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**Impacts of Efficacy and Exemplification in an Online Message about Weight Loss on
Weight Management Self-Efficacy, Satisfaction and Importance**

Abstract

Health information search is among the most popular Internet activities, requiring health campaigns to attract attention in a context of unprecedented competition with alternative content. The present study reconstructs a similar context that allows selective avoidance and exposure in order to examine which health message characteristics foster particular message impacts. Drawing on social cognitive theory (e.g., Bandura, 2004a/b), a three-session study examined short-term and delayed impacts of efficacy and exemplification as characteristics of a weight loss online message, offered for selective reading amongst other content, on weight loss/management self-efficacy, satisfaction, and importance. Both short-term impacts and impacts two weeks after exposure reflect that the high-efficacy, exemplar version increased self-efficacy and satisfaction, while the high-efficacy, base-rate version lowered them. However, both the exemplar and the base-rate versions of the low-efficacy message increased importance of body weight management.

Impacts of Efficacy and Exemplification in an Online Message about Weight Loss on Weight Management Self-Efficacy, Satisfaction and Importance

Health campaigns ultimately strive to improve health behaviors and usually need to change perceptions and attitudes to achieve this goal (U.S. DHHS, 2005). The current investigation addresses how perceptions and attitudes, which are key to behavioral changes based on social cognitive theory (Bandura, 2004b), are affected by health information obtained in an online selective exposure setting. The Internet has fundamentally changed how people access health information, as 80% of American adult Internet users report they search health information online (Fox, 2011), and places information consumption in a context of unprecedented competition with alternative messages (Bennett & Iyengar, 2008). Thus, the present work examines impacts of health message features in an exposure context that allows selection and avoidance, in contrast to forced-exposure settings generally applied in experimental work on health communication.

While related research has been conducted on the topic of physical activity (Gray & Harrington, 2011), weight loss was chosen as the health issue for this examination due to the prevalence and severity of consequences of overweight and obesity (e.g., Ogden & Carroll, 2010). Considering the extent of health campaign efforts regarding nutrition and energy balance (Reedy & Krebs-Smith, 2008), the continuous upward trend for obesity is puzzling (CDC: BRFSS survey data, 1984-2010; Ogden & Carroll, 2010). One precondition for success of these efforts is getting noticed by the public, but they may not sufficiently stand out from the crowd of competing messages. Commercial messages that promise quick weight loss (FTC, 2002) are very common but likely foster unhealthy dieting with long-term weight gain (Neumark-Sztainer, Wall, Haines, Story, & Eisenberg, 2007). Moreover, an avalanche of ads for high-sugar and

high-fat foods (Mink, Evans, Charity, Calderon, & Deger, 2010) probably counteracts the advice on healthy eating. Hence, for effective public health communication efforts, it will be crucial to get noticed despite a flood of competing messages on nutrition. Examining weight loss message impacts in a selective exposure setting, allowing individuals to avoid or disregard the message, reflects natural message consumption much better than forced-exposure settings.

Regarding features that could make a message stand out, theoretical frameworks suggest that efficacy (Knobloch-Westerwick, 2008) and exemplification (Zillmann, 1999) increase message exposure. Further, effective portrayals of a recommended behavior, especially when featuring models or exemplars (Zillmann, 1999), have been shown to increase self-efficacy perceptions among individuals, which suggests these message characteristics are two potential triggers that activate part of the behavior change process (Bandura, 2004b). For instance, Gray and Harrington (2011) showed that a message presenting a positive outcome for an exercise behavior, a manipulation similar to message efficacy, increased recipients' own control beliefs, even though their findings showed no exemplification effect. The current work examines the characteristics of efficacy and the use of exemplars showing the target behavior of weight loss.

More specifically, we will examine a health message's impact on self-efficacy with regard to weight loss, importance of this behavior, and satisfaction with one's own weight loss performance. Social cognitive theory has identified self-efficacy perceptions as a crucial component in the process of behavior change (Bandura, 1977) but also argued whether someone actually engages in a behavior depends on expected resulting self-satisfaction. This anticipated self-satisfaction, in turn, depends on importance of that behavior. In the following, we will first review relevant components of social cognitive theory (Bandura, 1977; 2004b) before we derive hypotheses from it and test them empirically.

Efficacy in the Social Cognitive Framework

Self-efficacy is the perception of one's capabilities to perform an action or behavior (Bandura, 1977). The link from a perception of one's own capabilities to behavioral intentions and actual behavior is well established, especially relative to the adoption or change of health behaviors (e.g., Bandura, 2004a/b; O'Leary, 1985; Rosenstock, Strecher, & Becker, 1988; Witte, 1992). Additionally, this research points to the strong influence that efficacy suggested in health messages and programs has in increasing self-efficacy tied to specific health goals as well as general health self-efficacy (Lee, Hwang, Hawkins, & Pingree, 2008; Schwarzer & Renner, 2000).

In the context of weight loss and dietary behavior, increasing self-efficacy has proven to be of crucial importance (see for recent examples see Anderson, Winett, Wojcik, & Williams, 2010; Linde, Rothman, Baldwin, & Jeffery, 2006; Rejeski, Mihalko, Ambrosius, Bearon, & McClelland, 2011). In the related research, details of how these programs' messages presented efficacy—that resulted in enhanced self-efficacy perceptions and subsequently weight loss—are usually not provided. Hence, it is hard to determine if merely conveying that losing weight can be done when people take action to do so is enough to improve individuals' self-efficacy perceptions.

