THE EFFECTS OF MESSAGE FRAMING ON FOOD CHOICE

by

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Abstract

As unhealthy eating habits and nutrition-linked health problems continue to pose significant public health concerns, understanding the effects of health communications has become crucial in promoting healthier food choices. The current research sought to understand the effectiveness of message framing and evidence type on food choice. The current study exposed participants to messages that described either the gains associated with eating healthy foods, the losses associated with eating unhealthy foods, or non-nutritional messages. Messages also manipulated whether they conveyed information using a narrative or statistical format. Data from the 3 (message framing: gain-framed, loss-framed, and control) x 2 (evidence type: statistical versus narrative) between-subject design showed that both gain-framed and loss-framed conditions promoted more healthy food choices than the control conditions. However, manipulating the evidence type did not persuade participants to make healthier food choices. Moreover, the results did not identify a significant interaction between message framing and evidence type. Implications of the current study are useful for understanding how health communication messages can influence people's food choices, and aid policymakers in developing persuasive health communication campaigns.

Keywords: message framing, food choice, eating behaviour, prospect theory, exemplification theory, health-communications.

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1 Chapter 1: Introduction

General Overview

The average Canadian does not consume a diet that supports optimal health (Bacon et al., 2019; Health Canada, 2012). As energy-dense high-fat foods have become readily accessible and inexpensive, the prevalence of nutrition-linked health problems (NLHPs), such as obesity and cancer has significantly increased (WHO, 2021). Obesity has risen for both Canadian men (17.9%) and women (16.8%) between the years 2003 and 2012 (Navaneelan & Janz, 2014). Currently, 1 in 4 (26.8%) Canadian adults are obese, and, if current dietary trends continue, by 2031, 1 in 3 Canadians will be affected by obesity (Bancej et al., 2015; Statistics Canada, 2019). The chronic consumption of unhealthy foods has contributed to increased national mortality rates and placed unwanted pressure on healthcare systems (WHO, 2021). Considering the growing public health concern, educational campaigns were launched in an effort to persuade adults to begin consuming healthier diets (WHO, 2021). However, the lack of behavioural change following these campaigns suggested that further research is needed in the realm of effective public health communications targeting food choices to bolster these campaigns' effectiveness (Gill & Boylan, 2012; Nagler, 2013). Research further indicates that consumers felt cynicism towards nutritional campaigns due to competing, confusing, vague, and contradictory information being presented (Spiteri et al., 2015). This forced consumers to seek information elsewhere from appealing yet potentially unreliable sources (Spiteri, et al., 2015).

Accordingly, the present study investigated the effects of health communication messages on food choice to determine how message construction can be bolstered, and better influence the effectiveness and persuasiveness of dietary consumption information. Ultimately,

findings provided by this study aim to help consumers make healthier food choices which would potentially lead to decreases in the health concerns associated with consuming an unhealthy diet, and lessen healthcare burdens.

Dietary Consequences

To maintain optimal health, individuals should avoid chronic overconsumption of foods containing high levels of saturated and trans fats, increased sugar content, and excessive levels of sodium (Cena, & Calder, 2020). Consuming an adequate intake of fruits, vegetables, fibres, seeds, grains, nuts, and micronutrients is essential to maintaining individual health, and promoting the prevention of NLHPs (Cena, & Calder, 2020). Globally, as of 2017, the average consumption of nearly all healthy foods was significantly below recommended dietary baselines, while the global daily consumption of unhealthy foods greatly exceeded suggested thresholds (Afshin et al., 2019). This pattern is prevalent in Westernized societies where energy-dense, high-fat foods are readily accessible, promoted through advertising, and relatively inexpensive compared to healthier foods (Haidar & Cosman, 2011).

Eating an unhealthy diet has been linked to numerous adverse health outcomes that impact diverse populations (WHO, 2021). According to the World Health Organization (WHO, 2021), the consumption of unhealthy foods has reached epidemic levels, as approximately 1.9 billion adults aged 18 years and older are overweight, and 650 million people are clinically obese (WHO, 2021). As increasing proportions of individuals are engaging in chronic unhealthy eating habits, the prevalence of NLHPs such as heart attacks, strokes, respiratory diseases, musculoskeletal diseases, diabetes, and cancer remains high (WHO, 2021). These groups of

diseases account for over 70% of premature non-communicable disease (NCD) deaths worldwide (WHO, 2021).

Although established environmental and genetic contributors have been identified as risk factors for NLHPs, modifiable lifestyle choices such as eating habits contribute significantly to the development of NLHPs at the individual level (Cena & Calder, 2020). Poor dietary choices increase an individual's risk of developing hypertension, inflammation, hypercholesterolemia, and obesity, which in turn, is associated with an increased risk of developing diseases associated with heightened morbidity and mortality (Koene et al., 2016). NLHPs associated with the chronic consumption of unhealthy foods kill approximately 41 million people each year, representing 71% of all deaths globally (WHO, 2021). Cardiovascular disease accounts for the highest proportion of annual NLHP deaths at approximately 17.9 million, followed by cancer (9.3 million), respiratory diseases (4.1 million), and diabetes (1.5 million) (WHO, 2021). By 2030, estimates indicate that NLHPs will account for approximately 52 million deaths annually (Marrero et al., 2012). This estimate is five times the projection of deaths resulting from communicable diseases, but may be mitigated if populations begin making positive dietary changes (Marrero et al., 2012).

The health concerns associated with NLHPs have placed an unwanted burden on individuals and healthcare systems (Tremmel et al., 2017). At the individual level, healthcare costs associated with treating diseases stemming from chronic unhealthy eating habits have the potential to deplete household resources. Costs include treatment, which is typically lengthy and expensive, and the loss of income (WHO, 2021). At the institutional level, healthcare systems face unprecedented economic pressures, as health complications due to unhealthy diets have risen (WHO, 2021). In 2014, the global economic impact of obesity alone was estimated to be

2.0 trillion dollars USD (Tremmel et al., 2017). Research conducted in Canada has provided similar estimates of the economic burdens created by excessive unhealthy eating habits (Lieffers, Ekwaru, Ohinmaa, & Veugelers 2018). Lieffers and colleagues (2018) estimated that in 2014, 13.8 billion dollars CAD were allocated to direct healthcare costs (e.g., hospitalization, drug, and physician costs) and indirect healthcare costs (e.g., lost productivity due to disability, morbidity, and premature mortality) associated with eating a poor diet (Lieffers et al., 2018). This represents a substantial increase in spending over the past two decades as Health Canada estimated that the cost of unhealthy eating habits was only 6.6 billion dollars CAD in 1998 (Lieffers et al., 2018). This trend will continue to increase if appropriate measures are not taken to effectively inform populations about the potential health and institutional consequences associated with long-term poor eating habits in a way that changes these habits for the better (Lieffers et al., 2018).

Message Framing in Health Communication

To reverse this trend, people must be persuaded to alter their behaviour and begin consuming healthier foods. Although multidisciplinary preventative policies are currently being implemented, the increasing prevalence of individuals consuming unhealthy foods suggests that further research is needed in the realm of dietary health communications (Balcetis, Manivannan, & Cox, 2020). Health communication campaigns have proven to be effective in reducing harmful behaviours such as smoking cigarettes (Schneider et al., 2001; Goodall & Appiah, 2008) binge drinking, (Churchill et al., 2016), HIV/AIDS transmission, (Apanovitch, McCarthy, & Salovey, 2003) and cancer risk (Ainiwaer, Zhang, Ainiwaer, & Ma, 2021), but conclusive evidence on effective messages to reduce unhealthy eating habits are unclear (Wirtz &

Kulpavaropas, 2014). An important task is to develop applicable and innovative nutritional communication campaigns that reliably aid individuals to make informed dietary choices.

Currently, health communication research focuses on message framing, which highlights the context and approach that is used to construct information (Carfora et al., 2022). Research indicates that responses to identical messages can differ significantly depending on the construction of the presented information (Churchill et al., 2016; Goodall & Appiah, 2008; Schneider et al., 2001). Therefore, the present study sought to determine which message frames and evidence formats were effective in promoting healthy dietary choices. To accomplish this, strategies were drawn from prospect theory and exemplification theory comparing gain versus loss-framed messages, and narrative versus statistical formats.

Prospect Theory

Prospect theory postulates that the persuasiveness and effectiveness of a message is influenced by how it is framed (Kahneman & Tversky, 1979). Originally, Kahneman and Tversky (1997) proposed that individuals evaluate messages differently, based on the potential gains or losses associated with the outcome (Kahneman & Tversky, 1979). According to prospect theory, two conventional types of message frames influence people's decision-making processes (Kahneman & Tversky, 1979). The first type is gain-framed messages, which highlight the benefits associated with engaging in a behaviour (Kahneman & Tversky, 1979). The second is loss-framed messages, which highlight the negative risks or losses associated with failing to engage in a self-protective behaviour (Kahneman, & Tversky, 1979). For example, a gain-framed message would state, eating a healthy diet is associated with increased life expectancy and an

overall improvement in health, highlighting the benefits an individual can experience while undertaking a health-promoting behaviour (Kahneman, & Tversky, 1979). Conversely, a loss-framed message would state that eating an unhealthy diet and failing to meet dietary recommendations is associated with negative life outcomes, such as obesity, or increased risk for developing cardiovascular disease (Kahneman & Tversky, 1979). Kahneman and Tversky (1979) further proposed that health behaviours can be conceptualized as performing one of two functions. A behaviour can detect a health problem, such as seeking a mammography test to detect potential cancer, or prevent the onset of a health problem, for example, applying sunscreen to prevent skin damage (Kahneman & Tversky, 1979). Research indicates that developing an effective message depends on various factors, including whether the behaviour is detective versus preventative, the severity of risks associated with the behaviour, and the certainty of an outcome (Kahneman & Tversky, 1979).

Rothman and Salovey (1997) expanded on prospect theory and proposed that gain-framed messages show greater success when targeting prevention behaviours, as the information makes people risk-averse, and thus, more likely to engage in safe low-risk prevention behaviours (Rothman & Salovey, 1997). Conversely, loss-framed messages seem to be more effective than gain-framed messages when promoting disease detection behaviours, as the information increases one's willingness to take risks, and engage in volatile detection behaviours (Rothman & Salovey, 1997). According to Rothman and Salovey (1997), individuals judge preventative behaviours as relatively safe, as they minimize the chances of future illness. Opposingly, people view detection behaviours as relatively risky, as they entail the possibility of identifying an underlying illness (Rothman & Salovey, 1997). Research supports this notion, as gain-framed messages have been more effective than loss-framed messages when promoting numerous

prevention behaviours such as sunscreen application (Detweiler et al., 1999), physical activity engagement (Latimer et al., 2008), and condom use (Linville, Fischer, & Fischhoff, 1993). Conversely, loss-framed messages have proven to be more effective than gain-framed messages when targeting detection behaviours such as mammography screening (Schneider et al., 2001) and encouraging HIV testing (Apanovitch, McCarthy, & Salovey, 2003).

Latimer and colleagues (2008) investigated the effects of gain-framed, loss-framed, and mixed messages (i.e., a combination of both positive and negative claims) designed to motivate engagement in physical activity. Researchers recruited 517 individuals who reported relatively sedentary lifestyles (i.e., no more than 2 days of exercise per week) to participate in a study that lasted 9 weeks. Latimer and colleagues conducted baseline telephone interviews with participants before the experiment, to verify baseline activity levels and collect demographic information. Within one day of their baseline interview, participants received a package that included messages according to their randomly assigned condition. Two weeks after receiving the messages, participants were contacted for a follow-up telephone interview to collect information concerning their current physical activity engagement. At week 4, participants received another message specific to their experimental condition. Researchers subsequently followed up with a final telephone interview at week 9. Results from this study indicated that after two weeks, both gain-framed and mixed-framed messages resulted in greater physical activity engagement than loss-framed messages. Moreover, after nine weeks, gain-framed messages resulted in greater physical activity engagement than both loss-framed and mixed-framed messages. Therefore, this study supported prospect theory, as gain-framed messages were more effective than loss-framed and mixed messages at targeting prevention behaviours.

Similarly, Detweiler et al., (1999) compared the effectiveness of four text-based brochures (i.e., 2 gain-framed brochures and 2 loss-framed brochures) to persuade beachgoers to obtain and use sunscreen. Researchers recruited 217 participants, aged 18 years or older, from a public beach in New England. Participants began the study by filling out questionnaires measuring their attitudes and intentions associated with sunscreen use. After collecting baseline measures, participants were given a brochure specific to their experimental condition. Once participants had finished reading the brochures, they were asked to fill out questionnaires and given a coupon redeemable for a small bottle of sunscreen at a different location on the beach. Results from the study indicated that individuals exposed to gain-framed messages were significantly more likely to request sunscreen using the redeemable coupon, intend to repeatedly apply sunscreen while at the beach, and intend to use sunscreen in the future compared to participants who read the loss-framed brochures. Thus, this study also supported prospect theory, as gain-framed messages were more effective than loss-framed messages at promoting prevention behaviours.

By contrast, loss-framed messages seem to be more effective than gain-framed messages when promoting disease detection behaviours, as the information increases one's willingness to take risks and engage in volatile detection behaviours (Rothman & Salovey, 1997). For example, Schneider et al (2001) examined the effects of gain-framed and loss-framed informational videos, aimed at persuading low-income women to obtain screening mammograms. Researchers recruited 752 women over 40 years old from community health clinics. Participants were exposed to the informational videos and asked to indicate their willingness to obtain screening mammograms via self-report questionnaires, immediately after exposure to the videos, and at a 6-month follow-up appointment (Schneider et al., 2001). Results from the study showed that

loss-framed videos were more effective than gain-framed videos at encouraging participants to seek a screening mammogram immediately after the experiment, and at the 6-month follow-up appointment (Schneider et al., 2001). Therefore, this study supported to claim that loss-framed messages are more effective than gain-framed messages when promoting disease detection behaviours.

Garcia-Retamero and Cokely (2011) further supported prospect theory, by investigating the effects of gain versus loss-framed messages aimed at increasing behaviours to mitigate the spread of sexually transmitted diseases (STDs). Researchers used gain-framed and loss-framed messages to persuade participants to engage in preventative behaviours such as condom use, and detection behaviours such as STD screening with a clinician. The sample consisted of 744 undergraduate students who had reportedly been sexually active in the previous 3 months. Researchers asked participants to read one of two text-based brochures, detailing the benefits afforded by adopting the health behavior (i.e., a gain-framed version of the brochure), or the costs associated with failing to adopt the health behavior (i.e., a loss-framed version of the brochure). Participants were then asked to provide Likert-scale ratings indicating their emotional response to the brochures, their attitudes towards STD prevention behaviours, and their behavioural intentions (i.e., future condom use and willingness to see a clinician for STD screening). Consistent with prospect theory, results indicated the gain-framed messages induced greater persuasion when targeting condom use, while loss-framed messages were more effective at encouraging participants to make an appointment with a doctor for STD screening (Garcia-Retamero and Cokely, 2011). Therefore, these findings support the hypothesis that gain-framed messages are more persuasive when targeting prevention behaviours, while loss-framed messages more effectively target detection behaviours (Rothman, & Salovey, 1997).

Although prospect theory has provided empirically supported generalizations for guiding health communication message framing, several studies have found no significant message-framing effects, or opposing results to Rothman and Salovey's previously hypothesized guidelines that gain-framed messages are always more effective at targeting preventative health behaviours than loss-framed messages (Cho & Boster, 2008; Lee & Kang, 2017). For example, Cho and Boster (2008) found that loss-framed messages were more effective at promoting substance use prevention than gain-framed messages. Lee and Kang (2017) found that among participants with prior indoor tanning/sunbathing experience, loss-framed health messages promoted higher intentions to avoid future indoor tanning than gain-framed messages. These findings contradict the notion that gain-framed messages are always more effective at targeting preventative health behaviours than loss-framed messages.

A meta-analysis conducted by O'Keefe and Wu (2012) found no significant results when comparing the persuasiveness of loss versus gain-framed messages encouraging people to undertake actions to prevent skin cancer. Studies included in this meta-analysis, such as Hwang et al. (2011), found no significant framing effects when comparing loss-framed and gain-framed messages, although, the authors did acknowledge that loss-framed messages were slightly more effective than gain-framed messages in promoting sunscreen use. Hevey et al. (2010) reported similar results, indicating that there were no differences between gain and loss-framed messages for either sunscreen use, or future sunbed use intentions. These findings indicate that further research is needed regarding the use of loss-framed and gain-framed messages in relation to preventative behaviours. The effectiveness of prospect theory regarding health-related choice (i.e., a preventative behaviour) also remains somewhat unclear, as various studies have found significant effects for gain-framed messages, while other studies have found no statistically

significant difference between gain-framed and loss-framed messages. (Pavey & Churchill, 2014; Bannon, Schwartz, 2006; Rosenblatt et al., 2018; Binder et al, 2020). Thus, further research is needed to determine how to construct effective health communication messages to target dietary behaviour.

Exemplification Theory

Beyond prospect theory (i.e., gain-framed and loss-framed messages), another theory that has been studied regarding its impacts on message persuasiveness and the ability to reform behaviours, is exemplification theory (Zillmann & Brosius, 2000). Exemplification theory focuses on how evidence type (i.e., narrative and statistical evidence) can influence the effectiveness of a message. This theory provides the framework for understanding the implications of how information is presented, concerning the effectiveness of health communication messages. Exemplification theory uses exemplars, which are examples used to communicate information about a broader concept or issue (Bigsby, Bigman, & Martinez Gonzalez, 2019). Exemplars aid in integrating single cases of information into people's overarching personal judgements (Bigsby, Bigman, & Martinez Gonzalez, 2019). For instance, a text-based message depicting the experience of a middle-aged man passing away from a NLHP may invoke greater behavioural change than fact-based statistics on the prevalence of NLHPs associated with consuming an unhealthy diet. Exemplification theory argues that how information is presented may increase message persuasiveness, and the types of exemplars used directly influence people’s views concerning social matters (Zillmann & Brosius, 2000).

Exemplification theory posits that qualitative evidence centered on a particular exemplar character, and their personal experiences surrounding a specific health behaviour, will be more persuasive than quantitative, base rate evidence regarding the same behaviour (Zillmann & Brosius, 2000). The presentation of characters in a narrative format impacts people's perception of messages, especially if the characters utilized are individuals with whom the general population can readily identify (Zillmann & Brosius, 2000). People may interpret single narratives as evidence of a larger group's experiences (Zillmann & Brosius, 2000). Individuals may also process information based on its ease of cognitive retrieval, as they are more likely to process vivid salient information than material that is abstract and personally irrelevant, such as a generalized statistic (Zillmann & Brosius, 2000).

