be a goal of future studies, Roseman's (2001) appraisal model was used to guide the selection of emotions that would be investigated in all of the studies. In total, nine emotions were selected for inclusion in the first study based on the

particular appraisal categories. Although it is possible for a person to have multiple (and possibly competing) motives in situations that require the use of a consumer product, it is likely that one active and important motive is to keep oneself from harm. If an important motive is safety, then a situation or event that could result in harm would be classified as motive-inconsistent.

In addition, warning label information often informs the consumer of harm that can be categorized based on Roseman's agency appraisal. This harm may be circumstance-caused (the circumstances themselves may result in harm; e.g., simply using the product may cause harm), other-caused (someone else is responsible for the potential harm; e.g., a product is more dangerous than it needs to be and this could result in harm), or self-caused (the person using the product is responsible for the potential harm; e.g., the consumer fails to heed precautions and/or uses the product improperly, which results in harm). Because the emotions in the self-caused category (regret, guilt, and shame) are often emotions experienced after an event has already taken place (e.g., harm has occurred because of something the consumer did or did not do), only circumstance-caused and other-caused emotions were selected for measurement in this study given that participants did not actually use the product.

Based on the model, there are several emotions that may be experienced when a situation or event is (a) motive-inconsistent and (b) either circumstance-caused or other-caused. These nine emotions (surprise, fear, sadness, distress, frustration, disgust, anger, dislike, and contempt) were measured in this study.

Method

Participants

Two hundred and two undergraduate students enrolled in a psychology course at the University of Oregon served as participants in this study (126 were female and 75 were male; 1 participant declined to respond). The students ranged in age from 18 to 57 years of age, with the mean age being 19.6 ($SD = 3.4$). One hundred eighty-six participants reported English as their first language, and 194 reported their student status as full-time. The sample of undergraduate students consisted of 98 freshmen, 61 sophomores, 25 juniors, and 15 seniors (3 participants declined to answer). The sample consisted of 5 African-Americans, 23 Asian/Pacific Islanders, 165 Caucasians, 7 Hispanics, and 1 Native American/Alaskan Native (1 participant declined to answer). One hundred twenty-five participants reported having no job, 73 reported having a part-time job, and 2 reported having a full-time job (2 participants declined to respond). Ninety-nine of the subjects reported living in a dorm, 93 reported living off-campus, and 10 reported living off-campus with their parents. Students were given course credit in return for their participation in the study.

Materials

Participants were asked to complete a number of questionnaires and read several different scenarios and product warning labels.

Demographic and Background Questionnaire. This questionnaire asked participants to provide basic demographic information (sex, age, race, etc.). In addition, subjects were asked general questions about how often they read warning labels and

comply with warning precautions, how often warning information affects their decision to use a product, and the extent to which they believe that warning labels are intended to protect the consumer from harm and the manufacturer from legal liability.

A baseline for emotion was also collected. Participants were presented with a list of the nine emotions selected for examination in this study (surprise, fear, sadness, distress, frustration, disgust, anger, dislike, and contempt; see discussion above for reasons why these emotions were selected) and were asked to rate the extent to which they were currently feeling each emotion on a unipolar 7-point Likert scale. For the first seven emotions (surprise, fear, sadness, distress, frustration, disgust and anger) the feeling resulting from each of the emotions was listed above the scale (e.g., surprised, fearful, sad, distressed, etc.), and the scale ranged from “Not at All” to “Extremely” (the wording of these anchors was selected so that subjects could easily combine the anchor with the feeling they were being asked to rate (e.g., not at all surprised, extremely fearful). For the last two emotions (dislike and contempt), the scale ranged from “No” to “Extreme.” This scale differed slightly from the seven other emotions because the resulting feeling is expressed in the same way as the emotion; the anchors associated with the other scale did not make sense when combined with these feelings (e.g., not at all dislike, extremely contempt), so the scale was altered slightly so that it would make sense if subjects combined the anchor with the feeling.

Scenarios. Before participants were presented with product warning labels, they were asked to read a scenario. The scenarios served to introduce the consumer product and provide a specific situation for all participants to imagine. The scenarios were

designed to evoke the strongest emotional response possible given the limitations of the study. I hypothesized that the emotional response would be strongest if the situation was one in which (a) the need for the product was high (the problem presented in the scenario needed to be resolved quickly) and (b) there were no other product options available. Therefore, all of the scenarios presented a problem that the participants would likely want to solve (so they needed the product), and only one product option was offered. The scenarios were standardized as much as possible given the different products selected for use in the study. The scenarios presented situations that were believable and easy to imagine (see Appendix A to view all scenarios used in this study). After reading a scenario, participants were asked to take some time to imagine themselves in the situation and to envision how they would feel and what they would be thinking before proceeding with the study.

Pre-Label Questionnaire. This questionnaire asked participants to rate the extent to which they would feel each of the emotions if they were in the situation described in the scenario. Participants were also asked to rate the likelihood that they would use the product given the scenario.

Warning Labels. Twelve warning labels, taken from real consumer products, were used in this study. The products were selected by using some general parameters to narrow down potential options and create product categories. Once categories were created, specific items were selected for each category. The following paragraphs provide more detail on how the products were selected.

Warning information is provided for several different types of consumer products. In one warning label study, Wogalter et al. (1991) divided 72 items into three general product categories: electrical (e.g., desk lamp, steam iron, vacuum cleaner, etc.), chemical (e.g., antacid, drain cleaner, kerosene, etc.), and non-electrical tools (e.g., garden shears, lawn mower, binoculars, etc.). Warning labels can come in several different forms; for example, warning information may be posted on the product itself, on the product container or packaging, and/or in a user manual. To maintain consistency, the products used in this study were limited to products that have warning labels posted on the product container/box. The only category in which most consumer products met this criterion was the chemical category. For this reason, only consumer products containing chemicals were used in this study. This category of product also offered a variety of different warning messages, hazard levels, and product types.

After deciding that items for the study would be chemical products with the warning label displayed on the product container/box, three product categories were created: household cleaners, over-the-counter medications, and miscellaneous. These categories were based on data collected in a previous exploratory study. In the study, participants were asked to remember the last time they read a warning label and to report the item that contained the warning label. Most of the chemical products reported by participants fell into these three general categories.

A total of twelve products, four for each category, were included in the study (a convenience sample of products was taken by visiting a local one-stop shopping center).

The miscellaneous category included ant poison, an eraser¹³, general trim adhesive, and a multipurpose glue. The over-the-counter medicine category included two pain relievers, an allergy medication, and an upset stomach reliever. The household cleaner category included a toilet cleaner, a carpet cleaner, an oven cleaner, and a multipurpose bathroom cleaner.

The warning labels were presented to participants in a semi-standardized manner. All warning labels were presented in black and white (even though some of the original labels contained color) and the space in which the label was presented was consistent (e.g., all margins were the same and borders were removed). However, if the original label contained information in all capital letters or bolded text, this formatting was retained so that the information the manufacturer wanted to emphasize was still highlighted in some way for the participant. To view all of the warning labels used in this study, see Appendix A.

Post-Label Questionnaire. The post-label questionnaire asked participants to rate the extent to which they would feel each of the emotions after reading the warning label (while still keeping the original scenario in mind). In addition, they were asked to rate the likelihood that they would continue to use the product after reading the warning label. The participants were also asked questions about the perceived dangerousness of the product, likelihood of injury, and severity of harm.

Post-Study Questionnaire. The post-study questionnaire asked participants to rate how believable and relatable they thought the scenarios were, how harmful they perceived products in each of the categories to be, how familiar they were with each of

¹³ The eraser was selected because of its unusual warning label (see Appendix A).

the product categories, and the likelihood that they would look for warning information for each of the product categories.

Procedure

All data for this study were collected online. Participants signed up for the study electronically, and they were free to complete the study in any location where they had access to a computer and an internet connection. After being directed to the study Webpage, participants were asked to read the informed consent form. If subjects agreed to participate, they were asked to complete the demographic and background questionnaire. Upon answering these questions, participants were asked to read the instructions for the study. Each participant was then presented with a scenario to read. After reading the scenario, participants completed the pre-label questionnaire. Subjects were then presented with the corresponding product warning label. After reading the warning label, participants were asked to complete the post-label questionnaire.

Participants were then presented with two more scenarios, pre-label questionnaires, warning labels, and post-label questionnaires. In total, each participant read three scenarios and three warning labels, one from each product category. The order in which the product categories were presented was counterbalanced across subjects, and the item within each category that was presented to the subjects was selected randomly. Once all three scenarios and product warning labels had been presented and the corresponding questionnaires had been completed, subjects completed the post-study questionnaire. Upon completion of the study, the debriefing form was displayed for subjects to read and/or print.

Results

Comparing Pre-Label and Post-Label Emotion

The first aim of this study was to determine whether people have an emotional reaction to warning label information, and if so, to identify which emotions are activated. To answer these questions, a series of paired-samples *t*-tests were conducted for each label to determine whether there were any significant changes between the pre-label and post-label emotion reported by participants.¹⁴ Surprise and/or fear increased after exposure to the warning label for 10 of the 12 products, while the other seven emotions either increased or decreased depending on the particular product. The changes in mean ratings are presented in Table 1.

Table 1

Mean Change in Emotion Ratings after Exposure to the Warning Labels

	Surprise	Fear	Sadness	Distress	Frustration	Disgust	Anger	Dislike	Contempt
Poison	-0.13	0.86	-0.16	-0.31	-0.94	-0.94	-0.78	-0.53	-0.13
Eraser	3.26	2.08	0.12	0.02	-0.60	1.72	0.28	1.06	0.81
Adhesive	1.46	1.64	-0.08	0.33	0.06	0.83	0.04	0.74	0.36
Glue	-0.27	0.13	-0.57	-1.06	-1.25	-0.18	-1.04	-0.24	-0.04
Pain 1	0.64	-0.12	-0.27	-0.94	-1.14	0.00	-0.70	-0.42	-0.10
Pain 2	0.03	-0.65	-0.98	-1.35	-1.55	-0.20	-1.10	-0.27	-0.02
Allergy	0.57	0.02	-0.20	-0.96	-0.86	0.18	-0.74	0.14	-0.11
Stomach	0.72	-0.24	-0.68	-1.10	-0.96	0.35	-0.65	-0.30	-0.50
Toilet	0.70	1.06	-0.06	-0.15	-0.53	0.24	-0.40	0.25	0.17
Carpet	0.45	0.77	0.08	-0.08	-0.66	0.50	-0.31	0.15	-0.14
Oven	1.08	0.86	0.06	-0.44	-1.22	0.37	-0.59	0.33	-0.25
Bathroom	0.85	1.23	-0.34	-0.23	-0.40	0.62	-0.33	0.66	0.04

Note: Bolded values represent changes significant at $p < .05$

¹⁴ Nine paired-sample *t*-tests were conducted for each label. Because the emotions are moderately correlated and multiple comparisons are being made, a more conservative alpha-level of $p < .006$ (Bonferroni corrected) could be used to lower the likelihood of Type I errors. However, because I am more interested in identifying potential differences, the standard alpha-level of $p < .05$ was used.

Ant Poison. Paired-sample *t*-tests between pre-label and post-label ratings of emotion revealed a significant change for fear, frustration, disgust, anger, and dislike. After reading the warning label, participants reported an increase in fear ($t(50) = -2.78, p < .01$), a decrease in frustration ($t(50) = 3.64, p < .01$), a decrease in disgust ($t(50) = 3.48, p < .01$), a decrease in anger ($t(49) = 2.65, p < .02$), and a decrease in dislike ($t(48) = 2.45, p < .02$).

Eraser. Paired-sample *t*-tests between pre-label and post-label ratings of emotion revealed a significant change for surprise, fear, frustration, disgust, dislike, and contempt. After reading the warning label, participants reported an increase in surprise ($t(49) = -10.89, p < .001$), an increase in fear ($t(49) = -7.29, p < .001$), a decrease in frustration ($t(49) = 2.05, p < .05$), an increase in disgust ($t(49) = -5.11, p < .001$), an increase in dislike ($t(47) = -4.63, p < .001$), and an increase in contempt ($t(47) = -3.50, p = .001$).

General Trim Adhesive. Paired-sample *t*-tests between pre-label and post-label ratings of emotion revealed a significant change for surprise, fear, disgust, and dislike. After reading the warning label, participants reported an increase in surprise ($t(49) = -4.68, p < .001$), an increase in fear ($t(49) = -5.72, p < .001$), an increase in disgust ($t(50) = -3.02, p < .01$), and an increase in dislike ($t(50) = -4.11, p < .001$).

Multi-Purpose Glue. Paired-sample *t*-tests between pre-label and post-label ratings of emotion revealed a significant change for sadness, distress, frustration, and anger. After reading the warning label, participants reported a decrease in sadness ($t(48) = 3.31, p < .01$), a decrease in distress ($t(48) = 4.14, p < .001$), a decrease in frustration ($t(47) = 4.74, p < .001$), and a decrease in anger ($t(48) = 4.27, p < .001$).

Pain Reliever 1. Paired-sample *t*-tests between pre-label and post-label ratings of emotion revealed a significant change for surprise, distress, frustration, anger, and dislike. After reading the warning label, participants reported an increase in surprise ($t(49) = 2.36, p < .03$), a decrease in distress ($t(49) = 4.46, p < .001$), a decrease in frustration ($t(49) = 4.52, p < .001$), a decrease in anger ($t(49) = 3.30, p < .01$), and a decrease in dislike ($t(49) = 2.27, p < .03$).

Pain Reliever 2. Paired-sample *t*-tests between pre-label and post-label ratings of emotion revealed a significant change for fear, sadness, distress, frustration, and anger. After reading the warning label, participants reported a decrease in fear ($t(50) = 2.05, p < .05$), a decrease in sadness ($t(49) = 4.83, p < .001$), a decrease in distress ($t(50) = 4.96, p < .001$), a decrease in frustration ($t(50) = 5.32, p < .001$), and a decrease in anger ($t(49) = 4.66, p < .001$).

Allergy Medicine. Paired-sample *t*-tests between pre-label and post-label ratings of emotion revealed a significant change for surprise, distress, frustration, and anger. After reading the warning label, participants reported an increase in surprise ($t(50) = 2.27, p < .03$), a decrease in distress ($t(49) = 4.14, p < .001$), a decrease in frustration ($t(49) = 3.82, p < .001$), and a decrease in anger ($t(49) = 3.15, p < .01$).

Upset Stomach Reliever. Paired-sample *t*-tests between pre-label and post-label ratings of emotion revealed a significant change for surprise, sadness, distress, frustration, anger, and contempt. After reading the warning label, participants reported an increase in surprise ($t(49) = -2.24, p = .03$), a decrease in sadness ($t(48) = 3.55, p < .01$), a decrease in distress ($t(49) = 3.77, p < .001$), a decrease in frustration ($t(48) = 3.39, p <$

.01), a decrease in anger ($t(48) = 2.38, p < .03$), and a decrease in contempt ($t(49) = 2.79, p < .01$).

Toilet Cleaner. Paired-sample t -tests between pre-label and post-label ratings of emotion revealed a significant change for surprise and fear. After reading the warning label, participants reported an increase in surprise ($t(49) = -2.40, p = .02$) and an increase in fear ($t(48) = -3.94, p < .001$).

Carpet Cleaner. Paired-sample t -tests between pre-label and post-label ratings of emotion revealed a significant change for fear, frustration, and disgust. After reading the warning label, participants reported an increase in fear ($t(51) = -3.29, p < .01$), a decrease in frustration ($t(52) = 2.38, p < .03$), and an increase in disgust ($t(52) = -2.70, p < .01$).

Oven Cleaner. Paired-sample t -tests between pre-label and post-label ratings of emotion revealed a significant change for surprise, fear, distress, frustration, and anger. After reading the warning label, participants reported an increase in surprise ($t(48) = -3.73, p = .001$), an increase in fear ($t(50) = -3.91, p < .001$), a decrease in frustration ($t(50) = 4.84, p < .001$), and a decrease in anger ($t(50) = 2.19, p < .04$).

Bathroom Cleaner. Paired-sample t -tests between pre-label and post-label ratings of emotion revealed a significant change for surprise, fear, sadness, disgust, and dislike. After reading the warning label, participants reported an increase in surprise ($t(47) = -2.72, p < .01$), an increase in fear ($t(47) = -4.23, p < .001$), a decrease in sadness ($t(46) = 2.23, p < .04$), an increase in disgust ($t(46) = -2.88, p < .01$), and an increase in dislike ($t(46) = -3.09, p < .01$).

Intention to Use Product

To determine whether there was a change in the reported likelihood of using the product after being exposed to the warning label, a series of paired-samples *t*-tests comparing the pre-label and post-label variables for likelihood of using the product were conducted. Results revealed a significant change in likelihood of using the product for all of the products except the glue. In all cases of significant findings, participants reported a decrease in the likelihood that they would continue to use the product after reading the warning label. Means and standard deviations for pre-label and post-label likelihood of using the product, as well as the paired-samples *t*-test results are displayed in Table 2.

Table 2

Likelihood of Using Product Means and Paired-Samples t-Test Results

Product	Pre-Label	Post-Label	<i>N</i>	<i>t</i>	<i>p</i>	<i>df</i>
Ant Poison	6.10 (1.18)	4.63 (1.77)	52	5.90	<.001	51
Eraser	6.50 (0.97)	3.96 (2.31)	50	7.70	<.001	49
Trim Adhesive	6.08 (1.15)	4.55 (1.80)	51	6.42	<.001	50
Glue	6.12 (1.38)	6.02 (1.18)	49	0.48	.634	48
Pain Reliever 1	6.10 (1.33)	5.65 (1.52)	49	2.56	<.02	48
Pain Reliever 2	6.22 (1.06)	5.20 (1.78)	51	3.87	<.001	50
Allergy Medicine	5.94 (1.09)	5.16 (1.68)	51	3.36	<.001	50
Stomach Reliever	5.90 (1.30)	4.98 (1.99)	50	3.36	<.01	49
Toilet Cleaner	6.06 (1.30)	5.18 (1.59)	50	3.86	<.001	49
Carpet Cleaner	6.45 (0.93)	5.26 (1.70)	53	4.93	<.001	52
Oven Cleaner	6.18 (1.32)	4.80 (1.69)	51	5.90	<.001	50
Bathroom Cleaner	6.10 (1.28)	4.71 (1.50)	48	6.07	<.001	47

Note: Responses were given using a 7-point Likert scale that ranged from Extremely Unlikely (1) to Extremely Likely (7).

While all post-label ratings for likelihood of use decreased (with the exception of the glue), almost all of the post-label means were still above the scale midpoint. To

determine whether post-label ratings could be considered significantly different from the midpoint value 4, a series of one-sample *t*-tests were conducted. Results showed that post-label ratings for likelihood of using the product were significantly different from the test-value of 4 (with the exception of the eraser). This demonstrates that while the post-label ratings for likelihood of use decreased, participants still reported that they would likely use the products. One-sample *t*-test results are displayed in Table 3.

Table 3

One-Sample t-Test Results for Post-Label Likelihood of Using Product

Product	Post-Label Mean	<i>N</i>	<i>t</i>	<i>p</i>	<i>df</i>
Ant Poison	4.63	52	2.583	.013	51
Eraser	3.96	50	-.122	.903	49
Trim Adhesive	4.55	51	2.174	.034	50
Glue	6.02	49	11.973	<.001	48
Pain Reliever 1	5.65	49	7.606	<.001	48
Pain Reliever 2	5.20	51	4.804	<.001	50
Allergy Medicine	5.16	51	4.924	<.001	50
Stomach Reliever	4.98	50	3.492	<.001	49
Toilet Cleaner	5.18	50	5.258	<.001	49
Carpet Cleaner	5.26	53	5.413	<.001	52
Oven Cleaner	4.80	51	3.406	<.001	50
Bathroom Cleaner	4.71	48	3.269	.002	47

Correlations between Emotion and Likelihood of Using the Product

The second goal of the study was to determine whether there was a relation between emotional arousal and intention to use the product. To answer this question, correlations between each post-label emotion and post-label likelihood of using the product were calculated for each warning label (see Table 4). There was a significant negative correlation between surprise and likelihood of use for 10 of the 12 products, and

a significant negative correlation between fear and likelihood of use for 9 of the 12 products.

Table 4

Correlations between Post-Label Intention to Use Product and Post-Label Emotion Ratings for All Products

	Surprise	Fear	Sadness	Distress	Frustration	Disgust	Anger	Dislike	Contempt
Poison	-.539	-.561		-.331	-.313	-.365	-.379	-.349	
Eraser	-.410	-.581		-.403	-.281			-.284	
Adhesive	-.588	-.468	-.364	-.353		-.468	-.436	-.424	-.389
Glue	-.547	-.524				-.314	-.316	-.318	
Pain 1	-.324	-.286							
Pain 2	-.281					-.338			
Allergy		-.320							
Stomach	-.569	-.443	-.309			-.429		-.337	
Toilet	-.393						-.288	-.299	-.358
Carpet	-.383	-.420	-.317			-.415	-.302	-.385	
Oven	-.351								.283
Bathroom		-.407					-.348	-.601	

Note: All correlations displayed have significance values of $p < .05$; bolded correlations have significance values of $p < .01$.

The correlations between surprise and fear ranged from .59 to .82 for the various products. The main function of surprise is to focus attention so that people can process and cope with unexpected events and their consequences (Izard, 1991), whereas the main function of fear is to motivate protective behavior (Reeve, 1992). Because of its motivational properties, the relation between fear and behavioral intention was further investigated. A series of regression analyses were conducted to determine whether post-label fear was capable of significantly predicting post-label likelihood of using the product.

Using Emotion to Predict Behavioral Intention

Two regression models were tested for each warning label: (a) a reduced regression model in which only fear was used to predict likelihood of using the product, and (b) and a full model that included all nine emotions to predict likelihood of use (to determine whether the addition of the other emotions added any predictive power to the model). The reduced model (fear only) significantly contributed to the variance in likelihood of use for 9 of the 12 products. The three exceptions were one of the pain relievers, the toilet cleaner, and the oven cleaner. For the pain reliever and the toilet cleaner, emotion did not significantly contribute to the variance in likelihood of use. In addition, fear was the *only* emotion to explain a significant amount of variance for seven of the products (ant poison, eraser, glue, pain reliever 1, allergy medicine, stomach reliever, and carpet cleaner). The regression results are summarized in Table 5.