While Bandura (1982) noted several types of information sources for self-efficacy; vicarious experiences and verbal persuasion are most relevant as sources of self-efficacy for health communication strategies in particular. Bandura (2004b, p. 83) proposed regarding vicarious experiences that "Seeing people similar to themselves change their lives for the better not only conveys strategies for how to do it, but raises television viewers' sense of efficacy that they too can succeed." In other words, seeing similar others succeed at a weight loss behavior

should increase efficacy regarding the modeled behavior, while seeing them fail should decrease it. The idea of providing models of behavior that allow for vicarious experiences relates to the notion of exemplification in media messages (Zillmann, 1999). Exemplification denotes the inclusion of special case descriptions to illustrate a broader phenomenon and is often contrasted with base-rate information as providing abstract numeric, statistical information on the phenomenon without any mentioning of a concrete behavior model. These considerations led to the following hypotheses:

- H1: Exposure to an article on weight loss success increases weight loss self-efficacy, whereas exposure to an article on weight loss failure decreases it.
- H2: The impact suggested in H1 is particularly pronounced for articles featuring behavior models as opposed to abstract, numeric information on the behavior.

Self-Satisfaction and Behavior Importance in the Social Cognitive Framework

In addition to self-efficacy, outcome expectancies are thought to govern behaviors. Not only expected material outcomes, but also anticipated evaluative responses by others and the self impact what behaviors an individual will engage in. Applicable to weight management, Bandura suggested that “People adopt personal standards and regulate their behavior by their self-evaluative reactions. They take actions that give them self-satisfaction and self-worth” (2004b, p. 82). Research on self-worth (Crocker & Park, 2003) suggests it is contingent upon domains or categories of outcomes that an individual deems important. In other words, perceived successes and failures, or adherence to self-standards in valued domains will determine an individual’s self-worth. Thus, even if a person has high self-efficacy regarding weight loss, he or she may not engage in weight management behaviors when needed if this domain is of low relevance for his or her self-worth. Due to this low relevance for self-worth, the person’s outcome expectancy may

not project the outcome of self-satisfaction derived from that behavior.

If self-efficacy weight loss perceptions are enhanced by the presence of efficacy information (see H1), and especially when efficacy information is presented through exemplars (see H2), individuals' attitudes regarding their weight management should also be enhanced. If self-efficacy is increased, it is likely that related perceptions of the behavior, losing weight, changes as well. Empirical support for this idea was reported by Kreuter and Wray (2003) and Mills, Polivy, Herman, and Tiggemann (2002). Accordingly, increased self-efficacy for weight loss would encourage the perception that it is an easier and more volitional, controllable task than originally thought and may thus enhance weight management satisfaction as well.

H3: Exposure to an article on weight loss success increases weight management satisfaction, whereas exposure to an article on weight loss failure decreases it.

H4: The impact suggested in H3 is particularly pronounced for articles featuring behavior models as opposed to abstract, numeric information on the behavior.

Ultimately, however, an increase in self-satisfaction that could result from a behavior change depends on the importance of that behavior. Research into self-worth suggests the greater the importance of a behavior domain, the greater the implications of success in this domain for self-worth (Crocker & Park, 2003). However, the influence of efficacy and exemplars in weight loss articles on importance is hard to speculate about. On one hand, if high efficacy and high efficacy exemplars increase self-efficacy perceptions and satisfaction with weight management, they probably also increase positive emotions regarding weight control. These new found ability perceptions and positive feelings toward the issue could instill pride among individuals, leading them to increase their belief that weight control is important in an effort to bolster their self-esteem. On the other hand, if exposure to high efficacy and high efficacy exemplar weight loss

articles lead to self-efficacy perceptions including the idea that weight loss is an easy, volitional task then weight management importance could be reduced. To explore these alternate speculations, the following research question is proposed:

RQ1: How do the message characteristics of efficacy and exemplification in a weight loss article influence weight management importance?

Method

Overview

The present 2 x 2 experiment manipulated two message characteristics—efficacy (low vs. high) and exemplification (base-rate information vs. exemplar)—in a weight loss article's lead in an online health magazine (see Appendix A for manipulation checks). Data were collected from college-aged participants in three waves over a three-week period: the first wave involved the collection of baseline information, the second was a selective exposure session administered in a computer lab, and the third session was conducted as an internet questionnaire, sent out two weeks after the lab session. A two-week time span between immediate and delayed measure was chosen because it is generally common in persuasion research (e.g., on the sleeper effect, see Kumkale & Albarracin, 2004) and has also been used in exemplification research (Zillmann, Gibson, Sundar, & Perkins, 1996).

Sample

Two hundred and fifty-one undergraduate students from a large Midwestern university participated in all sessions. Fifteen were excluded from the analysis because their gender was not reported. Additionally, another 39 participants were excluded because it was clear from their website activity that they did not partake in the browsing task. These outliers spent either more than 2.5 minutes on any individual article or more than 3 minutes on the overview page.

Comparatively, the average time spent on an individual article across all eight articles was 36.78 ($SD = 4.26$) seconds with the range of averages from 17.19 to 57.50 and the average time spent with the overview page was 66.85 ($SD = 34.05$) seconds. Of the 197 participants used for analysis 71.1% (140) were female. The average age was 21.36 ($SD = 4.20$), with no significant difference between the genders. Participants' body mass index (BMI) ranged from 17.01 to 43.45 with an average of 23.17 ($SD = 3.82$) and significant differences between genders, $t(197) = 4.29$, $p < .001$. Males had a higher average BMI ($M = 24.93$, $SD = 3.44$) than females ($M = 22.45$, $SD = 3.75$).