Two formats for presenting information that have been recognized and researched are narrative and statistical messages (Lin & Lee, 2021; Shen et al., 2015; Braverman 2008). Narrative messages present information in a personal anecdotal format, such as describing a person who engages in a behaviour and the consequences they may encounter (Zillmann & Brosius, 2000). Statistical messages generally present information using population summary statistics and may incorporate information such as the number of cases for a specific demographic, or the number of deaths associated with a particular health threat (Zillmann & Brosius, 2000). Although these message formats have been previously studied (Lin & Lee, 2021; Shen et al., 2015; Braverman 2008), their effectiveness regarding varying health behaviours remains unclear. For example, previous research has provided mixed results, supporting both narrative and statistic-based messages in promoting detective and preventative health behaviours (Gray & Harrington, 2011; Shen et al., 2015; Braverman 2008). Moreover, because narrative and statistical messages both have different qualities, they seem to elicit

different responses. For example, Kopfman et al. (1998) conducted a study investigating the cognitive and affective reactions to statistical and narrative messages, to determine why these different types of evidence are persuasive. Their results indicated that narrative messages resulted in stronger affective reactions, whereas statistical messages provoked more cognitive responses (Kopfman et al., 1998). Previous findings have highlighted a relatively complex relationship between narrative- and statistic-based messages, and their effects on health behaviours (Kopfman et al., 1998). Therefore, further empirical support is needed to determine the effectiveness of both statistical and narrative health messages, and their impacts on promoting nutrition-related health behaviours such as food choice.

Gray and Harrington (2011) investigated the effects of statistical versus narrative messages aimed at encouraging positive exercise attitudes and intentions. Researchers exposed 345 undergraduate students to either a statistical, narrative, or control message through a web-based survey. Following the web-based survey, participants filled out Likert-scale questionnaires summarizing their exercise attitudes, exercise control beliefs, intention to exercise, and perceived message effectiveness. Researchers found no significant differences between narrative and statistical messages, indicating that neither message format was superior over the other at targeting exercise attitudes nor intentions. Although researchers could not determine which message format was more persuasive, they found that both the narrative and statistical messages were more effective than the control group message. Both statistical and narrative messages increased positive exercise attitudes and intentions when compared to the control message, suggesting that the effects were due to the message conditions.

Shen, Sheer, and Li (2015) conducted a meta-analysis investigating the persuasiveness of narrative message frames in health communication. Their results indicated that narratives

produced significant effects regarding both prevention and detection behaviours (Shen et al., 2015). A study included in this meta-analysis was McQueen et al. (2011) who examined the longitudinal effects of personal narratives versus traditional informational approaches aimed at promoting mammography testing and reliable uptake of breast cancer information. The study recruited 489 women aged 40 years and older from low-income areas (McQueen et al., 2011). Before exposing participants to experimental conditions, researchers collected baseline measures, including education, medical system trust, cancer fatalism, and history of mammography screening using Likert-scale questionnaires. Post-experimental manipulation, participants provided ratings concerning their cognitive reactions and engagement with the video. Results indicated that women who watched the narrative video compared to the informational video experienced stronger cognitive and affective responses to stimuli, increased personal identification and engagement, increased risk perception, and increased behavioural intention to act on pertinent health information (McQueen et al., 2011).

Another study included in this meta-analysis was Green and Brin (2003) who investigated the effects of narrative and statistical messages on tanning bed use, aimed at preventing excessive exposure to ultraviolet radiation and skin cancer. Their study highlighted a narrative about a woman named Alicia, who frequently used tanning beds and developed skin cancer. The statistical message provided identical information but highlighted the risks of using tanning beds and statistical information about skin cancer susceptibility. Ultimately, their study determined that narrative messages were more effective than statistical messages in decreasing intentions to use tanning beds, and augmenting perceptions of cancer risk (Green & Brin, 2003). Notably, research by McQueen et al. (2011) and Green and Brin (2003) were chosen from the

meta-analysis conducted by Shen, Sheer, and Li (2015), as they compared messages using only narrative versus statistical-based formats and no further experimental manipulation.

Braverman (2008) conducted a study investigating the effectiveness of testimonial messages compared to informational health messages aimed at promoting weight loss. This study recruited participants to participate in a web-based survey and exposed participants to weight loss messages for 30 seconds. Participants were assigned to one of four experimental conditions, where they viewed either a text-based informational message, a text-based narrative message, a narrative-based video, or an informational-based video. After being exposed to messages, participants were asked to fill out a Likert-scale questionnaire to measure the persuasiveness of the messages. Braverman (2008) found that testimonial messages were more effective than informational messages when presented through an audio format. Testimonial messages were also more effective when targeting individuals who did not display a high willingness to change their diet. Furthermore, informational messages were only more effective than testimonial messages when presented to participants who were rated as having a high readiness to change their diet. Ultimately, this study demonstrates that when individuals are not highly motivated to pay close attention to a message, they will most likely exhibit greater behavioural change regarding weight loss when exposed to testimonial health messages rather than informational messages.

Although numerous studies have investigated the effects of narrative and statistical messages in promoting health behaviours, literature remains limited concerning the effectiveness of narrative and statistic evidence types in promoting healthy food choices. Lin and Lee (2021) conducted a three-part study exploring how consumers respond to statistical and narrative messages when evaluating food products, and whether their previous nutrition knowledge or

need for cognition (i.e., the tendency to engage in and enjoy cognitive activity) impacted the effectiveness of narrative and statistical health claims. In the first part of the study, 80 university students were randomly assigned to one of two experimental conditions (i.e., narrative or statistical message conditions) and exposed to a health message. After having read the message, participants were asked to answer 4 Likert scale questions about the health food product, indicating how attractive, convincing, and credible they thought the message was, and their future intention to buy the health food product. Responses to the 4 Likert scale questions were subsequently added together to represent one measure of overall food preference. Results from the first study indicated that statistic messages were more effective than narrative messages at promoting the healthy food product. In the second part of the study, 121 university students were recruited for a 2 (evidence types: statistical vs. narrative) × 2 (health knowledge: high vs. low) experimental design. Firstly, participants completed a dietary and health knowledge measure and were separated into two groups (i.e., high versus low health knowledge). Next, participants were exposed to either a narrative message or statistical message similar to the previous study. Results from the second study indicated that participants with low health knowledge rated the health food product supported by the statistical message more favourably, whereas participants with high health knowledge rated the food product supported by narrative health claims higher. Finally, in the third study, researchers investigated the interaction between NFC (need for cognition) and evidence type. Participants completed an NFC measure and were separated into two groups (i.e., high versus low NFC). Study three followed the same message manipulation and product evaluation procedures as the previous two studies, exposing participants to either a narrative or statistical health message. Results indicated that participants with low NFC rated the food product supported by the narrative message higher, whereas participants with high NFC

rated the food product supported by the statistical health message higher. Results from this study demonstrated that both narrative and statistical messages can be effective at promoting healthy food products dependent on participants previous health knowledge or NFC.

Altogether, exemplification theory highlights the importance of considering both narrative and statistical evidence types when designing effective health communications. Exemplification theory utilizes the power of relatable characters and personal experiences to enhance message persuasiveness, while also acknowledging the value of statistical data in specific contexts. Exemplification theory also highlights the importance of tailoring narrative and statistical evidence types to the desired audience and health behaviour. However, research remains limited regarding the effectiveness of exemplification theory in promoting healthy food choice. Thus, future research is needed to investigate the effectiveness of narrative and statistical messages in promoting healthy food choices.

Current Research on Message Framing and Eating Behaviour

The previous research on message construction in public health communications led to studies examining the effects of message framing on food choice. Some studies had examined the effects of message framing on food choice and intentions to consume a healthy diet, but results remained limited and unclear. Further research was needed to determine which combination of message characteristics are most effective to sustainably alter dietary habits. The studies that follow summarize the most current research on message framing and health communication messages.

Garg, Govind, and Nagpal (2021) performed two studies to examine the impacts of positive (gain-framed) versus negative (loss-framed) health messages, to determine their effects on food consumption over short and long-term intervals. The first study investigated the influence of multiple exposures to health messages over eleven days using a daily food consumption diary to measure participant's consumption of healthy foods. Longitudinal data on the amounts of differing food groups consumed indicated that loss-framed messages were more effective than gain-framed messages at decreasing the consumption of unhealthy food products. The second study extended the findings from study one, by randomly exposing participants to one of four experimental conditions. The conditions exposed participants to either only positive messages, only negative messages, predominantly positive messages, or predominantly negative messages. The second study further supported the efficacy of negatively framed messages over positive messages in terms of influencing healthy dietary intentions, as participants exposed to negative messages reported a higher willingness to eat healthy foods in the future. This study uniquely provided valuable information regarding the effects of message framing on actual food consumption, and future dietary intentions. The researchers demonstrated that loss-framed messages were more effective at promoting healthy dietary behaviour and intentions than gain-framed messages. Thus, findings from this study contradict prospect theory, as loss-framed messages were more effective at promoting preventative behaviours than gain-framed messages.

Pavey and Churchill (2014) investigated the effects of message framing (i.e., gain-framed and loss-framed messages) and agency (i.e., autonomy, heteronomy, and control) on the avoidance of high-calorie snacks. The study consisted of 152 undergraduate students. Importantly, there were no significant differences in age, gender, or baseline snacking behavior prior to starting the experiment. Participants were first assigned to one of three experimental

conditions, which consisted of a priming task asking participants to unscramble 30 sets of five words. The priming task included either autonomy-related words (e.g., freedom, choice, and decision), heteronomy-related words (e.g., pressure, control, and must), or neutral words (e.g., book, table, and coffee). Following the priming task, participants read a health message detailing either the benefits of avoiding unhealthy snacking (gain-framed), or the health dangers of not avoiding unhealthy snacking (loss-framed). Participants subsequently provided ratings of their intentions to avoid eating unhealthy snacks over the following seven days. Results did not identify any significant main effects of agency or message framing on unhealthy snack avoidance. However, results identified a significant interaction between agency and message framing. That is, results suggested that gain-framed messages were more effective in promoting the avoidance of high-calorie snacks compared to the loss-framed message, after completing the autonomy priming task. Therefore, results from this study support prospect theory and suggest that when designing health communications, agency-related words can be incorporated with gain-framed claims to bolster message persuasiveness.

Rosenblatt et al. (2018) examined the effects of health communication messages on a dietary self-control task. Baseline dietary control was measured by having participants provide health and taste ratings of various snack foods, followed by completing an assessment of dietary self-control which was operationalized by being allowed to choose healthy items as opposed to unhealthy items to consume at the end of the experiment. This study utilized text-only, or text-and-graphic positively and negatively framed health messages to determine their persuasiveness regarding consuming healthier diets. The study randomly assigned participants into one of five experimental conditions, where people would view two health warnings of a specific form (text-based, negative framing; graphic, negative framing; text, positive framing; graphic, positive

framing; or a no warning control message). After the experimental exposure, participants completed a second dietary control assessment to determine whether specific message combinations impacted their food choices. Results indicated that positively framed graphic messages, and negatively framed text warnings, promoted greater dietary self-control when compared to the control group or positive text group. Overall, graphic-based images were more effective at promoting dietary self-control than text-based messages. Results from this study provide valuable information suggesting that health warnings can impact dietary self-control.

Zahid and Reicks (2018) investigated the impact of loss-framed and gain-framed messages aimed at encouraging parenting practices to reduce the intake of sugar-sweetened beverages (i.e., sodas and fruit drinks) by their children. Positive parenting practices included controlling the availability of unhealthy drinks within the household, and modeling healthy drink choices. Parents were eligible to participate in the study if they had a child between 6- to 12-years old, and had primary responsibility for food acquisition and preparation. Parents were asked to view informational messages through a web-based slideshow format, which highlighted either gain-framed or loss-framed text-based nutritional messages. After having read the designated messages, parents filled out self-report questionnaires, detailing their intentions to manage home availability of beverages and model positive beverage intake. Results indicated that gain-framed messages were more effective than loss-framed messages at increasing parents' intentions to limit unhealthy drinks within their households, and their intentions to model positive dietary behaviour for their children. Therefore, this study supported prospect theory, as results suggest that gain-framed messages may be more effective than loss-framed messages in promoting healthy dietary choices.

Vidal, Machín, Aschemann-Witzel, and Aresyes (2019) evaluated the impact of message framing on promoting the use of nutritional warnings, behavioural intentions, and actual behaviour concerning dietary choices. They accomplished this by assessing visual attention to nutritional warnings using eye-tracking technology, followed by asking participants to choose a snack product after being exposed to an experimental condition. Participants engaged in a between-subject design, being exposed to either gain-framed messages, loss-framed messages, or a non-nutritional related message (control group). Regardless of message framing, individuals who viewed nutritional messages fixated their gaze on nutritional warnings during the snack choice task significantly longer than the control group. Participants exposed to loss-framed messages fixated their gaze on health warnings the longest when compared to all other experimental conditions. Finally, when evaluating the healthfulness of the snacks chosen, participants exposed to nutritional messages chose healthier snacks than individuals in the control group. Thus, the study suggests that nutritional messages aimed at increasing awareness of nutritional warnings may encourage consumers to choose healthier food options and increase visual attention toward product labelling. Moreover, the results suggest that both loss-framed and gain-framed messages can equally persuade participants to make healthy food choices.

Binder, Naderer, and Matthes (2020) investigated the effects of message framing on snacking behaviour by exposing children ages 6- to 10 years old to audiovisual cartoon movies expressing either gain-framed, loss-framed, or non-nutritional messages. The dependent variable, snack choice, was operationalized by allowing children to choose between grapes, mandarins, fruit gummies, or fruit chews at the end of the experiment after being exposed to the messages. Overall, results indicated that gain-framed messages were more effective than loss-framed messages at increasing children's healthy snack choices. Thus, this study supported the notion

that gain-framed health messages can alter food selection behaviour and promote healthy eating in children.

Taken together, these studies provide evidence that message framing can enhance the persuasiveness of health communications and increase healthy food choices. Moreover, research has indicated that nutritional health messages can influence future behavioural intentions, attention to product labelling, and most importantly, actual behaviour regarding food consumption. However, as can be seen from the summarized studies, at times gain-framed messages are more effective, sometimes loss-framed messages are more effective, and sometimes they are equally effective. So, although it is clear that both gain-framed and loss-framed messages are more effective at promoting healthy eating choices than being exposed to no message at all, it is still unclear which type of framing is the most effective way to construct a message to promote healthy food choices.

Present Study

The previously described research regarding the effects of message framing on food choice indicates that health communications are effective at altering dietary choices, but that further research is needed to enhance message persuasiveness. More specifically, further research is needed to identify the most effective mechanism to construct and present dietary health communications, to reliably promote healthy food choices. The objective of the present study was to measure the efficacy of message framing (i.e., gain-framed, loss-framed, and control messages) and two evidence types (i.e., statistical and narrative evidence) on food choice,

to gain further insight into the mechanisms that improve health communication campaigns directed at immediate food choice.

The present study aimed to extend upon previous knowledge in the realm of effective nutritional health communication (Pavey & Churchill, 2014; Binder, Naderer, and Matthes 2020) by incorporating statistical- and narrative-based evidence formats, combined with gain- and loss-framed message framing to bolster message persuasiveness. To the best of our knowledge, these specific message frames and evidence types have not been previously combined, concerning their effectiveness on food choice. For the purpose of the present study, the independent variables were combined to form six experimental conditions that exposed participants to one health message. The conditions included a loss-framed statistic message, gain-framed statistic message, loss-framed narrative message, gain-framed narrative message, statistic control message, and narrative control message. The current study aimed to provide evidence supporting a specific message frame and evidence type that reliably persuades individuals to make healthy food choices.

The present study further extended upon previous research, by designing a virtual food choice task, that closely measured immediate food selection as opposed to future dietary intentions. Numerous studies have focused on the effects of message framing on future intentions to consume healthier foods (Pavey & Churchill 2014; Shimul, Cheah, & Lou, 2021), but failed to recognize that intentions do not always correlate with definitive behaviour (Lo et al., 2012). For this reason, participants were exposed to an online food choice task and asked to indicate which foods they would choose to consume directly after the experimental conditions. Participants were asked to be as accurate as possible in deciding which foods they would choose to eat now. Although participants did not consume the food directly after the experiment, it was believed that

asking individuals to make immediate concrete dietary choices would provide a more valid representation of food choices than questions concerning their intentions to consume healthy foods in the distant future. This reasoning aligns with the results of Lo et al. (2012), as their study on the effects of message framing and healthy eating found that health messages had significant effects on behavioural intentions and expectations, but there was no conclusive evidence for actual behavioural change. Thus, the proposed study hoped to determine the effects of message framing on immediate food choice, using a novel food choice task developed for the purpose of this experiment.

The food choice task in the present study was inspired by Balcetis, Manivannan, and Cox (2020), who studied the impact of message framing and temporal distance (e.g, short term-versus long-term claims) on healthy eating preferences. Balcetis and colleagues sought to measure participants' desires to consume healthy foods directly after exposure to health messages. In their study, participants were presented with 11 pairs of food items, and asked which one they would choose to snack on after being exposed to experimental conditions. The pairs consistently included one healthy snack paired with one unhealthy snack. For instance, the authors compared an orange bag of chips to an orange bag of baby carrots. A long brown candy bar was compared to a brown pretzel stick. Following the food selection task, researchers computed the percentage of healthy food options chosen versus unhealthy options as their primary outcome variable of interest.

The present study used a similar format as Balcetis et al. (2020) to measure food selection after participants had been exposed to experimental conditions. The current study aimed to measure food selection through an online format, by asking participants to make concrete choices about what foods they would prefer to consume directly after being exposed to health

messages. An online format was chosen due to the increased feasibility of gaining data from a large sample. The current study also presented participants with 15 food pairings to gain a larger sample of participants' food preferences than previously done by Balcetis and colleagues (2020). Food item presentation was standardized to alleviate biases in selection. That is, food items were displayed beside one another using pictures of equal size and consistent colour to ensure visual consistency. Food pairings were modified but followed a similar methodology to Balcetis, et al. (2020) by exposing participants to one healthy item juxtaposed against one unhealthy item. For example, participants were asked to choose between a bowl of blue fruits such as blueberries, or a bowl of blue candy. Participants were able to take as much time as needed to make food choices. After responses had been submitted, the percent of healthy options chosen versus unhealthy options was calculated. Thus, the proposed design included the independent variables of message frame (gain-framed, loss-framed, and control messages) and evidence type (i.e., statistical and narrative evidence) and the dependent variable of food selection (i.e., the percentage of healthy versus unhealthy foods selected at the end of the experiment).

