Two Essays On The Effects Of Emphasizing Social Consequences In Warning Messages

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Two Essays on the Effects of Emphasizing Social Consequences in Warning Messages

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ABSTRACT

This dissertation examines the effects of warning messages that emphasize the social consequences of negative health outcomes and demonstrates that highlighting social (versus health) consequences leads to greater perceived temporal proximity of the outcome, increased perceived vulnerability to the outcome, and less favorable consumption experiences. Oftentimes health messages are ineffective at altering risk perceptions and eliciting long-term behavior change because the health consequence seems very distant and unlikely to happen (e.g. mouth cancer from smoking). However, when a negative health outcome is seen through a social lens (e.g. mouth cancer makes a person unattractive) versus a health lens (e.g. mouth cancer weakens the immune system) the health outcome (e.g. mouth cancer) appears closer in time and individuals feel more vulnerable to it.

Across two essays I investigate how social consequences influence perceptions of risk (essay 1) and delayed consumption experiences (essay 2). In the first essay, I document that when social consequences are emphasized individuals see the health outcome as more temporally proximate and feel more vulnerable to the outcome. In the second essay, I demonstrate that warning messages that emphasize social consequences can alter the enjoyment and favorability of the targeted health behavior. These findings suggest that the use of social consequences may have long term, subtle effects on consumer experiences, thereby increasing the likelihood of compliance with the message.
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INTRODUCTION

Given that many widespread health epidemics (e.g. obesity, diabetes) are preventable, the federal government, state health agencies, and private corporations have spent billions of dollars on warning messages that are meant to inform individuals of the risks of their behaviors and persuade them to engage in healthier behaviors. Unfortunately, individuals often do not feel susceptible to long-term health outcomes and delay changing their behavior (e.g. “I’ll start my diet on Monday”, “I’ll quit smoking next year”) because the risks associated with a negative behavior seem very far away. In this dissertation I look at how highlighting the social consequences (e.g. disfigurement, social isolation) of negative health outcomes (e.g. skin cancer, obesity) that are typically displayed in warning messages can influence perceptions of risk of the negative health outcome. More specifically, I look at how the addition of social consequences to a warning message increases the perceived temporal proximity of the negative health outcome and perceived vulnerability to the negative health outcome.

The first essay focuses on documenting how highlighting social consequence in warning messages influences perceptions of temporal distance and vulnerability. Rather than compare social and health consequences directly as has been done in past research, I use the same health outcome (e.g. gingivitis) in both experimental conditions and compare the social consequences (e.g. bad breath) and the health consequences (e.g.
weakened immune system) of this negative health outcome. I find that when social (vs. health) consequences are used, respondents report the negative health outcome (e.g. gingivitis) as being more temporally proximate and more likely to occur. I also find two moderators to this effect: current health status and the time frame used in the warning labels. The second essay examines how the addition of social consequences to warning labels can influence perceptions of experiences. Because the link between intentions and behavior can be weak, this research seeks to identify an alternate route to influence long-term behavior change. Specifically, I investigate how the consequence type (social vs. health) highlighted in a warning messages influence perceptions of experiences (e.g. texting while driving) and perceptions of products (e.g. sunscreen). I find that individuals who view warning labels that highlight social consequences, have less favorable consumption experiences with related behaviors/products.

In summary, essay 1 explores how consideration of the social consequences of negative health outcomes influences risk perceptions while essay 2 investigates how consideration of the social consequences of negative health outcomes can influence perceptions of experience.
CHAPTER 1: THE STING OF SOCIAL: HOW EMPHASIZING SOCIAL CONSEQUENCES IN
HEALTH MESSAGES INFLUENCES PERCEPTIONS OF RISK
ABSTRACT

This research examines the effects of warning messages that emphasize the social consequences of negative health outcomes and demonstrates that when social (versus health) consequences are highlighted it leads to greater perceived temporal proximity of and increased perceived vulnerability to the outcome, thereby affecting risk perceptions and behavioral intentions. This effect is documented across four studies in different health domains including flossing (study 1), soda consumption (study 2), smoking (study 3) and unprotected UV exposure (study 4). These findings point to the important role of the consequence type highlighted in warning messages, which can have a significant impact on risk perceptions. Public policy and marketing implications are discussed.

Keywords: health, temporal distance, perceived vulnerability, perceived severity, warning messages, consumer experiences

INTRODUCTION

"The science is conclusive: by taking a few simple steps in our personal lives we can greatly improve our health and our nation's health, both today and in the future." ~ Richard H. Carmona, Surgeon General, U.S. Public Health Service (2004).

With costly epidemics such as obesity and drug use sweeping the nation, government agencies and public policy officials are employing a variety of marketing campaigns to influence consumer risk perceptions, attitudes, and behaviors. One of the tools frequently used in such campaigns is graphic warning messages (e.g. “Tips from Former Smokers” ad campaign from the CDC, Painter 2014). Graphic warnings usually
contain vivid images and descriptions of the health outcomes of undertaking the target behavior. For example, cigarette packages sometimes include vivid pictures of diseased lungs to visually emphasize that lung cancer is a health outcome from smoking (Andrews, Netemeyer, Kees, and Burton 2014). While such warning messages can help many consumers make healthier choices, they can also backfire if not implemented correctly. For example, the billion dollars spent on the National Youth Anti-Drug Media Campaign appeared to have no effect among certain populations and in some cases caused a boomerang effect where more ad exposure predicted less intention to avoid marijuana use (Hornik et al. 2008). One of the reasons for this mixed effectiveness of warning messages is that the health outcomes typically emphasized in such messages are perceived as so distant in the future that they fail to influence current risk perceptions (Smith and Stutts 2003). For example, while smokers acknowledge that smoking causes lung cancer, it is possible that cancer is seen as likely to occur after several decades, which lessens the urgency to change current smoking behavior. Thus the temporal distance between the behavior and the health outcome reduces consumers’ motivation to change their current behavior since the distance may make the health outcome appear less likely (Chandran and Menon 2004) or lead consumers to believe that they have adequate time in the future to change their behavior and thereby avoid the outcome.

Therefore, reducing the perceived temporal distance between the target behavior and its negative health outcome ought to increase the perceived riskiness of the behavior by increasing its likelihood of occurrence, thereby creating pressure on consumers to comply with the warning message and alter their current behavior. In this context, I suggest a simple but highly effective message strategy – the addition of social
consequences of the focal health outcome. I suggest that because social consequences (e.g. bad breath) of a negative health outcome (e.g. mouth cancer) will be viewed as more commonplace and immediate than health consequences (e.g. mouth sores), they will make health outcomes appear closer in time. This increased proximity will make these outcomes appear more likely to occur (i.e. increases vulnerability to the outcome), thus enhancing message effectiveness. This prediction is rather counterintuitive since health consequences (e.g. mouth sores) are likely to be viewed as more severe than social consequences (e.g. bad breath). Thus, despite the greater severity of the health consequences (Pechmann and Reibling 2006), I predict that the increased proximity of the social consequences will render messages that highlight social consequences of health outcomes more effective at increasing risk perceptions than messages that focus only on health outcomes and subsequent health consequences.

I find support for my predictions across four studies wherein pairing social consequences with health outcomes increases the perceived temporal proximity of the health outcome, and thereby increases its likelihood of occurrence. In study 1, I demonstrate that when a negative health outcome (i.e. gingivitis) is paired with a social (vs. health) consequence, participants perceive it as closer in time and feel more vulnerable to the health outcome. In study 2, I replicate my findings from study 1 in a different domain (i.e. excessive soda consumption leading to obesity) and find that my effect is moderated by current health status such that the advantages of social consequences are attenuated among individuals who are already highly vulnerable to the health effects of excessive soda consumption. In study 3, I examine the independent effects of outcomes versus consequences of outcomes and find that the sequence of
addition matters such that adding social consequences to health outcomes is more effective than adding health consequences to social outcomes. In other words, not just any combination of social and health themes is effective. Finally, in study 4, I use UV protection as my target behavior and find that the effects of adding social consequences are similar to the effects of temporal framing.

My research contributes to the literatures on risk perceptions (Menon, Raghubir, Agrawal 2006), temporal perceptions (Kees 2010) and consumer experiences (Hoch and Ha 1986) in several ways. First, by documenting the significant effects of social consequences on temporal proximity and risk perceptions, I reconcile the inconsistent findings with respect to the relative efficacy of health versus social appeals in warning message and thus answer the call for greater research in this area (Keller and Lehmann 2008; Hoek, Hoek-Sims, and Gendall 2013). While previous research has largely focused on the relative effectiveness of using different types of outcomes (health, social) in warning messages with limited comparison of subsequent consequences as influencers of risk perceptions, attitudes and behavioral intentions, I focus on the combined effects of outcomes with consequences on these downstream variables of interest. I also contribute to the literature on risk perceptions by documenting unique interactive effects of severity and vulnerability on message compliance. My finding that increasing severity when vulnerability is high (adding health consequences to social outcomes) does not enhance compliance as much as increasing vulnerability when severity is high (adding social consequences to health outcomes) suggests that specific combinations of severity and vulnerability may be important to consider.
Second, I add to the literature on temporal perceptions by documenting a new antecedent variable that impacts perceived proximity and thereby vulnerability – social consequences. While prior research has considered the consequences of enhancing temporal proximity of health outcomes, there is little understanding of how the use of specific outcomes and consequences can impact temporal perceptions. Third, the finding that the temporal proximity of the health outcome may be increased by the addition of social consequences contributes to the literature on psychological distance (Trope and Liberman 2010) by suggesting that the consequences of outcomes may impact perceptions of temporal distance to those outcomes and the likelihood of these outcomes. While prior research has examined the simple correlation between temporal distance and outcome likelihood, I suggest that this relationship is more complex and impacted by a heretofore unexamined variable – consequence type.

My work holds important implications for marketers and public policy makers by documenting a message technique that is easy to implement and highly effective at enhancing the persuasiveness of warning messages, thereby allowing for a strong application of marketing theory to marketing practice. Given the millions of dollars spent annually on warning messages in the USA alone (e.g. $70 million on the “Tips from former smokers campaign” CDC 2015; Over $10 million on the “It can wait campaign” Hall 2013), any incremental improvement in the effectiveness of warning messages has the potential to enhance the cost effectiveness of such messaging along with significantly contributing to consumer well-being. Further, the fact that I showcase these effects using real-life stimuli that have been used in warning campaigns increases my confidence in the practical significance of my findings.
I begin by referencing the relevant literature on warning messages, in particular, research on risk perceptions, temporal distance, and social consequences and then present my research questions. I then present results from four studies that provide empirical support for my propositions. I conclude by summarizing the theoretical contributions, limitations, and practical implications of my research.

**Warning Messages Using Social Consequences**

*Risk Perceptions and Warning Messages*

The aim of many warning communications is to increase consumer risk perceptions in order to render the behavior of interest more or less attractive. For example, increasing the perceived riskiness of smoking ought to lower its attractiveness and promote cessation or reduction in cigarettes smoked. Similarly, increasing the perceived risk of unprotected UV exposure should make sunscreen usage more attractive, promoting its use. In this regard, several health information processing models such as the Health Belief Model (Rosenstock, 1974; Rosenstock, Strecher, & Becker, 1994), Protection Motivation Theory (Rogers 1983), and The Extended Parallel Process Model (Witte 1992) conceptualize risk as comprising two distinct components – perceived vulnerability and perceived severity. Perceived vulnerability is the likelihood component of risk perception and refers to the chances of experiencing a negative health outcome (Witte 1992). Perceived severity is the impact component of risk and is an individual’s belief regarding the seriousness of a health outcome (Witte 1992). Perceptions of risk can vary between individuals (Janz and Becker 1984) and lead to significant behavioral changes (Brewer et al. 2007).
Risk perceptions increase with increases in perceived vulnerability and perceived severity and both severity and vulnerability need to reach adequate levels in order for a message to motivate attitude, intention, or behavior change (Feather 1982; Weinstein 2000). Hence, prior research shows that warnings are not always effective either because some consumers do not find the outcomes sufficiently severe or threatening, i.e. low in severity (Hammond 2011), or because they think that the health related outcome is unlikely to happen, i.e. low vulnerability (Hoek, Hoek-Sims, and Gendall 2013; Keller 1999). Indeed, often consumers may suffer from a false sense of security due to the self-positivity bias (Menon, Block, and Ramanathan 2002) such that they believe that the outcome may likely occur for other consumers, but not for them, thereby reducing their perceived vulnerability. In addition, there appear to be interactive effects of vulnerability and severity such that the joint effects of both variables are not completely clear. Thus, meta-analyses (Floyd, Prentice-Dunn and Rogers 2000) reveal that the combined effect of health risk severity and vulnerability is lower than the sum of their independent effects, suggesting some negative synergies between the two. Along these lines, research has found that increases in severity, given low vulnerability, can in fact have negative effects on intentions (Mulilis and Lippa 1990, Pechmann et al. 2003).

