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Gain or Loss? The Effect of Ad Framing on the Intention to Control Sugar Intake

Kang Li

Abstract

Health authorities have pointed out that high sugar intake can cause many health problems. The aim of this research is to examine the effectiveness of ad framing (gain vs. loss vs. neither gain nor loss) on persuading people to control their sugar intake. The results of an online experiment showed that both gain and loss frame were more effective than the neutral frame. Gain frame was the most effective one to persuade people to lower sugar intake. Moreover, individual difference of regulatory focus moderated the effect of ad framing (gain vs. loss). In addition, processing fluency mediated the effects of ad framing (gain vs. neutral/loss vs. neutral) on people's intention to limit sugar intake. Contributions and implications to advertising on sugar control are discussed.

Keywords: ad framing, gain vs. loss vs. neither gain nor loss framing, regulatory focus, regulatory focus theory, processing fluency, structural equation modeling (SEM)

1. Introduction

High sugar consumption is becoming a serious problem that threats public health in many countries. Excessive sugar intake can cause a series of health consequences, such as tooth decay, obesity, diabetes, and heart diseases [1]. These health problems greatly increase the expenditure on healthcare. In the United States, one trillion dollars are spent on healthcare each year due to the national addiction to sugar [2].

The World Health Organization (WHO) is urging people to reduce the amount of sugar they eat, suggesting restriction of added sugar to less than 5% of one's dietary intake [3]. However, it is not easy for people to control sugar intake because sugar is added to so many foods in the market [3]. Given the reality of added sugar in the market, WHO suggests that people should change eating behaviors, rather than waiting for the reformulation of products [3]. Thus, it is urgent to develop effective messages to persuade people to reduce their sugar consumptions.

This study aimed at examining the effectiveness of advertising on people's intention to limit sugar intake. Specifically, three types of message framing were investigated in this study: gain-framed ads, loss-framed ads, neither gain- nor loss-framed ads.

Gain vs. loss frame is a common approach in health message design (e.g., [4, 5]). Gain frame usually emphasizes the positive results if an individual adopts

a recommended behavior, while loss frame stresses the negative consequences if someone does not adopt a recommended behavior. A large amount of research in health communication has suggested that gain vs. loss frame can influence people's preferences of whether or not to adopt a health behavior. However, most health-related research focuses on behaviors related to smoking, drinking, or fitness; little research investigates the impacts of gain vs. loss framing on changing behaviors regarding sugar intake. One contribution of the current study is to fill this gap by applying message framing in the advertising of limited sugar intake and examining the effects of gain vs. loss framing in this specific health context.

Moreover, neutral framing (neither gain- nor loss-framing) has been seldom examined in the previous research. The current research included neutral framing that only presented the neutral information about sugar but emphasized neither loss nor gain in order to fully examine the effects of message framing.

Although the effects of message framing (gain vs. loss) on people's health behaviors has been found in many studies, meta-analyses (e.g., [6–10]) have shown that gain- and loss-framed messages do not have meaningful different effects on message persuasiveness. According to the results of meta-analyses, researchers have suggested that the studies of gain vs. loss framing should be focused on potential moderators that lead to meaningful framing differences [5, 7, 11]. Following this suggestion, the current study specifically investigated the moderation effects of regulatory focus on gain- vs. loss-framing.

According to regulatory focus theory [12, 13], people mainly adopt two self-regulatory orientations: promotion focus and prevention focus. Promotion focus is based on hopes and aspirations; prevention focus is motivated by security and safety emphasizes. Research showed that positively framed promotion-focused messages were more effective for people with a promotion focus, while negatively framed prevention-focused messages were more persuasive for people with a prevention focus (e.g., [14, 15]). This is most likely because people may experience regulatory fit when a message matches their regulatory focus orientation, which in turn leads them to "feel right" and then process the message more fluently (i.e., more easily) [14, 16]. The enhanced processing fluency (i.e., the ease of processing the information) further results in better persuasiveness of the message [14].