Procedure

Baseline questionnaire. Participants received an email inviting them to partake in a research study. This email provided the participants a link to a survey website on which they were asked to create an account using an unidentifiable user login and password. The login information was kept consistent for each participant and used to track their data from the following two sessions of the study. For the first session, after the participants created their account, they logged in and completed a questionnaire that collected baseline information, such as participants' demographics, their self- and response-efficacy beliefs about various health topics, the importance of these topics, some of their health behaviors and their satisfaction relative to those behaviors. They then signed up for a time to complete the second session of the study.

Selective exposure session. The second session took place in a computer lab. An experimenter greeted participants and then took them to a small private room to initiate the fully computerized session. During this session, the weight loss message was presented in an online

health magazine targeting students and surrounded by seven other articles available for consumption (see Appendices B and C for stimuli details).

The first screen page instructed participants as follows: "In the following, you will see a test-version of the magazine. Please examine it, browse through it, and read whatever you find interesting." Once the participant read these instructions they were taken to an online health magazine to peruse the health article leads and corresponding full article texts as they pleased for six minutes, while this webpage activity was unobtrusively logged by software. After the scheduled browsing time elapsed, participants rated their impressions of the articles based on how *credible*, *important*, *biased*, *interesting*, *timely*, *well-written*, and *relevant* they were (7-point scales), which merely served to provide closure. Lastly, participants completed questions ascertaining self-efficacy and importance, embedded in questions about other health-related perceptions..

Post questionnaire. Two weeks after the experimental session was completed participants were emailed another link to the survey website to login once more and complete the third questionnaire. This questionnaire was virtually the same as that used in the base-line session to investigate any changes in beliefs or behaviors. The participants were then thanked and debriefed.

Measures

Self-efficacy. The measure for weight loss self-efficacy was embedded in seven additional self-efficacy items, which helped to distract from the behavior of interest, and was presented in all three sessions: "I am able to lose weight if I take action to do it." The 7-point response scale ranged from 'strongly disagree' to 'strongly agree.' The difference between self-efficacy responses recorded at baseline ($M = 5.84$, $SD = 1.17$) and those recorded at the second ($M = 5.75$,

$SD = 1.12$) and third ($M = 5.73$, $SD = 1.23$) time points were used to determine changes in self-efficacy perceptions. Self-efficacy was higher, $t(195) = 2.157$, $p = .032$, for males ($M = 6.12$, $SD = 1.17$) than females ($M = 5.73$, $SD = 1.16$) at baseline but not for the later two time points.

Weight management satisfaction. Embedded in seven other items with the prompt "How satisfied are you with your effort to" was the target item "Lose weight / regulate body weight." The 7-point scale ranged from 'very unsatisfied' to 'very satisfied.' Weight management satisfaction was measured in both the first ($M = 4.80$, $SD = 1.40$) and last session ($M = 4.89$, $SD = 1.32$) of the study. There were significant gender differences at baseline, $t(195) = 2.188$, $p = .030$, such that males reported higher weight satisfaction ($M = 5.14$, $SD = 1.32$) than females ($M = 4.66$, $SD = 1.41$). There was no gender difference at t3.

Importance. Personal importance of thirteen health topics including 'body weight control' was also assessed in all three sessions, with a 5-point scale ranging from 'not at all important' to 'extremely important.' Importance ratings for 'body weight control' scored $M = 3.77$, $SD = 1.05$ for the first session, $M = 3.94$, $SD = .96$ for the second, and $M = 3.81$, $SD = 1.03$ for the third. There were gender differences for each time point: baseline, $t(195) = 4.050$, $p < .001$, t2, $t(195) = 2.907$, $p = .004$, as well as t3, $t(191) = 4.297$, $p < .001$. Specifically males rated importance lower at baseline ($M = 3.32$, $SD = 1.15$), t2 ($M = 3.63$, $SD = 1.05$), and t3 ($M = 3.33$, $SD = 1.16$) than females ($M = 3.96$, $SD = .94$; $M = 4.06$, $SD = .91$; $M = 4.00$, $SD = .90$).

Weight loss behavior. Weight loss behavior was measured in the first ($M = 1.10$, $SD = 1.16$) and last ($M = 1.08$, $SD = 1.15$) sessions using just one item regarding the behavior recommended by the weight loss message. Participants were prompted with "Within the last 15 days, how often did you..." and responded to 18 health behavior items, among them the target item 'track your eating to lose weight.' The response options were *frequently (on 11–15 days)*

(coded 3), *often (on 5—10 days)* (=2), *occasionally (on 1—5 days)* (=1), *not at all* (=0). There were no significant differences between genders for weight loss behavior.

Selective exposure. To capture selective exposure to the weight loss article, hyperlink use was tracked in order to log whether they accessed the article and for how long they viewed it. Average exposure in seconds for the weight loss article was $M = 57.50$ ($SD = 42.85$); when only considering the 155 participants that had clicked on it at all, average exposure was $M = 73.08$ ($SD = 34.51$). Further, females spent a significantly longer amount of time, $t(195) = 3.117$, $p = .002$, with the weight loss article ($M = 63.24$, $SD = 39.50$) than males ($M = 42.81$, $SD = 47.24$). To control for selective exposure in later analyses, it was condensed into a dichotomous variable with zero to 20 seconds categorized as *brief exposure* (as all participants had at least encountered the article lead and thus had minimal exposure to the weight loss message) and 21 thru 146 as *long exposure*, with 73% of the sample falling into the latter category.