Hypotheses

Consistent with prospect theory (Kahneman & Tversky, 1979), which states that gain-framed messages are more effective than loss-framed messages at targeting preventative behaviors, the current study hypothesized that individuals exposed to the gain-framed messages would display a higher percentage of healthy food choices than loss-framed messages or the control conditions. This hypothesis aligns with Rothman and Salovey's ideology, that individuals judge preventative behaviours (i.e., making healthy dietary choices) as relatively safe, as they minimize the chances of future illness (Rothman & Salovey, 1997). Rothman and Salovey

(1997) further speculate that gain-framed messages yield greater success when targeting prevention behaviours such as choosing to consume healthy foods, as the information makes people risk averse, thus, more likely to engage in safe, low-risk prevention behaviours (Rothman, & Salovey, 1997). Therefore, the current study predicted that gain-framed messages would be more persuasive than loss-framed messages in promoting healthy food choices, because of the minimal risk that making healthy food choices entails.

Furthermore, research investigating the effects of gain-framed versus loss-framed messages targeting prevention behaviours has supported prospect theory, as evidence suggests that gain-framed messages are more effective than loss-framed messages when promoting numerous prevention behaviours such as sunscreen application (Detweiler et al., 1999), physical activity engagement (Latimer et al., 2008), and condom use (Linville, Fischer, & Fischhoff, 1993). Meta-analyses have also provided empirical support for the increased effectiveness of gain-framed messages over loss-framed messages in targeting preventative behaviours including, smoking cessation, exercise, dental hygiene, sunscreen use, and dietary change (Gallagher & Updegraff, 2012; O'Keefe & Jensen, 2006). Additionally, current research on message framing and food choice further supports this hypothesis, as numerous studies investigating the efficacy of message framing in increasing healthy food choices have supported the increased persuasiveness of gain-framed over loss-framed messages in altering dietary behaviour (Binder, Naderer, & Matthes, 2020; Zahid & Reicks, 2018; Pavey & Churchill, 2014). Although numerous studies have supported the increased persuasiveness of gain-framed messages over loss-framed messages in promoting healthy food choices, it should be noted that some literature contradicts prospect theory. That is, previous studies have also supported the increased

persuasiveness of loss-framed messages over gain-framed messages, or found them to be equally effective at promoting healthy eating behaviours (Garg, Govind, & Nagpal, 2021).

Secondly, it was hypothesized that narrative evidence would be more effective than statistical evidence in promoting healthy food choices. This hypothesis aligns with exemplification theory, which states that qualitative evidence centered on a particular exemplar character and their personal experiences surrounding a specific health behaviour will be more persuasive than quantitative evidence regarding the same behaviour (Zillmann & Brosius, 2000). In sum, narrative messages would be more emotionally arousing, easier to recall, and that participants would more readily identify with them compared to statistical messages which participants may view as abstract and personally irrelevant (Zillmann & Brosius, 2000).

Finally, it was hypothesized that gain-framed narrative messages would have the most salient effect overall on healthy food selection. The combination of gain-framed claims and a narrative-based evidence format was predicted to elicit the strongest persuasion and emotional reaction encouraging participants to choose healthy food options instead of unhealthy options. This interaction was predicted due to the forecasted effectiveness of gain-framed messages over loss-framed messages, and the prediction that narrative-based messages would be more effective than statistical messages. The results of the current study are expected to help further our understanding of the construction of persuasive dietary information to effectively promote healthy food choices.

Exploratory Research

In addition to investigating the effects of message framing and evidence type on food choice, the present study sought to explore whether variations in message framing and evidence type impacted participant's emotional responses. Public health messages often use persuasive language to change attitudes and behaviors, which can evoke a wide range of positive or negative emotions (Dunlop, Wakefield, & Kashima, 2008). Previous research on health communications and emotions suggests that understanding the emotional responses elicited by messages may help bolster message persuasiveness (Yoo, Kreuter, Lai, & Fu, 2013; McQueen et al., 2011). However, there is limited literature examining emotional responses as a mediating factor to better understand the effects of message framing and evidence type on health behaviours (Yoo, Kreuter, Lai, & Fu, 2013).

Firstly, Mikels et al. (2016) provide evidence that gain-framed and loss-framed messages promote different emotional responses. These authors conducted an experiment asking younger and older participants (i.e., younger participants had a mean age of 21 years and older participants had a mean age of 74 years) to read a series of gain-framed or loss-framed messages about exercise, and then to rate their emotional response to each message using Likert scale questionnaires. Additionally, researchers took physiological measures including facial electromyography (fEMG) and skin-conductance level (SCL) before and after exposure to messages to further measure emotional arousal. Results from the study indicated that gain-framed messages evoked stronger positive emotions compared to loss-framed messages for both younger and older participants. By contrast, the affect rating for loss-framed messages differed by age. That is, younger adults responded with more negative emotions when exposed to loss-framed messages relative to older adults. Altogether, research by Mikels et al. (2016) suggests

that both gain-framed and loss-framed messages may evoke different emotional responses dependent on age.

Yan, Dillard, & Shen (2012) studied the effects of happiness, anger and fear on the processing of gain-framed and loss-framed messages associated with disease prevention. Participants included 305 undergraduate students at Pennsylvania State University. Firstly, participants were separated into one of three experimental conditions, where they completed a priming task aimed at inducing either happiness, sadness, or fear. Next, participants read a booklet containing either a gain-framed or a loss-framed message describing the importance of disease prevention. Finally, participants completed a questionnaire that assessed their perceived message effectiveness. The results from this study indicated that gain-framed messages produced the highest level of persuasion after participants had completed the happy priming condition. Accordingly, the study supported the notion that the effectiveness of gain-framed messages in promoting healthy behaviours may be associated with positive emotions.

Literature on narrative and statistical evidence types also indicates that emotional responses may impact message persuasiveness (McQueen et al., 2011). Research suggests that when participants become emotionally engaged with a message, they are more likely to identify with the message content (McQueen et al., 2011). For example, McQueen et al. (2011) investigated the effects of narrative and informational messages aimed at increasing mammography screening. They exposed participants to either narrative or informational videos and measured cognitive reactions, emotional responses, and behavioural intentions through Likert scale questionnaires. Results indicated that the narrative messages generated greater emotional responses overall than informational messages, and that the emotional responses enhanced cognitive processing. Moreover, researchers found that negative emotion was

positively associated with liking the breast cancer messenger, as well as engagement with the breast cancer message. Altogether, participants who watched the narrative video compared to the informational video experienced stronger cognitive and affective responses to stimuli, increased personal identification, and increased behavioural intention to act on pertinent health information (McQueen et al., 2011). Thus, this study provided evidence that understanding emotional responses elicited by messages may help bolster the effectiveness of health communications.

Altogether, research on health communications and emotions suggests that understanding the emotions elicited by health messages may contribute to further understanding message persuasiveness. Therefore, the current study incorporated a measure of emotional response after participants had been exposed to the experimental conditions. More specifically, embedded within the manipulation check questionnaire, participants were asked how the message they just read made them feel and to provide a Likert scale rating ranging from very sad to very happy. This was done to explore whether specific message frames or evidence types elicited different emotional responses, and whether or not participants' emotional responses impacted their food choices.

2 Chapter 2: Materials and Methods

Pilot Study

Before beginning the experiment at Laurentian University, 12 volunteers from Sudbury, Ontario were asked to read one of the six experimental messages (i.e., a loss-framed statistic message, gain-framed statistic message, loss-framed narrative message, gain-framed narrative message, statistic control message, or narrative control message). Accordingly, 2 participants were exposed to each message condition during a pilot phase. The pilot study was conducted to assess whether the experimental messages fit the designated criteria prior to starting the experiment.

Prior to reading the health-related messages, each volunteer was asked to time themselves reading the health message in its entirety. This was done to determine a baseline for the time needed to complete each message. Results indicated that the average time needed to read a message was 1-minute and 23 seconds. The minimum time needed to complete a message was 58 seconds. Finally, the maximum time needed to read a message was 2-minutes and 17 seconds.

After reading one experimental message, volunteers were asked to answer two questions using a multiple-choice format. The first question asked participants to indicate whether they thought the message they read highlighted positive, negative, or neutral claims. The second question asked subjects whether they thought the message was presented using a narrative or statistical format. The pilot study participants were chosen from outside of Laurentian University to avoid exposing students to the experimental material before launching the study. The pilot study participants fell within an age range of 21- to 28-years old.

Results from the pilot study indicated that all of the experimental messages met the desired criteria. That is, the two respondents who read the loss-framed statistic message indicated that the message highlighted negative claims and used statistical evidence to convey information. Both participants exposed to the gain-framed statistic message noted that the message described positive claims and used statistical evidence. Those exposed to the loss-framed narrative message both chose that the message highlighted negative consequences and used narrative evidence. All participants exposed to the gain-framed narrative message indicated that the messages displayed positive claims using narrative evidence. The two participants exposed to the statistic control message noted that the messages displayed neutral claims using statistical evidence. Additionally, those exposed to the narrative control message noted that neutral claims were highlighted using narrative evidence. Therefore, results from the pilot study indicated that the messages were validated and fit the designated criteria prior to beginning the experiment.

Participants

Participants included 238 (84% identified as female, 15.6% identified as male, and 0.4% identified as non-binary or "other") undergraduate students recruited from Laurentian University selected by convenience sampling. This sample size was comparable to recent studies that have found significant message-framing effects in relation to eating behaviour (Garg, Govind, & Nagpal, 2021; Vidal et al., 2019; Binder, Naderer, & Matthes, 2020). All participants were recruited voluntarily and signed up to participate in the experiment via the Laurentian University SONA platform. Course credits were available to participants enrolled in psychology courses to incentivise participation in the experiment.

Materials

The experiment contained a combination of unique questionnaires and stimuli developed for the purpose of the experiment (see **bold** items in Appendices A through E), combined with a food choice task which was developed based on previous research by Balcetis et al. (2020) to measure immediate food choice. In total, the experiment contained materials including a demographic questionnaire, experimental messages, a manipulation check questionnaire, a measure of participants' feelings, and a food choice task.

Demographics

Participants' age, gender, educational level, employment status, current physical activity level, height, weight, willingness to change diet, feelings about current dietary habits, and dietary restrictions were assessed to determine the diversity of the sample and any correlation to other factors being measured. The information was further used to determine whether participants responded uniquely to specific message frames, whether specific participants' answers on the food choice task were biased due to dietary restrictions, and to ensure that participants only completed the experiment once. Repeated trials were not permitted (see Appendix A for all demographic questions).

Messages

A total of 6 messages (i.e., 1 message per experimental condition) were developed for each of the following categories: loss-framed statistic message, gain-framed statistic message, loss-framed narrative message, gain-framed narrative message, statistic control message, and narrative control message (see Appendix B for all experimental messages). Before reading the health message, participants read a statement indicating that they would be tested on the message

material and that they should read the information carefully. The message content was adopted and modified from previous research (Balcetis, et al., 2020; Elbert & Ots, 2018; Wirtz & Kulpavaropas, 2014). The criteria of one message per condition was selected due to its effectiveness in previous experiments using this baseline (Elbert & Ots, 2018; Wirtz & Kulpavaropas, 2014). Each message contained approximately 300 characters highlighting equivalent information tailored to the experimental condition. All messages were displayed on a white background using black lettering (12-point Times New Roman font). Participants were exposed to each message for a minimum of one minute but could remain on the page longer if needed. Time spent reading each message was measured by having participants click on a timestamp button before and after reading the message. Time was measured to ensure that participants spent enough time on the page to read the message. Participants who spent less than 30 seconds on the message page would be excluded from the final sample, as this would indicate that they were not properly exposed to the experimental manipulation. This timeframe was chosen based on results from the pilot study.

To ensure the validity of the manipulation, each message was constructed to fit specific criteria. Gain-framed messages only contained positive themes, including “living a longer and healthier life”, “improved sleep quality and energy levels”, and “saved from developing health problems”. Gain-framed messages highlighted the benefits an individual can experience by consuming a regular healthy diet. Conversely, loss-framed health messages highlighted exclusively negative outcomes such as “decreased functioning of the cardiovascular system”, “higher likelihood of an early death”, and “poor sleep quality”. Loss-framed messages only depicted the consequences an individual will experience by failing to eat a regular healthy diet.

Regarding the evidence formats (i.e., statistical and narrative), statistical messages used numerical support to convey the importance of eating a healthy diet. For instance, statistical messages identified the prevalence of the current Canadian obesity epidemic and the number of people who die each year from specific NLHPs. Information was retrieved from Statistics Canada and no anecdotal information was used. Conversely, narrative messages depicted the story of two Canadian adults, John and Sally, and the consequences they encountered due to the food they consumed. The narrative did not use any numerical evidence and only conveyed the importance of consuming healthy foods using the personalized experiences of John and Sally. Although each message frame presented information in a distinct format, the messages conveyed equivalent information. Each message highlighted the consequences associated with nutritional decisions such as personal health, premature death, economic issues, and quality of life.

Control messages presented information unrelated to any aspects of nutrition or NLHPs. More specifically, control messages described information about the Canadian Rocky Mountains. Control messages were presented using either narrative or statistical evidence formats similar to all other experimental conditions. The information presented in the statistic control message provided numerical descriptions of the Canadian Rocky Mountains. Narrative control messages provided a story describing John and Sally visiting the Canadian Rocky Mountains.

Manipulation Check

Participants were asked to complete a questionnaire concerning the messages they read, to verify that they read the message, understood the content, and to measure the emotional

response that the message elicited (see Appendix C for the manipulation check questionnaire). Both Likert scale and multiple-choice formats were used to assess participants' responses. Participants were asked to respond to a total of 5 questions regardless of the message they read. Additionally, participants were asked to answer fact-based questions about the content of the health messages to ensure that they understood and retained the information presented.

Emotion Measure

Participants were asked to provide a rating of their emotional response after being exposed to one of the six experimental conditions. After having read the designated message, participants were immediately asked: How did the message you just read make you feel? Participants were subsequently required to provide a rating on a 5-point Likert scale with options ranging from very sad to very happy (see Appendix C). This measure was included to assess participant's emotional response after being exposed to specific message frames and evidence types. A 5-point Likert scale format was chosen to allow participants to indicate the strength of the emotions they experienced after exposure to the experimental messages. All participants were required to answer the emotion measure.

Food Choice Task

The food choice task measured immediate food choice after exposure to nutritional messages (see Appendix D for the food choice task). Food choice (i.e., the selection of unhealthy versus healthy food options) was measured by presenting participants with fifteen choices, and asking which food they would choose to eat now, following exposure to the experimental

messages. Each healthy food chosen represented a score of 1, and each unhealthy food chosen was scored 0. Thus, the total number of healthy food choices was added together for a total score of 15. The pairs always included one healthy snack juxtaposed against one unhealthy snack. Specific pairings were selected to ensure the equivalence of visual features. For example, all pictures were of equivalent colour, size, and shape. All food items were featured on a white background. This food choice task was a forced choice task, as participants needed to choose an option to proceed to the next page. Only one food pairing was displayed on each page. Participants could take as much time as needed to make food choices.

Procedure

After ethics approval was granted (see Appendix E for ethics approval), the experiment was copied into an online format. Participants were recruited via the Laurentian University SONA platform, then prompted to click a link that redirected them to the survey website. The experiment was conducted through the REDCap external web browser. The experiment contained 6 parts, including informed consent, a demographic questionnaire, exposure to one experimental message, a manipulation check, a food choice task, and a debriefing form.

The first page of the survey informed participants of the purpose of the study (see Appendix F for the informed consent form), which was to investigate the effects of health communication messages on food choices. While no overt deception of participants was employed, the full hypothesis of the research was not revealed to participants until they had completed the experiment. Due to the personal nature of the demographic questions, participants were informed that they did not need to provide any identifying information throughout the

experimental procedure. Informed consent was obtained from all individuals via the first page of the questionnaire, and participants were reminded that they could withdraw from the study at any time, including after completion of the questionnaire by contacting the researchers listed on the first page of the study.

After consenting to participate in the experiment, participants were directed to the second page of the study, and asked to provide demographic information. Participants were informed at the top of the page that they could choose to skip any question if they did not feel comfortable providing the requested information. Participants were subsequently prompted to proceed to the third page of the experiment, where they were randomly assigned to a condition, and exposed to one experimental message (i.e., a loss-framed statistical message, gain-framed statistical message, loss-framed narrative message, gain-framed narrative message, statistic control message, or narrative control message). Time spent reading the messages was recorded, and participants were also informed that they would not be able to review the message once they had chosen to proceed to the next page. Next, participants were exposed to the manipulation check which consisted of 5 questions, broadly investigating their comprehension and emotional arousal associated with the message they read. Finally, participants completed the food choice task consisting of 15 food pairings.

Completing the experiment took approximately 15-20 minutes. Following the completion of the experiment, participants were redirected to a page containing a debriefing document (see Appendix I for the debriefing form), thanking them for their participation and soliciting feedback about their experience, suggestions for improvement, and further questions.

Data Analyses

The data were analyzed using a combination of statistical methods provided by the IBM statistical software SPSS Version 28. The current study investigated the effects of message framing on food choice, by using a 3 (gain-framed message, loss-framed message, and control message) x 2 (statistic and narrative evidence type) between-subjects design. The main hypotheses were examined using a two-way between-subjects ANOVA to assess the observed differences between conditions. Thus, the proposed design included the independent variables of message frames (gain-framed message, loss-framed message, and control message) and evidence type (statistic and narrative evidence) and the dependant variable of food choice. The results of these analyses will be discussed in the following section.

3 Chapter 3: Results

Data Cleaning

A total of 225 participants were included in the final sample. Notably, 238 participants completed the experiment over the course of the data collection process, from January 2023 to April 2023. However, 12 participants did not complete the food choice task in its entirety, and were subsequently excluded. By applying this exclusion criterion, approximately 95% of the original sample was included in the final data analysis.

Participant's Demographics

Participants' ages ranged from 17 to 60 years old, with over half of participants being between 18- to 22-years old (i.e., 54% of the overall sample). The mean age of the sample was 26 years old (SD = 9.605). Participants' weights ranged from 90 to 300 pounds, with a mean participant weight of 159.72 pounds (SD = 38.638). Female gender was the most commonly selected at 84%, followed by male at 15.6%, and non-binary or "Other" at 0.4%. When asked about their highest level of education obtained, 95.6% of participants indicated that they were currently enrolled in, or had previously obtained a bachelor's degree, 0.9% were currently enrolled in or had obtained a master's degree, and 3.6% of participants indicated that they preferred not to share information concerning their educational background.