Therefore, processing fluency may play a mediator role in the interaction effect of message framing and regulatory focus on people's behavioral intention. Nevertheless, little research investigated the abovementioned relationship. Hence, another expected contribution of this study was to fill the research gaps by examining a mediated moderation relationship between regulatory focus and processing fluency in influencing the effectiveness of gain- vs. loss-framing in the context of promoting less sugar intake.

2. Literature review and theoretical framework

2.1 Gain vs. loss framing on health issues

Health professionals often attempt to maximize the impact of a health message on people's attitudes and behaviors by framing the message in different ways [17]. Gain-framed health information stresses the benefits of taking a health action, while loss-framed information emphasizes the costs of failing to engage in that action. It is necessary to note that a gain-framed message can stress the benefits by presenting either positive results that will happen or negative consequences that will not happen, whereas a loss-framed message can present either negative consequences that will happen or positive results that will not happen to address the costs [17].

Rothman et al. suggested that, based on the conceptualization of prospect theory, the impact of a given frame on a behavior depends on whether the behavior is perceived as a risk-seeking or a risk-averse course of action [17]. They further proposed that people consider a behavior as safe or risky depending on how they perceive the extent to which that behavior will cause an unpleasant outcome. For example, a detection behavior of getting a mammogram can be seen as risky (i.e., a risk-seeking behavior) because it is possible to discover breast cancer; a prevention behavior of using sunscreen is relatively safe or low risk (i.e., a risk-averse behavior) because the purpose is to prevent an unpleasant outcome of skin cancer and maintain current health.

Consistent with this viewpoint, Rothman et al. argued that loss framing is more persuasive in promoting disease detection behaviors that involve perceived risk of unpleasant outcomes, whereas gain framing is more persuasive in promoting prevention behaviors that have little risk of bad outcomes [17]. This argument has been supported by a plethora of research (e.g., [18–24]).

Since lower sugar intake can be considered a preventative behavior with little risk of bad consequences, gain framing may be more persuasive than loss framing in convincing people to adopt the recommendation to limit sugar intake. In the present study, a control condition of neither gain nor loss framing was added to further examine the effects of message framing; however, little literature provides information about the different effects among three types of framing (i.e., gain, loss, and neither gain nor loss in this study). Hence, the following hypothesis is proposed for testing and a research question is raised for exploring:

H1: Gain-framed ads lead to greater intention to limit sugar intake than loss-framed ads.

RQ1: Will ads that are neither gain nor loss framed lead to different intent to reduce sugar intake than ads that are gain and loss framed (i.e., will the effect of neutral framing on sugar-reduction intention be different than the effects of gain or loss framing)?

2.2 The moderator role of regulatory focus

Previous research has identified regulatory focus is a moderator of gain and loss frames [14]. Higgins developed regulatory focus theory and posited that when people pursue certain goals, they self-regulate their behaviors according to their regulatory orientations [12]. Two kinds of regulatory orientations were proposed by Higgin: Promotion focus and prevention focus [12]. People with promotion focus tend to take actions that advance desired results, while people with prevention focus are more likely to adopt actions that avoid undesired results.

The promotion orientation is associated with aspirations and advancement, while the prevention orientation is associated with responsibilities and safety [25]. Thus, promotion-focused people tend to approach pleasure and positive outcomes; prevention-focused people tend to avoid pain and negative outcomes [12]. Cesario, Higgins, and Scholer claimed that promotion focus and prevention focus are present in every individual to some degree because both nurturance and security are necessary survival needs [26]. However, people may have a predominant focus due to chronic individual differences, and additionally, situational features can momentarily activate one focus or the other [26].

Regulatory focus theory also posits that there are different goal-pursuit strategies for each system [25]. It distinguishes between eager means and vigilant means [25, 26]. Eager strategic means are associated with ensuring the presence of positive outcomes or against the absence of positive outcomes; therefore, this is a natural approach for promotion focus self-regulation, which concerns advancement and

accomplishment [25]. In contrast, vigilance strategies ensure the absence of negative consequences or against the presence of negative consequences; accordingly, this is a natural means for prevention focus self-regulation, which concerns safety and responsibility [25]. This can be illustrated with an example of two students with different regulatory orientations. When they want to achieve the same goal of getting a decent grade in a course, the student with a promotion-focus orientation may read extra materials beyond the required readings (i.e., an eager means) to attain a good score, whereas the student with a prevention-focus orientation may make sure to fulfill all course requirements (i.e., a vigilant means) to attain a decent grade.