Results

An ANOVA with self-efficacy recorded at three different time points as the within-group factors and message efficacy and exemplification as between-group factors addressed H1 and H2. Similarly, for H3 and H4 on change in weight management satisfaction, an ANOVA examined weight management satisfaction at baseline and in the third time session as the within-group factors and message efficacy and exemplification as between-group factors. Another ANOVA with importance for body weight control recorded at baseline, right after selective message exposure, and in the third session as the within-group factors and efficacy and exemplification as the between group factors addressed the research question. Because pre-existing weight loss behavior is likely to affect the weight loss message impacts and has been found to vary by sex (e.g., Forster & Jeffrey, 1986), initial involvement with the recommended

“track eating” behavior recorded at time 1 and recipient sex were controlled for. Furthermore, length of exposure to the weight loss article (brief vs. long exposure) should affect impacts and was thus also controlled for as between-group factor.

Impact on Self-Efficacy

H1 was not supported, as efficacy did not show a direct impact on self-efficacy, $p = .479$. However, H2 was supported by an interaction effect of message characteristics on changes in self-efficacy, $F(2, 350) = 5.44$, $p = .005$, partial $\eta^2 = .030$. No other between-group factor impacts emerged as significant. Self-efficacy increased from baseline immediately as well as two weeks after exposure to the exemplification weight loss article featuring high efficacy (see Table 2). Conversely, self-efficacy decreased immediately and two weeks after exposure when participants viewed the exemplification weight loss article with low efficacy. In addition to these opposing impacts of message efficacy in the exemplification weight loss articles on self-efficacy, a decrease from baseline self-efficacy immediately and two weeks after exposure to the base-rate weight loss article featuring high efficacy emerged. No self-efficacy change occurred at any point after viewing the base-rate article with low efficacy. While the ANOVA used original scores, Figure 1 features each individuals' baseline self-efficacy set to zero and then changes between sessions computed as differences for self-efficacy at t1 and t2 and then between t1 and t3, to illustrate changes more clearly. While there were differences between groups, there were no significant changes within a given group over time.

Impacts on Weight Management Satisfaction

The second ANOVA did not demonstrate a positive change in weight satisfaction, $p = .640$, from high efficacy weight loss article exposure, failing to support H3. However, the analysis yielded an impact pertaining to H4, which predicted an interaction effect of efficacy

and exemplification message characteristics on changes in weight satisfaction, $F(1, 175) = 4.243$, $p = .041$, partial $\eta^2 = .024$. Similar to findings above (see Table 2), efficacy worked in opposite ways depending on exemplification. Both the exemplar weight loss article with high efficacy and the base-rate weight loss article with low efficacy produced positive changes in weight management satisfaction, whereas the exemplar article with low efficacy and the base-rate article with high efficacy reduced it. Figure 2 illustrates these changes with means.

Impacts on Importance

The results regarding RQ1 on changes in importance were only significant for message efficacy, $F(2, 350) = 3.05$, $p = .049$, partial $\eta^2 = .019$. The low efficacy article versions led to an increase in importance, whereas high efficacy versions, if anything, led to a decrease. Two weeks after exposure, though the low efficacy versions' effect had dissipated, participants who had seen the high efficacy article versions were still marginally significantly lower in importance (Table 2). To illustrate changes more clearly, Figure 3 shows changes using baseline importance set to zero and then changes between sessions computed as differences for importance at t1 and t2 and then between t1 and t3.

Unlike analyses for the hypotheses, the analysis pertaining to RQ1 yielded control variable impacts. General weight management importance (averaged across the three measurement points) was linked to recipient sex, $F(1, 175) = 5.54$, $p = .020$, partial $\eta^2 = .031$ ($M_{\text{females}} = 4.00$, $SD = .83$, vs. $M_{\text{males}} = 3.43$, $SD = .97$), to selective exposure, $F(1, 175) = 9.07$, $p = .003$, partial $\eta^2 = .049$ ($M_{\text{brief exposure}} = 3.41$, $SD = 1.01$, vs. $M_{\text{long exposure}} = 3.99$, $SD = .82$), and just as strongly to tracking food intake at baseline, $F(1, 175) = 9.08$, $p = .003$, partial $\eta^2 = .049$ ($r = .32$, $p < .001$).

Discussion

The present results indicate that portraying successful weight loss behavior has a positive impact on weight loss self-efficacy and weight management satisfaction if presented in articles depicting exemplars. Thus, the impacts hypothesized in H1 and H3 were indeed qualified as suggested in H2 and H4. Despite the importance that these findings place on efficacy relative to exemplification articles, these results also revealed that efficacy has a negative influence on self-efficacy and weight satisfaction if paired with base-rate information rather than exemplars. Hence, careful consideration of the message format must be taken into account to avoid boomerang or any other unintended campaign effects. Additionally, the implementation of efficacy in messages must be executed with even more care given the findings demonstrating a reduction in importance among participants who received high-efficacy articles reporting successful weight loss behavior (pertaining to RQ1). Apparently, by increasing efficacy in messages, for instance telling receivers that a behavior is “easy and effective” for losing weight, participants’ perceptions of the importance of weight management are lowered.

The positive effects of efficacy in exemplar articles can easily be explained by social cognitive theory as outlined in the arguments supporting the hypotheses; however, the relationship regarding the presence of efficacy in base-rate information is much more difficult to decipher. Even though Bandura suggested a rather complex connection of social cognitive theory to social comparison theory--self-satisfaction is affected through social comparison processes (1991, p. 255) whereas self-efficacy is not (1982, p. 127)--one possible interpretation draws upon social comparison theory and its additions (Festinger, 1954; Will, 1981). This research has shown whether a person affiliates or contrasts with another depends on intragroup versus interpersonal perceptions. When confronted with a large number of in-group members, distinctiveness needs are rendered salient and lead to contrast effects of the comparisons (Brewer

& Weber, 1994). When comparing with specific cases of in-group members, affiliation needs will be rendered salient and result in assimilation effects.