To summarize, both vulnerability and severity are necessary to elicit message compliance and neither alone appears sufficient. In this regard, most warning messages tend to focus on long-term negative health outcomes (e.g. heart disease, death, cancer) that are high in severity but low in vulnerability. Hence, after exposure to a warning message, individuals may understand the seriousness of potential negative outcomes, but since they do not feel susceptible to the outcome because they see it as temporally distant,
they rarely change their behavior. Thus, an ideal warning message would be one that retains the necessary levels of perceived severity, but also manages to elicit high levels of perceived vulnerability among its target audience. I propose that highlighting the social consequences of negative health outcomes may be an effective solution to increase perceptions of risk while maintaining the serious, long-term nature of the negative health outcome. This is because social consequences are likely to increase the perceived temporal proximity of the health outcome and therefore increase perceived vulnerability.

Temporal Perceptions and Likelihood Estimates

Literature on psychological distance suggests that the temporal distance of an event can impact the estimates of likelihood of that event. For example, Chandran and Menon (2004) found that the same event was reported as being less likely to occur when it was framed as being farther in time than closer in time. In the context of warning messages, this suggests that perceived temporal distance may be an important determinant of the perceived likelihood of negative health outcomes, rendering it important to understand what features of a warning message will alter subjective measures of temporal distance such that increasing the proximity of the outcome will increase its likelihood, i.e. perceived vulnerability.

One way by which researchers have attempted to address people’s natural propensity to distance themselves from undesirable future outcomes is through temporal framing of the message. For example, Chandran and Menon (2004) found that when health risks are presented in “day” terms are perceived as more threatening than those presented in “year” terms. Thus, specific attributes of the messages can make risks appear closer in time. However, the effect of message framing may have differential effects
based on consumers’ tendencies to consider the distant consequences of their behaviors. In multiple studies, Kees (2010) demonstrated that consumers who are less future oriented will benefit the most from messages displayed in a proximal (vs. distal) format. Since temporal framing cannot always be used in messages and may only benefit a segment of the audience, the current research identifies ways to increase the temporal proximity of negative health outcomes in another way – by emphasizing social consequences in warning messages. I suggest that social consequences will be viewed as more short term and occurring more frequently than health consequences and hence be perceived as more temporally proximate, thereby eliciting perceptions of greater vulnerability to the health outcome.

**Social versus Health Appeals**

Message content is a critical component that can amplify or undermine the effectiveness of a warning message (Pechmann and Catlin 2016). The bulk of research on warning messages has focused on the effectiveness of using negative health outcomes such as cancer (Dillard and Nabi 2006), diseases (Kees et al. 2010), and even death (Cameron, Pepper, and Brewer 2013). This is not surprising since the vast majority of warning communications in real life tend to utilize health appeals (Keller and Lehmann 2008). There is very limited research on the effectiveness of using other types of outcomes and consequences such as social (Agrawal and Duhachek 2010; Smith and Stutts 2006) and financial (Strahan 2002), rendering it difficult to make predictions about these types of appeals. The problem is compounded by the fact that the scant research on social appeals documents conflicting evidence on their effectiveness (Denscombe 2001; Hoek, Hoek-Sims, and Gendall 2013; Pechmann and Goldberg 1998; Smith and Stutts
2003; 2006), with some research documenting an advantage for social appeals as compared to health appeals (e.g. Schoenbachler and Whittler 1996), and other research documenting the reverse effect (Pechmann et al. 2003).

In addition, most research on social-focused warning messages has been conducted with adolescents, with little research among adults (Erikson and Erikson 1998). For example, Pechmann and colleagues (2003) tested several types of warning messages among seventh and tenth graders and found that the most effective messages emphasized serious social disapproval. However, messages that highlighted cosmetic risks (e.g. looking unattractive) - which also have a social component - and health risks were not effective. Thus, it is difficult to determine when messages that highlight social consequences will be effective among adult populations, especially because social consequences are more relevant among young people and health consequences are generally more important among older people (Gold and Roberto 2000).

I suggest that there could be two potential explanations for the conflicting evidence on the effectiveness of social appeals. One is the lack of clarity in how social outcomes have been defined in warning messages, ranging from highly visible and concrete outcomes such as cosmetic risks (e.g. yellowing of teeth - Smith and Stutts 2003), to less visible, abstract risks such as social ostracism (Hoek, Hoek-Sims, and Gendall 2013) and social disapproval (Pechmann et al. 2003). Thus, often certain consequences can be viewed as both social as well as health (e.g. yellow teeth indicate tooth decay), rendering it difficult to clearly define social outcomes and to distinguish whether the effects found were due to the social aspects or health aspects of the risks used.
Two, is the fact that social outcomes are high in vulnerability but not severity. In other words, social outcomes are likely to be viewed as quick to occur and temporally proximate (e.g. bad breath is almost an instantaneous outcome of smoking) but are also likely to be viewed as not very severe or threatening (e.g. bad breath is not very serious). The low levels of severity lower risk perceptions of the health behavior, leading to low motivation to comply with the message and change behavior. I therefore suggest that adding social consequences to health outcomes may be an effective way to achieve high levels of severity and vulnerability, leading to high risk perceptions and thereby message compliance. In other words, the health outcome introduces severity while the social consequences of the health outcome introduce temporal proximity and thereby vulnerability to the outcome.

In this regard, an important distinction between the current research and previous research is the way that social themes are operationalized and utilized in the warning message. Previous research has used a simple social versus health comparison where social outcomes of a targeted behavior (e.g. smoking) are used exclusively in one condition and health outcomes are used exclusively in the other condition. For example, Smith and Stutts (2003) showed a series of anti-smoking advertisements to adolescents that highlighted bad breath, stinking clothes, and stinking hair under the tagline “Smoking Stinks” for the social condition, and advertisements that highlighted lung cancer, heart attack, and stroke with the tagline “Smoking Kills” for the health condition. A problem with this approach is that it confounds variables such as severity of the outcome with the outcome type. That is, the health outcomes (cancer, heart attack and stroke) are significantly more severe than the social outcomes (bad breath, stinking
clothes and hair) and therefore, any differences between the two conditions may be attributed to either the outcome type or the difference in severity.

In order to eliminate this possibility, my research delineates between the outcomes of a behavior and the consequences of that outcome. I utilize the same health outcome, and simply highlight a subsequent health consequence or a social consequence of this negative health outcome. For example, soda consumption can lead to obesity. Obesity can impact an individual’s life in many different ways including additional health consequences such as heart disease or additional social consequences such as appearing unattractive (see figure 1). By keeping the main negative health outcome the same in all conditions, I demonstrate how highlighting additional consequences (either social or health) can influence the perception of the same negative health outcome. Consequently, the dependent variables of most importance (i.e. risk perceptions and perceived vulnerability), focus on the perceptions of the main health outcome (i.e. obesity). Further, I ask respondents to generate their own social or health consequences to a health outcome in many of my studies, thereby ensuring that the consequences are perceived as being clearly either social or health.

In sum, I answer the call from Keller and Lehmann (2008) to more fully investigate the combination of health and social themes in the same warning and suggest that warning messages which emphasize the social consequences of negative health outcomes will alter the way that individuals see the temporal distance to and the likelihood of those outcomes, resulting in greater risk perceptions. Further, I propose that temporal proximity will mediate the relationship between consequence type and perceived likelihood (vulnerability). I test these hypotheses in four studies using different
health behaviors, different manipulations of consequence types and different dependent measures including risk perceptions, behavioral intentions and perceptions of experience.

PRETEST

Prior to conducting my main studies, I conducted a pretest to test my contention that social consequences are seen as more temporally proximate than health consequences of the same health outcome. While past research has suggested that this is likely (Smith and Stutts 2006), till date no empirical evidence in support of this claim has been reported.

I selected obesity as the negative health outcome of interest because obesity affects over one-third of the U.S. adults (Flegal et al. 2012), obesity-related health care costs almost 200 billion per year in the U.S. (Cawley and Meyerhoefer 2012), and most importantly because obesity leads to a variety of well-documented health consequences (National Heart, Lung, and Blood Institute 2013) and social consequences (Brownell et al. 2005).

Procedure

60 American adults (45% female) participated in an online survey on Amazon’s Mechanical Turk service for monetary compensation. They were informed that the study dealt with the consequences of obesity and were presented with eight health consequences (e.g. heart disease) and eight social consequences (e.g. unattractiveness) of obesity. The list of consequences was compiled from current warning messages and federal government reports on the consequences of obesity (Centers for Disease Control and Prevention 2015).
My key dependent measures included perceptions of temporal proximity (e.g. How far away do the negative health consequences of soda consumption seem to you?), vulnerability (e.g. How likely do you think it is that you will become obese?), severity (e.g. I believe that obesity is serious), with all measures derived from prior research (Greene et al. 1996, Witte et al. 1996, Witte 1992, Ronis Harel 1989). Participants answered these questions for all the 16 consequences (8 health and 8 social). I also collected relevant health and demographic information including frequency of indulging in these health behaviors and current and past health status. I averaged the dependent measure scores across the eight health consequences and the eight social consequences to arrive at mean results for health versus social consequences. Details of all dependent measures are presented in Appendix A.

Results

A paired-samples t-test was conducted that compared the health to the social consequences of obesity. The results indicate support for my proposition with the social consequences of obesity viewed as more temporally proximate ($t(59) = 8.36, p < .05$) and seen to develop faster ($t(59) = 11.01, p < .05$) than health consequences of obesity. Further, participants reported greater perceived vulnerability to social as compared to health consequences both for themselves ($t(59) = -2.12, p < .05$) and others ($t(59) = -1.80, p = .07$). However, participants viewed health consequences as more severe than social consequences ($t(59) = -12.31, p < .05$).

These results provide support for my intuition that social consequences are seen as more temporally proximate than health consequences. Further, health and social
consequences of the same health outcome have opposing effects on severity and vulnerability with social (health) consequences seen as less (more) severe but more (less) likely to occur. Given these findings, I conducted study 1 to test whether this greater proximity of social consequences would spill over to the proximity of the health outcome when health outcomes are linked to social consequences in a warning message context.

**STUDY 1**

Study 1 was a 2 (social versus health consequences) cell between subjects design with 72 undergraduate students (62% female) who participated in the study in exchange for course credit. They were informed that they would be asked to evaluate a health communication message. In the health condition an image of teeth with gingivitis was paired with a warning that stated, “Not flossing regularly eventually causes gingivitis, which weakens gum tissue, and can adversely affect your health”. In the social condition the warning stated, “Not flossing regularly eventually causes gingivitis, which results in bad breath, and can adversely affect your social life”. Both conditions used the same graphic image (Appendix B).