Of the total sample, 69% of participants reported being employed full-time or part-time, and 31% of participants indicated that they were currently unemployed. When participants were asked if they currently followed a rigid diet, 8.4% of participants indicated that they already followed a rigid diet before participating in the experiment, while 91.6% of participants noted that they did not currently follow a rigid diet. Relatedly, participants who indicated that they

followed a rigid diet were allowed to elaborate on their specific diet regimens and food restrictions. Given their responses, no participants needed to be excluded from the final sample based on dietary restrictions.

Participants were asked to rate how often they currently engaged in physical activity. Overall, 0% of participants indicated “Never”, 6.2% chose “Very Rarely”, 8% indicated “Rarely”, 33.3% responded “Occasionally”, 35.6% indicated “Frequently”, and 16.4% chose “Very Frequently”. Additionally, 0.4% of subjects indicated that they did not feel comfortable providing the requested information (see Figure 1). When asked how willing participants were to change their diet, 3.1% responded “Completely Unwilling”, 3.1% noted, “Very Unwilling”, 3.1% chose “Unwilling”, 21.3 % responded “Neutral”, 40% chose “Willing”, 21.8% responded “Very Willing” and 7.6% chose “Completely Willing” (see Figure 2).

Participants were queried concerning how important changing their diet would be for their overall physical health. Responses included, 0.9% choosing “Not at all Important”, 4.0% responded “Low Importance”, 6.2% chose “Slightly Important”, 7.6% responded “Neutral”, 35.1% indicated “Moderately Important”, 27.6% chose “Very Important” and 18.2 % responded “Extremely Important”. Relatedly, 0.4% of respondents indicated that they did not feel comfortable sharing the requested information (see Figure 3). Finally, when participants were asked how happy they were with their current eating habits, 4.9% of participants responded, “Completely Unhappy”, 10.2% chose “Mostly Unhappy”, 16.9% indicated “Somewhat Unhappy”, 11.1% chose “Neutral”, 25.3% responded, “Somewhat Happy”, 24.9% indicated “Mostly Happy”, and 6.7% noted that they were “Completely Happy” (see Figure 4).

Figure 1

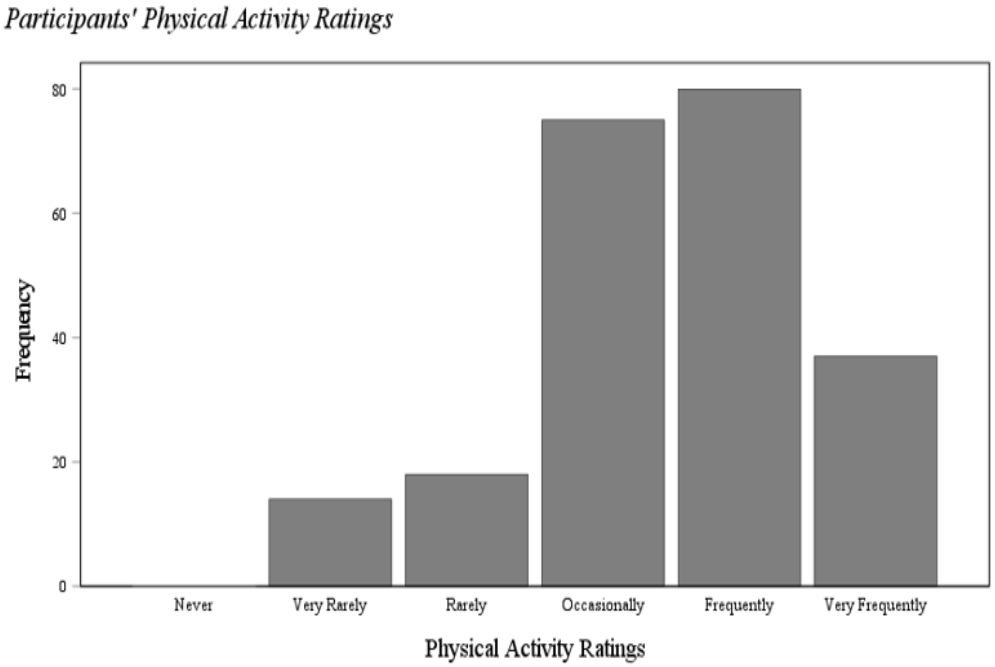

Figure 1. Frequency of participants' current self-reported physical activity engagement. Physical activity ratings included, Never, Very Rarely, Rarely, Occasionally, Frequently, and Very Frequently (based on n = 225).

Figure 2

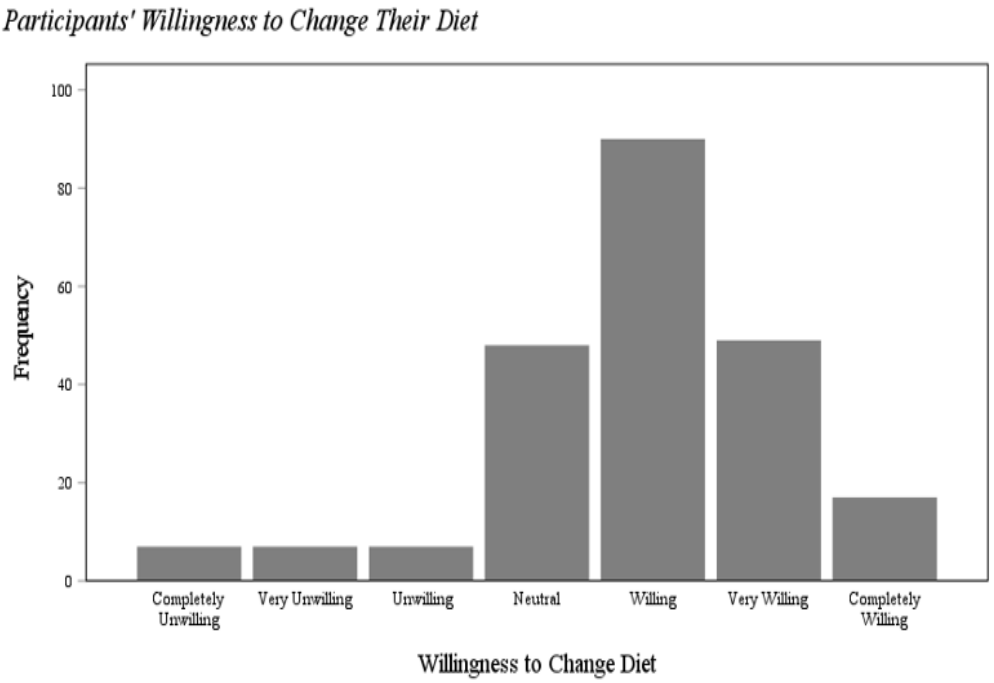

Figure 2. Frequency of participants' willingness to change their diet. Choices included, Completely Unwilling, Very Unwilling, Unwilling, Neutral, Willing, Very Willing, and Completely Willing (based on n = 225).

Figure 3

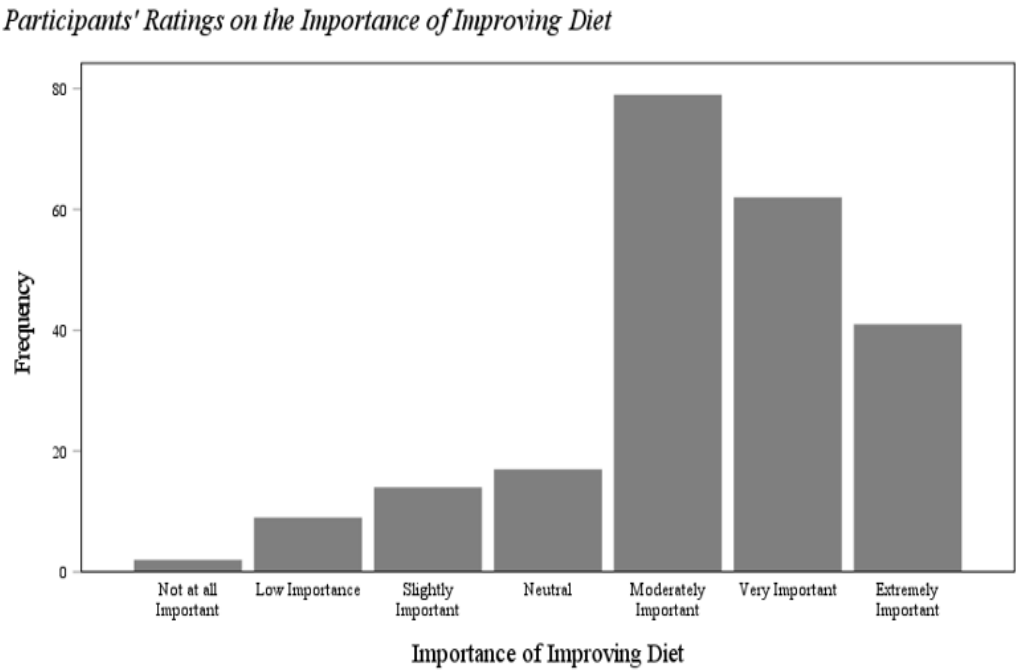

Figure 3. Frequency of participants' ratings on the importance of changing their diets to improve their physical health. Ratings included, Not at all Important, Low Importance, Slightly Important, Neutral, Moderately Important, Very Important, and Extremely Important (based on n= 225).

Figure 4

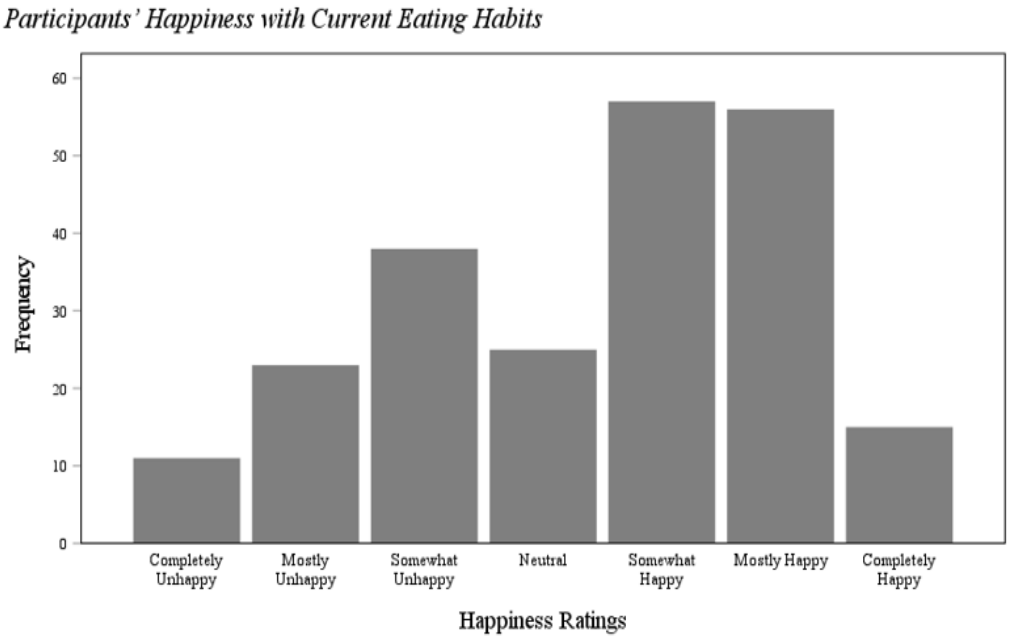

Figure 4. Frequency of participants' happiness ratings concerning their current eating habits. Ratings included, Completely Unhappy, Mostly Unhappy, Somewhat Unhappy, Neutral, Somewhat Happy, Mostly Happy, and Completely Happy (based on n = 225).

Instrument Validity and Principal Component Analyses

Food choice was measured by having participants complete a food choice task consisting of 15 different food pairings. Participants were asked to choose one food from each pairing, which consisted of one healthy item and one unhealthy item. Each healthy item chosen represented a score of 1, and each unhealthy food selected represented a score of 0. The total number of healthy foods chosen were subsequently added together, for a total score out of 15. For example, a score of 15 indicated that participants chose the healthy food option every time. Conversely, a score of 0 indicated that the participants chose an unhealthy food option from each pairing.

The food choice task responses were found to be relatively normally distributed across the six experimental conditions (i.e., loss-framed statistic, gain-framed statistic, loss-framed narrative, gain-framed narrative, statistic control, and narrative control), with a mean score of 9.95, and a standard deviation of 3.105. Skewness (-.205) and Kurtosis (-.678) were both found to be within acceptable ranges (see Figure 5). However, participant responses tended towards the positive end of the frequency distribution. That is, no participants chose 0 healthy items, while multiple participants chose all 15 healthy food choices.

Figure 5

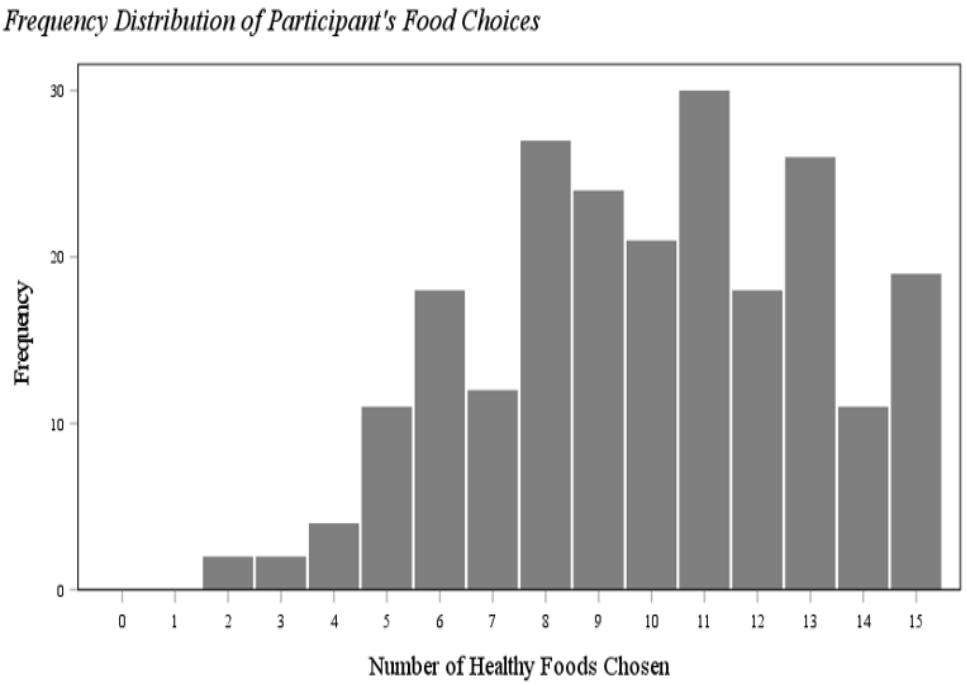

Figure 5. Frequency of participants' responses on the food choice task. Higher scores represent a higher frequency of healthy foods chosen compared to unhealthy foods. Each healthy item chosen represented a score of 1, and each unhealthy food selected represented a score of 0. The total number of healthy foods chosen were subsequently added together, for a total score out of 15 (based on n = 225).

The Effect of Message Frame and Evidence Type on Food Choice

The present study investigated the effect of message framing (loss-framed, gain-framed, and control messages) and evidence type (statistic and narrative evidence) on food choice. A two-way between-subjects ANOVA was used to assess for the observed differences in food choice as a function of the IVs. The assumption of homogeneity of variance was tested and found to be satisfied based on a non-significant Levene's test. There was a statistically significant main effect of message framing on food choice ($F (2, 219) = 10.671$, $p = <.001$ $\eta 2 = .089$). Conversely, the effect of evidence type on food choice was not significant ($F (1, 219) = .138$, $p = .711$, $\eta 2 = .001$). Additionally, there was no significant interaction between message framing and evidence type ($F (2, 219) = 1.117$, $p = .329$ $\eta 2 = .010$).

Post-hoc tests were used to further investigate the main effect of message framing on food choice. Results from the LSD post-hoc tests indicated that participants in the gain-framed ($M = 10.86$, $SD = 3.232$) and loss-framed ($M = 10.30$, $SD = 3.178$) conditions both selected significantly more healthy food options compared to the control condition ($M = 8.70$, $SD = 2.471$). The difference in means between the gain-framed and control conditions (mean difference = 2.158, 95% CI: 1.235 to 3.081) was moderate (Cohen's $d = .750$). Moreover, the difference in means between the loss-framed and control conditions (mean difference = 1.604, 95% CI: .679 to 2.529) was also moderate (Cohen's $d = .565$). There were no significant differences between the gain-framed and loss-framed conditions (see Figure 6). Figure 7 shows the data for evidence-type.

Despite the statistically non-significant interaction effect, LSD adjusted pairwise comparisons were conducted for a finer grained analysis of the message conditions. The

conditions included a loss-framed statistic message (M = 10.09, SD = 3.275), a gain-framed statistic message (M 10.79 =, SD = 3.434), a loss-framed narrative message (M = 10.49, SD = 3.077), a gain-framed narrative message (M = 10.92, SD = 3.061), a statistic control message (M = 9.16, SD = 2.304), and a narrative control message (M = 8.21, SD = 2.591). More specifically, pairwise comparisons identified statistically significant differences between the loss-framed statistic and the narrative control conditions. The difference in means (mean difference = 1.875, 95% CI: .503 to 3.248) was moderate (Cohen's d = .638). There was also a statistically significant difference between the gain-framed statistic and the statistic control conditions. The difference in means (mean difference = 1.627, 95% CI: 282 to 2.973) was moderate (Cohen's d = .555). Additionally, there was a statistically significant difference between the gain-framed statistic and the narrative control condition. The difference in (mean difference = 2.579, 95% CI: 1.189 to 3.969) was large (Cohen's d = .848).

Comparisons further identified statistically significant differences between the loss-framed narrative condition and the narrative control condition. The difference in means (mean difference = 2.277, 95% CI: .984 to 3.570) was large (Cohen's d = .80). There was also a statistically significant difference between the gain-framed narrative condition and the statistic control condition. The difference in means (mean difference = 1.759, 95% CI:.513 to 3.005) was moderate (Cohen's d = .648). Additionally, there was a statistically significant difference between the gain-framed narrative condition and the narrative control condition. The differences in means (mean difference = 2.711, 95% CI: 1.414 to 4.007) was large (Cohen's d = .956) (see Figure 8). There were no statistically significant differences identified between the loss-framed statistic, gain-framed statistic, loss-framed narrative, or gain-framed narrative conditions (p >

0.05). Moreover, there were no statistically significant differences found between the narrative control and statistic control conditions (see Table 1).