Accordingly, self-perceptions are affected differently when an individual contrasts versus assimilates with others. When contrasting with others, upward comparison results in self-deflation; when assimilating, upward comparison leads to self-enhancement (Brewer & Weber, 1994). The success/failure and intragroup/interpersonal conditions used in this previous research are quite comparable to the manipulations utilized in the current research and thus, the findings were parallel. For instance, high efficacy articles are associated with depictions of success, while low efficacy is associated with depictions of failure. Additionally, base-rate statistics can provide comparison with a large number of in-group members, triggering contrasting effects, whereas exemplars foster interpersonal affiliation, resulting in assimilation effects.

An interpretation of the present findings applying this logic would suggest exposure to the high efficacy exemplar enhanced self-efficacy through affiliation with a specific in-group member succeeding at weight loss. This perspective also aligns well with recent findings by Kreuter et al. (2008) demonstrating that ‘identification’ (a concept similar to affiliation) was the best predictor for cancer survivor story effectiveness. The present data yielded negative effects from the low efficacy exemplar because participants affiliated with the failure shown. On the other hand, the high efficacy base-rate article illustrated many in-group members succeeding with weight loss, with which participants likely contrasted. These depictions potentially furthered participants from the success portrayed and thus, their self-efficacy decreased. Only for the low efficacy base-rate article version were no impacts on self-efficacy regarding weight loss found.

The impact pattern suggested by Brewer and Weber (1994) may be even more applicable to weight management satisfaction, because they had targeted self-evaluations specifically. Indeed, participants' weight management satisfaction was influenced by the article versions in the same manner as their self-efficacy perceptions described above. Additionally, increases in weight management satisfaction, comparable to those seen after exposure to the high efficacy exemplar articles, were even reported after exposure to low efficacy base-rate articles. These articles displayed failure among many in-group members, distancing participants from the failure and possibly fostering downward comparisons that likely produced the enhanced weight management satisfaction.

Future research should be conducted to investigate this potential explanation, both with a similar sample, given the topic relevance to college students, but also with additional non-convenience samples. Further research should also address limitations of the present work by utilizing more diverse and larger samples that would allow for the examination of the variables of interest with a larger range. For instance, participants with normal versus high BMI might respond differently to the messages—the present sample was relatively homogenous and comparatively low regarding BMI (for comparison data, see Ogden, Fryar, Carroll, & Flegal, 2004). Likewise, factors that are known to be associated with body weight differences such as educational level and race (*ibid.*) could not be examined due to lack of variation in the present predominantly white college student sample. It is also desirable to include additional variables such as weight loss locus of control (for review see Wallston & Wallston, 1978) or weight loss history in the investigation (Elfhag & Rössner, 2005). Moreover, in the interest of establishing the robustness of the exemplification impact, similar examinations should be conducted on the present health topic as well as other contexts. For instance, no impacts from exemplification

were found in Gray and Harrington's (2011) study on exercise. Perhaps this difference in findings could be explained by the variation in context or, as suggested by the authors, their weaker manipulation. For the current study, it also needs to be acknowledged that the actual body text for the stimuli message (provided in Appendix C) was possibly read differently depending on the framing in the lead—thus, there is variation in length of exposure as well as framing, which affects the internal validity of the present finding. However, while considering these methodological challenges associated with selective exposure research, future investigations should complement existing knowledge from forced-exposure designs further by using a more realistic context that allows for selectivity.

Efficacy's interaction with both exemplification and base-rate message characteristics illustrates an alarming inverse relationship, such that it positively influences outcomes when paired with exemplars and negatively influences outcomes when paired with base-rate information. This finding is appalling given the high efficacy base-rate article is most similar to the current nature of health information used in public health communication and education campaigns for weight loss. Perhaps this partially explains why obesity is still so prevalent despite the numerous public health attempts to persuade individuals to adjust their attitudes and behaviors regarding weight loss solutions. These messages are promoting the most helpful techniques for weight loss and management—such as self-monitoring of food intake, which emerged as the best predictor for successful weight loss in a meta-analysis by Michie, Abraham, Whittington, McAteer, and Gupta, 2009, and is recommended in the current Dietary Guidelines for Americans (U.S. DHHS, 2010). However, it seems the interaction of messages' elements or characteristics are producing perceptions opposite to those desirable for subsequent behavior

change. These public health efforts might make recipients feel less empowered regarding weight loss/management, at least according to the current findings.

On the other hand, examples following what *to* do according to the present research findings do exist and suggests some additional support. These examples are the “quick fix” products and advice provided in advertisements (FTC, 2002) and popular magazines (Malkin, Wornian, & Chrisler, 1999). A large portion of these messages utilize exemplification formats that are high in efficacy—for instance, testimony by or stories of cases where individuals have used these products or followed certain advice and experienced positive results. These advertisements and articles following the present study’s recommended message design seem to be extremely effective at selling their product and/or advice. Americans that are looking to lose weight (about 53%) are spending enormous amounts of money on these “quick fix” products, which make up about a \$58.6 billion dollar market, and advice giving magazines (International Food Information Council, 2009; MarketData Enterprises, 2009).

Despite the proclaimed results and their effectiveness at selling the product, these “quick fix” products and advice have not been successful in actually producing individual as well as overall effects on the prevalence of obesity in America. Additionally, based on this study’s results regarding the relationship between efficacy and importance, the sheer magnitude of these messages, selling “effective” solutions, could be a tacit influence over individuals’ perceptions of the importance of overweight and obesity issues in America. As it stands, current public health message developers would be well advised to implement the present study’s recommended design, which has already shown positive sales results for advertisers, in order to successfully promote the weight loss techniques that are most effective.