Prior to the main study, I measured the perceived temporal proximity, severity and vulnerability to the health and social consequences that were used in my manipulations (weakened gums, bad breath) using a sample of sixty-five American MTurk respondents (58% female). Similar to the results of my pretest, I found that the social consequence (bad breath) was rated as significantly greater in terms of temporal proximity ($M_{social} = 32.73$, $M_{health} = 47$, $t = 5.37, p < .05$) and vulnerability ($M_{social} = 5.26$, $M_{health} = 4.60$, $t = 4.16, p < .05$) as compared to the health consequence (weak
gums), but the health consequence was rated as marginally significantly more severe than the social consequence ($M_{social} = 4.73, M_{health} = 5.32, t = 3.09, p = .08$).

**Dependent Measures**

My key dependent measures (Appendix A) were perceived temporal proximity of the outcome highlighted in the warning (e.g. “How far away does gingivitis seem to you?”, $\alpha = .93$), perceived vulnerability to the outcome (e.g. “How likely do you think it is that you will get gingivitis?” $\alpha = .63$) and perceived severity of the outcome (e.g. “I believe that gingivitis is serious”, $\alpha = .93$). I also measured imagery ($\alpha = .85$) and fear ($\alpha = .93$) evoked by the message to ensure that there were no differences in these variables that could potentially explain my results (all $p$’s > .1). Thus, the use of social consequences does not make the message more vivid or fear-evoking than the use of health consequences.

I also measured respondents’ importance rating of their social life and health to rule out the possibility that differential importance accorded to these dimensions could explain my results. While health was reported as being more important (6.57) than social (5.92, $t = 5.48, p < .05$), there were no differences in this reported importance of social versus health dimensions across my experimental conditions (all $p$’s > .1), and there were no significant effects of importance on any of my dependent variables. Thus my results cannot be explained by the differential importance accorded to social or health aspects by consumers. Finally, there were no effects of gender on any of the dependent measures ($p$’s > .1). These patterns for imagery, fear, gender, and relative importance of health versus social dimensions were similar across all of my studies (no significant effects), and hence I do not refer to these variables further in the paper.
Results

Temporal proximity. As expected, social consequences resulted in greater perceived proximity as compared to health consequences ($M_{social} = 64.21$, $M_{health} = 76.00$, $t = -2.28, p < .05$).

Perceived vulnerability. The pattern for perceived vulnerability was the same as the pattern for perceived temporal proximity, with social consequences resulting in greater perceived vulnerability as compared to health consequences ($M_{social} = 3.81$, $M_{health} = 3.12; t = 2.83, p < .05$). Thus, the greater the perceived proximity of the consequences of not flossing, the more vulnerable respondents felt to these consequences.

Perceived severity. Interestingly, there were no differences in perceived severity of the outcome between the social and health-focused messages ($p > .1$). Thus, despite health consequences (weakened gums) being seen as marginally more severe than social consequences (bad breath), this difference in severity did not spillover to the health outcome (gingivitis). Hence, the differences in temporal proximity found do not appear to lead to differences in perceived severity, but only to perceived vulnerability.

Mediation Analysis. A mediation analysis using the SPSS-Macro (Model 4; Preacher and Hayes 2004; Hayes 2012) with consequence type as the independent variable, perceived vulnerability as the dependent variable and temporal proximity as the mediator revealed a significant effect of temporal proximity alone ($\beta = -.026, t = -5.41, p < .01$) with the effects of consequence type on vulnerability reduced to non-significance ($p > .05$). A bootstrap analysis confirmed an indirect effect at 95% bias corrected CI [-.65, -.04], supporting my contention that the effects on perceived vulnerability are mediated by perceived temporal proximity of the health outcome.
Despite the fact that there were no differences in perceived severity of the outcome across the two experimental conditions, I conducted a second mediation analysis using severity as the mediator and found no significant effects (95% bias corrected CI [-.12, .12]). I also tested for the possibility that both severity and temporal proximity could be joint mediators and again found no support for severity (95% bias corrected CI [-.14, .12]), but only for temporal proximity (95% bias corrected CI [-.66, -.04]). This increases my confidence that the effects on vulnerability are mediated only by temporal proximity of the outcome.

Discussion

The results of study 1 provide support for my hypotheses and document that highlighting social consequences in addition to the health outcome of not flossing increases perceived temporal proximity and perceived vulnerability. This occurs despite the fact that the social consequence (bad breath) is less marginally severe than the health consequence (weak gum tissue). While this did not impact the perceived severity of the health outcome, it is intriguing to consider that less severe social consequences may be more effective than more severe health consequences due to their ability to bring the health outcome closer in time, thereby increasing its likelihood.

In study 2, I use a different health behavior – soda consumption – to generalize my results. I specifically selected soda consumption in order to examine whether my results would hold for warning messages that advocate the prevention of negative behaviors as compared to study 1 that focused on the promotion of a positive behavior. I also examine the moderating role of current health status (BMI) on the effects of consequence type. Since social consequences have the effect of making the health
outcome seem closer in time and hence increasing perceived vulnerability to the outcome, this effect ought to be attenuated for consumers who already perceive themselves as being close and highly vulnerable to the outcome, i.e. consumers with high BMIs. I therefore expect that BMI will moderate the effects of consequence type such that respondents with lower BMIs will exhibit more pronounced effects than consumers with higher BMIs. This is consistent with prior research that has documented the moderating role of BMI on risk perceptions (Kan and Tsai 2004).

A limitation of study 1 is that I do not control for differences between the social and health consequences on dimensions unrelated to risk such as vividness, imageability, mood and novelty. For example, it may be possible that social consequences are seen as more novel in a warning message since they are not used as frequently as health consequences. Or perhaps, social consequences are more vivid and thereby easier to imagine than health consequences, elicit a more positive mood and these differences in novelty, vividness, mood and imageability rather than differences in temporal proximity, lead to greater elaboration of the message and thereby enhanced risk perceptions. I address this issue in study 2 by using a more conservative manipulation of consequence type by exposing all respondents to the same warning message, but allowing respondents to generate their own social or health consequences. Since all respondents viewed the same message for the same amount of time, differences in elaboration cannot explain my results. I also pretested my message to ensure that there were no differences on the other dimensions mentioned above (vividness, imageability, mood and novelty).
Study 2

Study 2 was a 2 (social versus health consequences) X 2 (BMI: high versus low; continuous) cell between subjects design. 81 members (56% female) of Amazon’s MTurk service received financial compensation for their participation. In both conditions, participants watched a twenty-three second video from the New York City Department of Health and Mental Hygiene (http://www.nyc.gov/html/doh) that showed a graphic depiction of the unhealthy nature of sugary beverages and advised viewers that “Drinking one can of soda a day can make you ten pounds fatter a year.” Viewers were also told, “Don’t drink yourself fat - Cut out soda and other sugary beverages”. After watching the video, participants were instructed to think about and list all of the social (vs. health) consequences of obesity. Thus, rather than explicitly highlighting the social or health consequences of obesity, participants generated their own list of consequences. They then filled out a survey containing the dependent measures and demographic measures, which were based on those used in study 1 (temporal proximity, vulnerability, severity). In addition, I also included measures of height and weight in order to compute respondents’ BMI.

As stated earlier, I conducted a pretest with 60 American MTurk workers (42% female) who viewed the same video used in my main study, listed social or health consequences, and subsequently completed measures related to vividness, imageability, mood and novelty (Appendix A). There were no differences on any of these constructs (all p’s >.1), thereby suggesting that my results cannot be explained by these variables.

Results
Manipulation checks. Participants in both conditions generated similar numbers of consequences ($M_{social} = 4.83$, $M_{health} = 5.62$, $t = -1.53, p > .1$), thus ruling out differences in the quantity rather than the type of consequences generated as an alternate explanation for my results. Further, an examination of the consequences listed (Appendix C) suggests a successful manipulation, such that respondents in the social condition listed more social consequences than health consequences ($M_{social\text{consequence}} = 3.83$, $M_{health\text{consequence}} = 0.48$, $t = -7.48, p < .05$) and respondents in the health condition listed more health consequences than social consequences ($M_{social\text{consequence}} = 0.78$, $M_{health\text{consequence}} = 5.15$, $t = -10.67, p < .05$).

I replicated my previous results from Study 1 and found a main effect of consequence type such that respondents in the social (vs. health) condition see the health effects of soda consumption as more temporally proximate ($M_{social} = 42.22$, $M_{health} = 58.97$, $t = -2.06, p < .05$) and see themselves as more vulnerable to obesity ($M_{social} = 4.49$, $M_{health} = 3.72$, $t = 2.18, p < .05$). However, as predicted I also found a moderating effect of BMI with a significant two-way interaction between BMI and consequence type on temporal proximity ($\beta = -1.09$, $t = -2.37, p < .05$) and perceived vulnerability ($\beta = .038$, $t = 2.01, p < .05$).

Temporal proximity. I had anticipated that respondents with high BMI scores would already be sensitized to the possibility of obesity and see the health effects of soda consumption (ie. obesity) as being closer in time than respondents with low BMI scores. A Johnson-Neyman floodlight analysis (Johnson and Neyman 1936; Spiller et al. 2013) supported this prediction (BMI = 26.96, $B_{JN} = 6.14$, $p = 0.05$) and revealed that individuals with lower BMI scores ($< 27$) saw the health effects of soda consumption as
more temporally proximate when exposed to a warning message that highlights social consequences as compared to individuals with higher BMI scores (>=27). Thus, the consequence type highlighted in the warning message has little differential effect on perceptions among those with high BMI. However, the consequence type highlighted has a significant effect for individuals in the normal weight range or below. More specifically, consideration of social consequences proves to be more effective than consideration of health consequences among individuals with relatively low BMI scores.

Perceived vulnerability. A floodlight analysis was also used to investigate the significant 2-way interaction between consequence type (social = -1, health = 1) and BMI (low vs. high; continuous on perceived vulnerability. The shift in perceived temporal proximity was driven by a difference in BMI, (BMI = 27.44, B_{IN} = -.25, p = 0.05). Similar to results for perceived temporal proximity, individuals with lower relative BMI scores (< 27) see themselves as more vulnerable to health outcomes when a social consequence is present in a warning message.

Perceived severity. Similar to study 1, there were no differences in perceived severity of the outcome between the social and health-focused messages (p > .1) and no differences based on BMI (p > .1). Thus, the differences in perceived proximity do not appear to impact severity, but only vulnerability.

Mediation analysis. In order to investigate the role of consequence type on perceived vulnerability I employed a bootstrapping approach to derive confidence intervals using the SPSS-macro syntax developed by Preacher and Hayes (2004) with 5,000 resamples and used model 7 (Hayes 2013). The results showed that consequence type (social vs. health) had a significant conditional indirect effect on perceived
vulnerability via perceived temporal proximity only among individuals with lower BMI’s
(estimated coefficient = -.38, 95% confidence interval [CI] exclusive of zero [-.70, -.12];
Preacher and Hayes 2004). Thus, proximity fully mediates the interactive effects of BMI and consequence type on perceived vulnerability.

Discussion

The results of study 2 provide further support for my hypotheses by documenting that social consequences of health outcomes elicit greater proximity and vulnerability than corresponding health consequences of the same outcome. Thus, respondents who considered the social consequences rather than the health consequences of obesity perceived themselves as more vulnerable to obesity, and saw the health effects of soda consumption as closer in time. However, these effects are moderated by the current health status of respondents such that consumers who already perceive themselves as vulnerable to the health outcome, may exhibit relatively less change in vulnerability and proximity judgments compared to consumers who do not perceive themselves as being currently vulnerable. In the case of soda consumption, it may be difficult to alter the perceived risk of high-BMI individuals because the outcome is already present in their lives, so their perceptions of vulnerability and time have likely already reached a ceiling.

In order to more conclusively document that BMI and vulnerability are positively correlated, I ran a separate study with 38 American MTurk respondents (66% female), using the same measures for temporal proximity, severity and vulnerability as in study 2 along with respondents’ BMI. Consistent with my predictions, BMI was significantly positively correlated with vulnerability ($r = .46, p < .01$), significantly negatively correlated with temporal proximity ($r = -.56, p < .01$), but not significantly correlated
with perceived severity ($r = -0.18, p > 0.2$). These findings further support my contention that already vulnerable respondents are less likely to be sensitive to social versus health consequences in health messages.