Table 5

Amount of Variance Explained in Likelihood of Using Product for the Reduced (Fear Only) and Full (All Emotions) Models

	Reduced Model (Fear Only)			Full Model (All Emotions) <i>Change Statistics</i>		
	R Square	F	p	R Square	F	p
Poison	.337	21.823	<.001	.114	0.911	.518
Eraser	.323	21.501	<.001	.133	1.128	.368
Adhesive	.245	14.581	<.001	.283	2.773	.017
Glue	.214	12.220	.001	.196	1.533	.180
Pain 1	.091	4.598	.037	.131	0.801	.605
Pain 2	.040	1.970	.167	.240	1.628	.148
Allergy	.100	5.226	.027	.198	1.375	.238
Stomach	.212	12.682	.001	.183	1.471	.199
Toilet	.056	2.648	.111	.207	1.299	.274
Carpet	.150	8.297	.006	.117	0.778	.624
Oven	.000	0.010	.921	.382	2.861	.014
Bathroom	.187	10.126	.003	.330	3.071	.010

Ant Poison. A linear regression analysis revealed that the reduced model using fear to predict likelihood of use was significant ($F(1,43) = 21.823, p < .001$) and was able to explain approximately 34% of the variance. Adding the other eight emotions to the model did not result in a significant change in the amount of variance explained. The coefficient for fear ($\beta = -.580, t(43) = -4.671, p < .001$) showed that as fear increased, likelihood of using the product decreased.

Eraser. A linear regression analysis revealed that the reduced model using fear to predict likelihood of use was significant ($F(1,45) = 21.501, p < .001$) and was able to explain approximately 32% of the variance. Adding the other eight emotions to the model did not result in a significant change in the amount of variance explained. The coefficient

for fear ($\beta = -.569$, $t(45) = -4.637$, $p < .001$) showed that as fear increased, likelihood of using the product decreased.

General Trim Adhesive. A linear regression analysis revealed that the reduced model using fear to predict likelihood of use was significant ($F(1,45) = 14.581$, $p < .001$) and was able to explain approximately 25% of the variance. Adding the other eight emotions to the model did result in a significant change in the amount of variance explained ($F\text{Change}(8,37) = 2.773$, $p = .017$) and was able to explain an additional 28% of the variance in likelihood to use the product. However, because all of the emotions were moderately correlated with fear, it was not clear which of the other emotions significantly contributed to predicting likelihood of using the product.¹⁵

Multi-Purpose Glue. A linear regression analysis revealed that the reduced model using fear to predict likelihood of use was significant ($F(1,45) = 12.220$, $p = .001$) and was able to explain approximately 21% of the variance. Adding the other eight emotions to the model did not result in a significant change in the amount of variance explained. The coefficient for fear ($\beta = -.462$, $t(45) = -3.496$, $p < .001$) showed that as fear increased, likelihood of using the product decreased.

Pain Reliever 1. A linear regression analysis revealed that the reduced model using fear to predict likelihood of use was significant ($F(1,46) = 4.598$, $p = .037$) and was able to explain approximately 10% of the variance. Adding the other eight emotions to the model did not result in a significant change in the amount of variance explained. The

¹⁵ Because of the multicollinearity problem, determining which emotions were significant predictors would require further analysis. Given that fear alone was capable of predicting likelihood of use for the majority of the products, these additional analyses were not conducted.

coefficient for fear ($\beta = -.301$, $t(46) = -2.144$, $p = .037$) showed that as fear increased, likelihood of using the product decreased.

Pain Reliever 2. A linear regression analysis revealed that the reduced model using fear to predict likelihood of using the product was not significant, and adding the other eight emotions to the model did not result in a significant change in the amount of variance explained.

Allergy Medicine. A linear regression analysis revealed that the reduced model using fear to predict likelihood of use was significant ($F(1,47) = 5.226$, $p = .027$) and was able to explain approximately 10% of the variance. Adding the other eight emotions to the model did not result in a significant change in the amount of variance explained. The coefficient for fear ($\beta = -.316$, $t(47) = -2.286$, $p = .027$) showed that as fear increased, likelihood of using the product decreased.

Upset Stomach Reliever. A linear regression analysis revealed that the reduced model using fear to predict likelihood of use was significant ($F(1,47) = 12.682$, $p = .001$) and was able to explain approximately 21% of the variance. Adding the other eight emotions to the model did not result in a significant change in the amount of variance explained. The coefficient for fear ($\beta = -.461$, $t(47) = -3.561$, $p = .001$) showed that as fear increased, likelihood of using the product decreased.

Toilet Cleaner. A linear regression analysis revealed that the reduced model using fear to predict likelihood of using the product was not significant, and adding the other eight emotions to the model did not result in a significant change in the amount of variance explained.

Carpet Cleaner. A linear regression analysis revealed that the reduced model using fear to predict likelihood of use was significant ($F(1,47) = 8.297, p = .006$) and was able to explain approximately 15% of the variance. Adding the other eight emotions to the model did not result in a significant change in the amount of variance explained. The coefficient for fear ($\beta = -.387, t(47) = -2.880, p = .006$) showed that as fear increased, likelihood of using the product decreased.

Oven Cleaner. A linear regression analysis revealed that the reduced model using fear to predict likelihood of use was not significant. Adding the other eight emotions to the model, however, did result in a significant change ($F\text{Change}(8,37) = 2.861, p = .014$) that accounted for approximately 38% of the variance in likelihood of using the product. However, because all of the emotions were moderately correlated, it was not clear which of the other emotions significantly contributed to predicting likelihood of use.

Bathroom Cleaner. A linear regression analysis revealed that the reduced model using fear to predict likelihood of use was significant ($F(1,44) = 10.126, p = .003$) and was able to explain approximately 19% of the variance. Adding the other eight emotions to the model resulted in a significant change in the amount of variance explained ($F\text{Change}(8,36) = 3.071, p = .01$) and was able to explain an additional 33% of the variance in likelihood of using the product. However, because all of the emotions were moderately correlated with fear, it was not clear which of the other emotions significantly contributed to predicting likelihood of using the product.

Components of Perceived Danger

The following analyses are not directly related to the specific research questions posed in this study. However, post-label perceptions of perceived dangerousness, perceived likelihood of harm and perceived severity of injury were collected, and the participant responses were analyzed in an effort to compare the results of this study with previous research. The means for these variables are displayed in Table 6.

Table 6

Mean Ratings of Perceived Dangerousness, Severity of Harm, and Likelihood of Harm

	<u>Danger Rating</u>		<u>Severity Rating</u>		<u>Likelihood Rating</u>	
	Mean (<i>SD</i>)	<i>N</i>	Mean (<i>SD</i>)	<i>N</i>	Mean (<i>SD</i>)	<i>N</i>
Ant Poison	5.48 (1.45)	52	4.96 (1.62)	52	4.17 (1.64)	52
Eraser	4.25 (1.77)	48	5.23 (1.74)	48	3.40 (1.69)	48
Adhesive Trim	5.39 (1.48)	51	5.31 (1.42)	49	3.88 (1.52)	50
Glue	4.04 (1.46)	49	4.78 (1.37)	49	2.96 (1.26)	49
Pain 1	3.54 (1.27)	50	4.20 (1.37)	50	2.80 (1.16)	50
Pain 2	3.56 (1.43)	50	4.27 (1.57)	49	2.80 (1.46)	50
Allergy	3.88 (1.51)	51	4.37 (1.28)	51	3.27 (1.27)	51
Stomach	3.80 (1.60)	50	4.16 (1.51)	49	3.10 (1.40)	50
Toilet	5.00 (1.44)	50	4.90 (1.50)	49	3.92 (1.34)	50
Carpet	4.57 (1.44)	53	4.52 (1.52)	52	3.46 (1.58)	52
Oven	5.29 (1.17)	51	5.22 (1.18)	50	4.10 (1.59)	51
Bathroom	5.42 (1.24)	48	4.98 (1.33)	48	3.90 (1.39)	48

Note: Responses given using a 7-point Likert scale ranging from Not at All (1) to Extremely (7).

A series of linear regression analyses were conducted to determine the extent to which perceived severity of injury and perceived likelihood of harm contributed to perceived dangerousness. For each of the products, two models were tested to predict

perceived dangerousness. The first model included only severity of harm, while the second model included severity of harm and likelihood of injury. Because previous research in the warnings literature has shown that hazard perception is largely a function of severity, the analyses were structured in this way to determine whether likelihood of injury significantly and independently contributed to the variance in perceived dangerousness for the consumer products presented in this study.

To summarize the findings presented below, both perceived severity of harm and perceived likelihood of injury contributed to the variance in perceived dangerousness for 10 of the 12 products. For one of the products (pain1), likelihood of injury explained a significant amount of variance but perceived severity of harm did not contribute to the model, and for one of the products (oven cleaner), perceived severity of harm explained a significant amount of variance in perceived dangerousness but likelihood of injury did not significantly contribute.

Ant Poison. A linear regression analysis revealed that the model containing severity of injury was significant ($F(1,50) = 68.344, p < .001$) and able to explain approximately 58% of the variance in perceived dangerousness. Adding likelihood of injury explained an additional 4% of the variance ($F\text{Change}(1,49) = 4.963, p = 0.031$). Taken together, severity of injury and likelihood of harm explain approximately 62% of the variance in perceived dangerousness. The coefficients for these variables show that as perceived severity ($\beta = .587, t(49) = 4.996, p < .001$) and perceived likelihood ($\beta = .262, t(49) = 2.228, p < .001$) increase, perceptions of danger also increase.

Eraser. A linear regression analysis revealed that the model containing severity of injury was significant ($F(1,46) = 20.424, p < .001$) and able to explain approximately 31% of the variance in perceived dangerousness. Adding likelihood of injury explained an additional 31% of the variance ($F\text{Change}(1,45) = 36.912, p < 0.001$). Taken together, severity of injury and likelihood of harm explain approximately 62% of the variance in perceived dangerousness. The coefficients for these variables show that as perceived severity ($\beta = .303, t(45) = 3.003, p < .01$) and perceived likelihood ($\beta = .613, t(45) = 6.075, p < .001$) increase, perceptions of danger also increase.

General Trim Adhesive. A linear regression analysis revealed that the model containing severity of injury was significant ($F(1,47) = 35.762, p < .001$) and able to explain approximately 43% of the variance in perceived dangerousness. Adding likelihood of injury explained an additional 13% of the variance ($F\text{Change}(1,46) = 13.269, p = 0.001$). Taken together, severity of injury and likelihood of harm explain approximately 56% of the variance in perceived dangerousness. The coefficients for these variables show that as perceived severity ($\beta = .456, t(46) = 4.053, p < .001$) and perceived likelihood ($\beta = .410, t(46) = 4.053, p < .001$) increase, perceptions of danger also increase.

Multi-Purpose Glue. A linear regression analysis revealed that the model containing severity of injury was significant ($F(1,47) = 16.037, p < .001$) and able to explain approximately 25% of the variance in perceived dangerousness. Adding likelihood of injury explained an additional 26% of the variance ($F\text{Change}(1,46) = 24.810, p < 0.001$). Taken together, severity of injury and likelihood of harm explain

approximately 51% of the variance in perceived dangerousness. The coefficients for these variables show that as perceived severity ($\beta = .346, t(46) = 3.220, p < .01$) and perceived likelihood ($\beta = .535, t(46) = 4.981, p < .001$) increase, perceptions of danger also increase.

Pain Reliever 1. A linear regression analysis revealed that the model containing severity of injury was not significant, accounting for only 4% of the variance in perceived dangerousness. Adding likelihood of injury explained an additional 25% of the variance ($F_{\text{Change}}(1,47) = 16.264, p < 0.001$). Taken together, severity of injury and likelihood of harm explain approximately 29% of the variance in perceived dangerousness; however, severity is not a significant predictor. As perceived likelihood of injury ($\beta = .502, t(47) = 4.003, p < .001$) increases, perceptions of danger also increase.

Pain Reliever 2. A linear regression analysis revealed that the model containing severity of injury was significant ($F(1,47) = 31.688, p < .001$) and able to explain approximately 40% of the variance in perceived dangerousness. Adding likelihood of injury explained an additional 14% of the variance ($F_{\text{Change}}(1,46) = 14.413, p < 0.001$). Taken together, severity of injury and likelihood of harm explain approximately 54% of the variance in perceived dangerousness. The coefficients for these variables show that as perceived severity ($\beta = .462, t(46) = 4.232, p < .001$) and perceived likelihood ($\beta = .415, t(46) = 3.796, p < .001$) increase, perceptions of danger also increase.

Allergy Medicine. A linear regression analysis revealed that the model containing severity of injury was significant ($F(1,49) = 4.970, p = .03$) and able to explain approximately 10% of the variance in perceived dangerousness. Adding likelihood of

injury explained an additional 42% of the variance ($F_{\text{Change}}(1,48) = 41.929, p < 0.001$). Taken together, severity of injury and likelihood of harm explain approximately 52% of the variance in perceived dangerousness. In the combined model, severity is not a significant predictor of perceived dangerousness. The coefficient for perceived likelihood ($\beta = .665, t(48) = 6.475, p < .001$) increases, perceptions of danger also increase.

Upset Stomach Reliever. A linear regression analysis revealed that the model containing severity of injury was significant ($F(1,47) = 27.834, p < .001$) and able to explain approximately 37% of the variance in perceived dangerousness. Adding likelihood of injury explained an additional 35% of the variance ($F_{\text{Change}}(1,46) = 59.136, p < 0.001$). Taken together, severity of injury and likelihood of harm explain approximately 72% of the variance in perceived dangerousness. The coefficients for these variables show that as perceived severity ($\beta = .296, t(46) = 4.232, p = .001$) and perceived likelihood ($\beta = .672, t(46) = 7.690, p < .001$) increase, perceptions of danger also increase.

Toilet Cleaner. A linear regression analysis revealed that the model containing severity of injury was significant ($F(1,47) = 52.119, p < .001$) and able to explain approximately 53% of the variance in perceived dangerousness. Adding likelihood of injury explained an additional 6% of the variance ($F_{\text{Change}}(1,46) = 6.545, p = .014$). Taken together, severity of injury and likelihood of harm explain approximately 59% of the variance in perceived dangerousness. The coefficients for these variables show that as perceived severity ($\beta = .560, t(46) = 4.872, p < .001$) and perceived likelihood ($\beta = .294, t(46) = 2.558, p = .014$) increase, perceptions of danger also increase.

Carpet Cleaner. A linear regression analysis revealed that the model containing severity of injury was significant ($F(1,49) = 32.397, p < .001$) and able to explain approximately 40% of the variance in perceived dangerousness. Adding likelihood of injury explained an additional 5% of the variance ($F\text{Change}(1,48) = 4.303, p = 0.043$). Taken together, severity of injury and likelihood of harm explain approximately 45% of the variance in perceived dangerousness. The coefficients for these variables show that as perceived severity ($\beta = .466, t(48) = 3.495, p = .001$) and perceived likelihood ($\beta = .277, t(48) = 2.074, p = .043$) increase, perceptions of danger also increase.

Oven Cleaner. A linear regression analysis revealed that the model containing severity of injury was significant ($F(1,48) = 60.005, p < .001$) and able to explain approximately 56% of the variance in perceived dangerousness. Adding likelihood of injury explained an additional 7% of the variance ($F\text{Change}(1,47) = 8.427, p < 0.001$). Taken together, severity of injury and likelihood of harm explain approximately 63% of the variance in perceived dangerousness. The coefficients for these variables show that as perceived severity ($\beta = .585, t(47) = 5.559, p < .001$) and perceived likelihood ($\beta = .305, t(47) = 2.903, p < .01$) increase, perceptions of danger also increase.

Bathroom Cleaner. A linear regression analysis revealed that the model containing severity of injury was significant ($F(1,46) = 27.964, p < .001$) and able to explain approximately 38% of the variance in perceived dangerousness. Adding likelihood of injury did not significantly contribute to the model. As perceived severity ($\beta = .606, t(46) = 5.288, p < .001$) increases, perceptions of danger also increase.

Discussion

Post-label emotion ratings for several of the products were significantly different from the pre-label ratings. Surprise and fear tended to increase after exposure to the warning labels, while frustration and anger tended to decrease; the remaining five emotions increased, decreased, or remained the same, depending on the product. One possible explanation for the decrease in mean ratings for some of the emotions is that the warning label information provided a solution to the problem posed in the scenario; this, in turn, led to a decrease in the emotions that were activated when participants were instructed to imagine themselves in the scenario described. While warning information may surprise the user or activate fear, the product may also be meeting the user's needs given the situation, which causes a decrease in other negative emotions.

Another possible explanation for the decrease in ratings for some of the emotions is that the strength of the initial emotion faded over time. Participants were asked to rate the extent to which they felt each emotion after reading the scenario (pre-label emotion) before they were asked to rate the extent to which they felt each emotion after reading the warning information (post-label emotion). While these two ratings are being compared to determine the effect of the warning label on emotion, it is possible that the observed decreases are not due to the label. Even though participants were asked to keep the situation in mind when rating post-label emotion (so that the difference observed could be attributed to the warning), it is possible that they were not able to do so. The observed decrease for some of the emotions may be a result of the participants' initial emotional reaction fading. In this case, the original emotional activation could be caused by the

situation, and the observed decrease could be attributed to decay rather than the product meeting the user's needs.

It is also possible that the difference in pre-label and post-label ratings revolves around participants applying the emotion scales to the situation and warning label separately. For example, when asked about pre-label fear, participants may have been rating fear with regard to the situation (e.g., fear of ants, fear of losing security deposit), and when asked about post-label fear, participants may have rated fear with regard to the warning (e.g., fear of potential harm associated with the product). Because there is no way to rule out these possibilities given the structure of the study, they remain alternative explanations for the decreases in emotion that were observed.

Emotional activation was found to be related to likelihood of use. While several significant negative correlations¹⁶ between the emotions and likelihood of use were obtained, the strongest and most consistent correlations across the products were observed for surprise and fear. As mentioned previously, one of the main functions of fear is to motivate behavior. For this reason, the predictive ability of fear was examined. The results of the linear regression analyses showed that fear consistently predicted likelihood of using the products. Fear was capable of explaining variance in this behavioral intention measure for 9 of the 12 products. Of those 9 products, fear was the only emotion that significantly contributed to the variance explained for 7 of the products. In all cases, likelihood of using the product decreased as fear increased.

¹⁶ Almost all of the significant correlations were negative. The one exception was the positive correlation observed between contempt and likelihood of use for the oven cleaner. Given that every other significant correlation was negative, it is not clear why this pattern was observed.

These results indicate that fear influences the probability that a consumer will use a product; however, it is unclear how fear might influence intentions associated with precautionary behavior. The post-label mean ratings for likelihood of use (with the exception of the eraser) showed that participants still intended to use the products, even though likelihood significantly decreased. This raises the question of how this activated fear would influence precautionary intent. Because the main goal of this study was to determine whether participants had an emotional reaction to the warning labels associated with the products, emphasis was not placed on investigating behavioral intentions associated with precautionary measures.

Although a measure was included that asked participants about the likelihood of following all of the safety precautions associated with the product, this variable was not particularly useful in the context of this study. Several of the products (a) did not list precautionary measures that could be taken to reduce the potential harm associated with the product (e.g., the eraser label), (b) simply informed users of potential harm and/or the circumstances in which harm was more likely, and then instructed them on action to take if harm occurred (e.g., stop use and seek medical help), or (c) listed the warnings and left the appropriate precautionary action to be inferred. For several of the products, the warning label had all three of these characteristics in some form (e.g., the oven cleaner supplied a precautionary measure for avoiding contact with skin, but not for avoiding contact with the eyes or the breathing of vapors). This made interpreting responses to this variable difficult, as it meant something different for each product, and in some cases, did not apply.

Additional Discussion Regarding Pre-Label/Post-Label Comparisons

In reviewing the pattern of pre-label/post-label emotion changes for the different categories of products, some general patterns emerge. For example, the pattern of emotion change for the over-the-counter medicine category was the most consistent of the three categories. While surprise increased for three of the four products, the remaining eight emotions either did not change or significantly decreased. This is the one category in which fear did not significantly increase for most of the products after the warning labels were presented. These results are not surprising when one considers the nature of the category. These products are ingested by the user, and it is likely that people consider these products relatively safe. In addition, most of the labels for the medications warn about the dangers of using the product if some other condition is present (e.g., heart disease, diabetes, allergies to specific ingredients, etc.). It may be that these warnings were not personally relevant for the majority of the participants; hence they failed to evoke an emotional reaction.

For the other two product categories—household cleaners and miscellaneous—the increase in fear after presentation of the warning label was consistent. However, there was one exception. Post-label ratings of emotion for the multipurpose glue either showed no change or a significant decrease in emotional activation for all nine emotion scales. An examination of the warning label associated with the glue provides possible reasons for this disparity. One potential explanation is that the warning label associated with the glue first lists the first aid measures that can be taken to counter adverse events, whereas the other labels present the associated hazards first and then list the first aid precautions

(except for the eraser; this product only lists the hazard associated with the product).

Research has shown that fear appeals are “best portrayed when the threat is presented first and the coping information second” (Tanner, 2006, p. 414).

Another possible reason for the observed differences between the glue and the other miscellaneous category products is that the warning on the glue addresses some hazards arising from obvious misuse of the product (e.g., swallowing the glue, microwaving the glue), while the hazards associated with the other products arise from simply using the product (e.g., inhalation, contact with skin) and require the user to take additional precautions to ensure protection. Again, the exception here is the eraser label; it simply informs participants of the associated hazard, but does not provide any precautionary suggestions.

Additional Discussion Regarding Likelihood of Using the Product

Likelihood of using the product decreased after seeing the warning label for 11 of the 12 products. The size of the decrease varied depending on the product. For example, likelihood of using the first pain reliever decreased by 0.45 points, while likelihood of using the eraser decreased by 2.54 points. However, with the exception of the eraser, all post-label likelihood ratings were on the “likely” side of the scale. This indicates that participants were still inclined to use the product after reading the warning information, even though post-label ratings were significantly lower than the pre-label ratings. For the eraser, however, the mean post-label likelihood of using the product was not significantly different from the scale midpoint, which corresponds to the “unsure” anchor. The pre-label rating was one of the highest observed among the products, which indicates that the

warning information on the eraser was enough to make participants weary of using the product.