Higgins argued that there is a natural fit between eager means (e.g., making sure everything goes right) and promotion-focus orientation; and there is a natural fit between vigilance means (e.g., making sure nothing goes wrong) and prevention-focus orientation [27]. The value from fit is that regulatory fit experienced by a person can increase the value of what he/she is doing [27].

When a persuasive message is designed in a way that matches audiences' regulatory focus, the audiences will feel right about the conveyed information, and regulatory fit emerges [14, 28]. Cesario et al. summarized that there are two main effects when people experience regulatory fit: First, people feel right about what they are doing during the process of goal pursuit; second, the strength of their engagement in the activity of goal pursuit can be enhanced [26].

Based upon the examination of 202 studies in a variety of topics over 13 years (1998–2010), a recent meta-analyzed study conducted by Grewal et al. also found that fit match is a way to create regulatory fit [29]. According to the discussion regarding fit match [29], gain-framed and loss-framed messages separately match people's promotion regulatory focus and prevention focus, which in turn can create regulatory fit and lead people to feel right about the message. This feeling will be further transferred into the evaluation of the message and increase the message persuasiveness [30]. Hence, from another perspective, regulatory focus moderates the persuasive effect of message framing. That is, gain- and loss-framed messages have different persuasiveness under different circumstances of regulatory focus. Therefore, the following hypotheses are proposed:

H2a: For promotion-focused individuals, gain-framed ads lead to greater intentions to limit sugar intake than loss-framed ads.

H2b: For prevention-focused individuals, loss-framed ads lead to greater intentions to limit sugar intake than gain-framed ads.

2.3 The mediator role of processing fluency

It should be noted that the moderating effects of regulatory focus on the persuasiveness of framing may be mediated by processing fluency. A great deal of research has examined the impact of fluency [14]. Processing fluency refers to the extent of ease of processing a piece of information [14]. In previous research, processing fluency is often measured by reaction time or by subjective assessment of how easy/difficult to process the information [29].

Lee and Aaker [14] summarized that research has been using various stimuli across a variety of settings to promote processing fluency, such as prior exposure (e.g., [31]), expectancy (e.g., [32]), or enhanced visual clarity (e.g., [33]). It also has been suggested that process fluency can be enhanced by regulatory fit [14, 16, 34]. The reason is that compared to a message that is regulatory nonfit, people can process the message that fits their regulatory focus more easily [16]. It also can be explained as when the information is consistent rather than inconsistent with the way people naturally think when they face issues involving both positive and negative outcomes, the information might be easier to process [14].
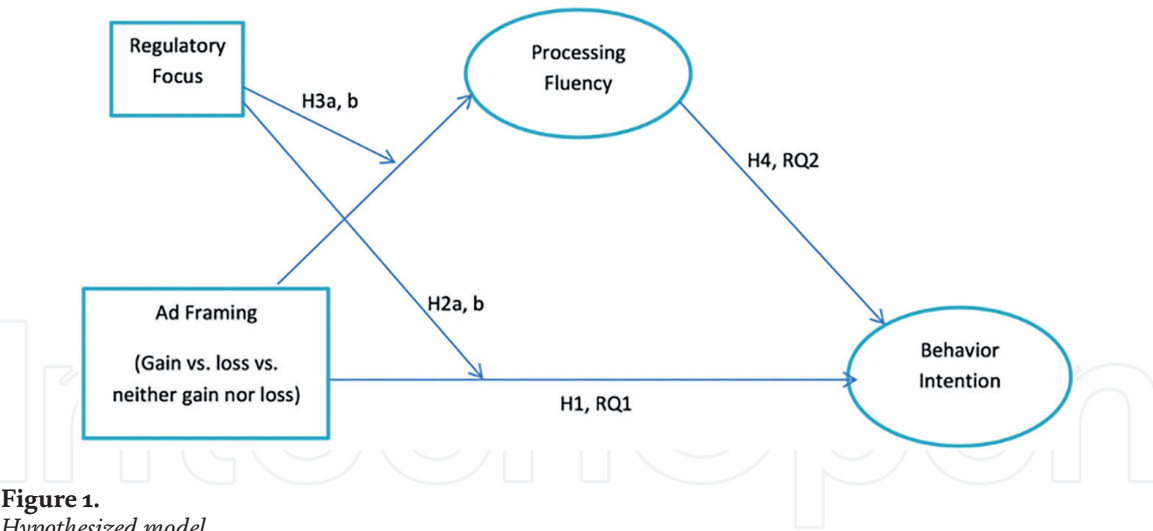
Figure 1.
Hypothesized model.