In study 3, I extend these findings by considering both health as well as social outcomes. That is, in studies 1 and 2 I only consider health outcomes (gingivitis, obesity) with added consequences (health vs. social), but do not consider social outcomes with added consequences. As indicated earlier, I hypothesized that the severity of a health outcome together with the proximity of a social consequence of that outcome would enhance vulnerability perceptions. However, since prior research has suggested that social outcomes may be more effective than health outcomes for certain populations (e.g. Ho 1998), it would be interesting to examine whether the advantages I find for social consequences are due to the addition of social consequences to health outcomes alone, or would hold for any combination of social and health. That is, is it possible that adding health consequences (e.g. depression) to a social outcome (e.g. social rejection) of a health behavior (e.g. smoking) would enhance temporal proximity and vulnerability perceptions similar to adding social consequences (e.g. feeling ugly) to a health outcome (mouth cancer) of that same health behavior (e.g. smoking)? In other words, would enhancing severity given high vulnerability (adding health consequences to social outcomes) lead to similar compliance as enhancing vulnerability given high severity (adding social consequences to health outcomes)? I examine this issue in study 3. Further, I also expand my pool of dependent measures to include quit intentions, thus focusing on message compliance and not just risk perceptions.
STUDY 3

The study was a 2 (outcome type: social versus health) x 2 (consequence type: none, social versus health) between subjects design with 119 American MTurk participants (43% female) who received monetary compensation for their participation. In line with previous research (Thrasher et al. 2009), I screened respondents to identify regular smokers (those who reported smoking in the past 30 days and who reported smoking at least 100 cigarettes over their lifetimes). The reason to focus on current smokers was to test whether my effects would hold among consumers who had the highest need to change their behavior. The screening also provided a strong test of my effects since my respondents were likely to have been exposed extensively to prior warning messages about smoking, likely resulting in a greater propensity to ignore such messages.

I used mouth cancer versus social rejection as my health versus social outcome and feelings of loneliness and depression versus feeling ugly and unattractive as my health versus social consequences. Thus, in a departure from my previous studies, I used mental health outcomes rather than physical health outcomes in order to extend the generalizability of my effects. For example, in the health (social) outcome with social (health) consequence condition, respondents were informed that “Smoking can lead to mouth cancer (social rejection) which can make you feel ugly and unattractive (lead to feelings of loneliness and depression) and adversely affect your social life (health)”. Thus, similar to study 1, I controlled consequence type within the message. All consequences were drawn from research on smoking effects (Boden, Fergusson, and Horwood 2010; Smith and Stutts 2006)
My key dependent measures (Appendix B) were intention to quit smoking (“How much, if at all, does this warning want to make you quit smoking?”) followed by perceived temporal proximity of the outcome highlighted in the warning (e.g. “How far away does mouth cancer (social rejection) seem to you?”, α = .91), perceived vulnerability to the outcome (e.g. “How likely do you think it is that you will get mouth cancer (experience social rejection)?” α = .85) and perceived severity of the outcome (e.g. “I believe that mouth cancer (social rejection) is serious”, α = .95).

Results

Since past research has shown that social outcomes are likely to be viewed as significantly less severe than health outcomes, I expected to find a main effect of outcome type on severity such that the health outcome (mouth cancer) would be seen as more severe than the social outcome (social rejection). An analysis of variance with outcome and consequence type as the independent variables supported this prediction, with a main effect of outcome type on severity such that mouth cancer (6.1) was seen as more severe than social rejection (4.1, F(1, 113) = 65.39, p < .05). There were no other main or interactive effects on severity (p’s > .1).

There was a significant interaction between outcome type and consequence type on quit intentions (F (2, 113) = 5.83, p < .05) and vulnerability (F (2, 113) = 3.38, p < .05) with a marginally significant interaction on temporal proximity (F (2, 113) = 2.55, p = .08). Planned contrasts revealed that when the outcome was health (cancer), I replicated the findings from previous studies such that social consequences elicited greater intention to quit (M_{social} = 5.24, M_{health} = 2.79, t = 5.42, p < .05), temporal proximity of the outcome (M_{social} = 56.98, M_{health} = 79.73, t = -3.09, p < .05) and vulnerability to the outcome.
Contrary to study 1 however, I found that health consequences also elicited marginally greater perceptions of severity of the outcome than social consequences \((M_{social} = 5.98, M_{health} = 6.48, t = -1.92, p = .07)\). Thus, the greater effectiveness of using social consequences held even when the outcome was viewed as being less severe in this condition. However, when the outcome was social (social rejection), there were no significant differences between the two conditions on any of the dependent measures (all \(p\)’s > .1). Thus, adding health versus social consequences to social outcomes did not appear to have any significant impact on risk perceptions or quit intentions.

**Health+Social versus Social+Health.** Of specific interest to us was the comparison of the health outcome + social consequences (cancer leading to feeling ugly and unattractive) and social outcome + health consequences (social rejection leading to loneliness and depression) conditions. A planned contrast revealed an advantage for the former with significantly greater intention to quit \((M_{health+social} = 5.2, M_{social+health} = 3.42, t = 2.98, p < .05)\). This difference appears to be due to significantly greater severity \((M_{health+social} = 5.98, M_{social+health} = 4.22, t = 2.98, p < .05)\) with marginally greater temporal proximity \((M_{health+social} = 56.98, M_{social+health} = 71.24, t = -1.78, p = .07)\) and vulnerability \((M_{health+social} = 4.09, M_{social+health} = 3.14, t = 1.91, p = .06)\) for the health+social condition as compared to the social+health condition. These findings suggest that not just any combination of social and health may be effective in eliciting compliance, but that the specific combination of a health outcome along with a social consequence may be the optimal pairing.
No consequences versus consequences. Also of interest to us were the comparisons between the no-consequence conditions and the health/social consequence conditions. When the outcome was health (cancer), I found that adding a health consequence increased severity of the outcome \( (t = 2.49, p < .05) \), while adding a social consequence increased the proximity of the outcome \( (t = -1.96, p = .05) \) and marginally increased perceived vulnerability to the outcome \( (t = 1.84, p = .07) \). These differences resulted in the no-consequence condition eliciting significantly greater intention to quit as compared to the health consequence condition \( (t = -2.71, p < .05) \), but significantly lower intention to quit than the social consequence condition \( (t = 2.57, p < .05) \). Thus, the health outcome + social consequence condition outperformed the health outcome alone condition.

When the outcome was social (social rejection), I found that there were no significant differences between the three consequence types on quit intentions or perceived severity \( (p’s > .1) \) although the no consequence condition was more temporally proximate \( (t = 2.05, p < .05) \) and elicited higher vulnerability ratings \( (t = -1.96, p = .05) \) than the health consequence condition, suggesting that adding a health consequence to a social outcome increases the perceived distance to the outcome.

Health versus social outcomes. A comparison of the two no-consequence conditions (mouth cancer versus social rejection) revealed no significant differences on quit intentions \( (t < 1) \). This may be since the advantage in temporal proximity \( (t = -2.44, p < .05) \) and thereby marginally enhanced vulnerability \( (t = 1.91, p = .06) \) accruing to the social outcome was offset by the increased severity of the health outcome \( (t = -3.87, p < .05) \).
Mediation analyses. A mediation analysis using the SPSS-Macro (Model 4; Preacher and Hayes 2004; Hayes 2012) with the interaction between outcome and consequence type as the independent variable, perceived vulnerability as the dependent variable and temporal proximity as the mediator revealed a significant effect of temporal proximity alone ($\beta = -0.02, t = -6.82, p < .05, 95\% \text{ CI } [-0.03, -0.02]$) with the effects of the interaction reduced to non-significance ($\beta = 0.001, t < 1, p > .1, 95\% \text{ CI } [-0.12, .13]$).

A second mediation analysis with intention to quit as the dependent variable, the interaction between outcome and consequence type as the predictor variables, and vulnerability and severity as the mediators revealed a significant effect of vulnerability ($\beta_{\text{Vulnerability}} = 0.68, t = 6.35, p < .05, 95\% \text{ CI } [0.47, 0.89]$) and a marginally significant effect of severity ($\beta_{\text{Severity}} = 0.17, t = 1.79, p = 0.07, 90\% \text{ CI } [0.01, 0.33]$), with the effects of the interaction reduced to non-significance ($\beta = -0.007, t < 1, p > .1, 95\% \text{ CI } [-0.15, .13]$). Thus, the effects of the message frame on quit intentions are mediated by vulnerability and partly by severity of the outcome. The effect of severity is unlike the null effects found in studies 1 and 2, and is likely due to the differential severity between the social and health outcomes.

Discussion

The results of study 3 extend my previous findings in several ways. First, I document that only a specific combination of health and social appeals may be effective rather than any combination of health and social appeals. Specifically, health outcomes along with social consequences are more effective than social outcomes with health consequences, and this is likely due to the optimal combination of severity (via the health outcome) and vulnerability (via the social consequence). Thus, I replicate my findings in
that when the outcome is health (cancer), social consequences render the message to be more effective than health consequences. However, when the outcome is social in nature (social rejection), it was perceived as less severe than the health outcome and its enhanced proximity and vulnerability did not translate to greater quit intentions. Thus, when severity is relatively low, the increase in temporal proximity via the addition of social consequences does not seem to have a meaningful impact on message effectiveness.

Second, I expand my set of dependent measures to include an intention measure. My results for quit intentions are particularly impressive, given that my sample only included regular smokers, a segment known to be resistant to warning messages. This increases my confidence in the generalizability and strength of my effects and suggests that there is significant benefit to adding social consequences to health warnings.

Third, I expand health consequences to include mental health consequences as compared to physical health consequences. This is an important contribution since it helps refute the argument that social consequences may be more visible than health consequences. Given that mental health consequences such as depression and loneliness are not readily apparent or visible, my findings help delineate better between social and health consequences as different from simple visibility.

Fourth, I replicate prior research (Milne, Sheeran, and Orbell 2000) in that quit intentions are impacted by both vulnerability and severity when there are significant differences in the severity of the outcomes used. In my previous studies, there were no such differences in severity of the health outcome, thereby leading to null effects for severity.
Studies 1-3 collectively provide support for my contention that the addition of social consequences of health outcomes makes these outcomes seem more temporally proximate, leading to heightened perceptions of vulnerability to these outcomes. In study 4, I provide further process evidence of this relationship between social consequences, temporal proximity and vulnerability by showing that my effects attenuate when the outcome is manipulated to be temporally proximate (versus distant). That is, in studies 1-3, I used health outcomes that were temporally distant and documented that the addition of social consequences made these outcomes seem closer in time. Instead, if the outcomes were already temporally proximate, then the addition of social consequences would not impact proximity and thereby vulnerability, leading to the attenuation of the advantages accruing to social consequences.

Past research (Chandran and Menon 2004) has used temporal frames (e.g. everyday versus every year) to vary perceived closeness of health outcomes and thereby the riskiness of these outcomes. I use such temporal frames in study 4 to manipulate outcome proximity and thereby add confidence in my theorizing about the processes underlying the effects of social consequences.

**STUDY 4**

The study was a 2 (temporal frame: every day versus none) x 2 (consequence type: social versus health) between-subjects study in which 119 MTurk workers (36% female) participated in return for monetary compensation. My health context was the effect of unprotected UV exposure leading to skin cancer with the social consequences of skin cancer framed as “wrinkled, leathery and ugly skin which can adversely affect your social life” and the health consequences framed as “damaging your skin cells and
weakening your immune system, which can adversely affect your health”. My
manipulation of temporal frame was drawn from past research (see Chandran and Menon
2004), and was “Thousands of Americans are diagnosed with skin cancer every day” in
the everyday frame condition versus “Thousands of Americans are diagnosed with skin
cancer” in the no-frame condition (Appendix A). Respondents were given 20 seconds to
view the warning message in order to control exposure and elaboration time. My
expectation was that when the “everyday” frame was used in the message, it would
encourage closer temporal proximity perceptions of skin cancer and lead to an attenuation
of the differences between the social and health conditions. When there was no frame
used in the message, I expected to replicate my findings from previous studies and find
an advantage for the social as compared to the health condition.