The one product in which likelihood of use did not decrease was the glue. As stated previously, the warning label for the glue was different from the other labels because it outlined first aid precautions before listing the potential hazards (this was the only product warning label to order information in this way); in addition, the label warned about harms associated with misuse. Another possibility for the difference is that the product was labeled as “multipurpose” glue. Glue is something with which most people are familiar, which may explain why participants did not have an emotional response to the label and why their post-label likelihood of use ratings did not change.

The question then remains, why did likelihood of use decrease for most of the products? While the likelihood of use decreased as fear increased, there was a large proportion of variance that could not be explained by emotion. One possibility is that reading the warning information may have alerted or reminded participants of the potential harms associated with the products. Attending to this information may cause people to be less sure about their safety, leading them to reconsider using the product.

Discussion Regarding Perceived Dangerousness

For the majority of the products, both perceived severity of harm and perceived likelihood of injury significantly contributed to the variance in perceived dangerousness of the product. The proportion of variance in dangerousness that could be explained by severity of harm was relatively consistent. For the miscellaneous category products, severity of harm explained 25% to 58% of the variance in dangerousness, and for the

cleaner category, severity explained 38% to 56% of the variance in dangerousness. The amount of variance explained by severity was not as consistent for the medicine category. For one of the products (pain reliever 1), severity of harm did not contribute to the variance in perceived dangerousness, and for the other three products, contributions ranged from 10% to 40%.

The proportion of variance that could be explained by likelihood of injury varied greatly depending on the product type. The only category in which the contribution was relatively consistent was the household cleaners. While significant, contributions were rather small, ranging from 5% to 7% for all of the cleaning products (except the oven cleaner; likelihood of injury did not significant contribute to perceived dangerousness for this product). This was also the case for the ant poison, in which likelihood contributed only 4%. The amount of variance explained by likelihood of injury varied greatly for the remaining miscellaneous and medicine category products (13% to 42%).

While previous research has shown that severity of harm explains a substantially large amount of the variance in perceived hazardousness, these findings do not show the level of contribution found in previous studies. Past research has shown that severity of harm alone can account for the majority of variance in hazard perception: 95% and 92% in the Wogalter et al. (1999) studies, and 79% in the Wogalter et al. (1991) study. In addition, the current results show that likelihood of injury is a significant predictor for many of the products, which is inconsistent with research in the warnings literature finding that the contribution of likelihood either did not result in a significant increase or resulted in minimal increase in variance explained (e.g., Wogalter et al., 1991; Wogalter

et al., 1999). The findings of this study are more consistent with the findings reported in the risk perception literature (e.g., Fischhoff et al., 1980; Slovic et al., 1980).

One reason why these findings differ from previous research in the warnings literature may relate to methodology. In the Wogalter studies cited above, participants were simply given a generic product name and were asked to rate perceived hazardousness, likelihood of injury, and severity of harm. In this study, however, participants were presented with a warning label. It may be that when participants are provided with only a product name, they base their hazard perceptions on the severity of harm that could occur while using the product rather than the likelihood of injury (for reasons provided by Wogalter et al., 1999; e.g., likelihood of injury is low for many common consumer products). However, supplying the warning label may provide participants with information related to both components. This information may remind or inform participants of the likelihood of injury associated with the product, which causes them to incorporate this likelihood information into their rating of perceived hazard.

Conclusions

The results of this study show that people do have emotional reactions to the information contained in warning labels. In addition, this emotional response is related to the likelihood that the product will be used. In almost every instance in which a significant correlation was found between emotion and likelihood of use, the higher the ratings on the emotion scale, the lower the likelihood of using the product. When emotion

was used to predict likelihood of use, fear alone was capable of predicting this intention for 9 of the 12 products. Once fear was accounted for, the other eight emotions did not add predictive power for the majority of the products. Because fear is able to predict likelihood of use, it follows that differences in this variable should be observed if fear is manipulated. In an effort to replicate the results obtained in this study, the main goal of the next study is to manipulate fear and observe the effect it has on behavioral intention.

CHAPTER III

STUDY 2

In the first study, fear consistently predicted likelihood of use after exposure to the warning label. The main goal of this study is to further investigate the influence of fear on behavioral intentions. To accomplish this goal, warning labels were created in an effort to evoke different levels of fear. Likelihood of using the product, intended carefulness, and likelihood of complying with safety precautions were measured to determine whether varying levels of fear influenced these behavioral intentions differently.

Understanding the relation between emotional arousal and behavioral intentions has important applications. For example, manufacturers may be worried that providing detailed warning information may have a negative impact on product sales. While it is quite possible that the potential for harm associated with using a product may result in elevated fear, it may also be that the presence of detailed information related to precautionary behaviors can reduce the fear experienced by the user without affecting the likelihood that the product will be used. In this case, it would benefit the manufacturer to ensure that the warning label provides detailed precautions when the potential for harm is high.

Fear is evoked when a person perceives harm or danger, and its function is to motivate people to protect themselves (Reeve, 1992). Fear generally occurs in response to an external danger and serves to mobilize a person to either avoid or escape the danger (Rogers & Deckner, 1975). Although the motivating properties of fear have not been studied extensively with regard to product warning labels, this topic has received considerable attention in the public health domain. Several researchers have investigated whether evoking fear is an effective way to motivate people to change their attitudes and intentions regarding behaviors that are harmful to their health. Some of the many examples include campaigns aimed to reduce cigarette smoking (e.g., Rogers & Deckner, 1975; Timmers & van der Wijst, 2007), decrease alcohol use (e.g., Moscato et al., 2001), reduce unsafe driving practices (e.g., Lewis, Watson, White, & Tay, 2007), and increase condom use to prevent sexually transmitted diseases (e.g., Struckman-Johnson, Struckman-Johnson, Gilliland, & Ausman, 1994).

While many studies have shown that fear appeals are effective, others show that evoking fear can lead to maladaptive responses, such as avoidance, denial or reactance (e.g., Rutter, Verplanken, Kok, & Verrij, 2003). In a meta-analysis of the fear appeal research related to public health campaigns, Witte and Allen (2000) found evidence to support the notion that strong fear appeals are more persuasive than weak or moderate appeals. Results showed that fear varied with the strength of the appeal; the stronger the appeal, the more fear aroused. With regard to attitudes, intentions, and behaviors, fear had a reliable, but weak, positive effect. In addition, the effectiveness of fear appeals did not appear to be influenced by individual differences such as age, gender, or ethnicity.

Manipulating Fear

In an attempt to manipulate the fear experienced by participants when reading a warning label, the general framework of Witte's (1992) Extended Parallel Process Model (EPPM) was adopted. The EPPM draws from both Leventhal's (1970) parallel processing model and Rogers' (1975) original protection motivation theory, and attempts to explain when fear appeals are likely to be either successful or unsuccessful (Witte, 1992). A fear appeal is "a persuasive message that attempts to arouse the emotion fear by depicting a personally relevant and significant threat and then follows this depiction of the threat by outlining recommendations presented as feasible and effective in deterring the threat" (Witte, 1994, p.114).

The information contained in many product warning labels fits this definition of a fear appeal. Most warnings include descriptions of "personally relevant and significant threats" and include precautionary measures that can be taken to reduce or eliminate the hazards associated with product use. The role of emotion in the warnings literature has not been directly examined, so fear appeal models have not been empirically tested in this domain. Because Witte's EPPM takes into consideration the strengths and weaknesses of the most prominent fear appeal theories and models, it was selected to guide the attempt to manipulate fear in this study.

Witte (1992; 1994; 1998) maintains that the three concepts central to fear appeals are fear, threat, and efficacy. According to Witte, fear is an internal, negative emotion that is comprised of subjective experience and physiological arousal, and is experienced when an individual perceives a threat that is serious and personally relevant. A threat is a

danger in the environment that exists, regardless of whether or not a person recognizes it as a threat. Witte makes a distinction between an actual threat, as defined above, and a perceived threat, which refers to a person's cognitions about the threat. Perceived threat is composed of two dimensions: perceived severity and perceived susceptibility.

Perceived severity refers to a person's beliefs about the seriousness of the potential consequences associated with the threat, while perceived susceptibility refers to beliefs regarding the likelihood that the person will actually experience the threat (Witte).

Efficacy is "the effectiveness, feasibility, and ease with which a recommended response impedes or averts a threat" (Witte, 1994, p. 114). As with threat, Witte distinguishes between efficacy and perceived efficacy, which refers to cognitions about efficacy. Perceived efficacy is also comprised of two dimensions: perceived response efficacy and perceived self-efficacy. Perceived response-efficacy refers to a person's beliefs regarding how effective the recommended actions are at eliminating or reducing the threat, and perceived self-efficacy refers to beliefs about one's capability of performing the recommended response (Witte, 1992, 1994, 1998).

The EPPM posits that when presented with a fear appeal, the individual will first evaluate the threat posed by the danger described in the fear appeal. If the threat associated with the message is low, there will be no further processing of the fear appeal message; this means that efficacy will not be evaluated and the message will be dismissed. On the other hand, if the threat is perceived as moderate or high, the individual will experience fear. The elicitation of fear will then cause the individual to engage in a second evaluation that assesses the efficacy of the recommended response. If efficacy is

perceived as high, people will be motivated to protect themselves from the perceived threat and will engage in danger control responses. Danger control responses are changes in belief, attitude, intention, and behavior in accordance with the recommended response that occur when a person believes that the threat can be prevented. However, if efficacy is perceived as low, people will engage in fear control responses—coping responses (e.g., defensive avoidance, denial, or reactance) aimed at reducing the fear experienced, rather than the danger (Witte, 1992, 1994, 1998).

In an effort to evoke varying levels of fear in this study, severity and response efficacy were manipulated.¹⁷ Four warning labels were created by varying severity (low, high) and response efficacy (low, high). Severity was manipulated by varying the potential harm associated with product use, and response efficacy was manipulated by varying the amount of detail provided in the precautionary instructions. Roseman's (2001) appraisal model was also used to guide the construction of the situational scenario and the product warning labels in this study. According to the model, fear is most likely when (a) expectations are not violated (in this case, a person may first experience surprise, but then the appraisal is updated and the potential hazards outlined in the warning label are no longer unexpected), (b) the situation is motive-inconsistent (in this case, it is assumed that the main motive is protection from harm, so using a product that may cause harm is considered motive-inconsistent), (c) the probability of motive-relevant

¹⁷ While the EPPM outlines two components for perceived threat and perceived efficacy, only one component of each factor was manipulated in this study. Both susceptibility (perceived threat component) and self-efficacy (perceived efficacy component) are dependent upon the person reading the information, and are likely a function of personal beliefs and experience. For this reason, there was not an attempt to manipulate these variables when the warning labels were created.

aspects are uncertain (in this case, this refers to the probability of harm, which is phrased in uncertain terms on the product warning labels), and (d) the motive-relevant event is circumstance-caused (in this case, simply using the product results in the potential for harm). The fifth appraisal that gives rise to fear is low control potential. An attempt to manipulate this appraisal was made by varying efficacy.

Hypotheses

The EPPM (Witte, 1992) focuses on predicting message acceptance and message rejection, rather than the amount of fear that will be experienced for each combination of threat and efficacy appraisals. However, the model can be used to guide predictions regarding the amount of fear that would be evoked by the warning labels created for this study. I predicted that participants would report the highest levels of fear when severity was high and efficacy was low, moderate levels of fear when severity was high and efficacy was high, and the lowest levels of fear when severity was low (regardless of efficacy condition). The highest levels of fear were expected in the high severity/low efficacy condition because participants would receive information about the potential for severe harm without precautions that prescribed specific behaviors. Moderate levels of fear were expected in the high severity/low efficacy condition because the presence of detailed precautionary instructions on how to reduce or eliminate the threat should lower fear. Roseman's (2001) appraisal model also predicts fear will be greatest when there is low control potential, and the high efficacy precautions serve to increase users' control potential. It was not expected that a difference in fear would be observed when

comparing the low severity/high efficacy and low severity/low efficacy conditions because the absence of a serious threat should fail to evoke a fear response.

The hypotheses regarding precautionary intent were also guided by the EPPM (Witte, 1992). While Roseman's (2001) model outlines the appraisals that give rise to certain emotions, the EPPM (Witte, 1992) goes one step further by outlining the nature of the responses associated with fear. The EPPM predicts different responses based on the interaction between threat and efficacy: the combination of high threat and high efficacy should initiate danger control processes and ultimately result in message acceptance (e.g., attitude, intention, or behavior changes), whereas the combination of the high threat and low efficacy should trigger fear control processes and result in message rejection (e.g., avoidance or reactance). Hence, participants in the high severity/high efficacy condition were expected to report higher ratings on the precautionary intent scales (likelihood of following safety precautions and intended carefulness) than those in the high severity/low efficacy condition. However, no difference was expected between the high severity/low efficacy condition and the low severity conditions. According to Witte (1998), a fear appeal can fail if (a) people do not process or respond to the message (null response), or (b) people engage in fear control processes. So, while these three groups should differ with respect to their fear responses, the model predicted that the behavioral outcomes for these different conditions would be the same.

Based on the findings of Study 1, I expected that likelihood of use would be negatively correlated with fear. Given the hypotheses regarding which conditions would evoke the most fear, I predicted that those in the high severity/low efficacy condition

would report being less likely to use the product than those in the high severity/high efficacy condition, and those in the high severity/high efficacy condition would report being less likely to use the product when compared to those in the low severity conditions.

Summary

In this study, an attempt was made to manipulate fear to determine whether fear affects various behavioral intentions. Four warning labels were created by varying information regarding the severity of consequences (low, high) and the efficacy of the precautionary instructions (low, high). I hypothesized that the highest levels of fear would be observed in the high severity/low efficacy condition, moderate levels of fear would be reported by those in the high severity/high efficacy condition, and the lowest levels of fear would be found in the low severity conditions. Regarding precautionary intent, it was expected that those in the high severity/high efficacy condition would report higher levels of compliance and intended carefulness when compared to participants in the other three conditions. It was also expected that fear would be negatively correlated with likelihood of use.

Method

Participants

Two hundred undergraduate students (125 females, 75 males) enrolled in a psychology course at the University of Oregon served as participants in this study. The

students ranged in age from 17 to 55 years, with the mean age being 20.2 ($SD = 3.3$). One hundred eighty-nine participants reported English as their first language (two declined to respond), and 195 reported their student status as full-time. The sample of undergraduate students contained 69 freshmen, 62 sophomores, 49 juniors, and 20 seniors. The sample consisted of 5 African-Americans, 17 Asian/Pacific Islanders, 164 Caucasians, 3 Hispanics, and 1 Native American/Alaskan Native; 8 participants reported their ethnicity as “Other” and two declined to respond. One hundred thirteen participants reported having no job, 84 reported having a part-time job, and 3 reported having a full-time job. Sixty-eight of the subjects reported living in a dorm, 118 reported living off-campus, and 13 reported living with their parents (one participant declined to answer). Students were given course credit in return for their participation in the study.

Materials

Participants were asked to complete a number of questionnaires, read a situational scenario, and read a product warning label.

Demographic and Background Questionnaire. This questionnaire asked participants to provide basic demographic information (sex, age, race, etc.). In addition, subjects were asked general questions about how often they read warning labels and comply with warning precautions, how often warning information affects their decision to use a product, and the extent to which they believe that warning labels are intended to protect the consumer and the manufacturer. A baseline for emotion was also collected. This measure included the same nine emotions that were presented in first study, with the addition of three positive emotions (happiness, relief, and hope). These three emotions

are the positive emotions in Roseman's (2001) model that meet the standards used for emotion inclusion in the first study when the motive is consistent (rather than inconsistent). Because it is possible that there are competing motives (protect oneself from harm and use the product to solve the problem), the relevant positive emotions were included to determine whether warning label information influenced these positive emotions. Consistent with the first study, all emotions were rated using a 7-point unipolar Likert scale ranging from "Not at All"/"No" to "Extremely"/"Extreme." See the Method section of Study 1 for more detail on the way in which participants rated emotion.

Scenario. The product selected for use in this study was the ant poison. The ant poison was selected for several reasons: (a) in the first study, fear explained the largest proportion of variance (approximately 34%) in the intention to use the product for the ant poison; (b) the ant poison had an average fear rating of 4 (the center of the scale) with a standard deviation of 2, so there was variance to work with when attempting to manipulate fear; and (c) the miscellaneous category, to which the ant poison belonged, was rated as the least familiar category by participants, so it was assumed that familiarity and experience with this product would be low. The scenario associated with this product in Study 1 was also used in this study (see the Method section of Study 1 for more detail on how the scenario was created). After reading the scenario, participants were asked to take some time to imagine themselves in the situation and to envision how they would be feeling and what they would be thinking before proceeding with the study.

Pre-Label Questionnaire. This questionnaire asked participants to rate the extent to which they would feel each of the emotions if they were in the situation described in

the scenario. Participants were then asked to answer questions about their experience and familiarity with the product, as well as questions relating to their perceptions of threat and behavioral intentions.

Warning Labels. Four warning labels were created for use in this study. As described previously, both severity and efficacy were varied to create four warning label conditions: (a) low severity/low efficacy, (b) low severity/high efficacy, (c) high severity/low efficacy, and (d) high severity/high efficacy. In the low severity conditions, the introduction to the warning information stated that the product *may be* hazardous, while the high severity conditions stated that the product *is* hazardous. In addition, the harm associated with the low severity warnings was described as less serious (e.g., slight irritation, temporary dizziness), while harm in the high severity warnings was described as more severe (e.g., severe irritation, severe dizziness). In the low efficacy condition, simple precautions were listed (e.g., avoid contact with eyes, avoid contact with skin); in the high efficacy condition, the precautions included specific behaviors that product users should engage in to protect themselves from harm (e.g., wear protective eyewear, wear long rubber gloves). To view the four warning labels used in this study, see Appendix B.

Post-Label Questionnaire. In this questionnaire, participants were asked to rate the extent to which they would feel each of the emotions after reading the warning label (while still keeping the original scenario in mind). They were again asked to rate perceptions of threat and indicate their behavioral intentions. In addition, participants were asked to answer several cognitive antecedent questions that related to the appraisal dimensions of Roseman's (2001) model.

Procedure

All data for this study were collected online using the SONA experiment management system. Participants signed up for the study electronically, and they were free to complete the study in any location where they had access to a computer and an internet connection. Participants were first asked to read the informed consent form. If subjects agreed to participate, they were asked to complete the demographic and background questionnaire. Upon answering these questions, participants were presented with the study instructions. After indicating that they had read the instructions, participants were presented with the scenario. After reading the scenario, participants completed the pre-label questionnaire before they were presented with the product warning label. After participants reported that they had read the warning label, they were asked to complete the post-label questionnaire. Upon completion of the study, the debriefing form was displayed for subjects to read and/or print.

Results

The results of this study are divided into two main sections. The first section presents the analyses directly related to the hypotheses. The second section presents additional analyses that were conducted in an attempt to better understand the pattern of results observed.

Analyses Addressing the Hypotheses

Fear Ratings. After viewing the product warning labels, I expected that those in the high severity/low efficacy condition would report the highest levels of fear, those in

the high severity/high efficacy condition would report moderate levels of fear, and those in the low severity/high efficacy and low severity/low efficacy conditions would report the lowest levels of fear. Before testing this hypothesis, a factorial ANOVA was conducted on pre-label fear ratings to ensure that significant differences between the groups did not exist prior to reading the warning information. As expected, there were no significant differences in pre-label fear ratings based on warning label condition.

A factorial ANOVA was then conducted to determine whether efficacy and severity conditions had an effect on post-label fear ratings. There was a significant main effect for severity, $F(1,195) = 3.947, p = .048$; those in the high severity conditions ($M = 3.97, SD = 1.61$) reported higher levels of fear than those in the low severity conditions ($M = 3.52, SD = 1.65$). There was also a significant interaction between severity and efficacy, $F(1,195) = 4.302, p = .039$. However, contrary to what was hypothesized, those in the high severity/high efficacy condition reported the highest levels of fear (see Figure 1).

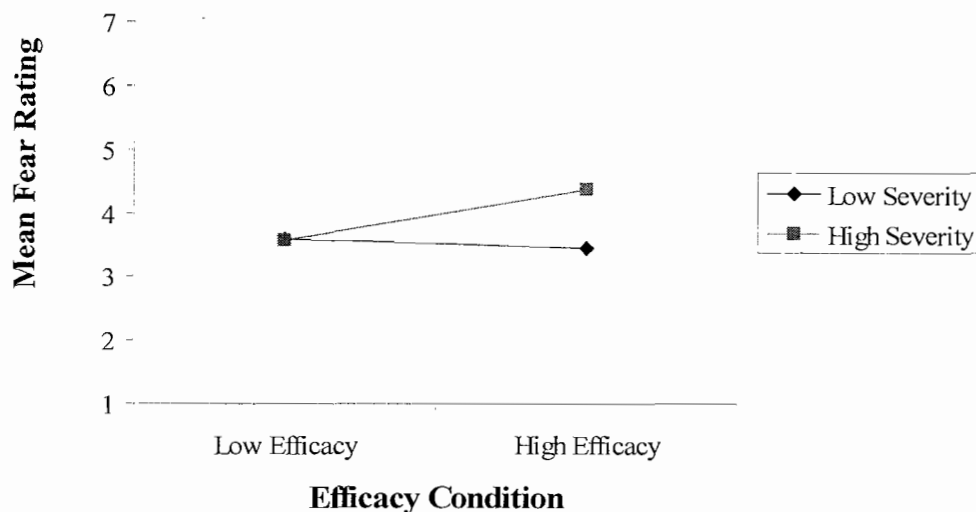


Figure 1. Mean fear ratings (post-label) for all warning label conditions.

After viewing the display of means for the four warning label conditions, a difference contrast was conducted to determine whether mean fear ratings for the first three conditions (low severity/low efficacy, low severity/high efficacy, and high severity/low efficacy) were significantly different from the fourth condition (high severity/high efficacy). Results revealed that the difference between the high severity/high efficacy group and the other three groups was significant, $F(3,195) = 3.346, p = .002$. A series of Tukey post-hoc tests revealed that the other three conditions were not significantly different from one another (see Table 7).