Figure 6

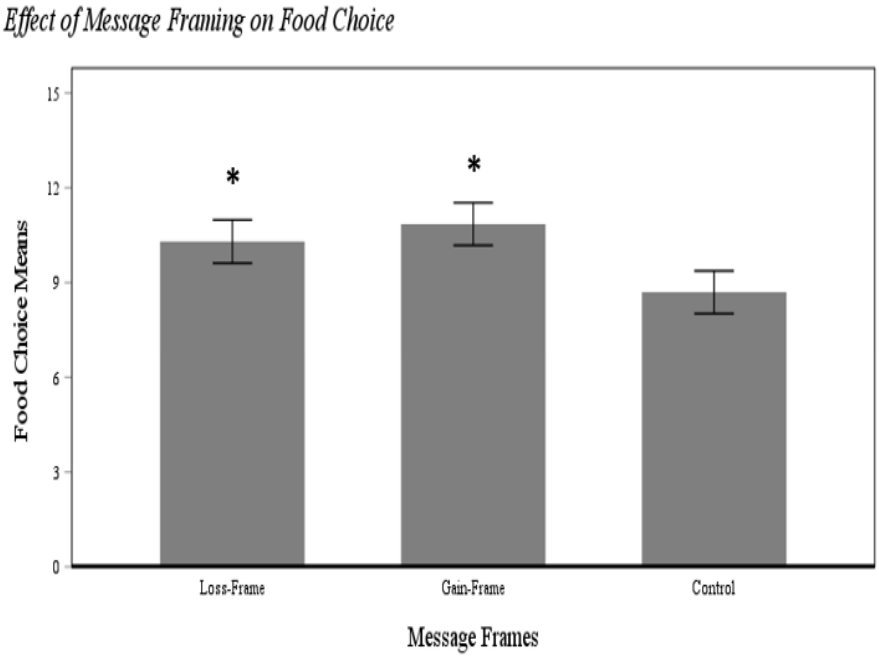

Figure 6. Bar graph comparing loss-frame, gain-frame, and control conditions on the food choice task. Y-axis values represent the mean number of healthy foods chosen out of 15 food pairings. Both loss-framed and gain-framed conditions chose significantly more healthy food options than the control conditions ($F (2, 219) = 10.671$, $p = <.001$ $\eta 2 = .089$). Error bars represent the SE (based on $n = 225$).

Figure 7

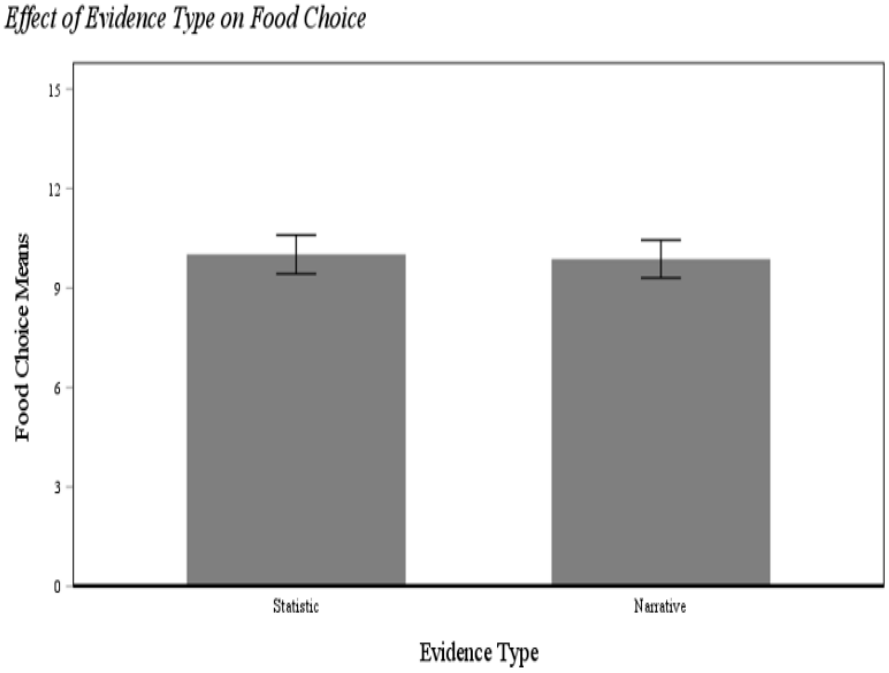

Figure 7. Bar graph comparing the statistic and narrative message conditions on the food choice task. Y-axis values represent the mean number of healthy foods chosen out of 15 food pairings. No significant difference was found between groups ($F(1, 219) = .138$, $p = .711$, $\eta 2 = .001$). Error bars represent the SE (based on n= 225).

Figure 8

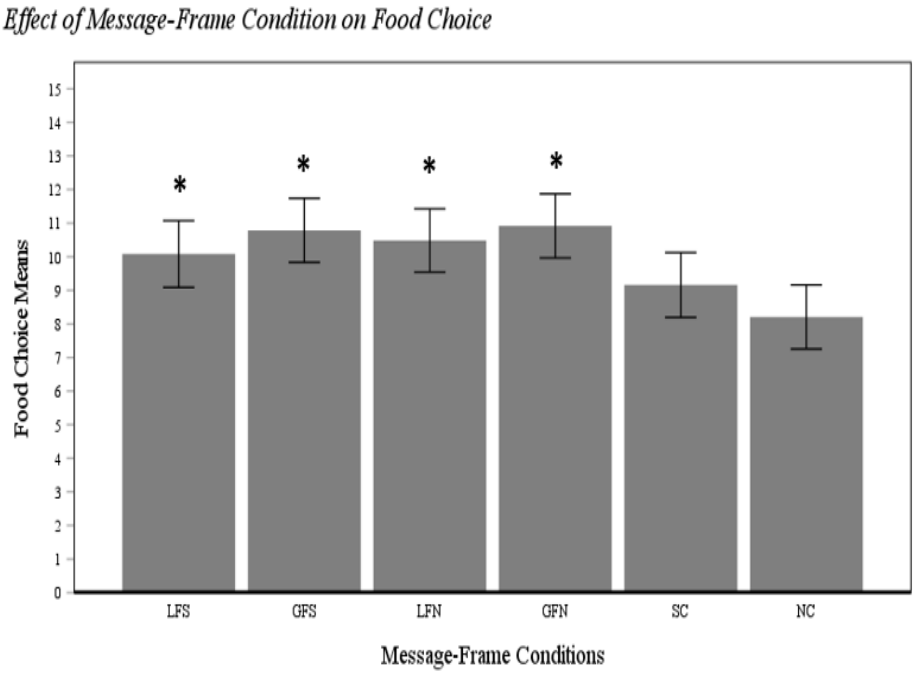

Figure 8. Bar graph comparing loss-framed statistic (LFS), gain-framed statistic (GFS), loss-framed narrative (LFN), gain-framed narrative (GFN), statistic control (SC), and narrative control (NC) conditions on a measure of food choice. Y-axis values represent the mean number of healthy foods chosen out of 15 food pairings. There was no significant interaction between message framing and evidence type. However, statistically significant differences were identified between conditions ($F (5, 219) = 4.780$, $p = <.001$ $\eta 2 = .098$.). That is, the LFS, GFS, LFN, and GFN conditions all chose significantly more healthy food options than the NC condition. Additionally, the GFS and GFN condition chose significantly more healthy food options than the SC condition. There were no statistically significant differences between control conditions or the LFS, GFS LFN and GFN conditions. Error bars represent the SE (based on n= 225).

Table 1

Experimental Condition Comparisons

Dependent Variable: Food Choice
LSD

(I) Message Frame Conditions	(J) Message Frame Conditions	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
LFS	GFS	-.704	.699	.315	-2.08	.67
	LFN	-.401	.694	.564	-1.77	.97
	GFN	-.835	.699	.233	-2.21	.54
	SC	.924	.703	.190	-.46	2.31
	NC	1.875*	.699	.008	.50	3.25
GFS	LFS	.704	.699	.315	-.67	2.08
	LFN	.302	.680	.657	-1.04	1.64
	GFN	-.132	.684	.848	-1.48	1.22
	SC	1.627*	.689	.019	.27	2.98
	NC	2.579*	.684	<.001	1.23	3.93
LFN	LFS	.401	.694	.564	-.97	1.77
	GFS	-.302	.680	.657	-1.64	1.04
	GFN	-.434	.680	.524	-1.77	.91
	SC	1.325	.684	.054	-.02	2.67
	NC	2.277*	.680	<.001	.94	3.62
GFN	LFS	.835	.699	.233	-.54	2.21
	GFS	.132	.684	.848	-1.22	1.48
	LFN	.434	.680	.524	-.91	1.77
	SC	1.759*	.689	.011	.40	3.12
	NC	2.711*	.684	<.001	1.36	4.06
SC	LFS	-.924	.703	.190	-2.31	.46
	GFS	-1.627*	.689	.019	-2.98	-.27
	LFN	-1.325	.684	.054	-2.67	.02
	GFN	-1.759*	.689	.011	-3.12	-.40
	NC	.952	.689	.168	-.41	2.31
NC	LFS	-1.875*	.699	.008	-3.25	-.50
	GFS	-2.579*	.684	<.001	-3.93	-1.23
	LFN	-2.277*	.680	<.001	-3.62	-.94
	GFN	-2.711*	.684	<.001	-4.06	-1.36
	SC	-.952	.689	.168	-2.31	.41

Table 1. Table comparing the loss-framed statistic (LFS), gain-framed statistic (GFS), loss-framed narrative (LFN), gain-framed narrative (GFN), statistic control (SC), and narrative control (NC) conditions on a measure of food choice. Statistically significant differences were identified between conditions. The LFS, GFS, LFN, and GFN conditions all chose significantly more healthy food options than the NC condition. the GFS and GFN condition chose significantly more healthy food options than the SC condition. There were no statistically significant differences between control conditions. There were no statistically significant differences between the LFS, GFS LFN or GFN conditions (based on n= 225).

The Effect of Message Framing and Evidence Type on Participants' Emotions

Participants were asked to provide information on how the specific messages made them feel. After reading one of six of the designated messages, participants were asked whether the message made them feel one of the following: Very Sad, Sad, Neutral, Happy, or Very Happy. A two-way between subjects ANOVA was used to assess the difference in participants' feelings after being exposed to the experimental conditions. The assumption of homogeneity of variance was tested and found to be satisfied based on a non-significant Levene's test. The statistically significant main effects of message framing ($F (2, 216) = 68.420$, $p = <.001$ $\eta 2 = .388$), and evidence type ($F (1, 222) = 7.904$, $p = .005$, $\eta 2 = .035$), can be understood by examining the statistically significant two-way interaction ($F (2, 216) = 8.061$, $p = <.001$, $\eta 2 = .096$).

Results from LSD pairwise comparisons revealed statistically significant differences between multiple experimental conditions. That is, there were statistically significant differences in participant's feelings, dependant on whether they read a message frame presented using a statistic or narrative evidence format. For example, there were statistically significant differences between the gain-framed narrative, loss-framed narrative, and narrative control conditions (see Table 2). More specifically, participants exposed to the gain-framed narrative message reported higher average scores on the feeling's measure compared to the loss-framed narrative and narrative control conditions, indicating that the gain-framed narrative message elicited more positive emotions. Participants exposed to the loss-framed narrative message reported significantly lower average scores on the feelings measure compared to the gain-framed narrative and narrative control conditions, indicating that the loss-framed narrative message

resulted in more negative feelings. Moreover, participants exposed to the narrative control message reported moderate average scores on the feelings measure compared to the loss-framed narrative and gain-framed narrative conditions. This indicated that participants exposed to the narrative control condition experienced feelings that were more within the range of neutral emotions, on average.

There were also statistically significant differences between the loss-framed statistic and gain-framed statistic condition. That is, participants in the loss-framed statistic condition had significantly lower average ratings on the feelings measure compared to the gain-framed statistic condition, indicating that the loss-frame statistic condition experienced more negative emotions compared to the gain-frame statistic group. Additionally, there were statistically significant differences between the loss-framed statistic and statistic control conditions. That is, the loss-frame statistic group reported significantly lower average ratings on the feelings measure compared to the statistic control group, indicating that the loss-framed statistic group experienced more negative emotions, on average, compared to the statistic control group. Conversely there were no significant differences between the gain-framed statistic and statistic control conditions (see Table 2).

Altogether, results indicated that average scores for the loss-framed statistic condition ($M = 2.29$, $SD = .572$) and loss-framed narrative condition ($M = 2.41$, $SD = .715$) were within the range of “Sadness”. The statistic control ($M = 3.14$, $SD = .481$), narrative control ($M = 3.03$, $SD = .440$), and gain-framed statistic conditions ($M = 3.14$, $SD = .585$) had average scores within the “Neutral” range on the feelings measure. Additionally, the gain-framed narrative

condition had the largest average score and most closely fell within an average rating of "Happiness" (M = 3.78, SD = .672) (see Figure 9).

Table 2

Message Conditions and Participants' Feelings Comparisons

Dependent Variable: Participants' Feelings Ratings

SxN	(I) GxLxC	(J) GxLxC	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
S	LF	GF	-.849*	.138	<.001	-1.122	-.577
		C	-.849*	.138	<.001	-1.122	-.577
	GF	LF	.849*	.138	<.001	.577	1.122
		C	.000	.137	1.000	-.269	.269
	C	LF	.849*	.138	<.001	.577	1.122
		GF	.000	.137	1.000	-.269	.269
N	LF	GF	-1.374*	.135	<.001	-1.639	-1.108
		C	-.617*	.135	<.001	-.882	-.351
	GF	LF	1.374*	.135	<.001	1.108	1.639
		C	.757*	.137	<.001	.488	1.026
	C	LF	.617*	.135	<.001	.351	.882
		GF	-.757*	.137	<.001	-1.026	-.488

Table 2. Pairwise comparison summarizing the interaction between evidence type (statistic (S) and narrative (N) messages) and message framing (loss-framed (LF), gain-framed (GF), and control (C) messages). There were statistically significant differences between the GFN, LFN, and NC conditions. There were statistically significant differences between the loss-framed statistic and gain-framed statistic condition, as well as the loss-framed statistic and statistic control conditions (based on n= 225).

Figure 9

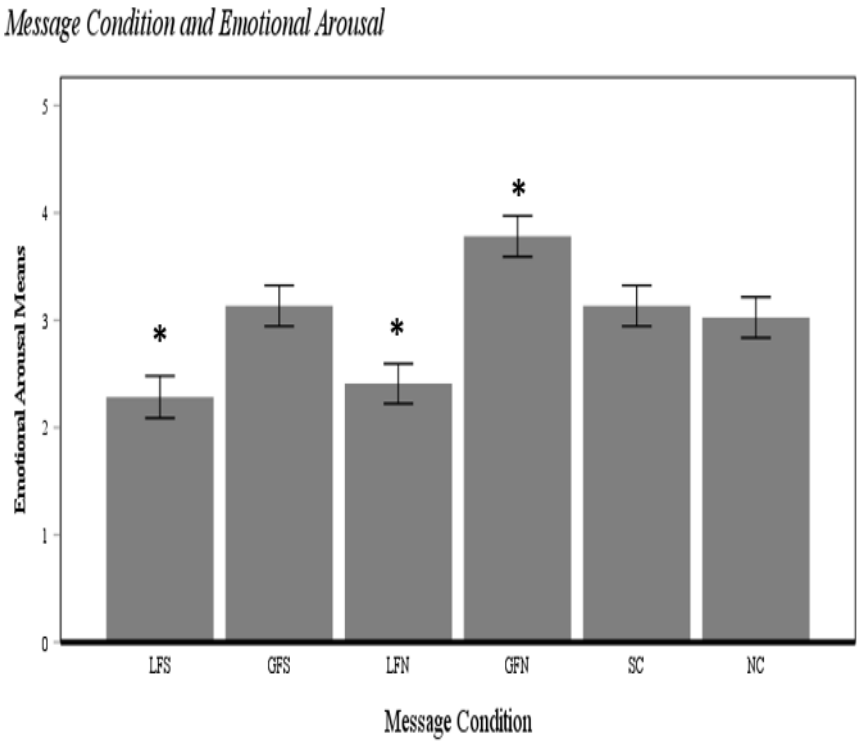

Figure 9. Bar graph summarising the effect of the loss-framed statistic (LFS), gain-framed statistic (GFS), loss-framed narrative (LFN), gain-framed narrative (GFN), statistic control (SC), and narrative control (NC) message conditions on participants' feelings. Y-axis values represent participant's ratings on the feelings measure. Ratings were given on a scale from 1 – 5 representing: 1= Very Sad, 2 = Sad, 3 = Neutral, 4 = Happy, 5 = Very Happy. There was a statistically significant interaction between message framing and evidence type ($F(2, 216) = 8.061$, $p = <.001$, $\eta 2 = .096$). There were statistically significant differences between the GFN, LFN, and NC conditions. There were statistically significant differences between the loss-framed statistic and gain-framed statistic condition, as well as the loss-framed statistic and statistic control conditions (based on n= 225).

Post-hoc (LSD) test results for the message frame main effect indicated that the gain-framed message ($M = 3.46$, $SD = .706$), loss-framed message ($M = 2.35$, $SD = .650$) and control ($M = 3.08$, $SD = .461$) conditions significantly differed on the emotion measure. More specifically, the average feeling rating for the loss-framed message condition was significantly lower than the average ratings for the gain-framed and neutral conditions. Examination of the

means showed that the average rating for the loss-framed condition was within the range of "Sad", the mean for the control condition aligned with a rating of "Neutral" on the measure, and the gain-framed condition produced an average rating that fell between "Neutral" and "Happy" (See Figure 10). Results further indicated that narrative and statistic messages also produced significantly different feelings. That is, narrative messages (M = 3.08, SD = .055) produced significantly more positive feelings than statistic messages (M= 2.85, SD = .056) (see Figure 11).