My dependent measures included the same set of measures that I used in my
previous studies including temporal proximity of skin cancer ($\alpha = .92$), perceived
vulnerability to skin cancer ($\alpha = .70$), perceived severity of skin cancer ($\alpha = .90$) and
intention to use sunscreen and encourage others to use sunscreen. All measures utilized 7-
point scales.

Results

In line with my expectations, I found a significant interaction between temporal
frame and consequence type on vulnerability to skin cancer ($F(1, 114) = 10.25, p < .05$)
and a marginally significant interaction on temporal proximity of skin cancer ($F(1, 114) =
3.18, p = .07$), and behavioral intentions ($F(1, 114) = 3.39, p = .06$). There were no main
or interactive effects of the independent variables on severity of skin cancer (all $p$’s >.1).
Planned contrasts revealed no differences between the social and health conditions on temporal proximity when the temporal frame of “everyday” was used ($M_{health} = 62.7$, $M_{Social} = 60.9$, $t < 1$), but revealed the expected greater proximity for social consequences than health consequences when no frame was used ($M_{health} = 73.2$, $M_{Social} = 55.6$, $t = -3.36$, $p < .05$). A similar pattern of results was found for perceived vulnerability with the advantages of using social consequences found in the no-frame conditions ($M_{health} = 3.82$, $M_{Social} = 4.03$, $t = 3.82$, $p < .05$), but not the frame conditions ($M_{health} = 3.93$, $M_{Social} = 3.49$, $t = -1.27$, $p > .1$). Behavioral intentions also showed a similar, but weaker pattern (No frame conditions: $M_{health} = 4.21$, $M_{Social} = 4.68$, $t = -1.66$, $p = .1$; Frame conditions: $M_{health} = 4.62$, $M_{Social} = 4.19$, $t = -1.1$, $p > .1$).

**Mediation analyses.** I employed a bootstrapping approach to derive confidence intervals using the SPSS-macro syntax developed by Preacher and Hayes (2004) with 5,000 resamples and used model 7 (Hayes 2013) with consequence type as the predictor variable, temporal frame as the moderator, vulnerability as the dependent variable and temporal proximity as the mediator. The results showed that consequence type (social vs. health) had a significant conditional indirect effect on perceived vulnerability via perceived temporal proximity only in the no-frame condition (estimated coefficient = -.54, 95% confidence interval [CI] exclusive of zero [-.90, -.23], but not the everyday frame condition (estimated coefficient = -.05, 95% confidence interval includes 0 [-.49, .47]. Thus, proximity mediates the effects of consequence type and frame on perceived vulnerability.

A similar mediation analysis with behavioral intentions as the dependent measure and vulnerability as the mediator revealed that consequence type (social vs. health) had a
significant conditional indirect effect on behavioral intentions via perceived vulnerability only in the no-frame condition (estimated coefficient = -.25, 95% confidence interval [CI] exclusive of zero [-.64, -.01]; Preacher and Hayes 2004), but not the everyday frame condition (estimated coefficient = .12, 95% confidence interval includes 0 [-.05, .51]. Thus, the effects of the message on behavioral intentions are mediated by perceived vulnerability.

Discussion

The results of study 4 provide additional support for my contention that the addition of social consequences renders health outcomes closer in time and thereby increases perceived vulnerability to the outcome. The attenuation of the advantages of social consequences when temporal proximity was increased by using a temporal frame suggests that social consequences work by increasing temporal proximity, and that if the proximity of health consequences can be increased, the differences between these two consequence types can be negated.

Similar to study 2, study 4 also documents that differential attention to or elaboration of messages with social consequences cannot explain my results since the time provided to respondents across all experimental conditions was held constant. Thus, my effects are not because social consequences are unusual or rarely found in warning communications, but rather due to the intrinsic greater proximity of such consequences.

General Discussion

Warning messages serve a critical role in informing and persuading individuals to understand the risks associated with certain behaviors. Because of the enormous potential for consumer well-being and the extremely high cost of warning messages, researchers
have devoted a significant amount of time identifying ways to improve these messages. Often, warning messages fail to be effective because the long-term health outcomes they highlight are not seen as likely or temporally close (i.e. these messages are low in eliciting perceived vulnerability; Keller 1999). In this research, I examine how framing the consequences of a negative health outcome that is highlighted in a warning message can affect perceptions of this outcome. I find that the nature of social consequences (develop quickly) increases the perceived likelihood of the negative health outcome without decreasing the perceived severity. Specifically, I illustrate that when the social consequences of negative health outcomes are highlighted, individuals feel more vulnerable to health outcomes and see them as more temporally proximate (studies 1-4), leading to enhanced behavioral intentions (studies 3 – 5). However, this effect (social consequences increasing proximity) attenuates when individuals are already vulnerable to the negative health outcome (current health status – study 2), when the health outcome is not sufficiently serious (social outcomes – study 3) and when the health outcome is already temporally proximate (study 4).

My findings contribute to the research on risk perceptions, temporal perceptions and warning messages in several ways. First, I reconcile some inconsistent findings regarding the effectiveness of health vs. social appeals in warning messages by illustrating the unique attributes of social consequences and how they can influence perceptions of risk when paired with a serious health outcome. In doing so, this research answers the call for research into the effectiveness of combining health and social themes in the same message (Keller and Lehmann 2008; Hoek, Hoek-Sims, and Gendall 2013) and demonstrates that the presence of social consequences can influence the way a
negative health outcome is perceived. Thus, linking a health outcome (e.g. obesity) with social consequences (e.g. social rejection) brings the health outcome closer in time and makes the outcome appear more likely but not less severe. My finding that temporal proximity impacts vulnerability alone also enhances my understanding of the processes underlying risk perceptions.

Second, by distinguishing between the outcomes of health behaviors and the consequences of these outcomes, I extend prior research that has focused on outcomes alone, and suggest that combinations of different types of outcomes and consequences may be an effective strategy to enhance message compliance. My finding that every combination of health/social outcomes with health/social consequences is not equally effective adds insight into the interactions between severity and vulnerability (Floyd et al. 2000) and suggests that increasing vulnerability to a severe outcome may elicit greater message compliance than increasing severity to a vulnerable outcome.

Third, while research has documented the importance of temporal framing (e.g. Chandran and Menon 2004) and temporal proximity on risk perceptions, my work is the first to link social consequences to temporal proximity and contributes to the literature on psychological distance (Trope and Liberman 2010) by suggesting that consequences of outcomes may impact perceptions of temporal distance to that outcome and the likelihood of that outcome. While prior research has investigated the simple relationship between temporal distance and outcome likelihood, I demonstrate that this relationship is more complex and impacted by the type of consequence attached to the outcome.

From an applied standpoint, my research provides specific recommendations to public policy makers and companies regarding the way health warning messages should
be constructed for maximum effectiveness by illustrating how the consequence type highlighted in a message influences perceptions of risk. Specifically, this research identifies a critical message attribute – highlighting the social consequences of negative health outcomes - that marketers can use in order to alter the perceived psychological distance until the negative health outcomes, which will increase perceptions of vulnerability and ultimately consumer experiences. This research echoes the suggestion of Keller and Lehmann (2008) that warning messages should include both a social and health component to increase effectiveness. Importantly, these studies document a strategy that can be used to overcome one inherent weakness of warning messages that focus on negative health outcomes - that is the low perceived vulnerability of a health outcome (see Pechmann et al. 2003).

Further, whereas much of the research on the effectiveness of health versus. social appeals has been conducted for tobacco-related warnings, I investigate my effect across a variety of health domains including behaviors that promote good health (flossing, UV protection) as well as behaviors that deter bad health (soda consumption, smoking), thus enhancing confidence in the generalizability of my findings. Finally, while prior research on the effectiveness of social appeals in warning messages has focused on adolescent populations I investigate these effects among adult populations, and thereby extend the applicability of social appeals to a broader audience.

LIMITATIONS AND FUTURE RESEARCH

One limitation of my research is that I do not consider the long term effects of using social consequences. It is important to ascertain whether the advantages of social consequences dissipate over time and future research needs to incorporate delays between
the message exposure and measurement of effectiveness. Future research can also explore the effects of my unique health outcome plus additional consequence tactic among a variety of other populations (e.g. adolescents, children) to determine its effectiveness. Further, since I weren’t able to test all types of social consequences, additional studies could be investigate different social consequences among various consumer groups. Certain groups may respond more favorably to different types of social consequences (e.g. cosmetic vs. social ostracism). Another possible avenue for future research could include consideration of other consequences besides social and health. Thus, financial consequences may be an important consequence given that people deal with financial consequences daily and are sensitive to the financial ramifications of their actions. Further, the financial consequences of health-related issues are extremely important and individuals may not be aware of the potential risks of poor health. For example, medical expenses are the number one reason for personal bankruptcy with around two million people in the US declaring bankruptcy every year due to medical expenses (Mangan 2013).

Previous research has shown that framing (positive versus negative) can influence the effectiveness of warning messages (Block and Keller 1995). While the current studies address a variety of behaviors, outcomes, and consequences, the messages used in the experiments all employ a negative frame – that is, they highlight the negative social/health consequences of engaging in a behavior. Future research could vary the type of frame (positive versus negative) to identify if messages that use positive social consequences of positive health outcomes impact risk perceptions.
Since social consequences are more commonplace in everyday life they may be more accessible in memory. This greater accessibility could translate into greater recall of the message, which could have delayed effects on attitudes, risk perceptions, and possibly consumption experiences. Therefore, an important delayed effect - consumption experiences - could be included in longitudinal studies to investigate the relationship between changes in perceptions of experiences and long-term behavioral change. It would also be interesting to consider what other patterns of differences exist between health and social consequences such as accessibility, frequency of encounters etc.
### Tables

**Table 1.1: Results of Pretest**

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Consequence type</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Health</td>
<td>Social</td>
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<tr>
<td>Temporal distance</td>
<td>4.18 (1.20)</td>
<td>2.50 (1.45)</td>
</tr>
<tr>
<td>Perceived vulnerability</td>
<td>4.09 (1.73)</td>
<td>4.40 (2.01)</td>
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<tr>
<td>Perceived vulnerability for others</td>
<td>4.28 (1.60)</td>
<td>4.52 (1.85)</td>
</tr>
<tr>
<td>Perceived severity</td>
<td>6.05 (0.73)</td>
<td>3.94 (1.3)</td>
</tr>
<tr>
<td>Perceived time to develop</td>
<td>4.09 (1.01)</td>
<td>2.34 (1.12)</td>
</tr>
</tbody>
</table>

*Figures in parentheses are standard deviations

**Table 1.2: Results of Study 1**

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Consequence type</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Health</td>
<td>Social</td>
</tr>
<tr>
<td>Temporal distance</td>
<td>75.93 (19.65)</td>
<td>64.21 (23.64)</td>
</tr>
<tr>
<td>Perceived vulnerability</td>
<td>3.81 (0.92)</td>
<td>3.12 (1.13)</td>
</tr>
<tr>
<td>Perceived severity</td>
<td>4.96 (1.23)</td>
<td>4.96 (1.34)</td>
</tr>
<tr>
<td>Imagery</td>
<td>4.75 (1.06)</td>
<td>4.67 (1.30)</td>
</tr>
<tr>
<td>Fear</td>
<td>3.19 (1.55)</td>
<td>3.64 (1.48)</td>
</tr>
<tr>
<td>Importance of health</td>
<td>6.69 (0.53)</td>
<td>6.44 (1.00)</td>
</tr>
<tr>
<td>Importance of social life</td>
<td>5.94 (1.20)</td>
<td>5.89 (1.04)</td>
</tr>
</tbody>
</table>