Table 7

Post-Label Fear Rating by Warning Label Condition

Efficacy	Severity	
	Low	High
Low	3.60 ^a (1.76)	3.58 ^a (1.66)
High	3.44 ^a (1.54)	4.37 ^b (1.47)

Precautionary Intent. I hypothesized that those in the high severity/high efficacy condition would report higher ratings on the precautionary intent scales (intended carefulness and likelihood of following safety precautions) than those in the high severity/low efficacy condition. However, no difference was expected between the high severity/low efficacy condition and the two low severity conditions. Because the precautionary intent scales were moderately correlated ($r = 0.61$, $N = 199$, $p < .001$), a MANOVA was conducted to determine whether efficacy and severity had an effect on these two precautionary measures.¹⁸

There were no significant differences between the groups for intended carefulness ratings. For likelihood of compliance, there was no effect for severity. However, there was a significant main effect for efficacy, $F(1,194) = 19.322$, $p < .001$. Those in the low efficacy condition ($M = 4.98$, $SD = 1.57$) reported being *more* likely to comply with the safety precautions than those in the high efficacy condition ($M = 4.08$, $SD = 1.89$). There was not a significant interaction between severity and efficacy.

¹⁸ A factorial ANOVA on pre-label intended carefulness revealed no significant differences between the groups.

Likelihood of Using the Product. A factorial ANOVA was conducted to determine whether severity and efficacy had an effect on post-label likelihood of using the product.¹⁹ There was no main effect for severity or efficacy; however, there was a *marginally* significant interaction between severity and efficacy, $F(1,195) = 2.813, p = .095$ (see Figure 2). A series of simple effect contrasts were conducted to determine whether there were any significant differences between the groups. Results showed that those in the high severity/high efficacy condition ($M = 3.98, SD = 1.76$) were *less* likely to use the product than those in the low severity/high efficacy condition ($M = 4.65, SD = 1.91$).

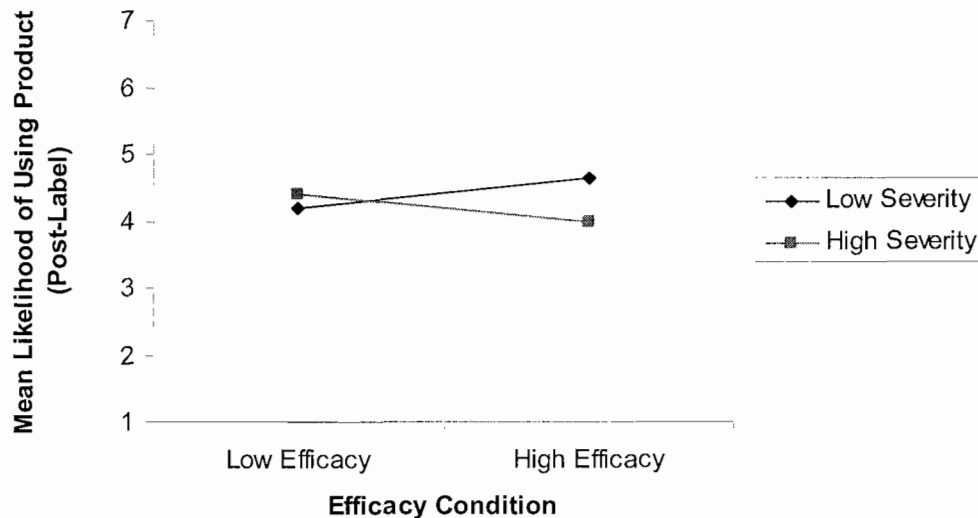


Figure 2. Likelihood of using product (post-label) for all warning label conditions.

¹⁹ A factorial ANOVA conducted on pre-label likelihood of using the product revealed no significant differences between the groups.

Correlations between Fear and Behavioral Intentions

To determine the effect of experienced fear on precautionary intent and likelihood of use, the correlations between fear and these behavioral intentions were calculated. Fear was negatively correlated with likelihood of use ($r = -.434, N = 199, p < .001$). However, fear was positively correlated with both intended carefulness ($r = .347, N = 199, p < .001$) and likelihood of compliance ($r = .217, N = 198, p < .001$).

Additional Analyses

The results only partially supported the hypotheses. In an attempt to better understand the differences between the four conditions, additional analyses were conducted using other variables included in the study. First, several variables were analyzed in an attempt to determine whether efforts to manipulate severity and efficacy were successful. Second, the results of a MANOVA conducted on post-label negative emotion was explored to determine whether warning label condition had an effect on any of the other negative emotions included in this study; in addition, a MANOVA was conducted to determine whether groups differed in their ratings for the positive emotions. Third, perceived dangerousness, likelihood of injury, and severity of harm ratings were analyzed to determine whether the groups differed in their perceptions of threat. Fourth, responses to the experience and familiarity questions were examined and the groups were compared. Finally, responses to the cognitive antecedent questions were compared in an attempt to understand why those in the high severity/high efficacy condition reported higher levels of fear than those in the other conditions.

Manipulation Check. The two variables manipulated to create the different warning label conditions were severity and efficacy. To determine whether the manipulation was successful, the responses given to manipulation relevant questions were analyzed.

To determine whether there was a significant effect for severity, three post-label variables were analyzed: fear, perceived dangerousness, and perceived severity of harm. As mentioned previously, there was a significant main effect for severity on fear, $F(1,195) = 3.947, p = .048$. Those in the high severity conditions ($M = 3.97, SD = 1.61$) reported higher levels of fear than those in the low severity conditions ($M = 3.52, SD = 1.65$). However, there was no main effect for severity on perceived dangerousness ($p = .265$) or perceived severity of harm ($p = .198$) ratings.

To determine whether the efficacy manipulation was successful, a factorial ANOVA was conducted on the responses given to the post-label efficacy question (To what extent are the precautions capable of reducing the risks?). There was a significant main effect for efficacy, $F(1,194) = 5.425, p = .021$. Those in the high efficacy condition ($M = 5.08, SD = 1.39$) rated the precautions as more capable of reducing the risks associated with using the product than those in the low efficacy condition ($M = 4.60, SD = 1.52$).

Participants were also asked about their own capability of reducing the risks (To what extent are you capable of reducing the risks?). This question was intended to measure self-efficacy rather than response-efficacy. Because it is possible that this variable could be influenced by the label manipulations, a factorial analysis of variance

was conducted to determine whether reported self-efficacy differed among the four conditions. Results showed that there was no difference in perceived self-efficacy among the different groups. In other words, self-efficacy ratings were not influenced by the warning label manipulation.

Emotion. Two MANOVAs²⁰ were conducted to determine whether severity and efficacy had an effect on post-label ratings for the other emotions measured in this study. The first analysis included all of the negative emotions.²¹ Before the analysis was run, a separate MANOVA was conducted on pre-label emotion to determine whether significant differences between the groups existed prior to reading the warning label information. As expected, there were not any significant differences between the warning label conditions for any of the pre-label ratings on the negative emotion scales. Because the results for fear were presented in the previous section, they will not be presented here.²²

There were no significant differences between the conditions for sadness, distress, frustration, disgust, anger, dislike, and contempt. There was, however, a significant main effect for efficacy on post-label surprise, $F(1,192) = 9.241, p = .003$; those in the high efficacy conditions ($M = 3.89, SD = 1.83$) reported higher levels of surprise than those in the low efficacy conditions ($M = 3.14, SD = 1.67$).

²⁰ MANOVAs were conducted because correlational analyses revealed moderate positive correlations between (a) all of the negative emotions, and (b) all of the positive emotions.

²¹ Surprise was included as a negative emotion because of its positive correlation with the other negative emotions.

²² When fear was included in the MANOVA, the main effect for severity found with the ANOVA went from significant ($p = .048$) to marginally significant ($p = .078$); however, the interaction between severity and efficacy remained significant ($p = .032$). Given the similarity in findings, the results are not repeated here.

Before the MANOVA on post-label ratings for the positive emotions was conducted, a separate MANOVA was run to determine whether there were any significant differences between the four conditions prior to viewing the warning labels. The analysis revealed that the groups did not differ on pre-label ratings of happiness and relief; however, there were significant differences between the groups on pre-label ratings of hope. There were significant main effects for both severity ($F(1,192) = 18.157, p < .001$) and efficacy ($F(1,192) = 27.707, p < .001$), and there was also a significant interaction between severity and efficacy, $F(1,192) = 18.905, p < .001$. A difference contrast comparing the high severity/high efficacy condition against the other three groups was significant, $F(3,196) = 22.277, p < .001$. It is unclear why this difference in pre-label hope was present. However, to control for this difference, pre-label hope ratings were added as a covariate to the MANOVA conducted on the post-label positive emotions.

The results of the MANOVA conducted on post-label ratings of happiness, relief, and hope revealed a significant main effect for severity on post-label hope, $F(1,193) = 4.667, p = .03$; those in the high severity condition ($M = 3.81, SD = 2.18$) reported higher levels of hope than those in the low severity condition ($M = 3.01, SD = 1.67$). There was also a significant main effect for efficacy on post-label hope, $F(1,193) = 15.364, p < .001$; those in the high efficacy condition ($M = 4.07, SD = 2.21$) reported higher levels of hope than those in the low efficacy condition ($M = 2.75, SD = 1.45$). There was also a significant interaction between severity and efficacy, $F(1,193) = 9.002, p < .01$ (see Figure 3). A difference contrast revealed that the high severity/high efficacy condition

reported significantly higher levels of hope than the other three conditions, $F(3,195) = 19.689, p < .001$.

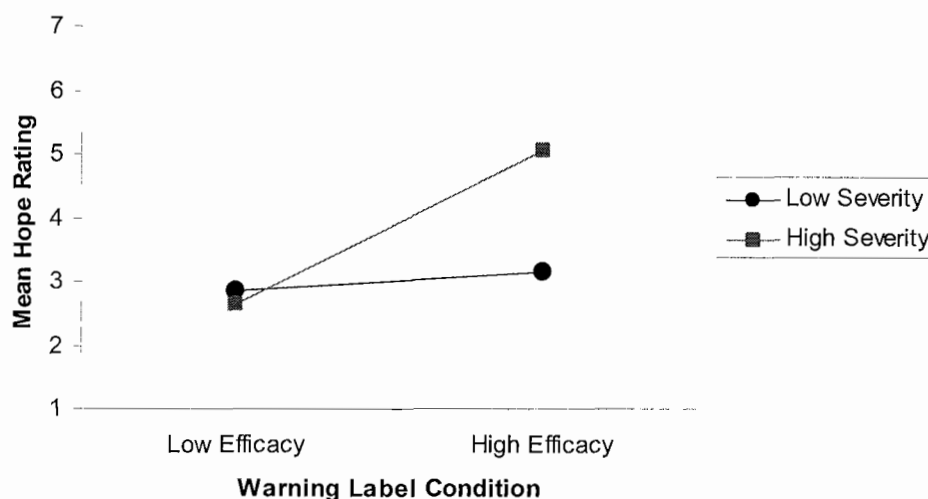


Figure 3. Mean hope ratings (post-label) for all warning label conditions.

The MANOVA run on post-label positive emotions also revealed a significant main effect for severity on post-label relief, $F(1,193) = 6.700, p = .01$. Those in the low severity conditions ($M = 2.36, SD = 1.33$) reported higher levels of relief than those in the high severity conditions ($M = 1.98, SD = 1.22$).

Perceived Danger. To determine whether severity and efficacy had an effect on hazard perceptions, a MANOVA was conducted on perceived dangerousness, perceived likelihood of injury, and perceived severity of harm.²³ Results revealed that there were not any significant main effects for severity or efficacy on the responses given for the

²³ A MANOVA conducted on pre-label ratings of dangerousness, likelihood, and severity revealed no significant differences between the groups before the warning label was presented.

three threat perception questions. There was, however, a marginally significant interaction between severity and efficacy on ratings of perceived dangerousness, $F(1,199) = 3.074, p = .08$. The pattern of means for the four conditions was similar to those observed for fear and hope ratings (see Figure 4). To determine whether the high severity/high efficacy condition differed significantly from the other three conditions, a difference contrast was conducted. Results showed the contrast was also marginally significant, $F(3,195) = 1.478, p = .06$.

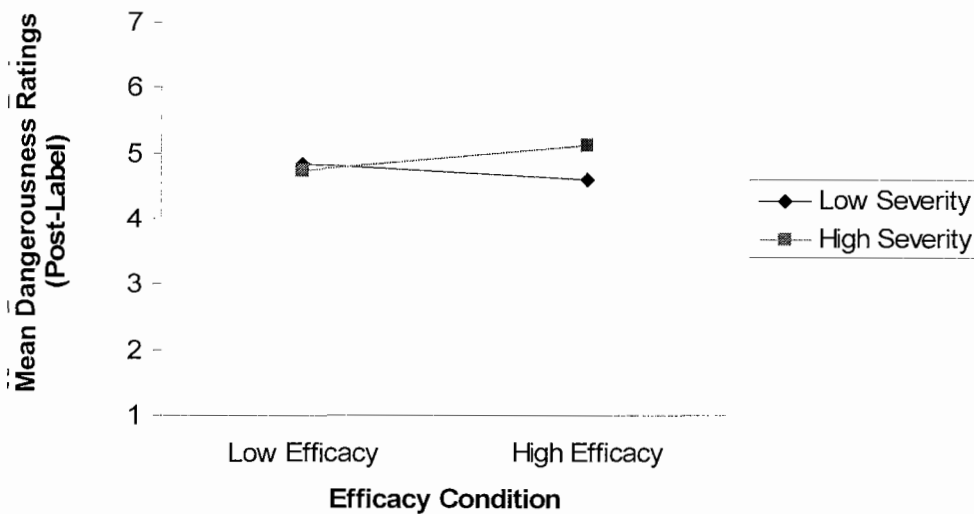


Figure 4. Mean dangerousness ratings (post-label) for all warning label conditions.

To determine whether mean ratings for the perceived danger variables significantly increased after exposure to the warning label, a series of paired-sample t -tests were conducted. After reading the warning label, participants perceived the product to be significantly more dangerous, believed that the likelihood of harm was significantly

higher, and rated the potential harm resulting from use of the product as significantly more severe (see Table 8).

Table 8

Pre-Label/Post-Label Perceived Threat Paired-Sample Comparisons (All Subjects)

Question	Pre-Label Mean	Post-Label Mean	Mean Difference	<i>N</i>	<i>t</i>	<i>p</i>	<i>df</i>
How dangerous do you think this product is? ¹	4.15 (1.23)	4.80 (1.33)	-.652	198	-6.142	<.001	197
How likely is it that harm will occur? ²	2.97 (1.27)	3.66 (1.53)	-.688	199	-6.585	<.001	198
If harm occurs, how severe would it be? ¹	3.58 (1.14)	4.50 (1.41)	-.915	199	-8.821	<.001	198

¹ Response given on a 7-point Likert scale with the anchors Not at All(1), Somewhat(4), and Extremely(7).

² Response given on a 7-point Likert scale with the anchors Extremely Unlikely(1), Unsure(4), and Extremely Likely(7).

To determine whether perceived likelihood of injury and severity of harm were capable of predicting perceived dangerousness, a linear regression analysis was conducted. In line with the analyses presented in the previous chapter, a reduced model using only severity to predict dangerousness was tested first, and then a full model containing severity and likelihood was run to determine whether likelihood significantly contributed to the variance explained. Results revealed that the reduced model was significant ($F(1,197) = 122.120, p < .001$) and able to account for approximately 38% of the variance in dangerousness. Adding likelihood of injury to the model explained an additional 11% of the variance, $F\text{Change}(1,196) = 42.001, p < .001$. Taken together, the

two predictors were capable of explaining approximately 49% of the variance in perceived dangerousness. The coefficients for these variables showed that as likelihood ($\beta = .398, t(196) = 6.481, p < .001$) and severity ($\beta = .396, t(196) = 6.437, p < .001$) increased, perceptions of danger also increased.

The post-label perceived threat measures were also correlated with post-label fear to determine whether experienced emotion and cognitions regarding threat were strongly related. Fear was significantly correlated with perceived danger ($r = .328, N = 199, p < .001$), perceived likelihood of injury ($r = .472, N = 199, p < .001$), and perceived severity of harm ($r = .345, N = 199, p < .001$).

Experience and Familiarity. Participants were asked about their experience and familiarity with the product on the pre-label questionnaire. Approximately 66% of the sample reported having used this type of product before. Participants were also asked about their familiarity with this type of product. Overall, participants reported being somewhat familiar with this type of product ($M = 3.84, SD = 1.64$); however, there was a significant difference in familiarity ratings for those with and without prior experience, $t(198) = -11.915, p < .001$; those who had never used the product before ($M = 2.37, SD = 1.30$) reported being less familiar with the product than those with prior experience ($M = 4.60, SD = 1.23$). To determine whether any of the conditions differed with respect to familiarity ratings, a factorial ANOVA was conducted. Results revealed that there were not any significant differences between the four groups with respect to familiarity.

Cognitive Antecedent Questions. Roseman's (2001) model predicts that fear is likely to be experienced when an event is motive-inconsistent, uncertain, circumstance

caused, and low in control potential. To determine whether the groups differed with respect to these appraisals, responses to the relevant cognitive antecedent questions were analyzed. Factorial ANOVAs were conducted on importance of avoiding harm (How important is it to you that you avoid any potential harm that may be associated with this product?), likelihood of harm, agency (If harm were to occur, to what extent do you feel that circumstances beyond anyone's control would be responsible?), and control potential (To what extent do you feel that you are in control of avoiding potential harm?). The results of these analyses showed no significant main or interactions effects for severity and efficacy. In other words, the four groups did not significantly differ in their responses to the cognitive antecedent questions.

Discussion

The hypotheses regarding the effect of severity and efficacy manipulations on fear were not supported. It was expected that participants would report the highest levels of fear in the high severity/low efficacy condition because potential harm was more severe and the precautionary instructions were vague. However, those in the high severity/high efficacy condition reported fear ratings that were significantly higher than those reported in the other three conditions. It was also expected that exposure to the warning information would result in a "hierarchy" of fear (low, moderate, and high fear levels). However, fear ratings for those in the high severity/low efficacy condition did not differ significantly from the ratings of those in the low severity conditions. The question now revolves around why those in the high severity/high efficacy condition reported higher

levels of fear than the other three groups. While an explanation is not immediately apparent, potential reasons for this finding are discussed below.

First, it may be that the precautionary instructions in the high efficacy condition provided participants with another source of information about the potential for harm. While it was intended that warning information be used to inform judgments regarding threat potential (and the efficacy information be used to inform judgments regarding whether the threat could be reduced), it may be that the efficacy information was also used when evaluating the threat posed by the product. In other words, it may be that the warning information resulted in an initial perception of threat that was then elevated after reading the high efficacy precautions, which resulted in an increase in fear. Those in the high efficacy conditions were more surprised after reading the warning label than those in the low efficacy conditions, so it is possible that when combined with the high severity information, the precautionary instructions on the high efficacy label is what caused participants to perceive the product as more dangerous. This explanation would suggest that while the detailed precautions are intended to provide users with the best instructions for preventing harm, they may also be implicitly communicating that the product is more dangerous than one would suspect. This possibility is supported by the pattern of responses given to the post-label perceived dangerousness question; results showed that the contrast comparing the high severity/high efficacy condition with the other three was marginally significant.

Related to this explanation is the potential issue caused by previous experience. Surprisingly, 66% of participants reported that they had used this type of product before.

It may be that the warning label did not catch participants' attention until the high severity condition was combined with the high efficacy condition. Because it was anticipated that this product would be unfamiliar to the majority of participants, focus was not placed on making the label ecologically valid. While many of the warnings and precautions were similar to what one would expect to see on an ant poison warning label, the associated consequences were more severe than those listed on the real warning label; in addition, the real ant poison warning label did not list very detailed precautionary instructions (to compare and contrast the real label with the those created for use in this study, see the ant poison label used for Study 1 in Appendix A). It may be that the combination of high severity and high efficacy caught the participants' attention because the information was not what they remembered reading when they had previously used the product, or the precautions were more extreme than the precautions they took when using the product, which resulted in higher levels of fear.

It may also be that elevated surprise present in the high efficacy conditions resulted in an increase in attention. As mentioned previously, participants in the high efficacy conditions reported significantly higher levels of surprise. Surprise occurs when an event is unexpected, and it serves to interrupt current emotional activity so that a person can focus on the new event/information (Izard, 1991; Roseman, 2001). In the case of the warning labels, it may be that when reading the high efficacy precautions, surprise was evoked, which caused participants to really focus on the information contained in the label. For those in the low severity condition, the potential harm outlined in the warnings statements was in line with expectations, so fear did not increase; however, for those in

the high severity condition, the potential harm was more severe than expected, which caused an increase in fear.

The hypotheses regarding the effect of severity and efficacy manipulations on precautionary intent were also unsupported. It was expected that those in the high severity/high efficacy condition would report higher ratings on the two measures of precautionary intent (intended carefulness and likelihood of following precautions) when compared to those in the other three conditions. However, the conditions did not differ significantly in their ratings of intended carefulness. The results for likelihood of compliance also did not show the interaction that was expected, but there was a significant main effect for efficacy. However, contrary to what was expected for the interaction, those in the high efficacy conditions reported being significantly *less* likely to follow the listed precautions than those in the low efficacy conditions. While this finding is opposite of what would be expected, closer examination of the way this question was presented to participants may explain this effect.

The question presented was “How likely is it that you would comply with all of the safety precautions outlined on this label?” Because the precautions on the high efficacy label were so detailed, it is possible that there were some precautions that participants knew they were not likely to follow (e.g., wearing safety goggles to avoid contact with eyes). For those in the low efficacy conditions, complying with the precaution “avoid contact with eyes” could have been interpreted as meaning any number of things. For example, a person may avoid contact with eyes by ensuring that the poison is sprayed away from the face and the head is turned away from the product while

spraying. Both of these precautionary actions may be considered easier than obtaining safety goggles. Because the question asked about following *all* of the precautions, it is possible that participants in the high efficacy conditions were aware that they may not comply with every precaution listed.

The hypothesis regarding likelihood of using the product was partially supported. It was anticipated that this behavioral intention would vary with fear ratings, such that higher fear ratings would result in a lower likelihood of using the product. Because it was expected that fear would be highest in the high severity/low efficacy condition, it was hypothesized that likelihood of using the product would be lowest for this condition. While this part of the hypothesis was not supported, the results did show that likelihood of using the product was lowest for the condition with the highest fear ratings (high severity/high efficacy). This finding supports the results obtained in Study 1: As fear increases, likelihood of using the product decreases.

While the manipulated factors did not influence fear as predicted, analyses were conducted to determine whether reported fear was related to behavioral intentions. Consistent with Study 1, higher fear ratings were associated with lower likelihood of use ratings. However, fear was positively related to precautionary intent. This result aligns with previous findings showing that fear positively influences behavioral intentions associated with message acceptance (e.g., Witte & Allen, 2000). So while fear may lower the likelihood that a person will use a product, it also motivates protective behavior.