Figure 10

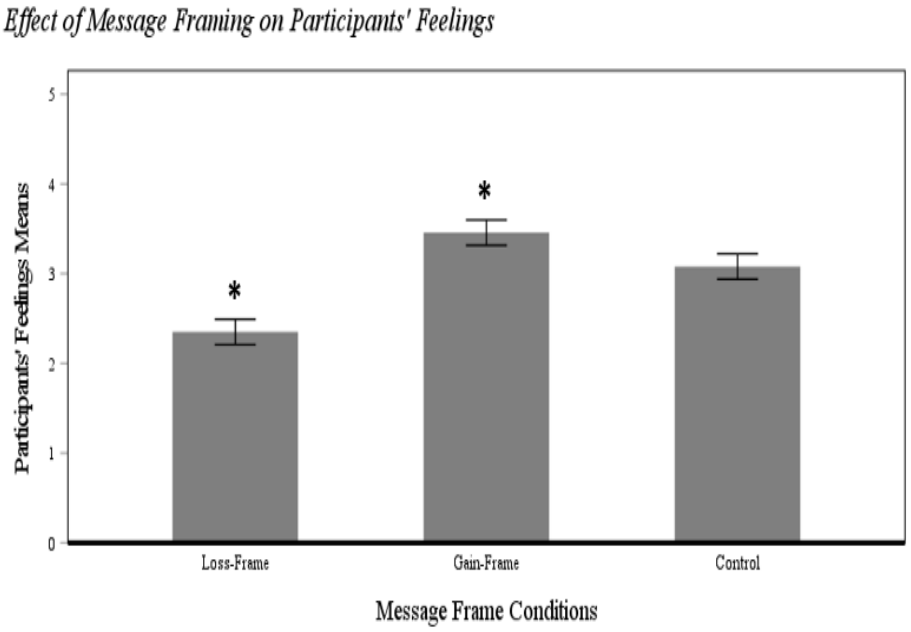

Figure 10. Bar graph summarising participant's feelings after being exposed to loss-frame, gain-frame, and control conditions. Ratings were given on a scale from 1 – 5 representing: 1= Very Sad, 2 = Sad, 3 = Neutral, 4 = Happy, 5 = Very Happy. There was a statistically significant difference between all three groups, F (2, 216) = 68.420, p = <.001 $\eta 2$ = .388 . The loss-framed messages were associated with a rating of "Sad", control conditions were associated with a rating of "Neutral", and gain-framed conditions produced ratings between "Neutral" and "Happy". Error bars represent the SE (based on n= 225).

Figure 11

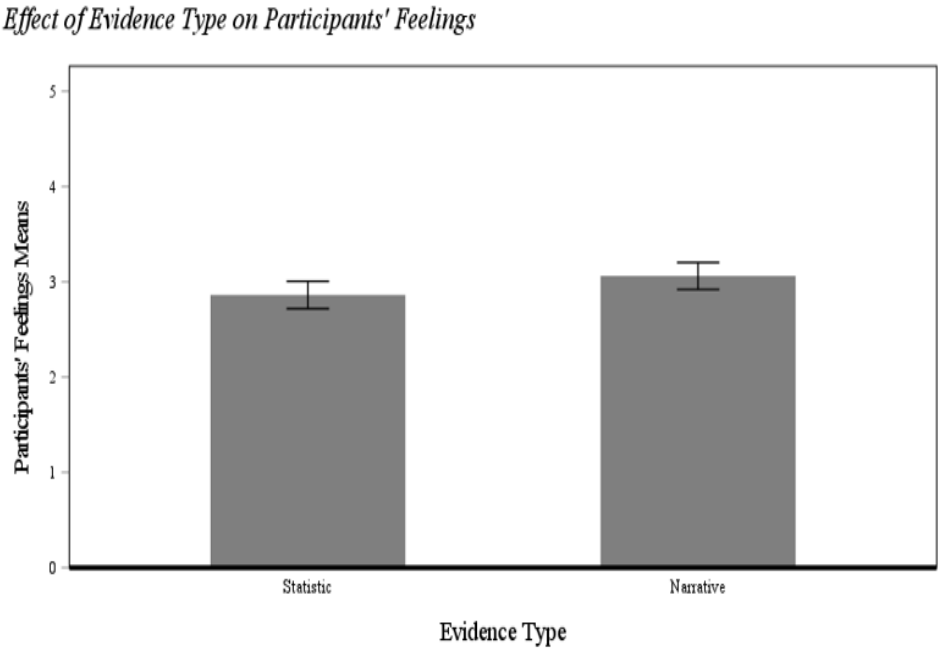

Figure 11. Bar graph summarising participant's feelings after being exposed to statistic or narrative messages. Ratings were given on a scale from 1 – 5 representing, 1= Very Sad, 2 = Sad, 3 = Neutral, 4 = Happy, 5 = Very Happy. There were significant differences between groups, $F(1, 222) = 7.904$, $p = .005$, $\eta 2 = .035$. Narrative messages elicited significantly more positive feelings than statistic messages. Error bars represent the SE (based on n= 225).

Altogether, results indicated that message framing had a significant effect on healthy food choices. That is, both gain-framed and loss-framed messages persuaded participants to make more healthy food choices compared to the control conditions. By contrast there was no significant effect of narrative or statistical evidence types on participants food choices. Moreover, statistical analyses did not identify an interaction between message framing and evidence type in promoting healthy food choices. Notably, exploratory analyses revealed a statistically significant interaction between message framing and evidence type on participants feelings. Furthermore, there were significant main effects of message framing and evidence type

on participants feelings. The interpretation of these findings will be discussed in the following section.

Chapter 4: Discussion

Summary of Key Findings

The purpose of the present study was to investigate the effect of message framing (loss-framed, gain-framed, and control messages) and evidence type (statistic and narrative) on food choice. The study sought to explore whether gain-framed messages were more effective than loss-framed and control messages in promoting healthy food choices. The current study further investigated the impact of evidence types on participants' food choices. Additionally, the study examined the interaction between message framing and evidence type to better understand their combined effects on participants' food choices. By investigating both message framing and evidence type, the study aimed to better understand the factors influencing people's decision-making processes and health-related food choices.

The results of the study demonstrated significant main effects of message framing on participants' food choices. Both gain-framed and loss-framed messages were found to be effective in promoting healthy food choices compared to the control condition. However, there was no significant difference in effectiveness between the gain-framed and loss-framed messages. That is, gain-framed messages were only marginally more effective than loss-framed messages at promoting healthy food choices. Further, results did not identify a significant difference in effectiveness between the two types of evidence. Both statistic and narrative messages were found to have similar impacts on promoting healthy food choices.

In terms of the combined influence of message framing and evidence type, the results did not identify a significant interaction. However, there were statistically significant differences between the experimental conditions. More specifically, the gain-framed conditions (narrative

and statistic) had larger effects than the loss-framed conditions (narrative and statistic) on participants' food choices. Further, the loss-framed statistic, gain-framed statistic, loss-framed narrative, and gain-framed narrative groups all chose significantly more healthy food options than the narrative control condition. By contrast, only the gain-framed narrative and gain-framed statistic conditions chose significantly more healthy food options than the statistic control condition. Thus, these results support that gain-framed messages were more effective than loss-framed and control messages in promoting healthy food choices.

Exploratory analyses revealed interesting results regarding the impact of message framing and evidence type on participants' feelings. The results indicated that there were significant main effects of both message framing and evidence type on participants' emotional responses. More specifically, participants exposed to gain-framed messages generated feelings between neutrality and happiness, control messages evoked feelings of neutrality, and loss-framed messages evoked higher levels of sadness. Moreover, as for the effect of evidence type on participants' emotional responses, participants exposed to narrative messages generated more positive feelings compared to statistical messages.

The interaction between evidence types and message framing on participants' feelings was also found to be significant. That is, the loss-framed statistic and loss-framed narrative conditions were associated with higher levels of sadness, while statistic control, narrative control, and gain-framed statistic conditions were associated with neutral feelings. Moreover, the gain-framed narrative condition evoked the highest levels of happiness. These results emphasize the effect of message framing and evidence type on emotional arousal. Moreover, the emotions elicited by being exposed to health communication messages may be a factor in bolstering message persuasiveness.

Interpretation of Key Findings

Message Framing and Food Choice

Firstly, the current study hypothesized that gain-framed messages would be more effective at promoting healthy food choices than both loss-framed messages and control messages. As predicted, gain-framed messages were significantly more effective than control messages at persuading participants to make healthy food choices. Additionally, gain-framed messages did persuade participants to make the highest percentage of healthy food choices overall, however, the advantage of gain-framed messages over loss-framed messages was not statistically significant. To better interpret these findings, we can draw upon literature on message framing and food choice.

The increased effectiveness of gain-framed messages over the control conditions aligns with prospect theory (Tversky & Kahneman, 1981) and current research on message framing and eating behaviour (Carfora, Morandi, & Catellani, 2022; Binder, Naderer, & Matthes, 2020). Current research has consistently shown that gain-framed messages can promote healthy food choices compared to control conditions (Carfora, Morandi, & Catellani, 2022; Binder, Naderer, & Matthes, 2020). For example, Carfora, Morandi, and Catellani (2022) examined the effects of message framing to increase the consumption of a Mediterranean diet. Promoting the Mediterranean diet was of interest due to its association with protective factors against NLHPs. Researchers exposed participants to one of three experimental conditions, consisting of either a gain-framed message, a loss-framed message, or a control (no message at all). Results from the

study demonstrated that the gain-framed messages were more effective than the control conditions at promoting a healthy diet.

Binder, Naderer, and Matthes, (2020) also investigated the effects of message framing on snacking behaviour by exposing children ages 6- to 10 years old to audiovisual cartoon movies expressing either gain-framed, loss-framed, or non-nutritional messages. Similarly, their results indicated that gain-framed messages were more effective than both loss-framed messages and control messages at increasing children's healthy snack choices. Altogether, current research on message framing and eating behaviour supports the effectiveness of gain-framed messages in promoting healthy food choices compared to control conditions. This finding is important, as message framing has proven to be an effective, low-cost strategy to promote dietary change. Thus, the findings from the current study further support the importance of utilizing message-framing techniques when designing interventions to promote healthy food choices.

Notably, current research has produced mixed findings regarding the superiority of gain-framed versus loss-framed messages, and their effectiveness in persuading individuals to make healthy food choices (Vidal et al., 2019; Garg, Govind, & Nagpal, 2021; Zahid & Reicks, 2018). For example, some studies have reported a stronger effect of gain-framed messages over loss-framed messages in promoting healthy food choices, indicating that emphasizing the benefits one can gain from engaging in a self-protective behaviour can be particularly persuasive in promoting dietary change (Binder, Naderer, & Matthes, 2020; Zahid & Reicks, 2018). By contrast, similar to the findings of the present study, other studies have found that both gain-framed and loss framed messages can be equally effective in promoting healthy food choices compared to control conditions (Vidal et al., 2019; Van Assema, Martens, Ruiter, & Brug, 2001). Moreover, some studies have found that loss-framed messages were more effective than gain-

framed messages in promoting healthy eating behaviour (Garg, Govind, & Nagpal, 2021). In sum, research suggests that at times gain-framed messages are more effective, sometimes loss-framed messages are more effective, and sometimes they are equally effective (Vidal et al., 2019; Garg, Govind, & Nagpal, 2021; Zahid & Reicks, 2018). Despite prior mixed findings, results from the current study suggest that both gain-framed and loss-framed messages are more effective at promoting healthy eating choices than being exposed to control messages or no message at all.

Consistent with the findings of the present study, literature indicates that both gain-framed and loss-framed messages can be equally as effective in promoting healthy food choices compared to control conditions. For example, Vidal et al. (2019) evaluated the impact of message framing on promoting the use of nutritional warnings, behavioural intentions, and actual behaviour concerning dietary choices. The authors accomplished this by assessing visual attention to nutritional warnings using eye-tracking technology, followed by asking participants to choose a snack product after being exposed to an experimental condition. Participants engaged in a between-subject design, being exposed to either gain-framed messages, loss-framed messages, or a control message. Regardless of message framing, individuals who viewed nutritional messages fixated their gaze on nutritional warnings during the snack choice task significantly longer than the control group. Additionally, when evaluating the healthfulness of the snacks chosen, participants exposed to both gain-framed and loss-framed messages chose significantly more healthy snacks than individuals in the control group. Thus, the results align with the findings of the current study, indicating that both loss-framed and gain-framed messages can equally persuade participants to make healthy food choices.

Literature also supports prior findings that loss-framed messages can be more persuasive than both gain-framed messages and control messages in promoting healthy eating behaviour (Garg, Govind, & Nagpal, 2021). For example, Garg and colleagues (2021) used two studies to examine the impacts of positive (gain-framed) versus negative (loss-framed) health messages to determine their effects on food consumption over short and long-term intervals. The first study investigated the influence of multiple exposures to health messages over eleven days using a daily food consumption diary to measure participant's consumption of healthy foods. Longitudinal data on the amounts of differing food groups consumed indicated that loss-framed messages were more effective than gain-framed messages at decreasing the consumption of unhealthy food products. The second study extended the findings from the first study by randomly exposing participants to one of four experimental conditions. The conditions exposed participants to either only positive messages, only negative messages, predominantly positive messages, or predominantly negative messages. The second study further supported the efficacy of negatively framed messages over positive messages in terms of influencing healthy dietary intentions, as participants exposed to negative messages reported a higher willingness to eat healthy foods in the future. This study demonstrated that loss-framed messages were more effective at promoting healthy dietary behaviour and intentions than gain-framed messages and control messages. Thus, consistent with the findings of the present study, research by Garg and colleagues highlights the importance of considering loss-framed messages in promoting healthy eating behaviours.

Altogether, current literature, and the findings from the present study, highlight the importance of considering both loss-framed and gain framed messages when designing health communications to promote healthy food choices. Findings from the current study suggest that

both loss-framed and gain-framed messages can be equally effective in promoting healthy food choices compared to non-nutritional messages. As noted previously, research suggests gain-framed messages show success when targeting prevention behaviours such as choosing to consume healthy foods, as the information makes people risk averse, thus, more likely to engage in safe, low-risk prevention behaviours (Rothman, & Salovey, 1997). Furthermore, research investigating the effects of gain-framed versus loss-framed messages targeting prevention behaviours supports prospect theory, as evidence suggests that gain-framed messages are more effective than loss-framed messages when promoting numerous prevention behaviours such as sunscreen application (Detweiler et al., 1999), physical activity engagement (Latimer et al., 2008), and condom use (Linville, Fischer, & Fischhoff, 1993).

Notwithstanding prior results, findings from the present study highlight the importance of also considering loss-framed messages in promoting healthy food choices. Research suggests that loss-framed messages may be equally effective as gain-framed messages at promoting healthy eating behaviour due to the complexity and increased investment that changing dietary habits requires compared to other preventative behaviours (Nabi et al., 2019). For example, while sunscreen application requires little effort to accomplish, changing one's diet requires substantial effort without the guarantee of achieving immediate positive outcomes. Current literature notes that loss-framed messages can invoke strong emotions surrounding food choice, increasing participants' willingness to make dietary changes despite investment costs and lack of guaranteed results (Nabi et al., 2019). This logic aligns with the "bad is stronger than good" hypothesis, which postulates that informational cues, experienced events, and visual stimuli with negative connotations may be effective in guiding human decision making and behaviour (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Otterbring, Gidlöf, Rolschau, & Shams,

2020; Liebrecht et al., 2019). Thus, research supports the notion that loss-framed messages can be equally or more effective than gain-frame messages dependant on the target population. Further research should be conducted investigating the effectiveness of both loss-framed and gain-framed messages in promoting healthy eating behaviours.

Several factors could have contributed to the observed results, that gain-framed messages and loss-framed messages were equally as effective in promoting healthy food choices. Food choice decisions are multifaceted; thus, these choices can be influenced by numerous individual differences including, personal taste preferences, dietary restrictions, cultural influences, self-efficacy, or risk perception (Pavey & Churchill, 2014). Therefore, the effectiveness of specific health messages may be affected by the nuances that food choices entail.

Werrij and colleagues (2010) investigated the impact of self-efficacy (i.e., an individual's belief in his or her capacity to execute a behaviour) as a moderator of the effects of gain- and loss-framed health messages on food choice. Their results indicated that the persuasiveness of gain-framed and loss-framed messages was dependent on the self-efficacy of the person reading the message (Werrij et al. 2010). That is, for participants high in self-efficacy, the gain-framed message increased participants' consumption of healthy food options compared to the loss-framed message. By contrast, there was no difference between message conditions for participants low in self-efficacy (Werrij et al. 2010). Therefore, participants in the current study may be low in self-efficacy concerning changing their diet, as indicated by the demographics, and the low number of subjects that were very willing to change their diet.

Contextual moderators can also influence the effectiveness of both gain-framed and loss-framed messages aimed at promoting specific health behaviours (Yan, Dillard, & Shen, 2010). For example, positive and negative mood states have been found to moderate the effectiveness of

gain-framed and loss-framed messages, with gain-framed messages eliciting greater health-recommended behavior when the recipient was in a positive mood compared to a negative mood (Yan, Dillard, & Shen, 2010). Thus, incorporating individual differences, and tailoring message content to target specific behaviours or subgroups, may be valuable to help bolster the effectiveness of both gain-framed and loss-framed messages on food choice. Future research should build upon our results, combining message framing techniques we found to be effective with measurements of individual differences, to determine whether specific subpopulations are uniquely persuaded by message appeals.

The finding that both gain-framed and loss-framed messages are more effective than control messages in promoting healthy food choices is important, as it highlights the nuanced importance of considering both gain-framed messages that highlight potential benefits and loss-framed messages that emphasize potential drawbacks when designing health communication campaigns. Both may be uniquely effective at promoting healthy food choices dependant on the target population.

Evidence Type and Food Choice

The present study also investigated the effectiveness of narrative and statistical messages in promoting healthy food choices. It was hypothesized that narrative-based messages would be more effective than statistical messages at promoting healthy food choices. Results from the study indicated that narrative messages were slightly more effective than statistic-based evidence

at promoting healthy food choices, however, the difference between evidence types was not statistically significant.

This finding contrasts with exemplification theory, which states that narrative messages should be significantly more persuasive than statistic messages due to the use of relatable exemplars, and their ability to evoke stronger emotional responses (Zillmann & Brosius, 2000). The presentation of characters in a narrative format impacts people's perception of messages, especially if the characters utilized are individuals with whom the population can readily identify (Zillmann & Brosius, 2000). The findings from the present study further contradict current literature as numerous studies have found a significant effect of narrative evidence over statistical evidence when targeting prevention behaviours (Shen, Sheer, & Li, 2015; McQueen et al., 2011; Xu, 2022). For example, Xu (2022) conducted a meta-analysis investigating the effectiveness of narrative and statistical evidence in health-related communication contexts. Results from the analysis indicated that narrative evidence had a significant advantage over statistical evidence for health messages advocating for prevention behaviors such as food choice (Xu, 2022).

One reason for the deviation from the original hypothesis, may be the issue of identification among the participants. Current literature demonstrates that the identification of characters and storylines presented in narrative messages is a crucial factor in determining the persuasiveness of health messages (Bell & Taylor 2016; Kotler, Schiffman, & Hanson, 2012). Participants in the current study were all participants from a postsecondary institution, with the most common age range being between 18- to 22-years old. However, the narratives used in the study centered around an older married couple, John and Sally, who developed health complications in their later years, which may have hindered identification with these characters

among the younger student population. Different age groups deal with different life events, circumstances, and health concerns. Thus, certain age groups may see information as highly relevant, while others may struggle to identify with certain characters due to circumstantial differences.