*Figures in parentheses are standard deviations

**Table 1.3: Results of Study 2**

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Consequence type</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Health</td>
<td>Social</td>
</tr>
<tr>
<td>Pretest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vividness</td>
<td>5.83 (1.23)</td>
<td>6.07 (1.53)</td>
</tr>
<tr>
<td>Imagery provoking</td>
<td>6.03 (1.22)</td>
<td>6.43 (1.04)</td>
</tr>
<tr>
<td>Novelty</td>
<td>4.83 (1.52)</td>
<td>5.23 (1.37)</td>
</tr>
<tr>
<td>Mood</td>
<td>3.67 (1.01)</td>
<td>3.37 (1.25)</td>
</tr>
</tbody>
</table>

**Main study**

| Temporal proximity                      | 56.53 (33.43)    | 42.22 (29.10) |
| Vulnerability                           | 3.72 (1.85)      | 4.49 (1.39)  |
| Severity                                | 6.34 (1.04)      | 5.96 (1.05)  |

*Figures in parentheses are standard deviation.
Table 1.4: Regression Results of Study 2

<table>
<thead>
<tr>
<th></th>
<th>Temporal proximity</th>
<th>Vulnerability</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequence type</td>
<td>$B = 5.50, t = 1.70$ (^a)</td>
<td>$B = -2.56, t = -2.41$ (^a)</td>
<td>$B = .16, t = 0.16$</td>
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<tr>
<td>BMI</td>
<td>$B = 71.07, t = 2.72$ (^b)</td>
<td>$B = -.086, t = -0.65$</td>
<td>$B = -.01, t = -0.63$</td>
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<tr>
<td>Consequence type x BMI</td>
<td>$B = -2.18, t = -2.37$ (^a)</td>
<td>$B = .075, t = 2.01$ (^a)</td>
<td>$B = .01, t = 0.28$</td>
</tr>
<tr>
<td>Overall model statistics</td>
<td>$F(3, 77) = 10.52$ (^a)</td>
<td>$F(3, 77) = 34.02$</td>
<td>$F(3, 77) = 1.66$</td>
</tr>
</tbody>
</table>

\(^a\)“a” denotes significance ($p \leq .05$), “b” denotes marginal significance ($p \leq .1$), otherwise non-significance ($p > .1$).

Table 1.5: Results of Study 3

<table>
<thead>
<tr>
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<th>Health Outcome</th>
<th>Social outcome</th>
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<tbody>
<tr>
<td></td>
<td>No consequence</td>
<td>Health consequence</td>
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<tr>
<td>Temporal proximity</td>
<td>72.5 (18.1)</td>
<td>79.73 (22.5)</td>
</tr>
<tr>
<td>Vulnerability</td>
<td>3.67 (1.04)</td>
<td>2.96 (1.26)</td>
</tr>
<tr>
<td>Severity</td>
<td>5.86 (.91)</td>
<td>6.42 (.50)</td>
</tr>
<tr>
<td>Quit Intention</td>
<td>4.05 (1.5)</td>
<td>2.79 (1.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social outcome</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No consequence</td>
<td>Health consequence</td>
</tr>
<tr>
<td>Temporal proximity</td>
<td>52.48 (27.67)</td>
<td>71.24 (24.81)</td>
</tr>
<tr>
<td>Vulnerability</td>
<td>4.11 (1.2)</td>
<td>3.14 (1.67)</td>
</tr>
<tr>
<td>Severity</td>
<td>4.44 (1.17)</td>
<td>4.23 (2.02)</td>
</tr>
<tr>
<td>Quit Intention</td>
<td>3.53 (1.5)</td>
<td>3.42 (2.26)</td>
</tr>
</tbody>
</table>

* Figures in parentheses are standard deviations
Table 1.6: Results of Study 4

<table>
<thead>
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</tr>
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<tbody>
<tr>
<td></td>
<td>Health consequence</td>
<td>Social consequence</td>
</tr>
<tr>
<td>Temporal proximity</td>
<td>73.2 (19.2)</td>
<td>55.6 (23.5)</td>
</tr>
<tr>
<td>Vulnerability</td>
<td>3.07 (.99)</td>
<td>4.03 (1.04)</td>
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<tr>
<td>Severity</td>
<td>6.12 (.87)</td>
<td>6.10 (.83)</td>
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<tr>
<td>Behavioral intentions</td>
<td>4.21 (1.4)</td>
<td>4.68 (1.03)</td>
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*Figures in parentheses are standard deviations

Table 1.7: Examples of Consequences Listed by Participants

<table>
<thead>
<tr>
<th>Chapter 1 Study 2</th>
<th>Examples of the social consequences of obesity that participants listed:</th>
<th>Examples of the health consequences of obesity that participants listed:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fewer friends, Unattractive, Bullying, Unprofessional, Not fitting in, Fewer dating opportunities</td>
<td>Diabetes, Heart attack, High cholesterol, Back problems, Lower life expectancy, Sleep apnea</td>
</tr>
</tbody>
</table>
Figure 1.1: Study 1- Consequence Type
Figure 1.2: Study 1 - Perceived Temporal Distance

Figure 1.3: Study 1 - Perceived Vulnerability
Figure 1.4: Study 2- Perceived Vulnerability

Figure 1.5: Study 2- Perceived Temporal Distance
Figure 1.6: Study 3 - Perceived Temporal Distance

Figure 1.7: Study 3 - Perceived Vulnerability
Figure 1.8: Study 3- Intentions to Quit Smoking
CHAPTER 2: BEYOND INTENTIONS: HOW EMPHASIZING SOCIAL CONSEQUENCES IN HEALTH MESSAGES LEADS TO LESS FAVORABLE CONSUMPTION EXPERIENCE
ABSTRACT

This research examines the effects of warning messages that emphasize the social consequences of negative health outcomes and demonstrates that when social (versus health) consequences are highlighted it will alter perceptions of experiences long after the message is viewed. These perceptions include the evaluation of text messages sent while driving (study 1) and perceptions of sunscreen (study 2). These findings suggest that there may be an alternate route to influencing long-term behavior change – altering consumption experiences through exposure to warning messages.

INTRODUCTION

Health care in the United States costs around 3 trillion dollars every year and with epidemics such as obesity on the rise this figure is set to increase dramatically in the coming years. Many of the health issues that people face can be minimized by making healthier choices. Oftentimes consumers are well-informed and intend to change behavior but do not follow through. This can be especially true when individuals want to change long-term health outcomes (e.g. prevent diabetes).

In order to inform and persuade consumers, governments at all levels implement health messages and warning labels. Specific tactics have been identified and continue to be identified that increase the effectiveness of health-related messages (Keller and Lehmann 2008) and help tailor messages to specific populations (Andreasan 2006). For example, research has demonstrated that graphic warnings substantially outperform text-only warnings in terms of increasing thoughts about quitting smoking (Andrews et al. 2014). However, it is much more difficult to document significant behavior changes over
time and many of these tactics that influence attitudes and intentions may not be effective in influencing long term behavior change.

In the first essay of this dissertation I investigate one such tactic and find that when social (vs. health) consequences are added to a warning label, individuals see negative health outcomes as more temporally proximate and more likely. Thus, the addition of social consequences can influence risk perceptions, but further research is required to identify if these increased risk perceptions will result in long-term behavior change or preference change.

This research examines how the addition of social consequences to warning labels can influence perceptions of experiences. Because the link between intentions and behavior can be weak, this research seeks to identify an alternate route to influence long-term behavior change. Specifically, I investigate how the consequence type highlighted in a warning messages influence perceptions of experiences (e.g. texting while driving) and perceptions of products (e.g. sunscreen). I find that individuals that view warning labels that highlight social consequences have less favorable consumption experiences with related behaviors/products.

Consumer perceptions of product experience have been shown to have important implications for consumer attitudes and decision making (e.g. Hoch and Ha 1986, Deighton 1984). Consumer experiences are especially important to marketers because perceptions of such experiences are often malleable and easily influenced using marketing tools such as advertising (Braun 1999). I extend this stream of research and suggest that warning messages may have delayed effects on the perception of the target behaviors depicted in these warning messages. To the best of my knowledge, no prior
work has considered consumer perceptions of experience as an outcome of warning messages.

Two studies support my prediction that pairing social consequences with health outcomes will influence perceptions of experience. In study 1, I demonstrate that when a negative health outcome (i.e. severely injuring yourself because of texting while driving) is presented and the social (vs. health) consequences are considered, participants have a more negative evaluation of text messages sent while driving. In study 2, I replicate the findings from study 1 in a different domain (i.e. sunscreen use) and with a longer delay period (4 days). The results indicate that participants will have more favorable perceptions of sunscreen after considering the social consequences of skin damage. Interestingly, these effects are documented after a delay, which illustrates the enduring nature of the impact of highlighting social consequences in warning messages. In addition, I present a preliminary study that highlights a memory advantage for health-focused messages when participants consider the social consequences of their health-related behavior.

**intentions and behaviors**

Commonly used models in health promotion research such as the health belief model (Hochbaum, Rosenstock, & Kegels 1952) and the theory of planned behavior (Ajzen 1991) represent a systematic over-reliance on intention measures while other important drivers of behavior change go under-researched. While the effects found on behavioral intentions in studies presented in essay 1 are encouraging, in this essay I examine whether the effects of social consequences could extend to attitudinal measures and actual consumption experience perceptions. Since past research has suggested that
over reliance on intention measures is not desirable because the intention-behavior link is often weak or nonexistent (Sutton 1998; Scholz et al. 2008) and intentions may only explain 28% of the variance in behavior (Sheeran 2002), I decided to use a different measure to assess the effectiveness of warning messages and add to the robustness of my findings—perceptions of experience.

Most warning messages emphasize long-term health consequences (e.g., lung cancer) but individuals don’t think they are at risk (e.g., smokers optimism) because the health outcomes seem so far away. In addition, health message researchers often measure intentions immediately after exposure to the warning message to measure the effectiveness of the message. However, in many cases intentions do not lead to long-term behavior change. This situation presents two unique opportunities for improvement. First, this research suggests that looking at other types of message components other than temporal framing in order to bring negative health consequences closer can be fruitful. In particular utilizing social consequences in warning messages targeted at adults could be effective at reducing the favorability of delayed consumption experiences.

Second, the following studies illustrate the importance of looking beyond intentions to determine the effectiveness of health campaigns and to understand the most appropriate ways to change long-term behavior, especially among those with low intentions to change. Thus, this research suggests an alternate route to behavior change that can operate through intentions or around intentions. Specifically, I expect that warnings that highlight social (vs. health) consequences could prove to be more effective at decreasing the favorability of delayed experience. In addition, I propose that attitudes toward a behavior change over time in social but not the health condition.
STUDY 1

Design and Procedure

This study tests my prediction that emphasizing social consequences can have a delayed effect on perceptions of experience even if measures of behavioral intentions measured immediately after exposure to a health message do not differ between health messages that emphasize health versus social consequences.

The study was a 2 (social vs. health consequences) cell between subjects design and was administered in two separate parts. Seventy-seven members of an online panel participated in the first section. In both conditions participants watched a two-minute video entitled “An instant can change your life – the Wil Craig story,” which highlights the story of a person that suffered severe injuries due to an accident which he caused by texting while driving. After watching the video, participants were instructed to “think about and list all of the social (vs. health) consequences of severely injuring yourself because you were texting while driving.” Thus, rather than explicitly highlighting either social or health consequences participants generated a list of consequences.

Approximately 48 hours after completing the first study, participants were given the opportunity to take part in a follow-up survey for additional compensation. In this section of the study participants reported their texting behavior and perceptions of their last experience of texting while driving. Forty-four participants completed the Part II follow-up survey resulting in a dropout rate of 43%. An analysis of the dropout rate revealed no significant differences across the two experimental conditions (p > .05).

Dependent Measures
In Part I, I measured overall evaluation of the health warning video (6-item scale; \( \alpha = .84 \)) and intention to reduce texting while driving (single item measure). I also measured respondents’ gender, overall health status, and frequency of texting. None of these measures had any significant effects on the dependent variables, and are hence not referred to further.