Additional Points of Discussion

The results of the manipulation check showed that the severity manipulation was questionable. While fear ratings were higher for those in the high severity conditions, ratings of dangerousness and severity of harm did not differ between the high and low severity conditions. While an attempt was made to make the consequences more extreme in the high severity condition, it is possible that the subtle differences between the two conditions were not sufficient to be perceived as distinctly different. The distinction between the low and high severity conditions rested on slight wording changes, which may not have been strong enough to communicate different levels of threat. It is also possible that the severity manipulation was not clearly effective because most of the participants had experience using this type of product. This previous experience may have caused participants to not be as sensitive to the subtle differences in wording for the severity manipulation. The efficacy manipulation, on the other hand, was successful. Those in the high efficacy conditions rated the precautions listed on the label as more capable of reducing the risks associated with using the product than those in the low efficacy conditions.

As mentioned previously, the expected hierarchy of fear was not observed. One possible reason for this may be explained by the way low efficacy was defined. In this study, the low efficacy condition was relative to the high efficacy condition; however, participants only received one version of the warning label. It is possible that the low efficacy condition was still considered efficacious by the participants. In other words, the participants considered the precautions listed on the low efficacy labels as sufficient for

protection. And while these precautions did not list specific behaviors one should engage in to avoid the potential harm, participants may still have felt confident in selecting behaviors that aligned with the precautions (e.g., when the precaution said avoid contact with skin, the participant planned to wear a long-sleeved shirt and rubber gloves). This possibility would explain why the fear reported by the high severity/low efficacy condition was lower than that reported by the high severity/high efficacy condition. If the low efficacy condition involved simply presenting the warning information to participants and leaving the precautionary measures to be inferred, the high severity/low efficacy condition may have resulted in the highest levels of fear as originally predicted.

Discussion Regarding Additional Analyses

Emotion. While the emotion of main interest in this study was fear, 11 other emotions were included to determine whether the warning label conditions activated other emotions. While surprise²⁴ and fear were the only negative emotions that were affected by the severity and efficacy manipulations, the analysis of the positive emotions revealed that relief and hope were also influenced by the manipulations. Of particular interest are the findings surrounding hope. Participants in the high severity/high efficacy condition reported being significantly more hopeful than those in the other three conditions. This is the same pattern observed for fear ratings. Interestingly, Roseman's (2001) appraisal "map" positions fear and hope next to one another. Both emotions arise when probability is uncertain, the event is circumstance-caused, and the potential for control is low. The only difference between the two emotions is the appraisal regarding

²⁴ Again, surprise was grouped with the negative emotions because of it was positively correlated with the negative emotions and negatively correlated with the positive emotions.

situational state: Fear is activated when the situational state is motive-inconsistent, while hope is activated when the situational state is motive-consistent. Not only do these findings suggest that competing motives are present (preventing harm and solving the problem), but they also suggest that the appraisals made by participants in the four conditions are distinctly different. Although these differences were not captured by the cognitive antecedent questions generated using Roseman's (2001) model, the results did show that those in the high severity/high efficacy condition perceived the product to be more dangerous than those in the other three conditions.

Perceived Danger. The results of the linear regression analysis that used perceived severity of harm and perceived likelihood of injury to predict perceived dangerousness was also consistent with the findings of Study 1. Both severity and likelihood significantly contributed to the variance in dangerousness ratings, and as ratings of severity and likelihood increased, perceptions of danger also increased.

Conclusions

The results of this study showed that fear influences behavioral intentions. Fear was negatively correlated with likelihood of use, as was found in Study 1. However, fear was positively related to precautionary intent. While fear was found to affect behavioral intentions, the warning label manipulations did not influence fear as expected. One potential explanation for why the manipulation did not work revolves around previous experience. Previous experience and increased familiarity with the product may have affected the way that the warning label information was processed. The main goal of the

next study is to replicate the findings obtained here using a consumer product that participants have less experience with.

CHAPTER IV

STUDY 3

The major aim of this experiment is to determine whether the findings of Study 2 could be replicated. This question is critical given that most of the hypotheses were not supported. It was the high severity/high efficacy condition that produced the highest fear ratings in the previous study, rather than the high severity/low efficacy condition. Before drawing any conclusions and attempting to determine why this condition causes more fear, replication is necessary. Because the majority of the participants had used ant poison before, it is unclear whether this finding could be attributed to previous experience. In other words, it is possible that previous experience and increased familiarity may have affected the way warning information was processed, which resulted in higher fear ratings for the high severity/high efficacy condition. It is also not known whether the results would vary if a different situation and product were presented to participants. For this reason, the third study also serves to determine whether the findings of the previous experiment are generalizable.

In the current study, participants were exposed to the same manipulated warning labels used in Study 2. However, a new product was selected and a new situational scenario was created. More specifically, a product that participants likely had less

experience with was used to reduce any potential effects that previous experience might have on measures of emotion and behavioral intention.

Hypotheses

Regarding the effect of the severity and efficacy manipulations on fear, I predicted that participants would report the highest levels of fear when perceived threat is high and efficacy is low, moderate levels of fear when perceived threat is high and efficacy is high, and the lowest levels of fear when perceived threat is low (regardless of efficacy condition). Given that this hypothesis was based on the EPPM (Witte, 1992), and there are potential explanations for the fear results obtained in Study 2, the original hypothesis was retained. The hypothesis regarding the effect of the manipulations on likelihood of use also remains unchanged. Because likelihood of using the product is negatively related to fear, I predicted that likelihood of use ratings would be higher in the low severity conditions (regardless of efficacy) than in the high severity/high efficacy condition, and higher in the high severity/high efficacy than the high severity/low efficacy condition.

The hypothesis regarding precautionary intent was altered. The hypothesis in the previous study was constructed using the EPPM (Witte, 1992), and it was predicted that the moderate fear expected in the high severity/high efficacy condition would result in danger control processes (changes in behavioral intentions), while the high fear expected in the high severity/low efficacy condition would lead to fear control processes and message rejection. However, the findings of Study 2 demonstrate that precautionary

intent is related to fear arousal. Based on this finding, precautionary intent (intended carefulness and likelihood of compliance) should also vary with fear. Based on the predictions regarding fear arousal, it was expected that precautionary intent would be higher in the high severity/low efficacy condition than the high severity/high efficacy condition, and higher in the high severity/high efficacy condition than the low severity conditions.

Method

Participants

Two hundred fifty-six undergraduate students (158 females, 97 males; 1 participant declined to respond) enrolled in a psychology course at the University of Oregon served as participants in this study. The students ranged in age from 17 to 46 years, with the mean age being 19.3 ($SD = 3.0$). Two hundred thirty-two participants reported English as their first language, and 249 reported their student status as full-time. The sample of undergraduate students contained 167 freshmen, 42 sophomores, 26 juniors, and 20 seniors (1 participant declined to respond). The sample consisted of 3 African-Americans, 26 Asian/Pacific Islanders, 195 Caucasians, 11 Hispanics, and 4 Native American/Alaskan Native; 17 participants reported their ethnicity as "Other." One hundred eighty-four participants reported having no job, 70 reported having a part-time job, and 2 reported having a full-time job. One hundred twenty-seven of the subjects reported living in a dorm, 112 reported living off-campus, and 15 reported living with

their parents (2 participants declined to respond). Students were given course credit in exchange for their participation in the study.

Materials

The materials for this study were very similar to the materials for Study 2. The demographic and background questionnaire, the pre-label questionnaire, and the warning labels were the same. However, the product and situational scenario were different. The product selected for use was a carpet adhesive; the scenario asked participants to imagine causing damage to the carpet in their apartment while moving out, and in order to receive the entire security deposit, the damage needed to be fixed (see Appendix C to view the scenario). As with the scenarios in the previous studies, an effort was made to present a problem that participants could relate to and would want to solve. The post-label questionnaire was also slightly different; it contained additional questions that could be useful in explaining the pattern of findings if the results from Study 2 were replicated. These additional questions mainly focused on beliefs regarding the precautionary measures outlined on the warning (e.g., whether the precautions were necessary to protect against harm, costs associated with the precautions, likelihood and severity of harm with/without the precautions, likelihood of complying with the individual precautions, etc.).

Procedure

The procedure for this study was identical to the procedure for Study 2.

Results

The results of this study are divided into four main sections. The first section serves to check whether participants had less experience and were less familiar with the product selected for use in this study (compared to the previous study). The second section presents the results of the analyses conducted to determine whether the severity and efficacy manipulations were successful. The third section focuses on the analyses that directly test the hypotheses to determine whether the results of this study are consistent with those of Study 2. The fourth section presents additional analyses that were conducted in an attempt to better understand the pattern of results observed.

Experience and Familiarity

Approximately 91% of the participants reported that they had never used this type of product before. Overall, participants reported being somewhat familiar with the product ($M = 3.57$, $SD = 0.91$). However, there was a significant difference in familiarity ratings for those with and without prior experience, $t(254) = -3.854$, $p < .001$; those who had never used the product before ($M = 3.51$, $SD = 0.87$) reported being less familiar with the product than those with prior experience ($M = 4.27$, $SD = 0.23$). To determine whether any of the conditions differed with respect to familiarity ratings, a factorial ANOVA was conducted. Results revealed that there were not any significant differences between the four groups with respect to familiarity.

Manipulation Check

The warning labels used in this study were the same labels used in the Study 2. The results of the manipulation check for Study 2 showed that the severity manipulation

was questionable (no differences existed between the two severity conditions for ratings of perceived dangerousness and perceived severity of harm; however, there was a significant difference between the groups for ratings of fear). To determine whether the severity manipulation produced different results for this study, factorial ANOVAs were conducted on post-label ratings of dangerousness, severity of harm, and fear.

The high and low severity conditions differed significantly for all three of these variables. Those in the high severity conditions ($M = 3.90$, $SD = 1.78$) reported higher levels of fear than those in the low severity conditions ($M = 3.31$, $SD = 1.55$), $F(1,252) = 8.196$, $p < .01$; those in the high severity conditions ($M = 4.92$, $SD = 1.36$) rated the product as more dangerous than those in the low severity conditions ($M = 4.38$, $SD = 1.38$), $F(1,252) = 10.058$, $p < .01$; and those in the high severity conditions ($M = 4.89$, $SD = 1.29$) rated potential harm as more severe than those in the low severity conditions ($M = 4.14$, $SD = 1.42$), $F(1,252) = 19.446$, $p < .001$.

To determine whether the efficacy manipulation was successful, a factorial ANOVA was conducted on the responses given to the post-label efficacy question (To what extent are the precautions capable of reducing the risks?). The analysis showed that the response-efficacy ratings significantly differed for the two efficacy conditions, $F(1,252) = 12.231$, $p = .001$. Those in the high efficacy condition ($M = 5.20$, $SD = 1.15$) rated the precautions as more capable of reducing the risks associated with using the product than those in the low efficacy condition ($M = 4.67$, $SD = 1.26$).

Analyses Addressing the Hypotheses

Fear Ratings. After exposure to the warning labels, it was expected that those in the high severity/low efficacy condition would report the highest levels of fear, those in the high severity/high efficacy condition would report moderate levels of fear, and those in the low severity/high efficacy and low severity/low efficacy conditions would report the lowest levels of fear. A factorial ANOVA was conducted to determine whether severity and efficacy conditions had an effect on post-label ratings of fear.²⁵ There was a significant main effect for severity, $F(1,252) = 8.196, p < .01$. Those in the high severity conditions ($M = 3.90, SD = 1.78$) reported higher levels of fear than those in the low severity conditions ($M = 3.31, SD = 1.55$). There was no main effect for efficacy, and there was not an interaction between severity and efficacy.

Precautionary Intent. After viewing the warning label, it was predicted that those in the high severity/low efficacy condition would report higher ratings on the precautionary intent scales than those in the high severity/high efficacy condition, and those in the high severity/high efficacy condition would report higher ratings of precautionary intent than those the low severity conditions. Because intended carefulness and likelihood of compliance were moderately correlated ($r = 0.68, N = 256, p < .001$), a MANOVA was conducted to determine whether efficacy and severity had an effect on intended carefulness and likelihood of compliance.²⁶ There were no significant differences between the four conditions for either measure of precautionary intent.

²⁵ A factorial ANOVA conducted on pre-label fear ratings revealed no significant differences between the conditions.

²⁶ A factorial ANOVA conducted on pre-label ratings of intended carefulness revealed no significant differences between the groups.

Participants intended to be careful ($M = 5.40, SD = 1.33$) and were likely to comply with the listed precautions ($M = 4.63, SD = 1.67$).

Likelihood of Using the Product. A factorial ANOVA was conducted to determine whether severity and efficacy had an effect on post-label likelihood of using the product.²⁷ While there was no main effect for efficacy and no interaction, there was a significant main effect for severity, $F(1,251) = 12.135, p < .01$. Those in the low severity conditions ($M = 5.33, SD = 1.59$) reported being more likely to use the product than those in the high severity conditions ($M = 4.53, SD = 1.88$).

Correlations between Fear and Behavioral Intentions. To determine the influence of fear on precautionary intent and likelihood of use, the correlations between fear and these behavioral intentions were calculated. Fear was negatively correlated with likelihood of using the product ($r = -.470, N = 256, p < .001$), but positively correlated with both intended carefulness ($r = .396, N = 256, p < .001$) and likelihood of compliance ($r = .310, N = 256, p < .001$).

Additional Analyses

Not only did the results of this study differ from those of Study 2, but they also did not support the hypotheses regarding the effect severity and efficacy on emotion and behavioral intentions. In an attempt to better understand the patterns present in the data, additional analyses were conducted using other variables included in the study. As with the first study, a MANOVA was conducted on the post-label emotion ratings to

²⁷ A factorial ANOVA conducted on pre-label likelihood of using the product revealed a near significant main effect for efficacy ($p = .071$). It is expected that this finding was random, but pre-label ratings were added to the ANOVA conducted on post-label rating to control for pre-existing differences between the groups.

determine whether differences existed between the warning label conditions for any of the other negative emotions; in addition, a MANOVA was conducted to determine whether groups differed in their ratings for the positive emotions. Second, perceived dangerousness, likelihood of injury and severity of harm ratings were analyzed to determine whether the groups differed in their perceptions of threat.

Emotion. Two MANOVAs were conducted to determine whether severity and efficacy had an effect on post-label emotion ratings: the first included all the negative emotions, and the second included all the positive emotions.

The results of the MANOVA showed a significant main effect for severity on surprise ($F(1,250) = 6.232, p = .01$), fear ($F(1,250) = 7.850, p = .01$), frustration ($F(1,250) = 4.785, p = .03$) and dislike ($F(1,250) = 5.746, p = .02$), and a marginally significant main effect for severity on distress ($F(1,250) = 3.193, p = .08$) and disgust ($F(1,250) = 3.607, p = .06$).²⁸ In all cases, those in the high severity conditions reported higher levels of the corresponding emotion than those in the low severity conditions. The results also showed a significant main effect for efficacy on sadness, $F(1,250) = 5.161, p = .02$; those in the low efficacy conditions ($M = 2.25, SD = 1.53$) reported higher levels of sadness than those in the high efficacy conditions ($M = 1.85, SD = 1.22$). The results also revealed a significant interaction effect for surprise ($F(1,250) = 4.775, p = .03$) and dislike ($F(1,250) = 4.329, p = .04$). To investigate the interaction for surprise, a Helmert contrast was conducted. Those in the low severity/low efficacy condition were

²⁸ A MANOVA conducted on pre-label ratings of the negative emotions showed no significant differences between the groups before the warning label was presented.

significantly less surprised after reading the warning label when compared to the other three groups, $F(3,252) = 3.706, p < .01$ (see Figure 5).²⁹

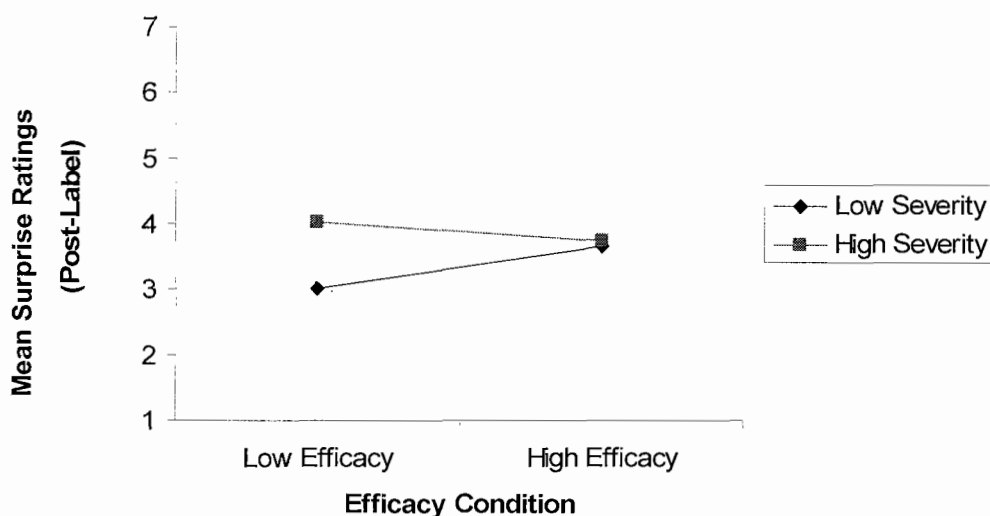


Figure 5. Mean ratings of post-label surprise for all conditions.

For the interaction effect on dislike, a difference contrast showed those in the high severity/low efficacy condition gave significantly higher ratings on the dislike scale after reading the warning label when compared to those in the other three groups, $F(3,252) = 3.568, p < .01$ (see Figure 6).^{30 31}

²⁹ There were not any significant differences between the other three conditions.

³⁰ There were not any significant differences between the other three conditions.

³¹ It should also be noted that while the interaction effects were not significant once dislike was accounted for, this same interaction pattern was observed for frustration, disgust, and anger.

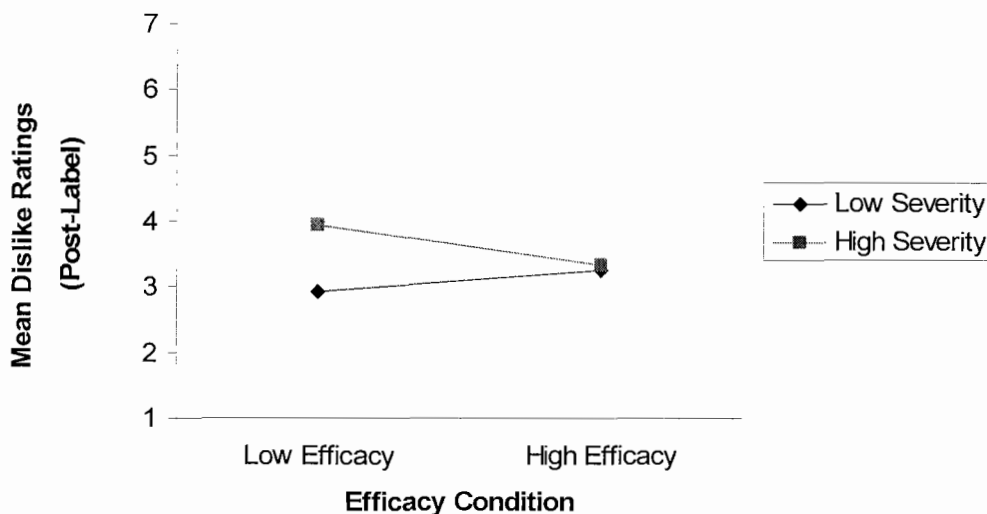


Figure 6. Mean ratings of post-label dislike for all conditions.

The results of this MANOVA were very different from the one conducted in the previous study. In Study 2, surprise and fear were the only negative emotions that differed among the groups (when the effects of these two variables were removed, the other negative emotions did not differ significantly between the conditions); however, the results of this MANOVA show that there are differences among the groups for the other negative emotions even after the effects of surprise and fear had been accounted for. Because the patterns observed for the severity and interaction effects tended to run in the same direction, it appears that the participants were not distinguishing between the negative emotions. These findings suggested that it would be appropriate to combine the negative emotions into one variable.

A factor analysis was conducted to determine whether there were groups of emotions that varied together. The principal components analysis included all of the

unipolar emotion scales (surprise, fear, sadness, distress, frustration, disgust, anger, dislike, contempt, happiness, relief, and hope) and resulted in the extraction of two components. Taken together, these two components accounted for approximately 61% of the variance (see Table 9).

Table 9

Total Variance Explained for PCA on Post-Label Emotion

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	Percent Variance	Cumulative Percent	Total	Percent Variance	Cumulative Percent
1	5.247	43.726	43.726	5.247	43.726	43.726
2	2.086	17.383	61.108	2.086	17.383	61.108
3	0.899	7.489	68.597			
4	0.817	6.812	75.409			
5	0.630	5.247	80.656			

When viewing the factor component matrix, it is clear that the first factor contains the negative emotions, while the second factor contains the positive emotions (see Table 10).

Table 10

Component Matrix for PCA on Post-Label Emotion (Unrotated)

	Component	
	1	2
Surprise Baseline	.730	-.063
Fear Baseline	.730	-.193
Sadness Baseline	.701	.196
Distress Baseline	.822	-.058
Frustration Baseline	.859	-.018
Disgust Baseline	.769	.018
Anger Baseline	.838	.011
Dislike Baseline	.767	-.155
Contempt Baseline	.624	.337
Happiness Baseline	-.066	.823
Relief Baseline	.043	.850
Hope Baseline	.025	.682

Based on these results, a negative factor score and a positive factor score were calculated for each participant. A factorial ANOVA conducted on the post-label negative factor scores revealed a significant main effect for severity, $F(1,250) = 7.084, p < .01$; those in the low severity conditions ($M = -.16, SD = .96$) had lower negative factor scores than those in the high severity conditions ($M = .17, SD = 1.02$). The results also revealed a near significant interaction between severity and efficacy, $F(1,250) = 3.334, p = .07$. After viewing the display of mean factor ratings (see Figure 7), a difference contrast comparing the high severity/low efficacy condition against the other three conditions was conducted. The high severity/low efficacy condition had higher negative factor scores when compared to the other three conditions, $F(3,250) = 3.732, p < .01$.