Research suggests that the persuasiveness of narrative messages relies heavily on the degree of identification individuals feel with the characters or storylines (Bell & Taylor 2016; Kotler, Schiffman, & Hanson, 2012). For example, Chen, Bell, and Taylor (2016) examined the effects of narrative message congruence on health threat perception. For the purpose of this study, researchers recruited participants who were all below the age of 30 years old. Participants were asked to read a health-related article, detailing the risks associated with overconsuming caffeine. To manipulate narrative message similarity, participants read an article in which the protagonist of the narrative was also younger than 30-years old, or a version of the narrative in which the protagonist was much older. Afterward, participants reported their perceived message persuasiveness and risk associated with the health concern. Results indicated that participants who read the version of the article that featured a similar character reported higher message persuasiveness than participants who read a version of the narrative that depicted an older character. Therefore, these results support the importance of utilizing characters with whom the target population can readily identify to enhance message persuasiveness.

Kotler, Schiffman, and Hanson (2012), investigated the influence of graphic messages depicting media characters, and their effectiveness in influencing children's food choices. Researchers conducted two experiments, in which the first experiment focused on children’s self-reported food preferences, and the second experiment measured actual food choices. In both experiments, participants were exposed to competing food options, that were endorsed by either

a character with whom they were familiar, or an unfamiliar character. Results from the first experiment indicated that children were more likely to indicate a preference for a specific food over another, when the food was endorsed by a character that they identified with. Results from the second study further supported the effectiveness of relatable characters, as children were more likely to try healthy foods if the familiar character had endorsed that food versus an unfamiliar character. Thus, this study also provides support that the degree to which individuals identify with the characters influences the persuasiveness of a message.

Although identification among participants was not directly measured in the present experiment, it may have contributed to the lack of persuasiveness of narrative evidence compared to statistic-based evidence in the present study. It was hypothesized in the current study that participants would more readily identify with narrative messages compared to statistical messages, as they would view the statistic as abstract and personally irrelevant. However, if the narrative message failed to promote identification among participants, it should be expected that the evidence types would provide similar results. Therefore, further research should be conducted measuring the effects of evidence types on personal identification among participants. This may prove to be valuable in increasing the persuasiveness of narrative based claims aimed at targeting specific populations.

Interaction between Message Framing and Evidence Type on Food Choice

Lastly, the current study hypothesized that there would be a significant interaction between message framing and evidence type. More specifically, it was predicted that the gain-framed narrative message would persuade participants to make the healthiest food choices

compared to all the other experimental conditions. This prediction was made based on the forecasted effectiveness of gain-framed messages over loss-framed messages, and the prediction that narrative-based messages would be more effective than statistical messages in promoting healthy food choices. Contrary to this prediction, there was no significant interaction between message framing and evidence type, suggesting that their combined effects did not persuade participants to make more healthy food choices. Notably, the gain-framed narrative message did persuade participants to make the highest percentage of healthy food choices compared to all other conditions, however, the difference between conditions was small.

As stated previously, these specific message frames and evidence types had not been previously studied investigating their combined effects on immediate food choice. Therefore, current literature is somewhat limited in this domain. Notwithstanding, past studies have investigated the effects of message framing and evidence types in different contexts. For example, Cox and Cox (2001) investigated the persuasiveness of message framing (gain-framed and loss-framed) and evidence type (statistical versus narrative) at increasing positive attitudes towards mammography screening. Their results indicated that loss-framed narrative messages were more persuasive than gain-framed narrative messages at promoting positive attitudes towards mammography screenings, while no framing effect was found in the statistical message condition. Similarly, Yu et al. (2010) investigated the effects of message framing and evidence type in promoting perceived efficacy and severity associated with Fetal Alcohol Spectrum Disorder (FASD). Their results suggested that the gain-framed statistical message was more effective in promoting perceived efficacy, while the gain-framed narrative message was more effective at increasing perceived severity associate with FASD. Altogether, the findings from these studies support the notion that combining message framing and evidence type can increase

awareness concerning health behaviours. However, further research is needed to expand on the body of literature combining message framing and evidence type to increase healthy food choices.

Numerous studies have also investigated the increased persuasiveness of combining message framing techniques with other factors to bolster message persuasiveness. For example, Rosenblatt et al. (2018) examined the effects of health communication messages on a dietary self-control task. The study randomly assigned participants into one of five experimental conditions, where people would view two health warnings of a specific form (text-based, negative framing; graphic, negative framing; text, positive framing; graphic, positive framing; or a no warning control message). Results indicated that positively framed graphic messages, and negatively framed text warnings, promoted greater dietary self-control when compared to the control group. Similarly, Pavey and Churchill (2014) investigated the effects of message framing (i.e., gain-framed and loss-framed messages) and agency (i.e., autonomy, heteronomy, and control) on the avoidance of high-calorie snacks. Participants were first assigned to one of three experimental conditions, which consisted of a priming task asking participants to unscramble 30 sets of five words. The priming task included either autonomy-related words (e.g., freedom, choice, and decision), heteronomy-related words (e.g., pressure, control, and must), or neutral words (e.g., book, table, and coffee). Following the priming task, participants read a health message detailing either the benefits of avoiding unhealthy snacking (gain-framed), or the health dangers of not avoiding unhealthy snacking (loss-framed). Results suggested that gain-framed messages were more effective in promoting the avoidance of high-calorie snacks compared to the loss-framed message after completing the autonomy priming task. Therefore, results suggest that when designing health communications, agency-related words can be

incorporated with gain-framed claims to bolster message persuasiveness. Altogether, current literature indicates that combining persuasive techniques with message framing can increase message effectiveness. Although the current study did not find a significant interaction between message framing and evidence type, further research should be conducted investigating factors that increase message persuasiveness and healthy food choices.

Interpretation of Exploratory Analyses

In addition to investigating the effects of message framing and evidence type on food choice, the present study explored whether variations in message framing and evidence type impacted the participants' emotional responses. The current study incorporated a measure of participants' feelings, as research suggests that understanding participants' emotional responses to health messages may help bolster the effectiveness of health communication campaigns (Yoo, Kreuter, Lai, & Fu, 2013; McQueen et al., 2011). However, there is limited literature investigating the effects of message framing and evidence type on participants' feelings.

Firstly, results from the current study indicated that there was a significant main effect of message framing on participants' emotional responses. That is, participants exposed to gain-framed messages generated feelings between neutrality and happiness, control messages evoked feelings of neutrality, and loss-framed messages were associated with higher levels of sadness. The findings that different message frames produced variations in participants' feelings aligns with current literature on message framing and emotions. For example, Mikels et al. (2016) provide evidence that gain-framed and loss-framed messages promote different emotional responses. Mikels and colleagues conducted an experiment asking participants to read a series of gain-framed or loss-framed messages about exercise, and then to rate their emotional response to

each message using Likert scale questionnaires. Additionally, the researchers took physiological measures including Facial electromyography (fEMG) and skin-conductance level (SCL) before and after exposure to messages to further measure emotional arousal. Results from the study indicated that gain-framed messages evoked stronger positive emotions, while loss framed messages evoked stronger negative emotions.

Research on message framing and food choice suggests that gain-framed messages consistently elicit positive emotions, while loss-framed messages evoke more negative emotions (Liu, Shuster, Mikels, & Stine-Morrow, 2019). Moreover, the positive and negative emotions induced by gain-framed and loss-framed messages is associated with higher message persuasiveness, especially when targeting preventative behaviours (Liu, Shuster, Mikels, & Stine-Morrow, 2019). Accordingly, research suggests that the emotional responses elicited by messages are a significant factor in promoting health behavioural change (Liu, Shuster, Mikels, & Stine-Morrow, 2019). Thus, the emotional responses elicited by the messages in the current study may have contributed to the observed effect of message framing on food choice.

Notably, the gain-framed messages in the current study failed to produce a definitive emotional response linked to positive emotions, while the loss-framed messages produced an emotional response associated with negative feelings. Thus, the lack of effectiveness of the gain-framed messages over loss-framed messages may be in part due to the lack of emotional arousal the gain-framed message elicited in the current study. Future research should be conducted to determine how to effectively construct text-based gain framed messages that promote strong emotional arousal and feelings of happiness.

Secondly, results indicated that evidence type also had a significant effect on participants' emotional responses. That is, participants exposed to narrative messages reported having

significantly more positive feelings, on average, compared to those exposed to statistical messages. The findings from the present study that participants exposed to narrative messages generated stronger positive feelings compared to statistical messages also aligns with current literature on evidence type and emotional arousal. For example, McQueen et al. (2011) investigated the effects of narrative and informational messages aimed at increasing mammography screening. They exposed participants to either narrative or informational videos and measured participants' cognitive reactions, emotional responses, and behavioural intentions through Likert scale questionnaires. Results indicated that the narrative messages generated greater emotional responses than informational messages. Participants who watched the narrative video compared to the informational video experienced stronger cognitive and affective responses to stimuli, increased personal identification, and increased behavioural intention to act on pertinent health information (McQueen et al., 2011). Thus, similar to the findings of the present study, results indicated that narrative messages elicit stronger positive emotional reactions than those exposed to statistical messages. Future research should be conducted to investigate how to design narrative messages that evoke strong emotional arousal.

Finally, the interaction between evidence types and message framing on participants' feelings was also found to be statistically significant. That is, the loss-framed statistic and loss-framed narrative conditions evoked higher levels of sadness, while the statistic control, narrative control, and gain-framed statistic conditions had average scores aligned with neutral feelings after message exposure. Moreover, the gain-framed narrative condition evoked the highest levels of happiness. To the best of our knowledge, research has not been conducted examining the combined effects of both message framing and evidence type on participants' feelings. Despite the lack of prior research, the observed interaction in the current study can be understood given

the unique effects that different message frames and evidence types had on participants' feelings. For example, it can be understood that the gain-framed narrative condition evoked the highest levels of happiness, as gain framed messages produced significantly higher levels of happiness than both loss-framed and control conditions, and narrative messages evoked stronger emotional responses that statistical messages. Thus, future research should be conducted investigating the effects of both message framing and evidence type on participants' emotions.

Altogether, the findings from the current study suggest that understanding the emotions elicited by health messages may contribute to further understanding of message persuasiveness. Effective health communications should not only convey accurate information but also be designed considering their emotional impact. Therefore, future research should be conducted investigating the impacts of different message frames and evidence types on participants' feelings.

Limitations and Future Research

The current study is not without limitations, some of which include ecological validity, generalizability, and the need for further measurement of participants' emotional responses. However, these limitations do not detract from the findings gathered, but rather allow potential avenues for future research to explore the effects of health communication on food choice. For example, concerning ecological validity, the current study incorporated a virtual food choice task that closely measured immediate food selection. Although participants did not consume the food directly after the experiment, it was believed that asking individuals to make immediate concrete dietary choices provided a more valid representation of food choices than questions concerning their intentions to consume healthy foods in the distant future (Lin & Lee, 2021). Notwithstanding, the virtual food choice task may not fully capture the complexity of real-life

food choices (Balcetis, & Dunning, 2008). Thus, the artificial nature of the experimental task may limit the ecological validity of the findings. Research shows that actual behaviour can deviate from stated preferences in research (Balcetis, & Dunning, 2008), thus, future research should incorporate a food choice task in more naturalistic settings including restaurants, cafeterias, or grocery stores to gain further insight into the effects of health communication messaging in naturalistic settings.

Secondly, the present study utilized a homogenous population, which only included students from a post-secondary context, with the most common age range being between 18- to 22-years old. Although exposing a homogenous population to health communication messages provided greater internal validity, the limited sample may not fully represent the broader population, henceforth, limiting the broader applicability of the current findings. For example, Peterson (2001) conducted a meta-analysis assessing the implications of using college student participants in social science research. The results suggested that the responses of college students may differ significantly from non-student populations depending on the outcome variable being investigated (Peterson, 2001). Additionally, as noted previously, the narratives used in the study centered around an older married couple who developed health complications in their later years, which may have hindered identification among the younger student population with the characters. Different age groups may see information as highly relevant, while others may struggle to empathize with certain characters due to circumstantial differences. Therefore, a replication study should be conducted measuring the effects of message framing and evidence type on food choice using a more generalized population and demographic-appropriate narrative characters.

Finally, the current study incorporated exploratory analyses, measuring participants' emotional response after being exposed to one of the experimental health messages. More specifically, after being exposed to a health message, participants were asked how the message they read made them feel using a Likert scale format ranging from 1 to 5. Although measuring the emotional responses associated health communication messages was not a primary variable of interest, a more comprehensive measurement for emotional arousal could be incorporated into future research. This may provide a more accurate measurement of participants' emotional responses after reading health communication messages. Altogether, the findings from the current study indicate that future research should be conducted investigating the effects of health communication messages on emotional responses. This may help to identify how to further improve message persuasiveness targeting food choice.

Conclusion

Designing persuasive public health communications that reliably alter eating behaviour is challenging, particularly as energy-dense, high-fat foods, have become readily accessible, advertised, and are relatively inexpensive. In the present study, we examined the effects of message framing and evidence type on immediate food choice. It was found that both gain-framed and loss-framed messages promoted significantly more healthy food choices compared to the control messages. Thus, the current study provides evidence that incorporating both gain-framed and loss-framed information in public health messages effectively bolsters message persuasiveness. Importantly, this information is useful in helping consumers make healthier food choices, which would potentially lead to decreases in the health concerns associated with consuming an unhealthy diet, and lessen healthcare burdens. Contrary to our expectations, results did not identify a significant difference between narrative and statistical-based messages

on participants' food choices. Additionally, results did not identify a significant interaction between message framing and evidence type, suggesting that the combined effects did not persuade participants to make more healthy food choices.

Notably, exploratory analyses were also conducted, revealing interesting results regarding the impact of message framing and evidence type on participants' feelings. The results indicated that there were significant main effects of both message framing and evidence type on participants' emotional responses. Moreover, the interaction between evidence types and message framing on participants' feelings was also found to be significant. Altogether, the different message frames and evidence types each elicited distinctly different feelings for participants. Thus, the current research furthers the growing knowledge base around designing effective public health communications to promote healthy food choices. By exploring the factors that contribute to persuasive health communications, we can gain insights into alleviating the prevalence of NLHPs, and lessen healthcare burdens.

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Appendix A – Demographic Questionnaire

Section 1: Demographics

Please provide answers to the following questions. You may skip questions if you do not feel comfortable providing the requested information.

What is your age?

What gender do you identify as?

a) Male

b) Female

c) Non-binary

d) Other

e) Prefer not to say

What is the highest level of education you have completed or are currently enrolled in?

a) Bachelor's degree

b) Master's degree

c) Ph.D. or higher

d) Prefer not to say

Are you currently employed?

a) Yes

b) No

How often do you engage in physical activity?

1) Never 2) Very Rarely 3) Rarely 4) Occasionally 5) Frequently 6) Very Frequently

How tall are you (Feet and Inches)?

Approximately how much do you weight (in pounds)?

Willingness to change your diet?

1) Completely Unwilling 2) Very Unwilling 3) Unwilling 4) Neutral 5) Willing 6) Very Willing 7) Completely Willing

How important is it for you to change your diet to improve your health?

1) Not at all important 2) Not very Important 3) Slightly Important 4) Neutral 5) Moderately Important 6) Very Important 7) Extremely Important

Are you happy with your current eating habits?

1) Very Unhappy 2) Mostly Unhappy 3) Somewhat Unhappy 4) Neutral 5) Somewhat Happy 6) Mostly Happy 7) Very Happy

Do you follow a rigid diet?

a) Yes

b) No

If yes, please indicate why you might follow a rigid diet?

Appendix B - Message Frames

Section 1: Loss-Framed Statistic

The Canadian Food Guide recommends that adults should avoid overeating foods with excessive salt, fat, sugar, and calories. They also recommend that adults should begin eating more fruits, vegetables, grains, and other nutrients needed to support optimal health. Failing to meet Canadian dietary recommendations will result in increased risk for developing nutrition linked health problems (NLHPs).

Canada is facing an obesity epidemic, as too many Canadian adults are consuming unhealthy diets. Health Canada believes that unhealthy eating is one of the leading causes of the obesity crisis. Currently, 1 in 4 Canadian adults (approximately 7.3 million) are obese, and if current dietary trends continue, 1 in 3 Canadians may be obese by 2031. This is a problem that affects both Canadian men and woman.

Multiple longitudinal studies have found a link between obesity and NLHPs such as cardiovascular disease, respiratory diseases, diabetes, and cancer. Cardiovascular disease accounts for the highest proportions of annual NLHP deaths worldwide (17.9 million), followed by cancer (9.3 million), respiratory diseases (4.1 million), and diabetes (1.5 million). By 2030, estimates indicate that NLHPs will make up approximately 52 million deaths annually. If Canadian adults continue to consume unhealthy diets, they will be at risk for developing health complications that generally require hospitalization, lengthy treatments, and expensive care.

Failing to maintain healthy eating habits may increase personal health risks such as:

- Decreasing the functioning of your cardiovascular system preventing it from effectively pumping blood

- Poor sleep quality and lowered energy levels making you feel tired throughout the day
- Higher chance of physical injury due to increased stress on your joints
- Increased risk for mental health issues and diminished ability to cope with stress
- Increased chances for developing all NLHPs

If Canadian adults do not begin consuming healthier diets, they will be putting themselves at risk for health complications, financial burdens, and lowered quality of life.

Section 2: Gain-Framed Statistic

The Canadian Food Guide recommends that adults should avoid overeating foods with excessive salt, fat, sugar, and calories. They also recommend that adults begin eating more fruits, vegetables, grains, and other nutrients needed to support optimal health. Following Canadian dietary recommendations will result in a longer and healthier life.

Currently, Canada is facing an obesity epidemic, as too many Canadian adults are consuming unhealthy diets. Health Canada believes that maintaining healthier diets could be a significant factor in solving the obesity crisis. Currently, 3 in 4 Canadian adults (approximately 21.9 million) are not obese and this number could be even higher if more Canadians maintained a healthy eating lifestyle. By 2031, the obesity epidemic could be significantly diminished if more Canadians begin eating healthier foods. The benefits of healthy eating can be experienced by both Canadian men and women.