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Table 1**Example for Health Article Lead Manipulation and Transitions to General Article Text**

	Low Efficacy	High Efficacy
Exemplar	<p>SLIMMING DOWN IS SIMPLY TOUGH [article lead]</p> <p>Chris Medley struggles with losing those excessive pounds! Having decided to slim down, Chris tracks food intake and exercise every day. Budgeting in small portions of favorite foods should help to not feel deprived but ultimately, Chris' weight stays in the overweight category.</p> <p>[transition]</p> <p>When the extra pounds indeed started to feel like a burden, Chris went on a nutritional regimen. "I cut out most empty calories from my diet such as fast food, sweets, soda etc, and really focuses on eating clean nutrient dense food", Chris said, "I also started weight lifting and regular cardio workouts to burn off excess fat".</p>	<p>SLIMMING DOWN THE SIMPLE WAY [article lead]</p> <p>Chris Medley successfully peeled off those excessive pounds! Having decided to slim down, Chris tracked food intake and exercise every day. Budgeting in small portions of favorite foods helped greatly to not feel deprived. Finally, Chris slimmed down to personal ideal body weight.</p> <p>[transition]</p> <p>When the extra pounds indeed started to feel like a burden, Chris went on a nutritional regimen. "I cut out most empty calories from my diet such as fast food, sweets, soda etc, and really focuses on eating clean nutrient dense food", Chris said, "I also started weight lifting and regular cardio workouts to burn off excess fat".</p>
Base-Rate	<p>SLIMMING DOWN IS SIMPLY TOUGH [article lead]</p> <p>Two-thirds of Americans are overweight or obese, and about 70% of the overweight fail in their weight loss efforts. Many struggle with tracking their eating and sticking to exercise routines; it's easier said than done. It is hard to change habits and lose weight.</p> <p>[transition]</p> <p>Food intake control and exercise changes hold emotional and physical implications, but all for good aspects. Statistics show that 80% of dieters, who are doing cardio to burn fat, can strengthen their muscles and become stronger. And actually cutting empty calories from fast food, sweets, and soda has been associated with long-term weight loss for 75% of dieters.</p>	<p>SLIMMING DOWN THE SIMPLE WAY [article lead]</p> <p>Two-thirds of Americans are overweight or obese, but about 70% of the overweight manage to reduce their weight after all. Many track their eating and stick to exercise routines; it can be done. It is possible to change habits and lose weight.</p> <p>[transition]</p> <p>Food intake control and exercise changes hold emotional and physical implications, but all for good aspects. Statistics show that 80% of dieters, who are doing cardio to burn fat, can strengthen their muscles and become stronger. And actually cutting empty calories from fast food, sweets, and soda has been associated with long-term weight loss for 75% of dieters.</p>

Table 2

Changes in Self-Efficacy, Weight Management Satisfaction, and Weight Management Importance as a Function of Exemplification and Efficacy as Weight Loss Message Characteristics (estimated means with standard errors in parentheses)

	Baseline Session	Exposure Session	Post Session
Self-Efficacy			
Low Efficacy, Base-Rate Message	5.81 (.18)	5.82 (.17)	5.80 (.19)
Low Efficacy, Exemplar Message	6.00 (.19)	5.72 (.18)	5.64 (.19)
High Efficacy, Base-Rate Message	5.83 (.21)	5.33 (.19)	5.55 (.21)
High Efficacy, Exemplar Message	5.86 (.23)	6.05 (.22)	6.14 (.24)
Weight Management Satisfaction			
Low Efficacy, Base-Rate Message	4.72 (.23)		5.08 (.22)
Low Efficacy, Exemplar Message	5.01 (.23)		4.91 (.21)
High Efficacy, Base-Rate Message	4.93 (.25)		4.68 (.24)
High Efficacy, Exemplar Message	5.12 (.29)		5.32 (.27)
Weight Management Importance			
Low Efficacy, Base-Rate Message	3.68 (.16)	3.79 (.14)	3.76 (.15)
Low Efficacy, Exemplar Message	3.43 (.15)	3.86 (.14)	3.60 (.15)
High Efficacy, Base-Rate Message	3.47 (.17)	3.43 (.16)	3.50 (.17)
High Efficacy, Exemplar Message	3.82 (.19)	3.76 (.18)	3.51 (.19)