In Part II, my dependent measures investigated how participants perceived the last text they sent while driving. More specifically, I asked participants to think back to the last text they sent while driving and to rate it on a series of scales (e.g. 7-point scale ranging from bad to good) and to think about how they felt while sending the text (e.g. 7-point scale ranging from ashamed to proud). I also measured attitudes towards texting while driving (\( \alpha = .88 \)) and attitudinal confidence (\( \alpha = .94 \)).

**Results**

An analysis of variance with consequence type (social versus health) as the independent variable revealed no differences on the dependent measures in part I for ad evaluation (F (1, 43) = 1.67, \( p > .05 \)) and intentions to reduce texting while driving (F (1, 43) = 0.168, \( p > .05 \)). Furthermore, attitudes toward texting while driving (F (1, 43) = 0.037, \( p > .05 \)) and attitude confidence (F (1, 43) = 0.01, \( p > .05 \)) showed no significant differences.

However, in Part II, when participants reflect on the last text they sent while driving they view the experience and the text itself in different ways. There was a main effect of consequence type on perceptions of the bad/good nature of the text sent (\( M_{social} = 2.80, M_{health} = 3.84; F (1, 43) = 5.71, p = .021 \)). Those in the social condition viewed the text as less good than those in the health condition. Furthermore, when asked about how
well thought out the text was, participants in the social condition indicated that the text was not well thought out, whereas those in the health condition indicated that the next was more well thought out ($M_{social} = 2.60$, $M_{health} = 3.92$; $F (1, 43) = 10.59$, $p = .002$).

Attitudes toward texting while driving as measured in the follow-up are significantly different ($M_{social} = 1.08$, $M_{health} = 1.37$; $F (1, 43) = 4.613$, $p = .037$). Attitudes toward texting while driving decreased significantly over time for participants in the social condition ($M_{social\_initial} = 1.55$, $M_{social\_follow-up} = 1.08$; $F (1, 19) = 7.410$, $p = .014$), but not for participants in the health condition ($M_{health\_initial} = 1.59$, $M_{health\_follow-up} = 1.37$; $F (1, 24) = 0.036$, $p = .852$).

Thus the type of consequence associated with a health message may have long-lasting effects that alter an individual’s perception of a text written while driving. If health messages can influence drivers in a way that alters their perceptions of unhealthy behaviors, perhaps they will be less likely to engage in these behaviors. Specifically in this case, drivers may be less likely to text when driving if they recognize that their texts are not well thought out. They may choose to wait in order to send a better text.

**Study 2**

The previous essay documented differences in perceived vulnerability, temporal proximity, attitudes, and favorability of consumption experiences between warning messages paired with social consequences and warning messages paired with health consequences. This research suggests a relationship between temporal proximity and vulnerability, whereby increased temporal proximity increases perceived vulnerability, which in turn leads to increased persuasiveness of the message.

*Design and Procedure*
The objective of the study was to examine whether the effects of emphasizing social consequences on perceived vulnerability and experience would persist after a longer delay between the health message and actual experience. In an attempt to further generalize my previous findings, I also chose a different domain – sun protection. The study was a 2 (social versus health consequences) cell between subjects design and comprised two parts. Undergraduate students enrolled in a marketing course participated in the first part of the study in return for course credit. They were informed that the study was an advertising evaluation study and were shown a set of 6 ads. The target ad was an ad ostensibly from the CDC and was adapted from actual health communications put forth by the CDC as part of the “Choose your cover” campaign (Appendix A). Respondents were given 30 seconds to view each ad in order to control exposure and elaboration time. In order to promote the cover story about ad evaluations, respondents answered different questions after each ad and the questions about the sun protection ad constituted my dependent measures in Part I. My manipulation of the type of consequence was similar to studies 2 and 3 with respondents having to generate as many social (versus health) related consequences of skin damage.

Four days after completing the first part of the study, the same students were given a chance to participate in an ostensibly unrelated study for course credit. In this part of the study, they were given a 1.5 gram sample of sunscreen to try and their opinions about the sunscreen were solicited. The sunscreen brand was Be Smart. No advertisement for the brand was provided; only a single use sample was given to the respondents. The use of sunscreen as my target product is a very subtle and conservative measure of the effectiveness of the message since the message advocated several target behaviors.
including using hats, sunscreen, sunglasses and long sleeved clothing. Thus, respondents could easily alter behaviors other than sunscreen use to comply with the message. Following their use of the sunscreen, respondents answered questions about their experience with the product and reported their attitudes and attitude confidence about sunscreens. 43 students completed both parts of the study (56% female).

**Dependent Measures**

In Part I, my dependent measures included the same set of measures that I used in previous studies including temporal proximity of skin damage ($\alpha = .93$), perceived vulnerability to skin damage ($\alpha = .74$), perceived severity of skin damage ($\alpha = .94$) and intention to protect skin against skin damage (single item scale). All measures utilized 7-point scales.

In Part II, my dependent measures included perceptions of experience with the sunscreen (3-item scale; enjoyable, good, nice; $\alpha = .89$), attitudes towards sunscreens ($\alpha = .89$) and attitudinal confidence ($\alpha = .82$) – Appendix B.

**Results**

An analysis of variance with consequence type (social versus health) as the independent variable revealed the expected significant main effect of type on temporal proximity ($F (1, 41) = 5.53, p < .05$) and perceived vulnerability ($F (1, 41) = 4.78, p < .05$) and a marginally significant effect on intention to protect skin ($F (1, 41) = 3.51, p = .06$) such that social consequences elicited greater vulnerability and intention to protect but lower temporal proximity than health consequences. These effects replicate my previous findings and further support my hypotheses.
Of greater interest to me, a similar analysis of variance for the dependent measures collected in part II also revealed the expected main effect of consequence type on experience perceptions \( (F(1, 41) = 4.18, p < .05) \) and attitude confidence \( (F(1, 41) = 4.11, p < .05) \), with no significant effects on attitudes towards sunscreens \( (F(1, 41) = 1.06, p > .1) \). A consideration of the pattern of means revealed that social consequences resulted in more favorable perceptions of the experience of the sunscreen and significantly greater attitudinal confidence, but no difference in attitudes. The lack of a significant difference in attitudes may be attributed to a ceiling effect with uniformly high attitudes across both conditions \( (M_{\text{social}} = 6.35, M_{\text{health}} = 6.07) \).

**Mediation analysis.** A mediation analysis using Process (Model 4) with consequence type as the independent variables, perceived vulnerability as the dependent variable and temporal proximity as the mediator revealed a significant effect of temporal proximity alone \( (B = -.32, t = -3.29, p < .05, 95\% \text{ CI } [-.49, -.15]) \) with the effects of consequence type on vulnerability reduced to non-significance \( (B = .14, t < 1, 95\% \text{ CI } [-.58, .87]) \). This supports my contention that the effects on perceived vulnerability are mediated by perceived temporal proximity of the health outcome.

A second mediation analysis using intention to protect skin as the dependent variable, perceived vulnerability as the mediator and consequence type as the independent variable revealed only a significant effect of vulnerability \( (B = .9, t = 5.44, p < .05, 95\% \text{ CI } [.62, 1.3]) \), with the effects of consequence type reduced to non-significance \( (B = 1.3, t < 1, 95\% \text{ CI } [-.08, 1.08]) \), suggesting that the effect of consequence type and temporal proximity on behavioral intentions is mediated by vulnerability to the outcome.
A similar analysis using attitude strength as the dependent variable also revealed a similar pattern of findings with a significant effect of vulnerability ($B = .36, t = 2.94, p < .05, 95\% \text{ CI} [.11, .62]$) and the effects of consequence type reduced to non-significance ($B = .36, t < 1, 95\% \text{ CI} [-.28, -1.01]$), further providing support for my contention that perceived vulnerability of the outcome underlies my effects.

A final mediation analysis using perceptions of experience as the dependent variable and vulnerability and intentions to protect skin as the mediators revealed significant effects of both intentions to protect skin ($B = -.32, t = -2.04, p < .05, 95\% \text{ CI} [-.64, -.002]$) and vulnerability ($B = .55, t = 2.30, p < .05, 95\% \text{ CI} [.06, 1.03]$) with no significant effects of consequence type ($B = .47, t = 1.03, p > .1, 95\% \text{ CI} [-.45, 1.41]$). Thus, temporal proximity enhances perceived vulnerability leading to greater intentions to protect skin and consequently greater enjoyment of the actual sunscreen experience.

Discussion

The results of study 2 are significant in establishing that the advantages of using social consequences in health warning messages extend beyond the traditional quit intention measures and impact attitudinal confidence as well as actual product experience. These findings also document that the favorable effects of highlighting social consequences of a health outcome can persist even with a delay (4 days) between message exposure and measurement of perceptions, as well as be elicited in a context that is relatively separate from the health message; my health message advocated skin protection while the target product was a specific form of skin protection, namely sunscreen. This is different from my previous studies where the product context was
identical to the advertising context and suggests that the effects of social consequences may be generalizable to contexts associated with a general health message.

The finding that perceptions of a target product can be impacted by the consequence type used in the warning message is intriguing since it significantly expands the range of variables to consider while assessing the effectiveness of warning messages beyond attitudes and behavioral intentions.

**GENERAL DISCUSSION**

A unique contribution of my work is its focus on consumer experience as a dependent variable. Prior research on warning messages has focused on behavioral intentions as the key indicator of message effectiveness, but has also showcased the limitations of using a dependent measure that may not translate into long-term behavioral change (Sheeran 2002). I address this issue by considering the effects of warning messages on consumer perceptions of product experience (Hoch and Ha 1986). To the best of my knowledge, my research is the first to document the effects of warning messages on consumer perceptions of experience, thereby providing an important and alternate pathway to persuasion in the context of health warning messages.

This research investigates how framing the consequences of a negative health outcome that is highlighted in a warning a message can affect perceptions of consumption experiences. More specifically, I illustrate that when the social consequences of negative health outcomes are highlighted individuals feel more vulnerable to health outcomes and see them as more temporally proximate. This effect (social consequences increasing proximity) has enduring qualities that persist over long periods of time (i.e. up to 4 days) and influence the perceptions of experience. More
specifically, when individuals are exposed to a message that highlights social consequences they will have experience a more negative consumption experience. Relevant boundary conditions such as user health status and length or delay are explored and documented as well.

Two studies provide initial support my prediction that pairing social consequences with health outcomes will influence perceptions of experience. In study 1, I demonstrated that when a negative health outcome (i.e. severely injuring yourself because of texting while driving) is presented and the social (vs. health) consequences are considered, participants have a more negative evaluation of text messages sent while driving. In study 2 I replicated the findings from study 1 in a different domain (i.e. sunscreen use) and with a longer delay period (4 days). The results indicate that participants will have more favorable perceptions of sunscreen after considering the social consequences of skin damage. Interestingly, these effects are documented after a delay, which illustrates the enduring nature of the impact of highlighting social consequences in warning messages.

The results of these studies have important theoretical and practical implications. This research demonstrates that highlighting the social consequences of negative health outcomes can influence individuals’ perceptions of consumption experiences. Given that intentions may not reliably work for a variety of established message tactics this research suggests and alternate measure of the effectiveness of a warning message.

In an additional preliminary study, I find that participants perform significantly better on cued recall tasks about the warning message when they consider the social consequences rather than health consequences of excessive sugar consumption. Thus
individuals were able to better recall important components of the message which could explain sustained advantages over time of social messages.

Theoretical Contributions

This research adds to research on message tactics (Keller and Lehmann 2008), time and intentions (Sheeren 2002), and consequences of warning messages (Witte 2000) by investigating the process by which various consequences can influence an individual’s perception of consumption experiences.