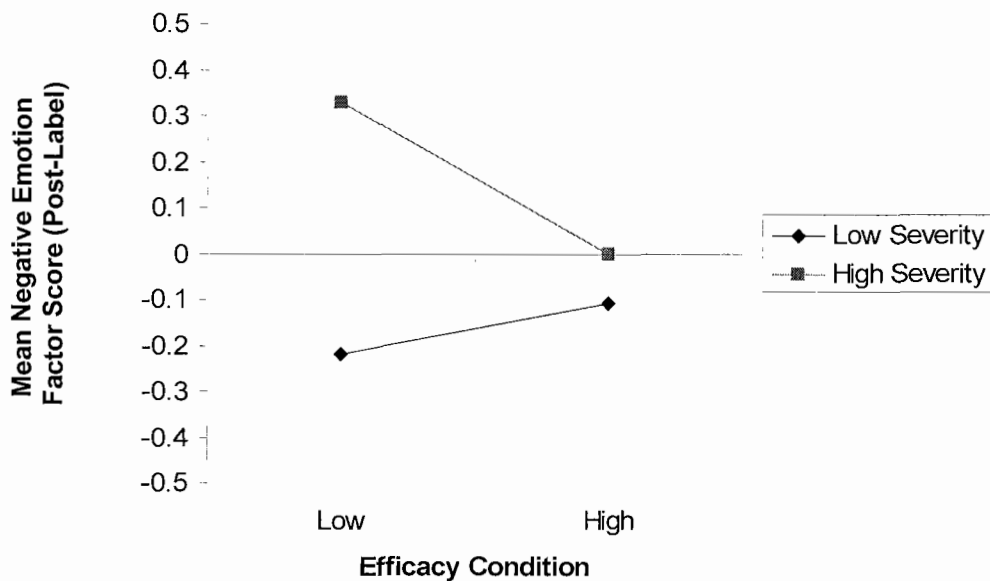


Figure 7. Mean negative factor scores (post-label) for all warning label conditions.

These results mirrored those obtained when running the MANOVA, which supported combining the negative emotions into one factor. A factorial ANOVA conducted on the positive factor scores for post-label emotion revealed that the four conditions did not differ significantly from one another.³²

Perceived Danger. To determine whether severity and efficacy had an effect on hazard perception, a MANOVA was conducted on perceived dangerousness, perceived likelihood of injury, and perceived severity of harm.³³ Results showed a significant main effect for severity on ratings for all three of the post-label threat related questions. Those

³² A MANOVA conducted on post-label ratings for the three positive emotions also showed no significant differences between the conditions.

³³ A MANOVA conducted on pre-label ratings of dangerousness, likelihood of injury and severity of harm revealed a significant main effect for severity on likelihood of injury, and a significant interaction between severity and efficacy on dangerousness ratings. It is expected that these findings are random. To control for these pre-existing differences when evaluating post-label ratings, pre-label likelihood of injury and pre-label ratings of dangerousness were included as covariates in the MANOVA on post-label ratings of threat.

in the high severity conditions rated the product as significantly more dangerous, the likelihood of injury significantly higher, and the potential harm as significantly more severe (see Table 11). There was no main effect for efficacy and no interaction between severity and efficacy for any of threat perception questions.

Table 11

Post-Label and Pre-Label Perceived Threat Ratings by Severity Condition

	<u>Perceived Threat Questions</u>		
	Dangerousness	Likelihood of Injury	Severity of Harm
Post-Label			
Low Severity	4.36 (1.38)	3.40 (1.46)	4.12 (1.41)
High Severity	4.92 (1.37)	3.93 (1.59)	4.89 (1.30)
Pre-Label	3.49 (1.00)	2.83 (1.21)	3.24 (1.09)

To determine whether ratings for these three variables increased after exposure to the warning label, a series of paired-sample *t*-tests were conducted. Results showed that ratings increased for perceived dangerousness ($t(254) = -11.574, p < .001$), likelihood of injury ($t(254) = -8.109, p < .001$), and severity of harm ($t(254) = -13.162, p < .001$) after reading the warning label. Because there were main effects for severity, the pre-label mean for each variable was compared to the post-label means for the low and high severity conditions. It is clear to see that while ratings increased for both severity conditions, the ratings increased more for the high severity conditions than the low severity conditions (see Table 11).

To determine whether perceived likelihood of injury and severity of harm were capable of predicting perceived dangerousness, a linear regression analysis was conducted. As with Studies 1 and 2, a reduced model using only severity to predict dangerousness was tested first, and then a full model containing severity and likelihood was run to determine whether likelihood significantly contributed to the variance explained. The ANOVA revealed that the reduced model containing severity of harm was significant and able to explain approximately 43% of the variance in dangerousness, $F(1,254) = 193.266, p < .001$. Adding likelihood of injury to the model explained an additional 15% of the variance, $F\text{Change}(1,253) = 90.275, p < .001$. Taken together, the two predictors were capable of explaining approximately 58% of the variance in perceived dangerousness. Coefficients revealed that as perceived severity of harm ($\beta = .381, t(253) = 7.610, p < .001$) and perceived likelihood of injury ($\beta = .475, t(253) = 9.501, p < .001$) increased, perceptions of danger also increased.

The post-label perceived threat measures were also correlated with post-label fear to determine whether experienced emotion and cognitions regarding threat were strongly related. Fear was significantly correlated with perceived danger ($r = .518, N = 256, p < .001$), perceived likelihood of injury ($r = .530, N = 256, p < .001$), and perceived severity of harm ($r = .449, N = 256, p < .001$).

Self-Efficacy. Participants were also asked about their own capability of reducing the risks (To what extent are you capable of reducing the risks associated with using this product?). This question was intended to measure self-efficacy rather than response-efficacy. Because it is possible that this variable could be influenced by both the severity

and efficacy manipulations, a factorial analysis of variance was conducted to determine whether reported self-efficacy differed among the four conditions. There was a significant main effect for severity, $F(1,252) = 9.784, p < .01$; those in the low severity conditions ($M = 5.58, SD = 1.29$) reported being more capable of reducing potential risks than those in the high severity conditions ($M = 5.05, SD = 1.47$). There was also a significant main effect for efficacy, $F(1,252) = 3.977, p = .047$; those in the high efficacy conditions ($M = 5.49, SD = 1.28$) reported being more capable of reducing the risks than those in the low efficacy conditions ($M = 5.15, SD = 1.50$). There was not a significant interaction between efficacy and severity.

Discussion

The hypothesis regarding the effect of severity and efficacy manipulations on fear was partially supported. Those in the high severity conditions reported more fear than those in the low severity conditions. However, the difference in fear that was expected for those in the high severity/low efficacy and high severity/high efficacy conditions was not present. This finding suggests that including detailed precautionary instructions neither increases nor decreases fear.

The hypotheses regarding the effect of the warning label manipulations on precautionary intent were not supported. Participants in the four conditions did not differ significantly in their post-label ratings of intended carefulness or likelihood of compliance. Mean ratings showed that participants intended to be careful when using the product and were likely to comply with all of the safety precautions. Interestingly, the

main effect for efficacy on likelihood of complying with the precautions that was observed in Study 2 was not present here. One possible explanation goes back to previous experience. As was mentioned in the discussion section of the previous chapter, those in the high efficacy condition may have reported being less likely to comply with the listed precautions because they had previously used the product without following the precautions advised in this label and did not suffer any harm. This benign experience may have led them to believe that following every listed precaution was not necessary. However, when participants do not have previous experience with the product, they may be more likely to follow all of the precautions to ensure that harm does not occur.

The hypothesis regarding the effect of severity and efficacy on likelihood of use was partially supported. As with the previous study, it was expected that likelihood of use would vary with fear. Because it was predicted that fear would be highest in the high severity/low efficacy condition, it was hypothesized that likelihood of use would be lowest for this condition. While the effect of the manipulations on fear were different than expected, likelihood of using the product was significantly lower for the high severity conditions (which reported significantly more fear). However, those in the high severity conditions were on the “likely” side of the scale, indicating that they still intended to use the product after reading the warning label. Unlike Study 2, in which the interaction between severity and efficacy affected likelihood of using the product, these results show that efficacy did not affect likelihood of using the product. In other words, providing high efficacy precautionary instructions did not lower intentions to use the

product; rather, it was the severity of the warning statement that resulted in the reduced intention to use the product.

Fear was negatively correlated with likelihood of use, but positively correlated with precautionary intent. These findings supported the hypotheses and replicated the results obtained in Study 2. The correlations obtained between fear and likelihood of use were comparable across the two studies (-.434 and -.470, respectively), as were the correlations between fear and intended carefulness (.347 and .396, respectively). However, the correlation between fear and likelihood of compliance was lower in Study 2 than it was in this study (.217 and .310, respectively). This difference may be due to the effect of efficacy on likelihood of compliance that was present in Study 2 but not Study 3. Taken together, these results show that an increase in fear is associated with an increase in precautionary intent.

Additional Points of Discussion

Results showed that only 8% of participants had previously used carpet adhesive (compared to 66% for the ant poison used in Study 2). This means that the effort to select an unfamiliar product for use in this study was successful. Even though those without past experience rated the product as less familiar than those with previous experience, the average familiarity rating for those without experience was still fairly high (mean rating of 3.5 on a 7-point scale that ranged from “Not at All”[1] to “Extremely”[7]). This finding demonstrates that while experience and familiarity are not identical concepts (DeJoy, 1999a, 1999b). It is possible that participants considered the carpet adhesive

similar to other products they had used before (e.g., certain types of glue), so they reported being somewhat familiar with the product.

The manipulation check revealed that both severity and efficacy were successfully manipulated. Those in the high severity conditions reported higher levels of post-label fear, rated the product as more dangerous, and rated potential harm as more severe than those in the low severity conditions. Likewise, those in the high efficacy conditions reported that the precautions on the label were more capable of reducing potential harm than those in the low efficacy conditions. Given that the warning labels were the same, it is surprising that the severity manipulation was very strong in this study but questionable in Study 2. As mentioned in the previous chapter, it is possible that the previous experience using ant poison caused participants to be less sensitive to the warning information. However, it is also possible that participants' initial expectations for the severity of harm differed for the products presented in the two studies.

For example, when paired with the ant poison, it is possible that neither the low nor high severity warning statement seemed out of the ordinary given that the product was a poison, so ratings on the perceived threat questions increased equally for all conditions. However, when the labels were paired with the carpet adhesive, the low severity statement may have been in line with what participants expected, while the high severity statement may have indicated that the product was much more dangerous than originally anticipated. This is supported by the finding that participants in the high severity conditions were more surprised than those in the low severity conditions (this finding that was not present in Study 2).

Regarding the findings pertaining to the original hypotheses presented in Study 2, the results of this study showed a different pattern than that observed in the previous study. Rather than finding that fear was highest for the high severity/high efficacy conditions (as with Study 2) or finding a hierarchy of fear (as was originally predicted), the results showed a main effect for severity on ratings of fear. Those in the high severity conditions reported more fear than those in the low severity conditions. However, when viewing the rest of the emotions measured in this study, a pattern emerged. For a majority of the negative emotions, there was a significant main effect for severity, with those in the high severity conditions reporting higher levels of the negative emotions. There were also two significant interactions between severity and efficacy for two of the emotions (surprise and dislike). These findings suggested that participants were not discerning between the negative emotions. When factor scores were created, the overall pattern observed mirrored that which was observed when the MANOVA was conducted. When the factor scores were analyzed, results showed that those in the high severity/low efficacy condition had significantly higher negative factor scores than those in the other three conditions. While the original hypothesis regarding emotion was specific to fear, it was expected that this pattern would be observed. In this case however, the pattern that was originally anticipated was present, but for negative affect rather than fear specifically.

While two (dangerousness and severity) of the three threat perception questions were discussed previously with respect to the manipulation check, likelihood of injury was not addressed. As with the other two questions, there was also a significant main

effect for severity on likelihood of injury ratings. Although ratings on all of the threat perception questions increased for both conditions, ratings made by those in the high severity conditions increased more than those in the low severity conditions. These results also differ from those of the previous study; however, the difference in perceived threat is likely due to the lack of influence the severity manipulation had in Study 2.

Interestingly, there were main effects for both of the manipulated factors on ratings of self-efficacy. Those in the low severity conditions reported being more capable of reducing the risks associated with the product than those in the high severity conditions, and those in the high efficacy conditions rated themselves as more capable of reducing the potential risks than those in the low efficacy conditions. In the previous study, self-efficacy ratings did not differ among the groups. Again, this difference in findings may be due to the severity manipulation. When the consequences are perceived as severe, people feel less capable of reducing the potential harm; however, when efficacy is high, people may feel more equipped to reduce the possible risks.

While Study 2 showed that the high efficacy condition, when coupled with high severity, resulted in higher levels of fear, the findings of this study show that high efficacy can have positive effects. As mentioned previously, those in the high efficacy conditions rated themselves as more capable of reducing the risks associated with the product when compared to those in the low efficacy conditions. In addition, efficacy did not increase ratings of fear or perceived threat. These findings suggest that detailed precautions may be superior to vague precautions in some circumstances.

Conclusions

This study replicated the findings of Study 2 by demonstrating the effect of fear on behavioral intentions. Fear negatively influenced likelihood of using the product, but had a positive effect on precautionary intent. While fear was associated with behavioral intentions, the warning label manipulations did not affect fear as expected. Given that an increase in fear is associated with an increase in precautionary intent, understanding how to manipulate fear is important. The findings of Studies 1 and 2 suggest that using the EPPM (Witte, 1992) to guide the development of warning labels may not be appropriate.³⁴ While severity and efficacy did not influence fear as predicted, these manipulations did have an effect on several other variables. However, the effects were not consistent across the two studies. The following chapter aims to identify potential reasons for the differences in findings for Studies 2 and 3.

³⁴ This topic will be discussed in more detail in Chapter 6.

CHAPTER V

COMPARING STUDIES 2 AND 3

The disparity in findings between Studies 2 and 3 leaves several questions unanswered. Given that the warning labels used in the two studies were identical, the question now revolves around why the findings for the two studies were so different. In this chapter, several analyses were conducted in an effort to identify possible explanations for the observed differences. Because the percentage of participants that had experience with the product in Study 2 was much higher than in Study 3, previous experience was investigated as a potential reason for the difference in results. In addition, ratings for the two products on measures of pre-label threat perception, pre-label behavioral intention, and post-label problem importance were compared.

Results and Discussion

The results presented in this chapter are divided into two sections. The first addresses whether previous experience is capable of explaining the observed differences between the two studies. To explore this possibility, a separate set of analyses were conducted on the data collected for Study 2, which included only those participants that had no previous experience using the ant poison. If previous experience is responsible for the differences in results, the pattern of results observed for those without experience in

Study 2 should resemble the results obtained in Study 3. The second section of results presented in this chapter compares the responses given by participants in the two studies on pre-label questions related to perceived threat and behavioral intentions, and post-label ratings of problem importance.

Analyses for Study 2 Participants with No Previous Experience

To determine whether the pattern observed for the emotion scales differed between those with and without experience in Study 2, a MANOVA was conducted on the post-label negative emotions for those with no previous experience using ant poison.³⁵ Results showed no significant main effects for severity or efficacy on any of the emotions; however, there was a near significant interaction effect on fear, $F(1,63) = 3.419, p = .07$. Consistent with the overall findings of Study 2, a difference contrast revealed that those in the high severity/high efficacy condition reported significantly higher levels of fear when compared to the other three conditions, $F(3,63) = 1.696, p = .04$ (see Figure 8).

³⁵ A MANOVA conducted on pre-label negative emotions revealed that the groups did not differ prior to viewing the warning label.

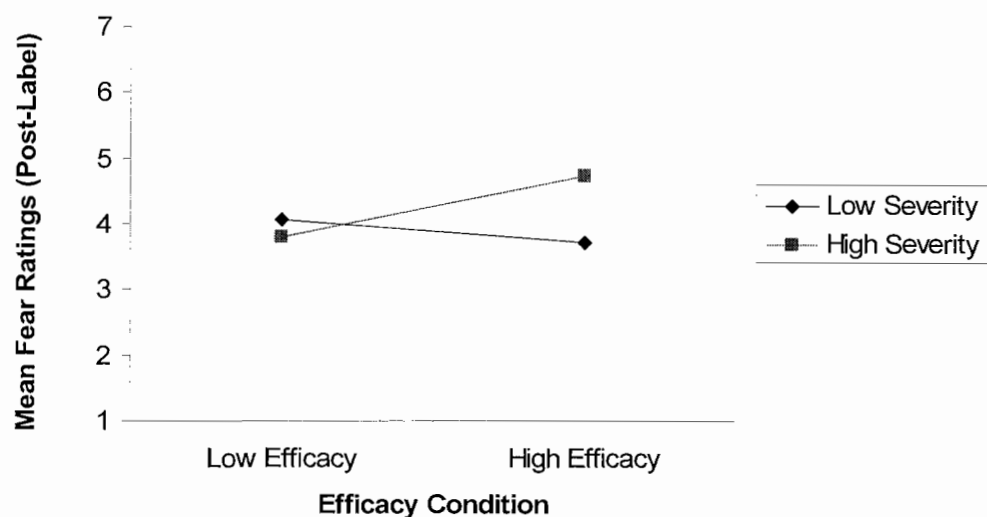


Figure 8. Mean post-label fear ratings for Study 2 participants with no previous experience using the ant poison.

The results of the MANOVA conducted on the post-label positive emotions for those without previous experience showed no significant main or interactions effects for happiness and relief.³⁶ However, the results for hope were consistent with the overall findings of Study 2. There were significant main effects for severity ($F(1,62) = 10.410, p < .01$) and efficacy ($F(1,62) = 8.027, p < .01$) on hope. Those in the high severity conditions ($M = 3.71, SD = 2.55$) reported higher levels of hope than those in the low severity conditions ($M = 2.55, SD = 1.44$), and those in the high efficacy conditions ($M = 3.76, SD = 2.26$) reported more hope than those in the low efficacy conditions ($M = 2.53, SD = 1.35$). There was also a significant interaction between severity and efficacy on ratings of hope, $F(1,62) = 10.12, p < .01$. A difference contrast revealed that those in the

³⁶ A MANOVA conducted on pre-label ratings revealed a significant main effect for efficacy on hope; to control for these pre-existing differences between the conditions, pre-label hope ratings were added as a covariate to the MANOVA conducted on post-label ratings.

high severity/high efficacy condition were more hopeful than those in the other three conditions, $F(3,63) = 10.352, p < .001$ (see Figure 9).

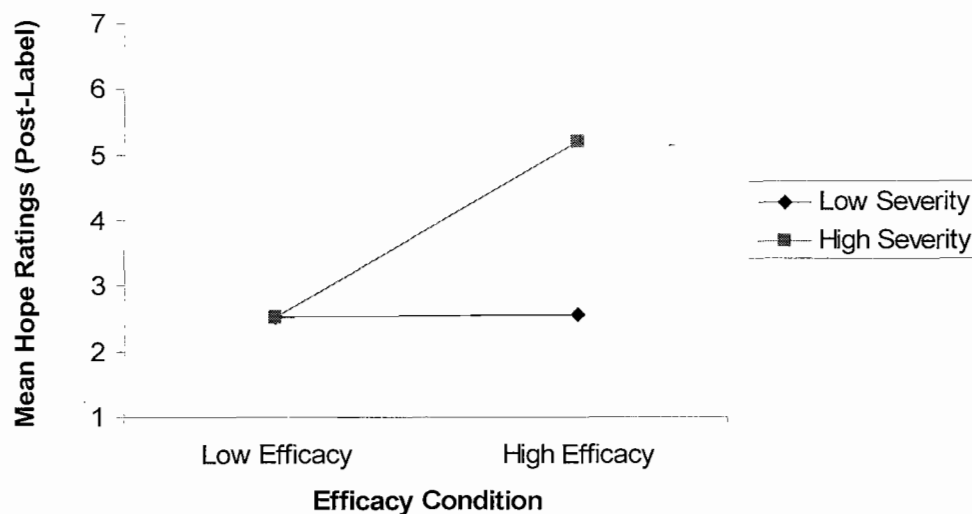


Figure 9. Mean post-label hope ratings for Study 2 participants with no previous experience using the ant poison.

To be sure that other differences between those with and without experience did not exist, the behavioral intention and perceived threat measures were also analyzed. First, a MANOVA was conducted on post-label ratings of intended carefulness and likelihood of complying with the precautions.³⁷ Results showed that the groups did not differ with respect to their post-label ratings of intended carefulness. However, there was a significant main effect for efficacy on likelihood of complying with the precautions, $F(1,64) = 11.631, p = .001$. The trend followed the observed pattern of results when all participants were included in the analysis for Study 2: Those in the high efficacy

³⁷ A factorial ANOVA showed that pre-label ratings of intended carefulness did not differ based on warning label condition.

condition ($M = 4.00$, $SD = 1.86$) were less likely to follow the precautions than those in the low efficacy condition ($M = 5.38$, $SD = 1.50$). This finding eliminates the potential explanation that previous benign experience with the product resulted in the reduced intention to comply with the precautions. The alternative explanation that question wording may have influenced the results also does not explain the main effect for efficacy obtained in Study 2 because this effect for efficacy on likelihood of compliance was not obtained in Study 3. At this point, it is not clear why those in the high efficacy conditions reported being less likely to follow precautions when compared to those in the low efficacy conditions in Study 2 (ant poison scenario).

The factorial ANOVA conducted on post-label likelihood of use for those with no experience showed that there were not any significant differences in intentions to use the product after reading the warning label.³⁸ This finding differs from the pattern observed when all participants were included in the analysis; the overall finding showed that those in the high severity/high efficacy condition were less likely to use the product than those in the low severity/high efficacy condition.

A MANOVA was also conducted on post-label ratings of perceived dangerousness, perceived likelihood of injury, and perceived severity of harm.³⁹ The analysis revealed no significant main effects for severity or efficacy on any of the three threat perception questions. There was, however, a significant interaction between severity and efficacy on dangerousness ratings, $F(1,63) = 5.265$, $p = .025$ (see Figure 10).

³⁸ A factorial ANOVA conducted on pre-label ratings showed no significant differences between label conditions.

³⁹ A MANOVA conducted on pre-label ratings for these three variables revealed no significant differences between the groups.

Consistent with the finding observed when all participants were included in the analysis, those in the high severity/high efficacy condition rated the product as more dangerous after exposure to the warning label than those in the low severity/high efficacy condition, $F(3,63) = 2.561, p = .01$; neither of these conditions differed from the low efficacy conditions.