It has been suggested that processing fluency results in enhanced affective judgment [14]. People may have more favorable attitudes toward a message when they can process that message fluently [35]. Once processing fluency is enhanced, people will evaluate the message more positively, so that it will be much easier to persuade them [14, 16].

Based on the above discussion, gain and loss framing separately fits people's promotion- and prevention-focused orientation. Compared to regulatory nonfit, the regulatory fit may enhance processing fluency, and further increase the message persuasiveness. Thus, in the context of persuading people to lower their sugar intake, the following hypotheses are generated:

H3a: For promotion-focused individuals, gain-framed ads lead to greater processing fluency than loss-framed ads.

H3b: For prevention-focused individuals, loss-framed ads lead to greater processing fluency than gain-framed ads.

H4: Processing fluency mediates the interaction effects between ads' gain vs. loss framing and individuals' regulatory focus on intentions to limit sugar intake.

Since there is no literature comparing the effects of regulatory fit and processing fluency on all three types of framing (gain, loss, neither gain nor loss), the related research question is proposed to compare these effects:

RQ2: Does regulatory focus moderate three types of framing (gain, loss, neither gain nor loss) differently via processing fluency in changing people's intention to limit sugar intake?

Based on all the hypotheses and research questions, a hypothesized model is also proposed and tested in the present study (see **Figure 1**).

3. Method

3.1 Participants and procedures

This study employed a three (message framing: gain vs. loss vs. neither gain nor loss framing) × two (regulatory focus: promotion focus vs. prevention focus) between-subjects online experiment design. In the experiment, the participants completed an online survey, which contained a presentation of stimuli (six ads). The questionnaire was built and distributed via an online survey tool, Qualtrics.

The subjects were paid and recruited via an online recruiting system Amazon Mechanical Turk (MTurk). In total, there were 1,104 people who resided in the

US participated in this study. About 49% of them were female and 51% were male (544 vs. 558). They aged 18 to 74 years, with a mean age of 36.26 years (SD = 12.72). Most participants (70%) were white.

After the participants agreed with a digital consent form, they were directed to the online survey. The participants were randomly assigned into three experimental conditions (gain vs. loss vs. neither gain nor loss framing). They first answered a number of questions about their sugar-eating habits, regulatory focus orientations, and risk perceptions of excessive sugar consumption. Then they viewed an ad stimulus and responded to a following questionnaire to answer their processing fluency of viewing the ads, behavioral intention to limit sugar-eating, and demographic information.

3.2 Stimuli and measures

Six ads were designed for three experimental conditions (gain vs. loss vs. neither gain nor loss framing). Two ads were created for each condition in order to increase the external validity of the experiment: one was mainly designed by using arguments; the other one was designed by telling a personal story. All ads presented both images (e.g., a background picture with a variety of sweet snacks and beverages) and text.

The ads in the gain-framing conditions addressed the benefits of lowering sugar intake (e.g., lose weight, look younger, improve health), while the ads in the loss-framing conditions stressed the negative consequences of continuing a high-sugar diet (e.g., gain weight, look older, get diseases). In the control conditions of neither gain nor loss framing, the ads just kept neutral statements by just addressing that Americans eat too much sugar in their daily life and burning the extra calories gained from high sugar intake needs a large amount of exercise. Manipulation check was conducted, and the results showed that the stimuli ads were appropriate.