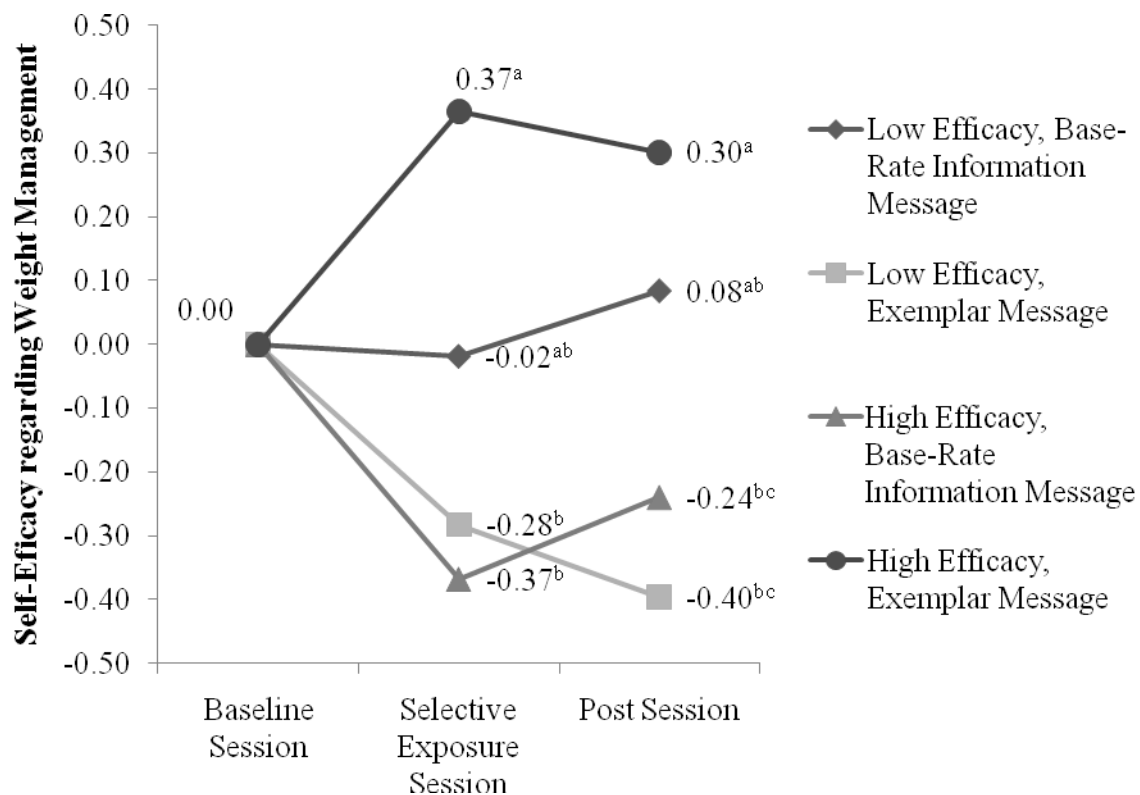


Figure 1. Changes in Self-Efficacy as a Function of Exemplification and Efficacy as Weight Loss Message Characteristics

Note: Estimated means with different superscripts differ at $p < .05$ in multiple comparisons with Sidak correction.

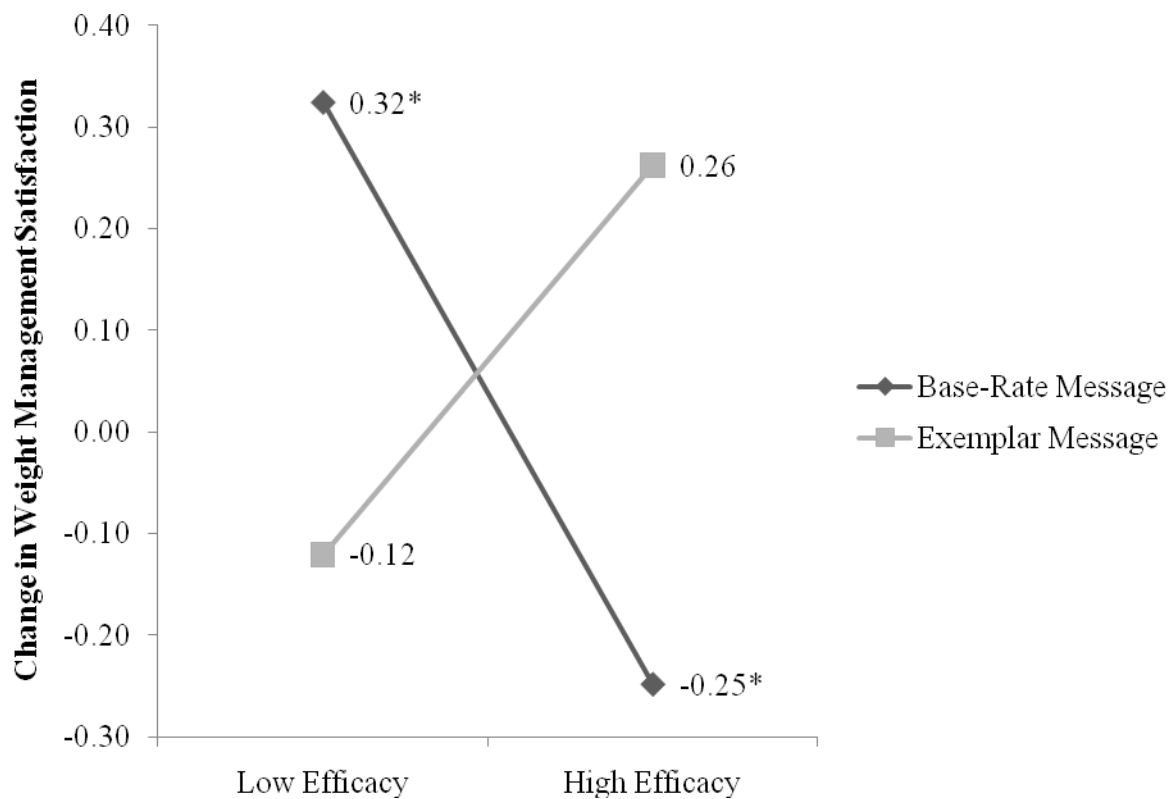


Figure 2. Changes of Weight Management Satisfaction as a Function of Exemplification and Efficacy as Weight Loss Message Characteristics

Note: Estimated means with asterisk differ at $p < .05$ in multiple comparisons with Sidak correction.