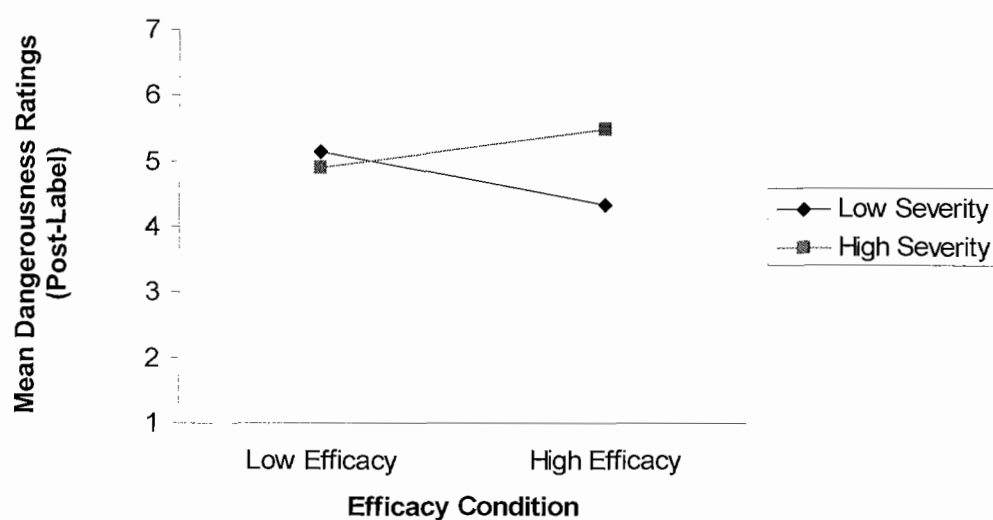


Figure 10. Mean post-label dangerousness ratings for Study 2 participants with no previous experience using the ant poison.

Taken as a whole, the pattern of findings observed in Study 2 for those with no previous experience using the ant poison is very similar to the overall findings for the study. This suggests that previous experience is not responsible for the differences observed between the two studies.

Comparing Studies 1 and 2

To determine whether participants differed in their initial perceptions of the two products prior to seeing the warning label, several comparisons were made between the two studies. A series of independent-sample *t*-tests were conducted on pre-label ratings of dangerousness, likelihood of injury, severity of harm, intended carefulness, and intention to use the product. The groups did differ significantly in their pre-label ratings of dangerousness ($t(452) = 6.324, p < .001$) and severity of harm ($t(453) = 3.329, p = .001$). The ant poison ($M = 4.15, SD = 1.23$) was rated by participants as more dangerous than the carpet adhesive ($M = 3.49, SD = 1.00$), and the potential harm associated with the ant poison ($M = 3.58, SD = 1.14$) was rated as more severe than the potential harm associated with the carpet adhesive ($M = 3.24, SD = 1.09$).

Ratings given for the post-label questions regarding importance of solving the problem and importance of avoiding potential harm were also compared across the two studies. There was a difference between the two studies regarding importance of avoiding potential harm, $t(454) = 2.56, p = .01$. While participants in both studies thought that avoiding harm was important, those receiving the ant poison scenario ($M = 5.75, SD = 1.28$) rated it as more important than those receiving the carpet adhesive scenario ($M = 5.38, SD = 1.37$). However, importance of solving the problem did not differ across the studies; participants asked to imagine using with the ant poison ($M = 5.88, SD = 1.36$) and carpet adhesive ($M = 5.91, SD = 1.21$) thought that solving the problem presented in the scenario was important.

Given that the warning labels were the same for both studies, it appears that pre-label expectations regarding the product may have influenced the way that the warning information was processed. This interpretation is supported by the comparisons between the two studies. When compared to those asked to imagine using the carpet adhesive, those receiving the ant poison scenario rated the product as more dangerous and the potential harm as more severe prior to viewing the warning label information; they also rated the importance of avoiding harm as more important.

Another potential explanation for the differences observed between the two studies revolves around the qualitative differences between the two scenarios presented. The first scenario asked participants to imagine discovering ants in their home, while the second scenario asked participants to imagine damaging carpet while moving out of an apartment. Not only are the two situations different with respect to agency (the ant problem is more likely to be viewed as circumstance-caused, while the carpet problem is more likely to be viewed as self-caused), but they also differ in terms of consequences (while the consequence of not solving the ant problem is likely discomfort, not solving the carpet problem will likely result in the loss of money). The original intention was to present participants with scenarios that (a) were easy to relate to, (b) provided all participants with the same situation to imagine, and (c) created circumstances in which there was a high need for the product and only one available option. However, it is possible that the different scenarios affected how participants processed and responded to the warning label information.

CHAPTER VI

GENERAL DISCUSSION

Taken together, the findings of these three studies show that fear has a reliable effect on the behavioral intentions measured. First, an increase in fear lowers the likelihood that a product will be used. Interestingly, however, participants indicated that they were still likely to use the product (even when the decrease reported after viewing the warning label is considered). Second, an increase in fear motivates precautionary behavior. This finding is consistent with past research showing that fear can positively influence behavioral intentions associated with message acceptance (Witte & Allen, 2000). However, the results of these studies show stronger effects for fear on precautionary intent than those observed in the meta-analysis conducted by Witte and Allen. They reported an overall correlation of .13 between fear and behavioral intention, while the average correlation between fear and precautionary intent across these studies was .32.⁴⁰ These results demonstrate that the positive effect of fear found in the health communication literature also applies to the warnings literature.

In addition, the findings exemplify the motivational properties of fear outlined in the emotion literature. The main function of fear is motivating safety behavior (e.g., Izard, 1991; Reeve, 1992; Rogers & Deckner, 1975), and these findings show that

⁴⁰ This difference is likely due to the range of topics and types of behavioral intentions included in the meta-analysis.

precautionary intent is higher when more fear is experienced. This illustrates that the consideration of emotion in the warnings literature contributes to better understanding the factors that motivate precautionary behavior. While past research aimed at identifying the factors that influence compliance with safety measures has demonstrated that hazard perception is related to an increase in precautionary intent/behavior (e.g., Wogalter et al., 1987; Wogalter, et al., 1999), the potential effect of emotion has received little attention. It has been assumed that perceived threat results in fear (DeJoy, 199b). However, perceived hazard and fear arousal, while moderately correlated, are not equivalent concepts. These findings advocate the inclusion of emotion in the warnings literature surrounding motivation and suggest that future research invest in further examining the influence of emotion on precautionary intent.

The effect of emotion on the behavioral intentions with which manufacturers are concerned (e.g., likelihood of use and intent to purchase) should also be investigated further. Because purchase intentions were not measured in this study, it is unclear how elevated fear would affect this behavioral intention. In all of the scenarios presented in these studies, participants were asked to imagine that they had already purchased the product and were preparing to use it when they read the warning label. These findings suggest that when a person is already in possession of a product and intends to use it, activated fear causes the person to be less sure about product use (even though use is still likely) and results in an increase in precautionary intent. However, it is not known how fear that is evoked when reading the warning label before a product is purchased may

affect buying intentions. It is possible in this case that activated fear could result in the person choosing a different product to purchase; perhaps one that evokes less fear.

Although fear can positively influence precautionary intent, it is unclear how fear can be manipulated reliably. Application of the EPPM (Witte, 1992) did not produce the hierarchy of fear that was expected in Studies 2 and 3. In both studies there were conditions that clearly stood apart from the others. In Study 2 it was the high severity/high efficacy condition that reported the highest levels of fear, and in Study 3 it was the high severity conditions that reported higher levels of fear. Perhaps the hierarchy that was anticipated was not present because the situational scenario affected how the warning information was processed, which in turn influenced emotion. It would be interesting to see what response participants would have when exposed to the warning labels without the presence of a scenario (e.g., imagine you just purchased a product and discovered this warning label). Would fear responses be different? While it is possible that presentation of the warning label alone would have shown the expected hierarchy, the results of this study demonstrate the importance of the situation. And in reality, warning information cannot be divorced from its context.

There are several potential reasons why the fear manipulation was not consistent in these studies. First, it may be that excluding susceptibility (the other threat component) and self-efficacy (the other efficacy component) altered the effectiveness of the warning. While warnings can be considered fear appeals using Witte's (1994) definition, many of the fear appeal examples used in the health communication literature are tailored to specific populations. Warnings, on the other hand, are general and provide information

that is applicable to everyone that may use the product. For this reason, including the type of susceptibility and self-efficacy information that is found in other tests of the EPPM is difficult. For example, when Witte (1994) examined the effect of fear appeals created using the EPPM for an AIDS prevention message, susceptibility was manipulated by either discussing how AIDS is affecting Africa (low susceptibility) or how AIDS is affecting the college student population (high susceptibility). Given that warnings need to be general enough to apply to several populations that may be using the product, manipulation of these factors is more difficult.

Another possible reason for why the severity and efficacy manipulations did not reliably influence fear revolves around the response efficacy manipulation used in this study. While the efficacy manipulation proved effective in both studies, it appears that both the low and high efficacy conditions were considered efficacious by the participants. While response efficacy refers to the ability of the recommended actions to prevent the described threat, which was successfully varied in this study, mean ratings of response efficacy were fairly high for both the low ($M = 4.64, SD = 1.38$) and high ($M = 5.15, SD = 1.26$) efficacy conditions. This suggests “good” and “better” efficacy conditions, rather than low and high conditions. This may be why fear did not vary in the high severity conditions for Study 3; while the severity manipulation produced varying levels of fear as expected, there was no difference between the high severity/low efficacy and high severity/high efficacy conditions. Perhaps a general precautionary statement (e.g. use caution while using this product), rather than the “avoid” statements, would have had an effect on fear ratings.

The difference in findings for Studies 2 and 3 highlights another potential consideration in the manipulation of fear. Although the warning labels were the same in both studies, the manipulations had different effects in the two experiments. This suggests that warning label information may be processed differently depending on the particular product it is paired with and/or the situation giving rise to the need for the product. The comparison between Studies 2 and 3 showed that participants differed in their perceptions of dangerousness and severity of harm before exposure to the warning label information; in both cases, those receiving the ant poison scenario gave higher ratings. In this case, participants may have expected to encounter the high severity information on the ant poison warning labels, which would explain why the severity did not produce the expected effects. However, participants may not have expected such severe consequences for the carpet adhesive label, which could explain why the severity manipulation was effective when the warning labels were paired with the carpet adhesive. These results indicate that pre-existing expectations regarding the product may have affected how the warning label information was viewed. Vredenburgh and Zackowitz (2006) explain that expectations are comprised of beliefs and attitudes that can influence the way in which warning information is processed. In this case, the EPPM (Witte, 1992) may be too simplistic for application in the warnings literature.

General Discussion Regarding Additional Emotion Analyses

While fear was the main focus of Studies 2 and 3, the effects of the severity and efficacy manipulations on the other emotions were investigated. Whereas the results of

Study 2 indicated that specific emotions were affected by the severity and efficacy manipulations (e.g., fear, hope, surprise, and relief), Study 3 showed a strong effect for severity that influenced several of the negative emotions. This finding led to the calculation of a negative factor score for each participant, and results showed that the effects of severity and efficacy on factor scores mirrored the results obtained when each emotion was considered separately. This finding for Study 3 suggests that participants were not differentiating between the negative emotions; rather, it seems that participants were experiencing a general negative affect that they were trying to communicate through use of the emotion scales. When comparing negative factor scores among the different conditions, results showed that those in the high severity/low efficacy condition had higher negative factor scores when compared to those in the other three groups.

One possible explanation for the different effects of the manipulations on these other emotions revolves around the reasons given in the scenarios as to why the two products were needed by the participants. As mentioned previously, the situation giving rise to the use of the ant poison is likely to be considered either circumstance-caused or other-caused (given that the scenario describes the ants as already present when the participant moved in to the house). According to Roseman (2001), events appraised as circumstance- or other-caused can lead to any of the 12 emotions measured in Studies 2 and 3. These emotions were originally selected because it was thought that the potential harm associated with using the product would be considered by the participant to be either circumstance-caused (simply using the product might result in harm) or other-caused (the product is more dangerous than necessary which could result in harm).

The negative emotions that can occur when an event is appraised as self-caused (regret, guilt, and shame) were not measured because it was thought that these emotions would only occur *after* a product had been used and the harm experienced was caused by something the user either did or did not do (this is in contrast to the other emotions that may be experienced immediately upon reading the warning label). In hindsight, however, the circumstances that gave rise to use of the carpet adhesive are likely to be considered self-caused. And even though participants were asked to evaluate the potential harm associated with use of the product, it is possible that participants would consider the possibility of harm to be self-caused, (e.g., if I did not tear the carpet, I would not have to use a product that could result in harm). In this case, the general negative effect that is captured in Study 3 may be the result of not including the self-caused emotions. In other words, while the participants were able to imagine how they would be feeling after reading the scenario and warning information, they may have been unable to communicate the specific emotions they would experience in the situation because the appropriate scales were not included. This inability to indicate the emotion(s) that would be experienced may have been what caused participants to respond similarly to most of the negative emotions scales.

Limitations

These results are limited to situations in which people actually read warning label information. Given that much of the warnings literature focuses on attracting and maintaining attention and changing attitudes/beliefs about the importance of warning

information so that people are more likely to read them, it cannot be assumed that people will always attend to the information contained in warning labels. This means that even if warning labels can be manipulated to evoke fear, which increases the likelihood that people will engage in precautionary behavior, the labels will only be effective if they are read. Therefore, when warning labels are created for the purpose of arousing fear, consideration should also be given to increasing the probability that the warning will be noticed and attended to. One way to do this is to place warning information in a place where the user must interact with it in order to use the product (e.g., use of a trigger guard) (Dingus et al., 1993).

Given the sample characteristics, these results are limited to young adults. Research has shown that while older adults are more likely to read warning information, they believe warnings to be less important than younger adults (Hancock, Rogers, & Fisk, 2001). While the effectiveness of fear appeals has not been found to differ based on individual differences such as age and ethnicity (Witte & Allen, 2000), these findings should be replicated using different sample characteristics before the results are generalized. In addition, while the effects of fear may be similar for users with different characteristics, the manipulations used to evoke fear could affect various groups of people differently.

Another limitation revolves around the way that emotion was experienced in this study. The “experienced” emotion captured in this study resulted from participants imagining themselves in specific situations and reporting how they would feel. It is likely that the emotion reported was not as strong as it would be if the participant was actually

experiencing the situation. It is also possible that the emotions experienced while imagining the circumstances described are different from the emotions that would be experienced in the actual situation. This is another potential explanation for why the expected hierarchy of fear was not observed; it may be that there is a limit to the fear that can be experienced while imagining a situation.

As with emotion, another limitation concerns measuring behavioral intentions, rather than actual behaviors. While measures of behavior (e.g., whether the product is used, whether precautions are followed) are the best way to determine the effects of the different variables studied, experiments that directly measure behavior are small in number (Kalsher & Williams, 2006; Smith-Jackson & Wogalter, 2006; Wogalter & Dingus, 1999). This is because experiments using this methodology can be costly (in terms of time, effort, and money) and are often limited by ethical considerations (Smith-Jackson & Wogalter, 2006). In addition, it is difficult to observe behavioral compliance in the natural environments (e.g., homes) where many people use consumer products (Wogalter & Dingus, 1999). Although motivation is generally measured using subjective reports of behavioral intention (Smith-Jackson & Wogalter, 2006), intentions do not always result in behavior. And while “research has shown an association between intent to display certain behaviors and actual observed behavior” (Silver & Braun, 1999, p. 257), the results obtained using behavioral intention measures need to be interpreted with caution. As pointed out by Kalsher and Williams (2006):

The link between intentions and behavior is strong enough to support the inclusion of intentions studies in our review. However, based on the existing evidence, intentions are clearly an imperfect substitute for compliance because their prediction depends on a number of specific conditions being met (p. 325).

Directions for Future Research

Future research should focus on understanding the ways in which fear can be manipulated. Because fear positively influences precautionary intent, determining how to consistently evoke fear with warning label information is essential. Studies should be conducted to explore the effects of threat and efficacy on fear when all components of the EPPM (Witte, 1992) are included and manipulated in warning label messages. If these efforts are unable to reliably produce fear, research should focus on the creation of a new fear appeal model that is specific to warning label communications. This endeavor should include the exploration of variables that may influence the way that warning information is processed (e.g., existing product expectations and characteristics of the context) and the effect that these variables have on fear.

Future research could also focus on investigating the effects of other emotions on precautionary intent and likelihood of using the product. While fear has received the most attention and has been shown to have a positive effect, it may not be the *most* effective (Ruiter et al., 2003). Perhaps attempting to evoke other emotions by varying different factors would be more successful in persuading people to follow safety precautions. For example, Averill (1987) makes the following observation in his discussion of the role that emotion and psychological defense can play with respect to self-protective behavior:

It is sometimes easier to shame people into action than to frighten them into action; many people will do things out of affection for others that they would not do out of fear for themselves; and if their pride is at stake, some people may face almost any danger. Anger can be a particularly effective emotion in getting people to take corrective action against unwarranted or avoidable dangers. [. . .] Unfortunately, such emotions as shame, affection, pride and anger have been little investigated in the context of persuasion or preventive behavior. (p. 75)

While it is unclear how evoking some of these emotions would map to the construction of effective warning labels, an effort should nonetheless be exerted to determine what effects other emotions might have on behavioral intentions. For example, evoking shame or anger toward a particular product may result in the consumer refusing to use it, which would defeat the manufacturer's purpose. However, it is also possible that evoking positive emotions may increase the likelihood of using the product but decrease precautionary intent, which may result in more instances of harm.

Implications

These findings suggest that warnings may be more effective (in terms of compliance) if they evoke fear. However, manufacturers may worry that arousing fear will negatively affect consumer perceptions of their products and reduce sales. Although this research shows that participants are still likely to use the product after reading the warning label, it is not known how an increase in fear would influence purchase intentions. As mentioned previously, the research in this area has produced conflicting results (e.g., Laughery et al., 1993; Silver et al., 1991). Manufacturers should not assume that providing information that evokes fear will negatively affect sales. Rather, additional research should be conducted to determine how fear influences this behavior/intention. It is quite possible that fear-evoking labels may communicate other product characteristics (e.g., effectiveness of the product) that would be considered beneficial from a manufacturer perspective.

Currently, manufacturers are required to adequately inform people about the “nature and extent of the danger” (Madden, 2006, p. 587) associated with their products, as well as outline the ways in which the danger can be avoided. One may use the findings of these studies to advocate that a different adequacy standard be adopted (e.g., requiring that labels evoke an emotional response; in this case, warnings that do not evoke emotion would be considered insufficient). However, a standard of this type has the potential to be problematic for several reasons.

First, while fear is associated with an increase in precautionary intent, the effect of fear is not yet fully understood. It is quite likely that the fear experienced in real life situations would exceed the fear reported by the participants in these studies, and it is possible that higher levels of fear may affect behaviors/intentions differently. Second, this research shows that people process and respond to warning information differently depending on the situation and/or expectations about the product, so it is not clear how fear can be manipulated reliably. This would make evaluating and/or enforcing a standard of this type extremely difficult because different rules would apply for different products. Third, warnings serve different purposes. In many cases, a warning simply serves to inform people (e.g., listing the possible side effects of a medication). In these instances, requiring that a warning evoke fear (or some other emotion) may make the product appear more dangerous than it actually is; requiring that all warnings arouse fear could lead to a higher likelihood that people dismiss all of the warning information on a label because the warning is not believable. Although the current findings provide several

possible directions for future research, they are too preliminary to suggest a new standard be implemented to evaluate warning adequacy.

Given the positive effects of fear on precautionary intent, the arousal of fear should not be something that manufacturers actively try to avoid. Intentionally minimizing the potential harm associated with a product so as not to arouse fear is unethical and may increase the likelihood of harm. While it is understandable that manufacturers are motivated to sell their products, they should not compromise the safety of the consumer to do so.

Conclusions

As a whole, the results obtained from the three studies presented in this dissertation demonstrate that fear has a reliable effect on behavioral intentions. While fear lowers the likelihood that a product will be used, it also increases the likelihood that people will take precautionary measures. While an attempt was made to manipulate fear by varying the severity and efficacy information contained in the warning labels, the manipulations used in these studies did not affect fear as predicted. Because fear motivates precautionary behavior, understanding how to evoke fear reliably has important applications. Future research in this area should focus on identifying the factors that influence the fear experienced when confronted with warning information.

APPENDIX A
STUDY 1 MATERIALS

Situational Scenarios

Ant Poison

Imagine that you have just moved into a house that you are renting. One morning you notice a trail of ants running along your kitchen counter. You take a closer look and notice that they are not only on your counter, but they have forged a trail down the side of your counter and along the kitchen floor. These ants make you extremely uncomfortable, and you want to remedy the problem as soon as possible. You go to the nearest grocery store and buy the only product they have for killing ants.

Now, please take a moment to imagine yourself in this situation. Envision how you would feel and what you would be thinking. Once you have the entire scene firmly in mind, please proceed with the study.

Eraser

Imagine that you are taking an introductory drawing class. You are up late one evening working on a drawing project that is due the next morning at 8am. As you are drawing, you realize that you need an eraser. You go the nearest store and buy the only package of hand held erasers that they have.

Now, please take a moment to imagine yourself in this situation. Envision how you would feel and what you would be thinking. Once you have the entire scene firmly in mind, please proceed with the study.

General Adhesive

Imagine that you have decided to sell your car. After receiving a call from a potential buyer, you set up an appointment to have the car viewed in an hour. As you go through your car to clean out your belongings, you notice that part of the carpet has separated from the floor. It is important to you that this be fixed, so you go to the nearest store and buy the only type of general adhesive they have (the general adhesive can be used to bond fabric, carpet and other lightweight materials).

Now, please take a moment to imagine yourself in this situation. Envision how you would feel and what you would be thinking. Once you have the entire scene firmly in mind, please proceed with the study.

Multi-Purpose Glue

Imagine that you have decided to sell your car. After receiving a call from a potential buyer, you set up an appointment to have the car viewed in an hour. As you go through your car to clean out your belongings, you notice that part of the interior door trim has separated from the door frame. It is important to you that this be fixed, so you go to the nearest store and buy the only type of multi-purpose glue they have.

Now, please take a moment to imagine yourself in this situation. Envision how you would feel and what you would be thinking. Once you have the entire scene firmly in mind, please proceed with the study.

Pain Reliever 1

Imagine that you have just arrived to campus. As you head to class to take a midterm exam, you realize that you are developing a painful headache. You are worried that this headache will affect your performance on the test, so you decide to stop at the campus store on your way to class to purchase a pain reliever. You buy the only pain reliever the store has in stock.