The measures of the main variables (i.e., behavioral intention, processing fluency, regulatory focus) were all drawn from the previous literature. Two control variables (i.e., sugar-eating habit, risk perception) were measured by self-created questions.

4. Results

Structural Equation Modeling (SEM) was used to explore the research questions and test the hypotheses and the model. Mplus 7 software [36] was employed to conduct the analysis. Since ad framing (gain vs. loss vs. neither gain nor loss) was a variable that had three categories, it was dummy coded into three variables in order to avoid having the analysis treat it as a continuous variable. Gain framing was first selected to be the reference group, so that the results could show the difference between gain and loss framing, as well as the difference between gain and neither gain nor loss framing. Then loss framing was chosen as the reference group for the analysis in order to compare the difference between loss framing and neither gain nor loss framing. The results showed that the model fit the data well, $\chi2$ (18) = 32.872, $p < .05$; CFI = .995; TLI = .991; RMSEA = .027.

The results of the direct effects of ad framing (gain vs. loss vs. neither gain nor loss) on behavioral intention showed that gain framing is significantly more effective than loss framing in leading to greater intention to limit sugar intake, $\gamma = -.09$, $p < .05$. Therefore, Hypothesis 1 was supported.

For the Research Question 1, the results showed that gain framing was not only more effective than loss framing but was also significantly more effective than neither gain nor loss framing in changing behavioral intention, $\gamma = -.16$, $p < .001$. Moreover, loss framing was also significantly more effective than neither gain nor loss framing in changing behavioral intention, $\gamma = -.07$, $p < .05$.

Individuals' regulatory focus (prevention vs. promotion) was found to moderate the effect of ad framing (gain vs. loss) on behavioral intention, $\gamma = .12$, $p < .01$. Specifically, for promotion-focused individuals, gain framing was more effective to lead to greater intentions to limit sugar intake than loss framing; for prevention-focused individuals, loss framing was more effective than gain framing. Thus, both Hypotheses 2a and 2b were supported.

The results showed that there was no interaction effect between ad framing (gain vs. loss) and regulatory focus on processing fluency ($\gamma = .02$, $p = .49$). Thus, the data were not consistent with Hypotheses 3a and 3b. This finding also indicated that there was no moderated mediation among these three variables. Moreover, the indirect effect of the above tested interaction on behavioral intention through processing fluency was also not significant ($\gamma = .01$, $p = .60$), which confirmed that there were no moderated mediation effects among ad framing (gain vs. loss), regulatory focus, and processing fluency on behavioral intention. Thus, the data were also not consistent with Hypothesis 4.

For Research Question 2, the results showed that the interaction effects between other types of ad framing and regulatory focus on behavioral intention were also not significantly mediated by processing fluency. That is, there were no moderated mediation effects among the tested ad framing, regulatory focus, and processing fluency on behavioral intention.