Further, while research has documented the importance of message tactics (e.g. Keller and Lehmann 2008) my work is the first to link increased risk perceptions from the consideration of social consequences to perceptions of consumption experiences. Thus, this research illustrates the delayed consumption experiences can be a new way of measuring the effectiveness of warning messages and suggests that these less-favorable consumption experiences could have a dramatic impact on subsequent behavior.

Future Research

The current research documents the effects only among select consumption experiences. Thus future research could identify if changes in perception occur in a variety of domain or only among certain types of behaviors (e.g. consuming food). Additionally, it will be important to identify if less favorable evaluations of a particular product will span across the entire product category or if they will be product specific. For example, if someone has a series of less favorable experiences drinking soda will they switch from soda to juice or just to another type of soda (e.g. switch from cola flavored to fruit flavored soda).
Furthermore, additional research is needed in order to identify the process by which these effects occur. Findings from a preliminary study suggest that messages that emphasize social (vs. health) consequences may have a memory advantage, which could explain the differences delayed consumption experience.

Practical Implications

This research attempts to provide specific recommendations to public policy makers and companies regarding the way health warning messages should be constructed for maximum effectiveness and to provide a theoretical contribution health risk literature by documenting how perceived temporal proximity and perceived vulnerability can impact perceptions of experience. More specifically, this research identifies critical message attributes that marketers can use in order to alter the perceptions of experience, which should increase the likelihood of a long-term behavior change. This research echoes the suggestion of Connor & Armitage (1998), that additional variables other than intentions should be studied in order to identify the best ways to initiate long-term behavioral change.
Table 2.1: Results of Study 2

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Consequence type</th>
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<th></th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>Temporal distance</td>
<td>5.07 (2.05)</td>
<td>3.57 (2.07)</td>
<td></td>
</tr>
<tr>
<td>Perceived vulnerability</td>
<td>4.56 (1.18)</td>
<td>5.31 (1.14)</td>
<td></td>
</tr>
<tr>
<td>Perceived severity</td>
<td>5.92 (1.10)</td>
<td>6.59 (0.86)</td>
<td></td>
</tr>
<tr>
<td>Attitudes</td>
<td>6.07 (0.85)</td>
<td>6.35 (0.94)</td>
<td></td>
</tr>
<tr>
<td>Attitude strength</td>
<td>5.63 (1.05)</td>
<td>6.27 (0.97)</td>
<td></td>
</tr>
<tr>
<td>Experience perceptions</td>
<td>4.32 (.97)</td>
<td>4.83 (.82)</td>
<td></td>
</tr>
</tbody>
</table>

*Figures in parentheses are standard deviations

Table 2.2: Examples of Consequences Listed by Participants

<table>
<thead>
<tr>
<th>Chapter 2 Study 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples of the social consequences of</td>
<td></td>
</tr>
<tr>
<td>excessive UV exposure that participants</td>
<td></td>
</tr>
<tr>
<td>listed:</td>
<td></td>
</tr>
<tr>
<td>Leathery skin</td>
<td></td>
</tr>
<tr>
<td>Judgment from people</td>
<td></td>
</tr>
<tr>
<td>Being ugly</td>
<td></td>
</tr>
<tr>
<td>Cannot participate in activities</td>
<td></td>
</tr>
<tr>
<td>Cannot go outside</td>
<td></td>
</tr>
<tr>
<td>Self-conscious around others</td>
<td></td>
</tr>
<tr>
<td>Wrinkles</td>
<td></td>
</tr>
<tr>
<td>Examples of the health consequences of</td>
<td></td>
</tr>
<tr>
<td>excessive UV exposure that participants</td>
<td></td>
</tr>
<tr>
<td>listed:</td>
<td></td>
</tr>
<tr>
<td>Skin cancer</td>
<td></td>
</tr>
<tr>
<td>Death</td>
<td></td>
</tr>
<tr>
<td>Sun burn</td>
<td></td>
</tr>
<tr>
<td>Blisters</td>
<td></td>
</tr>
<tr>
<td>Other cancers</td>
<td></td>
</tr>
<tr>
<td>Sun poisoning</td>
<td></td>
</tr>
<tr>
<td>Psoriasis</td>
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</table>
Figure 2.1: Study 5- Perceived Vulnerability

Figure 2.2: Study 5- Perceived Vulnerability
Figure 2.3: Study 5- Perceived Temporal Distance

![Perceived Temporal Distance](image1)

Figure 2.4: Study 5- Intentions to Protect Skin

![Intentions to Protect Skin](image2)
CONCLUSION

This research attempts to provide specific recommendations to public policy makers and companies regarding the way health warning messages should be constructed for maximum effectiveness and to provide a theoretical contribution to psychological distance literature by illustrating how psychological distance influences health-related behaviors. More specifically, this research identifies critical message attributes that marketers can use in order to alter the perceived psychological distance until the negative health outcomes, which will increase the susceptibility of the negative health outcome resulting in less favorable consumption experiences. Furthermore, these studies suggest that there may be alternate routes to influences behavior other than through intentions. Specifically, if warning messages can alter perceptions of experience perhaps they can be more effective at changing behavior than messages that attempt to change intentions.

This research identifies a unique way of pairing health outcomes (e.g. obesity) with social consequences rather than simple presenting health or social outcomes and documents how such a a simple strategy can significantly enhance the effectiveness of the warning message by increasing perception of risk. Because this research suggests a simple tactic that could be easily implemented in a variety of health communication strategies it has of the enormous potential for good and adds to the work of other researchers who have spent years identifying ways to improve warning messages. In addition to documenting this effect I also identify relevant boundary conditions and
moderators to help public policy makers make better decisions of when to implement this type of message.

In addition to documenting how social consequences influence the temporal proximity and perceived vulnerability of negative health outcomes, this research suggests that there may be alternate routes to influence behavior other than through intentions. Prior research examining the relationship between intentions and behavior is often overly dependent on intentions as a predictor of behavior change. This is especially true given that intentions explain such as small amount of the variance in behaviors (Sheeran 2002). Past research has suggested that other variables besides intentions can have an important impact on behavior and require further investigation (Connor & Armitage 1998). The current series of studies suggests an alternate route by which behavior change may occur, namely, through altering consumption experiences via exposure to warning messages. Specifically, by being exposed to warning messages that highlight the social consequences of a health outcome, individuals may have less favorable consumption experiences, and, over time, may modify behavior.
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APPENDIX A- DEPENDENT MEASURES

Pretest Measures
Health Consequences used in the pretest
Diabetes, Ulcers, Hypertension, Heart disease, Osteoarthritis, Stroke, High cholesterol, Cancer
Social Consequences used in the pretest
Social isolation, less confidence in social settings, ill-fitting clothes, unattractiveness, being judged negatively by others, less respect from others, fewer romantic relationships, flabby arms

Temporal proximity
For each of the following consequences of obesity, we are interested in how long it takes for each consequence to develop. Please rate each outcome on a scale of 1 to 7 where 1 = Not long At All and 7 = Very Long.

For each of the following consequences of obesity, we are interested in how far away the following outcomes seem to you. Please rate each outcome on a scale of 1 to 7 where 1 = Not Far At All and 7 = Very Far.

Severity
For each of the following consequences of obesity, we are interested in how serious you think each consequence is. Please rate each outcome on a scale of 1 to 7 where 1 = Not at all serious and 7 = Very serious.

Vulnerability
For each of the following consequences of obesity, we are interested in how you rate the likelihood of someone similar to you experiencing that particular consequence. Please rate each outcome on a scale of 1 to 7 where 1 = Very unlikely and 7 = Very likely.

Study 1 Measures
Perceived temporal proximity,
How far away does gingivitis seem to you (0- not far at all, 100 – very far)
How long does the time period between now and when you could start developing gingivitis seem to you? (0-not long at all, 100- very long)
How distant in the future does gingivitis seem to you (-not distant at all, 100 – very distant)
Perceived vulnerability
How concerned are you about getting gingivitis? (1-not at all concerned, 7- extremely concerned)

How likely do you think it is that you will get gingivitis? (1-very unlikely, 7- very likely)

How likely do you think it is that not flossing will give you gingivitis (1-very unlikely, 7-very likely)

**Perceived Severity**
I believe that gingivitis is severe. (1- strongly disagree, 7 – strongly agree)
I believe that gingivitis is serious. (1- strongly disagree, 7 – strongly agree)
I believe that gingivitis is significant. (1- strongly disagree, 7 – strongly agree)

**Importance of Health/Social Life**
Please rate how important each of the following dimensions is to you:
Your health (1-not at all important, 7- Very Important)
Your social life (1-not at all important, 7- Very Important)

**Imagery**
We would like your opinion on the warning that you saw on the previous page. Please rate it on the following scales:(Not imagery provoking , 7- Imagery provoking), (1- dull, 7-vivid), (1-boring, 7 interesting), (1-Irrelevant, 7-relevant), (1-Not at all believable, 7 – Very believable)

**Fear**
Please indicate how that warning made you feel.(1-not fearful at all, 7-very fearful), (1-not anxious at all, 7- very anxious), (1-not nervous at all, 7-very nervous)

**Study 2 Additional Measures**

**Novelty**
The warning message I saw previously is unconventional/original/new/modern (1-Totally disagree, 7- Totally agree).

**Mood**
At this moment, to what extent are you experiencing the following emotions:
Happy/Angry/Pleasant/Sad/Delighted/Glad/Unpleasant/Distressed (1- Not at all, 10- Extremely).

**Vividness and Imagery**
We would like your opinion on the health warning video that you saw on the previous page. Please rate it on the following scales.
(1- Dull, 7 – Vivid), (1- Not imagery provoking, 7- imagery provoking)

**Perceived temporal proximity**
How far away do the negative health consequences of soda consumption seem to you? (0-not far at all, 100 very far).

**Study 5 Additional Measures**

**Attitude toward sunscreen**
In general using sunscreen is: 1 - Bad, 7 – Good, Negative, 7 – Positive, Unfavorable, 7 – Favorable, Undesirable, 7 – Desirable

**Attitude strength**
How strongly do you hold the opinion about using sunscreen that you reported in the previous question? (1-not at all strongly, 7-very strongly)
How confident are you in your opinion of using sunscreen? (1-not at all confident, 7-very confident)
How certain are you in your opinion of using sunscreen? (1-not at all certain, 7-very certain)
Product Experience Scale
Please rate the sunscreen on the following scales:
1- Not at all enjoyable; 7 - Very enjoyable, 1- Bad, 7 – Good; 1- Awful, 7 - Nice
APPENDIX B- STIMULI

ESSAY 1, STUDY 1 STIMULI

ESSAY 1, STUDY 2 STIMULI
https://www.youtube.com/watch?v=F4t8zL6F0c&feature=youtu.be
ESSAY 1, STUDY 3 STIMULI

Health + Social Condition

Health + Health Condition

Social + Social Condition

Social + Health Condition

Social Condition

Health Condition
ESSAY 1, STUDY 4 STIMULI

Social, Temporal Frame

Thousands of Americans are diagnosed with skin cancer every day

Unprotected UV exposure can lead to skin cancer, making your skin leathery, wrinkled and ugly which can adversely affect your social life.

COVER UP! USE SUNSCREEN!

Health, Temporal Frame

Thousands of Americans are diagnosed with skin cancer

Unprotected UV exposure can lead to skin cancer, damaging your skin cells and weakening your immune system, which can adversely affect your health.

COVER UP! USE SUNSCREEN!

Social, No Frame

Thousands of Americans are diagnosed with skin cancer

Unprotected UV exposure can lead to skin cancer, making your skin leathery, wrinkled and ugly which can adversely affect your social life.

COVER UP! USE SUNSCREEN!

Health, No Frame

Thousands of Americans are diagnosed with skin cancer

Unprotected UV exposure can lead to skin cancer, damaging your skin cells and weakening your immune system, which can adversely affect your health.

COVER UP! USE SUNSCREEN!
ESSAY 2, STUDY 1 STIMULI

https://www.youtube.com/watch?v=p-hW99LWCAw

ESSAY 2, STUDY 2 STIMULI