Now, please take a moment to imagine yourself in this situation. Envision how you would feel and what you would be thinking. Once you have the entire scene firmly in mind, please proceed with the study.

Pain Reliever 2

Imagine that you have just arrived to campus. As you head to class to take a midterm exam, you realize that you are developing a painful headache. You are worried that this headache will affect your performance on the test, so you decide to stop at the campus store on your way to class to purchase a pain reliever. You buy the only pain reliever the store has in stock.

Now, please take a moment to imagine yourself in this situation. Envision how you would feel and what you would be thinking. Once you have the entire scene firmly in mind, please proceed with the study.

Allergy Medicine

Imagine that you have just arrived to campus. As you head to class to take a midterm exam, you realize that you have forgotten to take your allergy medication. You are worried that your allergy symptoms will affect your performance on the test, so you decide to stop at the campus store on your way to class to purchase an allergy medication. You buy the only allergy medicine that the store has in stock.

Now, please take a moment to imagine yourself in this situation. Envision how you would feel and what you would be thinking. Once you have the entire scene firmly in mind, please proceed with the study.

Upset Stomach Reliever

Imagine that you have just arrived to campus. As you head to class to take a midterm exam, you realize that you are developing a stomach ache. You are worried that this stomach ache will affect your performance on the test, so you decide to stop at the campus store on your way to class to purchase an upset stomach reliever. You buy the only upset stomach reliever the store has in stock.

Now, please take a moment to imagine yourself in this situation. Envision how you would feel and what you would be thinking. Once you have the entire scene firmly in mind, please proceed with the study.

Carpet Stain Remover

Imagine that you are getting ready to move out of your apartment. You paid a \$150 refundable cleaning deposit, so if the apartment does *not* need to be cleaned by the landlord after you leave, you will receive your deposit in full. You are ready to lock up and leave after cleaning the entire apartment, when you see a few spots on the carpet that need to be cleaned. You do not want to forfeit any part of your deposit, so you go to the nearest store and buy the only carpet stain remover they have in stock.

Now, please take a moment to imagine yourself in this situation. Envision how you would feel and what you would be thinking. Once you have the entire scene firmly in mind, please proceed with the study.

Bathtub Cleaner

Imagine that you are getting ready to move out of your apartment. You paid a \$150 refundable cleaning deposit, so if the apartment does *not* need to be cleaned by the landlord after you leave, you will receive your deposit in full. You are ready to lock up and leave after cleaning the entire apartment, when you realize that you have forgotten to clean the bathtub. You do not want to forfeit any part of your deposit, so you go to the nearest store and buy the only bathroom cleaner they have in stock.

Now, please take a moment to imagine yourself in this situation. Envision how you would feel and what you would be thinking. Once you have the entire scene firmly in mind, please proceed with the study.

Toilet Bowl Cleaner

Imagine that you are getting ready to move out of your apartment. You paid a \$150 refundable cleaning deposit, so if the apartment does *not* need to be cleaned by the landlord after you leave, you will receive your deposit in full. You are ready to lock up

and leave after cleaning the entire apartment, when you realize that you have forgotten to clean the toilet. You do not want to forfeit any part of your deposit, so you go to the nearest store and buy the only toilet bowl cleaner they have in stock.

Now, please take a moment to imagine yourself in this situation. Envision how you would feel and what you would be thinking. Once you have the entire scene firmly in mind, please proceed with the study.

Oven Cleaner

Imagine that you are getting ready to move out of your apartment. You paid a \$150 refundable cleaning deposit for the oven (separate from the general cleaning deposit), so if the oven does *not* need to be cleaned by the landlord after you leave, you will receive your deposit in full. You are ready to lock up and leave after cleaning the entire apartment, when you realize that you have forgotten to clean the oven. You do not want to forfeit your deposit on the oven, so you go to the nearest store and buy the only oven cleaner they have in stock.

Now, please take a moment to imagine yourself in this situation. Envision how you would feel and what you would be thinking. Once you have the entire scene firmly in mind, please proceed with the study.

Product Warning Labels

Ant Poison

When you turn the can around to read the directions, you encounter the following warning label:

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS:

CAUTION: Harmful if swallowed or absorbed through skin. Avoid breathing mist. Avoid contact with skin or clothing. Wash thoroughly with soap and water after handling. Provide adequate ventilation of area being treated. Do not apply to humans, pets, plants or contaminate feed, foodstuffs, dishes or utensils. Cover and avoid spraying fish aquariums. Cover or remove exposed food, dishes, utensils and food handling equipment. Keep out of reach of children.

FIRST AID:

Have the product container or label with you when calling a poison control center or doctor, or going for treatment advice. **IF ON SKIN OR CLOTHING:** Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice. **IF IN EYES:** Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if

present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice. **IF INHALED:** Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice. **IF SWALLOWED:** Immediately call a poison control center or doctor. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give any liquid to the person. Do not give anything by mouth to an unconscious person.

PHYSICAL OR CHEMICAL HAZARDS:

FLAMMABLE. CONTENTS UNDER PRESSURE.

Keep away from heat, sparks, open flame or pilot lights. Do not puncture or incinerate container. Exposure to temperature above 130° F may cause bursting.

Eraser

While opening the package, you encounter the following warning label:

WARNING: This product contains chemicals known to the state of California to cause cancer, birth defects, and/or reproductive harm.

General Trim Adhesive

When you turn the can around to read the directions, you encounter the following warning label:

May affect the brain or nervous system causing dizziness, headache or nausea. **REDUCES THE BLOOD'S OXYGEN CARRYING CAPACITY.** Causes nose and throat irritation. Do not puncture or incinerate (burn) container. Exposure to heat or prolonged exposure to the sun may cause bursting. Do not expose to heat or store at temperatures above 120 degrees F (49 degrees C).

Notice: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.

Vapors may ignite explosively. Keep away from heat, sparks and flame. Contact with flame or hot surface may produce toxic/corrosive gasses. Do not smoke. Extinguish all flames and pilot lights and turn off stoves, heaters, electric motors and other sources of ignition during use and until all vapors are gone.

Use only with adequate ventilation. Use this product outdoors, if possible. If you must use it indoors, open all windows and doors or use other means to ensure fresh air movement during application and drying. If workplace exposure levels cannot be

controlled to below established OSHA exposure limits (29CFR 1910.1000), then appropriate respiratory protection must be provided. Obtain professional advice before using respiratory protection. A dust mask does not provide protection against vapors. Do not use in basement or unventilated area. Do not breathe dust, vapors or spray mist. Avoid contact with eyes, skin and clothing.

First Aid: If swallowed, do not induce vomiting. Get medical attention immediately. If you experience difficulty in breathing, leave the area to obtain fresh air. If continued difficulty is experienced, get medical attention immediately. In case of eye contact, flush immediately with plenty of water for at least 15 minutes and get medical attention; for skin, wash thoroughly with soap and water.

KEEP OUT OF REACH OF CHILDREN

WARNING: This product is not saleable in the State of California.

VOC Content: 4.62 lbs/gal or 554.16 g/l

In case of spill or medical emergency call Chemtrec 800-424-9300

Multi-Purpose Glue

When you turn the bottle around to read the directions, you encounter the following warning label:

FIRST AID: Eye Contact: flush thoroughly with water for at least 15 minutes and SEEK IMMEDIATE MEDICAL ATTENTION. Skin Contact: wash affected areas with soap and water. If inhalation causes physical discomfort, remove to fresh air. If breathing difficulty occurs or product is swallowed SEEK IMMEDIATE MEDICAL ATTENTION.

WARNING: Keep out of reach of children and animals. Harmful or fatal if swallowed. Do not microwave or heat.

Individuals with chronic asthmatic conditions should consult physician prior to using product.

Prevent contact with skin and eyes. May cause gastrointestinal blockage if swallowed. For medical emergencies only, call 800-420-7186.

Pain Reliever 1

When you turn the bottle around to read about dosage information, you encounter the following warning label:

Warnings

Allergy alert: Ibuprofen may cause a severe allergic reaction, especially in people allergic to aspirin. Symptoms may include:

- Hives
- Facial swelling
- Asthma (wheezing)
- Shock
- Skin Reddening
- Rash
- Blisters

If an allergic reaction occurs, stop use and seek medical help right away.

Stomach bleeding warning: This product contains a nonsteroidal anti-inflammatory drug (NSAID), which may cause stomach bleeding. The chance is higher if you:

- Are age 60 or older
- Have had stomach ulcers or bleeding problems
- Take a blood thinning (anticoagulant) or steroid drug
- Take other drugs containing an NSAID (aspirin, ibuprofen, naproxen or others)
- Have 3 or more alcoholic drinks every day while using this product
- Take more or for a longer time than directed

Pain Reliever 2

When you turn the bottle around to read about dosage information, you encounter the following warning label:

Warnings

Reye's syndrome: Children and teenagers should not use this medicine for chicken pox or flu symptoms before a doctor is consulted about Reye's syndrome, a rare but serious illness reported to be associated with aspirin.

Allergy alert: Aspirin may cause a severe allergic reaction which may include:

- hives
- facial swelling
- asthma (wheezing)
- shock

Do not use if you have ever had an allergic reaction to any other pain reliever/fever reducer

Stop use and ask a doctor if an allergic reaction occurs. Seek medical help right away.

Alcohol warning: If you consume 3 or more alcoholic drinks every day, ask your doctor whether you should take aspirin or other pain relievers/fever reducers. Aspirin may cause stomach bleeding.

Ask a doctor before use if you have asthma, ulcers, bleeding problems, or stomach problems that persist or recur, such as heartburn, stomach upset or stomach pain.

Ask a doctor or pharmacist before use if you are taking a prescription drug for anticoagulation (blood thinning), diabetes, gout, or arthritis.

Stop use and ask a doctor if pain gets worse or lasts more than 10 days, ringing in the ears or loss of hearing occurs, redness or swelling is present in the painful area, or any new symptoms occur.

If pregnant or breast-feeding, ask a health professional before use. It is especially important not to use aspirin during the last 3 months of pregnancy unless definitely directed to do so by a doctor because it may cause problems in the unborn child or complications during delivery

Keep out of reach of children. In case of overdose, get medical help or contact a Poison Control Center right away.

Allergy Medication

When you turn the box around to read about dosage information, you encounter the following warning label:

Warnings

Alcohol warning: If you consume 3 or more alcoholic drinks every day, ask your doctor whether you should take acetaminophen or other pain relievers/fever reducers. Acetaminophen may cause liver damage.

Do not use

- with any other product containing any of these active ingredients
- if you are now taking a prescription monoamine oxidase inhibitor (MAOI) (certain drugs for depression, psychiatric or emotional conditions, or Parkinson's disease), or for 2 weeks after stopping the MAOI drug. If you do not know if your prescription drug contains an MAOI, ask a doctor or pharmacist before taking this product.

Ask a doctor before use if you have

- heart disease
- high blood pressure
- glaucoma
- diabetes
- thyroid disease
- trouble urinating due to an enlarged prostate gland
- a breathing problem such as emphysema or chronic bronchitis

Ask a doctor before use if you are taking tranquilizers or sedatives

When using this product

- **do not exceed recommended dosage**
- drowsiness may occur
- avoid alcoholic drinks
- alcohol, sedatives, and tranquilizers may increase drowsiness
- be careful when driving a motor vehicle or operating machinery
- excitability may occur, especially in children

Stop use and ask doctor if

- new symptoms occur
- you get nervous, dizzy, or sleepless

- redness or swelling is present
- fever gets worse or lasts for more than 3 days
- pain or nasal congestion gets worse or lasts for more than 7 days

If pregnant or breast-feeding, ask a health professional before use.

Keep out of the reach of children.

Overdose warning: Taking more than the recommended dose (overdose) may cause liver damage. In case of overdose, get medical help or contact a Poison Control Center right away. Quick medical attention is critical for adults as well as for children even if you do not notice any signs or symptoms.

Upset Stomach Reliever

When you turn the box around to read about dosage information, you encounter the following warning label:

Warnings

Reye's syndrome: Children and teenagers who have or are recovering from chicken pox or flu-like symptoms should not use this product. When using this product, if changes in behavior with nausea or vomiting occur, consult a doctor because these symptoms could be an early sign of Reye's syndrome, a rare but serious illness.

Allergy alert: Contains salicylate. Do not take if you are

- allergic to salicylates (including aspirin)
- taking other salicylate products

Do not use if you have

- bloody or black stool
- an ulcer
- a bleeding problem

Ask a doctor before use if you have

- fever
- mucus in the stool

Ask a doctor or pharmacist before use if you are taking any drug for

- anticoagulation (thinning the blood)
- diabetes
- gout
- arthritis

When using this product a temporary, but harmless, darkening of the stool and/or tongue may occur

Stop use and ask a doctor if

- symptoms get worse
- ringing in the ears or loss of hearing occurs
- diarrhea lasts more than 2 days

If pregnant or breast-feeding, ask a health professional before use.

Keep out of reach of children. In case of overdoses, get medical help or contact a Poison Control Center right away.

Carpet Stain Remover

When you turn the bottle around to read the directions, you encounter the following warning label:

CAUTION! May cause eye, skin, nose and throat irritation and may affect the central nervous system, causing dizziness, headache or nausea. May cause temporary lightening of the skin. To protect sensitive skin, use of gloves is advised.

CONTAINS: Water, 2-butoxyethanol, hydrogen peroxide and surfactants.

PRECAUTIONS: Use only with adequate ventilation. Avoid eye and prolonged skin contact. Avoid breathing of vapors, mist or spray. Wash thoroughly after handling. Close container after each use.

STORAGE: Keep from freezing. Do not store above 120° F.

KEEP OUT OF REACH OF CHILDREN.

SUGGESTED FIRST AID:

Eye Contact: Flush eyes with large amounts of water. If signs/symptoms persist, get medical attention.

Skin Contact: Wash affected area with soap and water. If signs/symptoms persist, get medical attention.

Inhalation: Remove person to fresh air. If signs/symptoms persist, get medical attentions.

If Swallowed: Do not induce vomiting. Give victim two glasses of water. Never give anything by mouth to unconscious person. Get medical attention.

Bathroom Cleaner

When you turn the bottle around to read the directions, you encounter the following warning label:

KEEP OUT OF REACH OF CHILDREN

DANGER: CORROSIVE. HARMFUL IF SWALLOWED. Causes eye and skin damage. **DO NOT** get in eyes, on skin or on clothing. **DO NOT** ingest. **DO NOT** breathe vapor or mist. **DO NOT** mix with bleach or other household chemicals as harmful fumes may result. Handle with care, wear rubber gloves and eye protection. Use in well-ventilated areas. **DO NOT** spray towards face. Contains sulfamic acid and alcohol ethoxylate.

FIRST AID: **If in eyes**, IMMEDIATELY rinse eyes thoroughly with water. Remove any contact lenses and continue rinsing eyes or at least 15 minutes. Get IMMEDIATE medical attention. **If on skin**, IMMEDIATELY wash with soap and water. Get IMMEDIATE medical attention. **If swallowed**, rinse mouth and drink a glass of water. Call a Physician or Poison Control Center.

Toilet Bowl Cleaner

When you turn the bottle around to read the directions, you encounter the following warning label:

PRECAUTIONARY STATEMENTS: HAZARDS TO HUMANS AND DOMESTIC ANIMALS.

WARNING: Causes substantial but temporary eye injury. Do not get in eyes, on skin or clothing. Wear protective eyewear, such as goggles, face shield or safety glasses. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum or using tobacco. Remove and wash contaminated clothing before reuse.

FIRST AID:

IF IN EYES – Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing.

IF ON SKIN – Take off contaminate clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice. Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

PHYSICAL AND CHEMICAL HAZARDS – DO NOT USE OR MIX WITH PRODUCTS THAT CONTAIN BLEACH (SODIUM HYPOCHLORITE). To do so may release hazardous gases. Always flush toilet before and after use of this product.

STORAGE AND DISPOSAL – Store in location inaccessible to children (and pets). Tightly close top between uses. Do not reuse empty container. Discard in trash or offer recycling. If recycling is not available, discard container in trash. Not harmful to septic systems.

Oven Cleaner

When you turn the can around to read the directions, you encounter the following warning label:

PRECAUTIONS: Recommended for use ONLY on porcelain enamel, iron, stainless steel, ceramic and glass surfaces. Avoid excessive use on glass. Do not use on exterior oven surfaces, aluminum, chrome, baked enamel. Do not use on self-cleaning or continuous cleaning ovens. Avoid spraying oven pilot light. Keep off all electrical connections such as heating element, thermostat, bulb receptacles, light switch. Do not

puncture or incinerate container, expose to heat or store at temperatures above 120° F. Never leave can on stove or near source of heat. Avoid freezing.

KEEP OUT OF REACH OF CHILDREN

DANGER: Contains sodium hydroxide (**LYE**).

WILL BURN SKIN AND EYES. Avoid contact with skin, eyes, mucous membranes and clothing.

HARMFUL IF SWALLOWED. Do not ingest. **AVOID BREATHING SPRAY MIST.**

WEAR LONG RUBBER GLOVES WHEN USING.

FIRST AID: SKIN – rinse immediately and remove contaminated clothing, wash thoroughly with soap and water and continue flushing with water for at least 10 minutes. If discomfort persists, call a physician immediately. **EYES** – rinse immediately, remove any contact lenses and continue flushing with water for at least 15 minutes. If discomfort persists, call a physician immediately.

IF SWALLOWED DO NOT INDUCE VOMITING – rinse mouth thoroughly with water, drink water or milk. Call a physician immediately.

APPENDIX B
STUDY 2 MATERIALS

Situational Scenario

Ant Poison

Imagine that you have just moved into a house that you are renting. One morning you notice a trail of ants running along your kitchen counter. You take a closer look and notice that they are not only on your counter, but they have forged a trail down the side of your counter and along the kitchen floor. These ants make you extremely uncomfortable, and you want to remedy the problem as soon as possible. You go to the nearest grocery store and buy the only product they have for killing ants.

Now, please take a moment to imagine yourself in this situation. Envision how you would feel and what you would be thinking. Once you have the entire scene firmly in mind, please proceed with the study.

Created Warning Labels

When you turn the can around to read the directions, you encounter the following warning label:

Low Severity/ Low Efficacy

THIS PRODUCT MAY BE HAZARDOUS TO HUMANS AND DOMESTIC ANIMALS. KEEP OUT OF THE REACH OF CHILDREN.

WARNING:

- Use of this product may cause slight eye, skin, nose, and/or throat irritation.
- Use of this product may cause temporary dizziness, headache or nausea.
- This product may cause harm if swallowed.
- If exposed to heat, the container may burst.
- If exposed to heat, the vapors may ignite.

SAFETY PRECAUTIONS:

- Avoid contact with eyes.
- Avoid contact with skin.
- Avoid breathing product vapors, mist or spray.
- Avoid contact with food and other household items.
- Avoid exposing product to flames, heat sources, and high temperatures.

Low Severity/High Efficacy

THIS PRODUCT **MAY BE HAZARDOUS** TO HUMANS AND DOMESTIC ANIMALS. **KEEP OUT OF THE REACH OF CHILDREN.**

WARNING:

- Use of this product may cause slight eye, skin, nose, and/or throat irritation.
- Use of this product may cause temporary dizziness, headache or nausea.
- This product may cause harm if swallowed.
- If exposed to heat, the container may burst.
- If exposed to heat, the vapors may ignite.

SAFETY PRECAUTIONS:

- Wear protective eyewear, such as goggles, a face shield or safety glasses.
- Wear long rubber gloves.
- Be sure area is well ventilated—open all windows and doors or use other means to ensure fresh air movement during application and drying—and spray away from face.
- Cover or remove exposed food, dishes, utensils and food handling equipment before use.
- Do not smoke while using product; extinguish all flames and pilot lights, and turn off stoves, heaters, electric motors and other sources of ignition during use and until all vapors are gone; do not expose to temperatures above 130° F.

High Severity/Low Efficacy

THIS PRODUCT **IS HAZARDOUS** TO HUMANS AND DOMESTIC ANIMALS. **KEEP OUT OF THE REACH OF CHILDREN.**

WARNING:

- Use of this product may cause severe eye, skin, nose, and/or throat irritation.
- Use of this product may cause severe dizziness, headache or nausea.
- This product may cause serious harm if swallowed.
- If exposed to heat, the container may explode and cause serious injury.
- If exposed to heat, the vapors may catch fire and cause serious burns.

SAFETY PRECAUTIONS:

- Avoid contact with eyes.
- Avoid contact with skin.
- Avoid breathing product vapors, mist or spray.
- Avoid contact with food and other household items.
- Avoid exposing product to flames, heat sources, and high temperatures.

High Severity/High Efficacy

**THIS PRODUCT IS HAZARDOUS TO HUMANS AND DOMESTIC ANIMALS.
KEEP OUT OF THE REACH OF CHILDREN.**

WARNING:

- Use of this product may cause severe eye, skin, nose, and/or throat irritation.
- Use of this product may cause severe dizziness, headache or nausea.
- This product may cause serious harm if swallowed.
- If exposed to heat, the container may explode and cause serious injury.
- If exposed to heat, the vapors may catch fire and cause serious burns.

SAFETY PRECAUTIONS:

- Wear protective eyewear, such as goggles, a face shield or safety glasses.
- Wear long rubber gloves.
- Be sure area is well ventilated—open all windows and doors or use other means to ensure fresh air movement during application and drying—and spray away from face.
- Cover or remove exposed food, dishes, utensils and food handling equipment before use.
- Do not smoke while using product; extinguish all flames and pilot lights, and turn off stoves, heaters, electric motors and other sources of ignition during use and until all vapors are gone; do not expose to temperatures above 130° F.

APPENDIX C
STUDY 3 MATERIALS

Situational Scenario

Imagine that you are getting ready to move out of your apartment. Before moving in, you paid a \$500 refundable security deposit in addition to the standard nonrefundable cleaning deposit. If there is no damage to the apartment when you move out, you will receive your refundable deposit in full. While moving your things, one of the legs of your dresser catches on the carpet, and the carpet separates from the floor. It is important to you that this be fixed so that you receive your entire security deposit. You go to the nearest home improvement store and buy the only can of carpet adhesive that is in stock.

Now, please take a moment to imagine yourself in this situation. Envision how you would feel and what you would be thinking. Once you have the entire scene firmly in mind, please proceed with the study.

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