However, based on the results of SEM analysis, it was found several additional findings. First, the results showed that regulatory focus not only had a significantly direct effect on behavioral intention to limit sugar intake ($\gamma = -.20$, $p < .001$), but also had a significantly effect on processing fluency, $\gamma = -.18$, $p < .01$. Promotion-focused individuals processed the ads more fluently and had greater intentions to limit sugar intake than prevention-focused individuals.
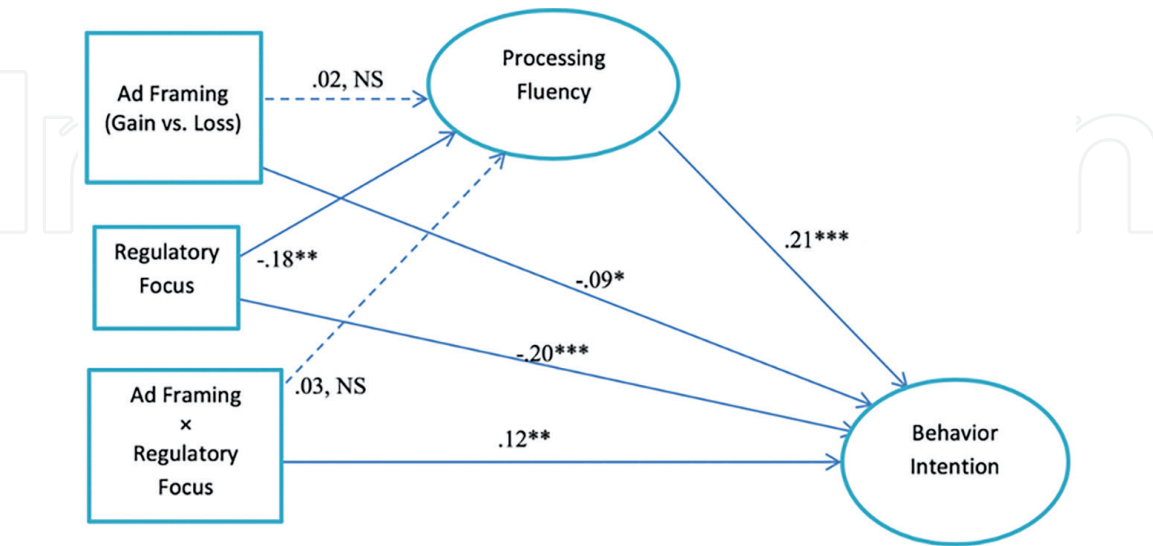