Multiple studies have found a link between lowering obesity and living a longer life by decreasing the chances of developing nutrition linked health problems (NLHPs) such as cardiovascular disease, respiratory diseases, diabetes, and cancer. Cardiovascular disease accounts for the highest proportions of annual NLHP deaths worldwide (17.9 million), followed by cancer (9.3 million), respiratory diseases (4.1 million), and diabetes (1.5 million). By 2031, estimates indicate that NLHPs will make up roughly 52 million deaths annually. If Canadian adults begin consuming healthier diets, they will increase their likelihood of maintaining optimal health, avoid lengthy hospital visits, and prevent expensive medical treatments.

By maintaining a regular healthy diet, Canadians will experience the following benefits:

- Increased functioning of your cardiovascular system allowing it to effectively pump blood
- Improved sleep quality and higher energy levels making you feel energized throughout the day
- Less chance of physical injury due to decreased pressure on joints
- Decreased risk for mental health issues and improved ability to cope with stress
- Decreased chances for developing all NLHPs

If Canadian adults begin consuming healthier diets, they will prevent health complication associated with NLHPs, avoid financial burdens, and increase their overall quality of life.

Section 3: Loss-Framed Narrative

John and Sally are Canadian adults who have been eating a diet high in fat, salt, and sugar for the past decade. They typically buy their meals from fast food restaurants, drink a soda with each meal, and avoid eating foods such as fruits, vegetables, and whole grains. Until recently, John and Sally didn't see any problem with their diet since most of their friends and family ate the same way.

Earlier this year, Sally started to feel sick, experiencing chest pain, shortness of breath, and muscle soreness. Given her symptoms, she decided to go to her family doctor for a check up to ease her mind. During her examination, the physician asked Sally to give a detailed explanation of the food she typically eats. The doctor informed Sally that she was beginning to develop cardiovascular disease due to the increased pressure her poor diet had placed on her heart and blood vessels. The physician informed Sally that given her current situation, she would need to take some time off work to recover, as cardiovascular disease could lead to an early death. The doctor also informed Sally that her body mass index was quite high, indicating that she could be considered obese, and needed change her diet as soon as possible.

Sally called John right after her appointment and told him the bad news. She told John that she would need to take time off work and that she needed his support for the time being. This news hit John particularity hard as it reminded him of his uncle William who had died too young due to cancer brought on by obesity. Although John was eager help, Sally worried that this might be too much for him, since he frequently complained about low energy levels, sleep problems, and sore feet. She also worried that John may need to change his diet too or be at risk for health problems in the future.

Section 4: Gain-Framed Narrative

John and Sally are Canadian adults who have been eating a diet high in fat, salt, and sugar for the past decade. They typically buy their meals from fast food restaurants, drink a soda with each meal, and avoid eating foods such as fruits, vegetables, and whole grains. Until recently, John and Sally didn't see any problem with their diet since most of their friends and family ate the same way.

A few months ago, Sally wasn't happy with her health, so she decided to make a change in her diet and began following the Canadian Food Guide's dietary recommendations. Now, she regularly eats fruits and vegetables, and tries to avoid junk food when possible. Within weeks, Sally noticed an improvement in her health. She lost weight, no longer had shortness of breath, her muscles felt strong, and her chest pain went away. She was very pleased with the positive health outcomes she gained from eating healthy foods. Sally went to see her family doctor for her yearly examination and explained the benefits she has been experiencing from eating healthy foods. He was pleased to inform her that making this change may have saved her from developing a health problem such as cardiovascular disease that has been associated with premature death. She was no longer at risk for obesity and would be able to enjoy an improved quality of life.

Sally called John right after her appointment and told him the good news. She told John how great she felt, and that she wanted him to start eating healthier foods as well. She explained to John that changing his diet would relieve the health issues he had been facing, and improve his sleep quality, increase energy levels, and alleviate the pain he has been feeling in his feet. Sally reminded John that his uncle William had previously changed his diet and recovered from cancer

brought on by obesity. She knew that if John changed his diet, he would avoid health problems in the future.

Section 5: Statistic Control Message

The Canadian Rocky Mountains run all the way from the North to the South ends of Canada. Known as "The Rockies", the territories can be divided into two parts: the British Columbia Rocky Mountains located in British Columbia, and the Alberta Rocky Mountains located in Alberta. The Rockies are home to over 50 high mountains whose elevation exceeds over 11,000 feet. The highest peak of this range of mountains is named Mount Robson, standing at 12,972 feet (3,954 metres) above sea level. The 2nd highest peak in this collection of mountains is Mount Columbia, standing at 12,294 feet (3,747 metres) above sea level. Although Mount Columbia is 2nd highest peak in the Canadian Rockies, it is the highest peak in all of Alberta.

In Albera, the Rocky Mountain Region is approximately 49,070 km^2 and takes up 7.4% of the province. As of July 2018, 60% of Alberta's mountains are considered protected land. These mountains hold large reserves of fresh water that help support Canadian populations. Canada holds 20% of the world's freshwater resources and highland mountain regions such as the Rockies help maintain the supply. The Mountains also help support Canada's wildlife species such as deer, elk, caribou, moose, bears, wolves, and fish. For example, the present-day wolf numbers are estimated to be around 4,000 – 5,000 in the Alberta Rockies alone.

The Canadian Rockies look very different from the American Rockies located across the border. The Canadian Rockies are made up of mostly layered sedimentary rock such as shale and limestone, while the American Rockies are composed mostly of igneous rock such as gneiss and granite. The Canadian Rockies are more jagged than the American Rockies because of heavy glaciation, resulting in pointed mountains separated by wide valleys. Some of the oldest sediments making up the Canadian Rockies are thought to be over 3.3 billion years old.

Section 6: Narrative Control Message

John and Sally are two Canadian adults who decided that they wanted to go and see the Canadian Rocky Mountains, also known as the “Rockies”. Although they weren’t exactly sure which part of the Rockies they wanted to visit, they were debating between going to see the British Columbia Rocky Mountains, or the Alberta Rocky Mountains. From what they had heard from their friends, the Rockies were home to a large collection of mountains with very high peaks. John wanted to go and see Mount Robson because he read online that it was the highest peak in all of the Rockies. Sally wanted to go and see Mount Columbia because although it was the second largest peak in the Rockies, it was the highest peak in all of Alberta.

Together, John and Sally decided that they would go to Alberta to see the Rockies. Once they arrived, they learned that the mountains make up a large portion of the province of Alberta. Additionally, a significant portion of the mountainous land was protected by the government. John and Sally explored the region and learned about the mountains role in providing water to Canadians, and the diverse wildlife species that inhabit the area. They were told that other travelers had spotted animals such as deer, elk, caribou, moose, bears, wolves, and fish.

Years ago, John had visited the American Rockies across the border. He was surprised how different the Canadian Rocky Mountains looked compared to the American Rockies. He noticed that the rocks looked quite different from what he remembered on his trip across the border. The mountains in Canada looked much more jagged and pointy. He noticed that the Canadian Rockies had more glaciation, and larger valleys separating the peaks. Although the terrain looked different, he could tell that the sediment covering the Canadian Rockies was very old.

Appendix C: Manipulation Check

Section 1: Gain-Framed Statistic Message

Please indicate your agreement with the following statements:

A. This message makes me focus on the benefits I would gain by eating healthy:

1) Very Strongly Disagree 2) Strongly Disagree 3) Disagree 4) Undecided 5) Agree 6) Strongly Agree 7) Very Strongly Agree

B. How did the message you just read make you feel:

1) Very Sad 2) Sad 3) Neutral 4) Happy 5) Very Happy

C. Approximately how many Canadian adults are not currently obese?

1) 3 in 4
2) 3 in 50
3) 3 in 100
4) None of the above

D. This message discussed what behaviour as contributing towards lessening Canadian health problems?

1) Less Smoking
2) Healthy eating
3) Less Alcohol Use
4) None of the above

What would you say best describes the way information was presented?

1) Statistics and numbers
2) Narratives and Storytelling
3) Pictures
4) None of the above

Section 2: Loss-Framed Statistic

Please indicate your agreement with the following statement:

A. This message makes me focus on what I would lose by not eating healthy:

1) Very Strongly Disagree 2) Strongly Disagree 3) Disagree 4) Undecided 5) Agree 6) Strongly Agree 7) Very Strongly Agree

B. How did the message you just read make you feel:

1) Very Sad 2) Sad 3) Neutral 4) Happy 5) Very Happy

C. Approximately how many Canadian adults are currently obese?

1) 1 in 4
2) 1 in 50
3) 1 in 100
4) None of the above

D. This message discussed what behaviour as contributing towards Canadian health problems?

1) Smoking
2) Unhealthy eating
3) Alcohol Use
4) None of the above

What would you say best describes the way information was presented?

1) Statistics and numbers
2) Narratives and Storytelling
3) Pictures
4) None of the above

Section 3: Gain-framed Narrative

Please indicate your agreement with the following statement:

A. This message makes me focus on the benefits people can gain by eating healthy:

1) Very Strongly Disagree 2) Strongly Disagree 3) Disagree 4) Undecided 5) Agree 6) Strongly Agree 7) Very Strongly Agree

B. How did the message you just read make you feel:

1) Very Sad 2) Sad 3) Neutral 4) Happy 5) Very Happy

C. By changing her diet and eating healthy, Sally avoided which health problem?

1) Cardiovascular Disease
2) Plantar fasciitis
3) Sleep Apnea
4) None of the above

D. This message discussed what behaviour that helped Sally avoid developing a health problem?

1) Less Smoking
2) Healthy eating
3) Less Alcohol Use
4) None of the above

How would you say best describes the way information was presented?

1) Statistics and numbers
2) Narratives and Storytelling
3) Pictures
4) None of the above

Section 4: Loss-Framed Narrative

Please indicate your agreement with the following statement:

A. This message makes me focus on what people can lose by not eating healthy:

1) Very Strongly Disagree 2) Strongly Disagree 3) Disagree 4) Undecided 5) Agree 6) Strongly Agree 7) Very Strongly Agree

B. How did the message you just read make you feel:

1) Very Sad 2) Sad 3) Neutral 4) Happy 5) Very Happy

C. By eating unhealthy, Sally began to develop which health problem?

1) Cardiovascular Disease
2) Plantar fasciitis
3) Sleep Apnea
4) None of the above

D. This message discussed what behaviour as contributing towards Sally developing a health problem?

1) Less Smoking
2) Unhealthy eating
3) Less Alcohol Use
4) None of the above

What would you say best describes the way information was presented?

1) Statistics and numbers
2) Narratives and Storytelling
3) Pictures
4) None of the above

Section 5: Statistic Control Message

Please indicate your agreement with the following statement:

A. This message described the Canadian Rocky Mountains using numbers and statistics:

1) Very Strongly Disagree 2) Strongly Disagree 3) Disagree 4) Undecided 5) Agree 6) Strongly Agree 7) Very Strongly Agree

B. How did the message you just read make you feel:

1) Very Sad 2) Sad 3) Neutral 4) Happy 5) Very Happy

C. The Canadian Rocky Mountains and the American Rocky Mountains look:

1) The same
2) Almost the same
3) Different
4) None of the above

D. What animal was mentioned in the message?

1) Wolf
2) Lion
3) Tiger
4) None of the above

What would you say best describes the way information was presented?

1) Statistics and numbers
2) Narratives and Storytelling
3) Pictures
4) None of the above

Section 6: Narrative Control Message

Please indicate your agreement with the following statement:

A. This message described the Canadian Rocky Mountains using a story or narrative:

1) Very Strongly Disagree 2) Strongly Disagree 3) Disagree 4) Undecided 5) Agree 6) Strongly Agree 7) Very Strongly Agree

B. How did the message you just read make you feel:

1) Very Sad 2) Sad 3) Neutral 4) Happy 5) Very Happy

C. The Canadian Rocky Mountains and the American Rocky Mountains look:

5) The same
6) Almost the same
7) Different
8) None of the above

D. What animal was mentioned in the message?

5) Wolf
6) Lion
7) Tiger
8) None of the above

How would you say best describes the way information was presented?

5) Statistics and numbers
6) Narratives and Storytelling
7) Pictures
8) None of the above

Appendix D: Food Choice Task

1)

2)

3)

4)

5)  

6)  

7)  

8)  

9)  

10)

11)

12)

13)

14)

15)

Appendix E – Research Approval

APPROVAL FOR CONDUCTING RESEARCH INVOLVING HUMAN SUBJECTS
Research Ethics Board – Laurentian University

This letter confirms that the research project identified below has successfully passed the ethics review by the Laurentian University Research Ethics Board (REB). Your ethics approval date, other milestone dates, and any special conditions for your project are indicated below.

TYPE OF APPROVAL / New X / Modifications to project / Time extension

Name of Principal Investigator and school/department	Kyle Gardner, Graduate Student (Psychology), Dr. Michael Emond (supervisor)
Title of Project	The Effects of Message Framing on Food Choice
REB file number	6021293
Date of original approval of project	Nov 18, 2022
Date of approval of project modifications or extension *(if applicable)*	
Final/Interim report due on: *(You may request an extension)*	Nov 18, 2023
Conditions placed on project	

During the course of your research, no deviations from, or changes to, the protocol, recruitment or consent forms may be initiated without prior written approval from the REB. If you wish to modify your research project, please refer to the Research Ethics website to complete the appropriate REB form.

All projects must submit a report to REB at least once per year. If involvement with human participants continues for longer than one year (e.g. you have not completed the objectives of the study and have not yet terminated contact with the participants, except for feedback of final results to participants), you must request an extension using the appropriate LU REB form. In all cases, please ensure that your research complies with Tri-Council Policy Statement (TCPS). Also please quote your REB file number on all future correspondence with the REB office.

Congratulations and best wishes in conducting your research.

Sandra Hoy, PHD, Chair, *Laurentian University Research Ethics Board*

Appendix F – Informed Consent Form

Section 1: Informed Consent

Informed consent

You are being invited to participate in the experiment, "The Effects of Message Framing on Food Choice". The goal of this study is to investigate the effects of health communication messages on eating behaviour. This experiment will take around 15 minutes to complete, and ask participants to provide demographic information, read a message, answer comprehension questions related to a message, and perform a food choice task.

Participation in this experiment is completely voluntary and you are free to withdraw from the research at any time. If you wish to withdraw from the study, your responses will be deleted. Your future will not in any way be affected by participating or not in this study. This consent form will ask you for your permission to use your responses for statistical analysis and research publishing. Your identity and any contact information will remain anonymous and will not be linked to, written about, or available to anyone besides the researchers themselves. Your responses will be saved by the research team for up to 2 years until the project is completed. Respondents' information will be encrypted and stored in a password protected location that is protected by Laurentian University's information technology measures.

The risks associated with the study are minimal. The harms or discomforts are no greater than what an average person would expect to experience in everyday life. However, some participants may experience emotional discomfort when reading the health-related information. For this reason, health resources will be provided to all participants. Conversely, there are also potential benefits associated with participating in study. Potential benefits include, learning accurate and reliable nutritional health information, increasing knowledge on the effects of health communication messaging on eating behaviour, and increasing one's understanding of the scientific process involved in research.

Please note that the experimental messages are available only in English. Those who are not above the age of 17 or cannot legally consent to participate in this experiment will be excluded. Should you have concerns about the experiment and wish to contact the researchers please find their contact information attached to the bottom of this document. Additionally, participants may contact the Research Ethics Officer who is not attached to the research team regarding possible ethical issues or complaints about the research itself.

I agree to voluntarily participate in the research study and am legally above the age of 17 and able to give my consent. I am aware of the purpose of this research and understand that I can withdraw from the study at any time.

- Agree
- Disagree

Contacts:

Kyle Gardner, Applied Psychology, Department of Psychology | 705-675-1151 ext. 4246 | kgardner@laurentian.ca

Dr. Michael Emond, Associate Professor, Department of Psychology | 705-675-1151 ext. 4246 | memond@laurentian.ca

Research Ethics Officer, Laurentian University Research Office | 705-675-1151 ext. 3213, 2436 or toll free at 1-800-461-4030 | ethics@laurentian.ca

Appendix G – Debriefing Form

Section 1: Debriefing Form

Experiment Debriefing

Thank you for your time and effort in completing this experiment investigating the effects of health communication messages on food choice.

This study was designed in response to the increasing prevalence of nutrition linked health problems associated with poor eating habits. Currently, the average Canadian does not consume a diet that supports optimal health, and this has caused an increase in financial burdens for both Canadian citizens and health care systems. The goal of this research is to provide experimental evidence supporting an effective nutritional health message that persuades Canadians to make healthier food choices. The more we understand about the characteristics of an effective nutritional health message, the more likely we will be able to persuade Canadians to make healthier food choices and lessen health problems associated with poor eating habits.

In this experiment, we asked people to read a message and complete a food choice task. Depending on the experimental condition in which you were randomly assigned to, you may have read a nutrition related message, or a non-nutrition related message. We asked participants to read a nutrition related message to see how the message would impact their food choices at the end of the experiment. Additionally, we asked participants to read non-nutrition related messages to get a baseline of food selection without having been exposed to dietary information.

The nutrition related messages were designed to highlight different aspects of food choice and were presented using different techniques. Some messages highlighted the benefits of consuming healthy foods, while other messages focused on the risks associated with eating an unhealthy diet. Some messages used numerical evidence to highlight nutrition related information, while other messages highlighted the same information using a story about two Canadian adults. Non-nutrition related messages focused on information related to the Canadian Rocky Mountains. The goal was to determine which combination of message characteristics had the strongest effect in persuading people to make healthy food choices. We predicted that people who read a message about two Canadian adults and the negative consequences they suffered due to their poor eating habits would choose the highest percentage of healthy food options at the end of the experiment.

Health Services:

Laurentian Counselling Services: Available on the second floor of the R.D. Parker Building Monday to Friday, 9:00 a.m. to 4:30 p.m. Services can be accessed by calling 705-673-6506, by e-mailing counselling@laurentian.ca, or by booking an appointment in person.

Telehealth Ontario: Provides 24/7 phone support for all health inquiries: Phone:1-866-797-0000

Laurentian Health and Wellness Services: Serves as an on-campus medical clinic to look after any health-care needs. Available Monday to Friday, 9:00 a.m. to 4:30 p.m. by Phone: (705) 673-6546 extension 1067, or by Email: healthservices@laurentian.ca.

For further reading related to this project please see:

Balcetis, E., Manivannan, M., & Cox, E. B. (2020). Concrete messages increase healthy eating preferences. *European Journal of Investigation in Health, Psychology, and Education*. https://doi.org/10.3390/ejihpe10020049

Again, thank you for your time in contributing to research and the scientific community. Please feel free to reach out to the researchers for more information about the study, possible results, publications, or to withdraw your data and consent at any time. If you have concerns about the research, please reach out to either the researcher or the research supervisor.

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