Figure 2.
*Final model (ad framing: Gain vs. loss). Note: 1. χ2 (18) = 32.872, p < .05; CFI = .995; TLI = .991; RMSEA = .027. 2. The model was evaluated by using gain framing as the reference group. 3. * indicates p < .05, ** indicates p < .01, *** indicates p < .001. 4. Dotted line indicates the effect is not statistically significant at 95% level of confidence. 5. The indirect effect of regulatory focus on behavioral intention through processing fluency is −.04, p < .01.*
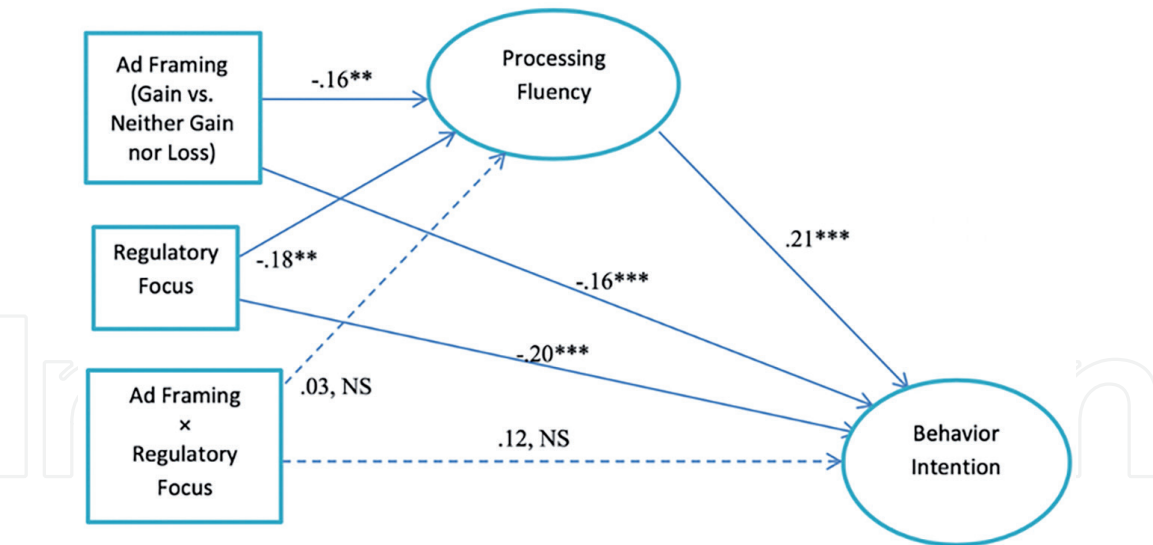
Figure 3.
Final model (ad framing: Gain vs. neither gain nor loss). Note: 1. χ2 (18) = 32.872, p < .05; CFI = .995; TLI = .991; RMSEA = .027. 2. The model was evaluated by using gain framing as the reference group. 3. * indicates p < .05, ** indicates p < .01, *** indicates p < .001. 4. Dotted line indicates the effect is not statistically significant at 95% level of confidence. 5. The indirect effect of gain vs. neither gain nor loss framing on behavioral intention through processing fluency is −.03, p < .01. 6. The indirect effect of regulatory focus on behavioral intention through processing fluency is −.04, p < .01.
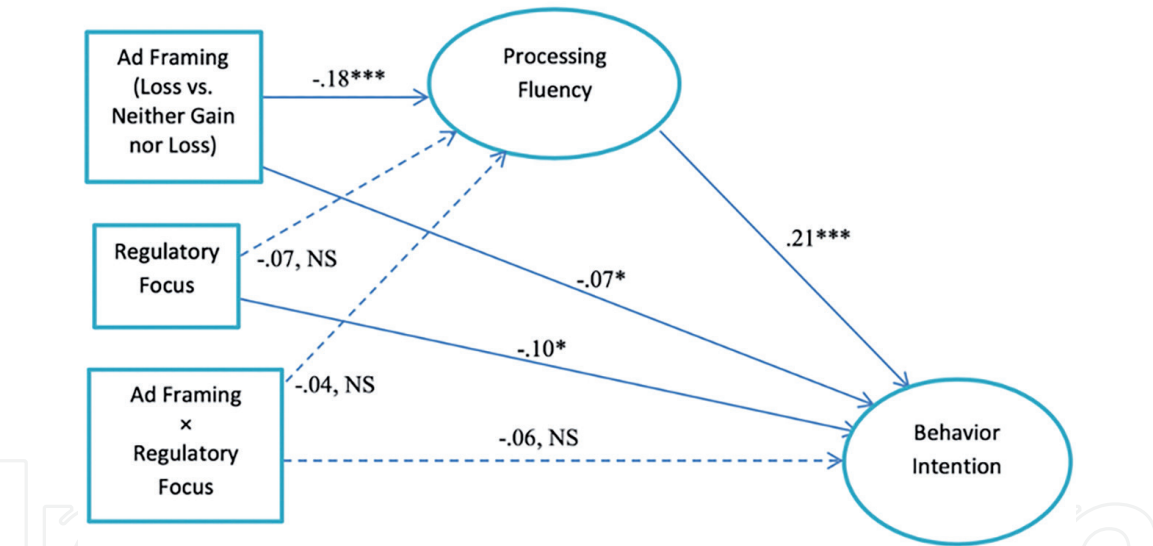

Figure 4.
Final model (ad framing: Loss vs. neither gain nor loss). Note: 1. χ2 (18) = 32.872, p < .05; CFI = .995; TLI = .991; RMSEA = .027. 2. The model was evaluated by using loss framing as the reference group. 3. * indicates p < .05, ** indicates p < .01, *** indicates p < .001. 4. Dotted line indicates the effect is not statistically significant at 95% level of confidence. 5. The indirect effect of loss vs. neither gain nor loss framing on behavioral intention through processing fluency is −.08, p < .001.

In addition, processing fluency mediated both the effect of ad framing (gain vs. neutral) and the effect of ad framing (loss vs. neutral) on people's behavioral intention: Processing fluency significantly affected people's behavioral intention, $\beta = .21$, $p < .001$. The indirect effect of ad framing (gain vs. neutral) on behavioral intention through processing fluency was significant ($\gamma = −.03$, $p < .01$). The indirect effect of ad framing (loss vs. neutral) on behavioral intention through processing fluency was also significant ($\gamma = −.08$, $p < .001$).

Based on the results, the statistical diagrams of the final model were presented as follows (See **Figures 2–4**).

5. Discussion

The purpose of this study was to investigate the effectiveness of advertising on people's intentions to control sugar intake. Specifically, three types of ad framing were examined: gain vs. loss vs. neither gain nor loss framing. Moreover, the moderator role of individuals' regulatory focus (promotion focus vs. prevention focus) on the effects of ad framing was explored. In addition, processing fluency was tested as a mediator.

By considering the influences of all tested variables in a whole SEM model, it was found that gain framing was more effective than loss framing in leading people to have greater intentions to limit sugar intake. The positive reaction toward gain-framed ads may be because people do not want to be told not to eat sugar: Many people may find it pleasant to consume sweets and foods with sugar, and limiting sugar intake is a prevention behavior that asks people to give up some kind of pleasure in order to pursue other desirable outcomes. Therefore, using a positive blueprint to persuade them to pursue desirable outcomes may be more effective than using negative illustrations to scare them into giving up their current pleasure.

The findings also showed that both gain and loss framing were more persuasive than the neutral framing in changing peoples' intentions to limit sugar intake. These findings suggest that ad framing (gain vs. loss vs. neither gain nor loss) matters in leading people to have greater intentions to adopt the recommended behavior of limiting sugar intake. Among the three types of ad framing, the neutral framing without emphasizing gain or loss cannot persuade people effectively to reduce sugar intake, while gain framing is the most effective framing to increase people's intention to eat less sugar.

Moreover, there was a significant interaction effect between ad framing (gain vs. loss) and regulatory focus on people's behavioral intentions. Gain framing was more effective in leading promotion-focused individuals to have greater intentions to limit sugar intake than loss framing, while loss framing was more effective in leading prevention-focused individuals to have greater behavioral intentions than gain framing. Based on regulatory focus theory [12], this result may indicate that gain-framed and loss-framed ads separately match people's promotion regulatory focus and prevention focus, which in turn create regulatory fit and lead people to feel right about the message. Therefore, regulatory focus is a moderator in the effects of ad framing (gain vs. loss) on behavioral intention.

Additionally, it was found that processing fluency mediated both the effects of ad framing (gain vs. neutral) and ad framing (loss vs. neutral) on people's behavioral intention to control sugar intake. That is, compared to the neutral-framed ads, both gain- and loss-framed ads were easier for participants to process, and then the greater processing fluency further led to greater advertising persuasiveness. This may be because people already have some knowledge or common sense about the negative consequences of high sugar intake or positive outcomes of controlling sugar intake; thus, compared to the neutral framing, they may process gain and loss framing more fluently with their existing knowledge, and then were better persuaded by the message.

This research provided several implications. The findings insinuate that to persuade the general population (i.e., without knowing their regulatory orientation) to control sugar intake, gain-framed advertising would be the best choice. Instead of always stressing the bad consequences of high sugar consumption to scare people, health professionals should design some positive-framed messages that stress the benefits of lowering sugar intake to stimulate people's stronger desires to control their sugar consumption. Moreover, neutral framing of neither gain nor loss is not

a good choice to persuade people to lower their sugar intake. However, if possible, it should be encouraged to find out people's regulatory orientation in order to better persuade them. For example, hospitals or other health organizations can ask obese patients or the patients with high blood sugar to fill out a questionnaire to know their regulatory focus; and then the health professionals can use different strategies tailored to different patients to help them control sugar intake. Specifically, gain-framed messages could be used more often for promotion-focused people, while loss-framed messages should get the priority to be selected for prevention-focused people. In addition, since the findings showed that processing fluency can increase message persuasiveness, making the messages easy to process should be a way to better persuade people to lower sugar intake.

6. Conclusion

Controlling sugar intake is important for individuals since today many people have an appetite disorder [37–39]. The chronical diseases associated with sugar consumption such as obesity and diabetes are epidemic globally [37, 38]. While sugar stimulates individuals' appetites, it also threatens public health if people appetite dysregulation and take excessive sugar [37, 38]. From a communication perspective, the present research contributes to this issue by investigating how to frame advertising messages to more effectively persuade individuals to actively reduce sugar consumptions. Prevention is better cure. More future research could be conducted to help individuals control sugar intake and build better health conditions.

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