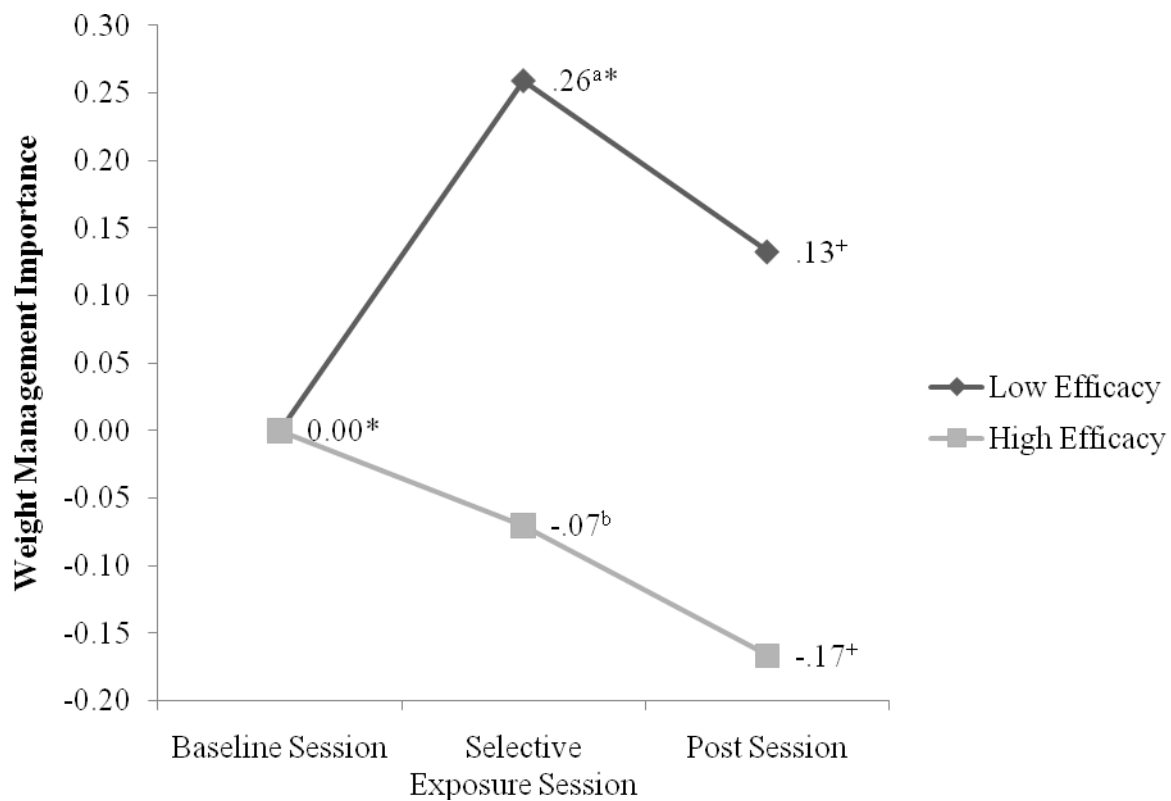


Figure 3: Changes in Weight Management Importance as a Function of Efficacy as Weight Loss Message Characteristic

Note: Means with different superscripts and means with asterisks differ at $p < .05$; means with plus symbols differ at $p = .06$ in multiple comparisons with Sidak correction.

Appendix A

Manipulation Checks

Additional respondents ($n = 47$) were recruited from the same population as the main selective exposure experiment. They had an average age of $M = 22.11$ ($SD = 2.45$) and were predominantly female (81%).

Paper questionnaires presented the manipulated article lead versions with the instruction “Consider a news article with the following lead paragraph.” To enhance the impression of reading an article lead, the stimuli texts were only three inches wide, framed, and centered on the page, with the headline in bold typeface. Respondents evaluated the article lead regarding response efficacy, self-efficacy, exemplar presentation, and base-rate information presentation. The questions were “Does this news lead indicate that there are *effective means* to influence habits with regard to body weight control?” and “Does this news lead indicate that *you are able to influence* your habits with regard to body weight control?” The two statements pertaining to exemplification were “This article features examples and case descriptions” and “This article features many numbers and statistics.” Responses for all four dimensions were given on a 7-point scale, ranging from *strongly disagree* to *strongly agree*. After evaluating the article leads, participants finally indicated socio-demographic information.

An ANOVA pertaining to the efficacy manipulation employed response efficacy and self-efficacy as repeated measures. ANOVAs pertaining to the exemplification manipulation used the difference between the ratings for the two related statements (score for “This article features examples and case descriptions” minus score for “This article features many numbers and statistics”). The average for both efficacy items for the weight loss message manipulation was 3.40 ($SD = .28$) for the low efficacy version and 4.84 ($SD = .29$) for the high efficacy version, $F(1, 43) = 12.5$, $p = .001$, partial $\eta^2 = .225$, while the average exemplification score was -1.50 ($SD = .37$) for the base-rate version and 3.11 ($SD = .38$) for the exemplar version, $F(1, 43) = 75.5$, $p < .001$, partial $\eta^2 = .637$. Thus, the stimuli manipulation was successful.

Appendix B

Stimuli Description

Online Health Magazine

The stimuli for this experiment were presented in an online newsmagazine format. In order to emulate the realistic features of an actual site, the format was adopted from an online health information site targeting students, hosted in the UK. The overview page featured a masthead with a 'student health' logo and some decorative icons on top. On the left, a (deactivated) navigation bar featured links such as 'Travel health' and 'Treatments & drugs.'

In the main frame, eight health articles including one article on a weight loss strategy were shown. The additional health topics were: Skin Cancer, Drug Abuse, Smoking Cessation, Depression, Eating Disorder, Safe Sex, and Stress Management. While only the weight loss article is of interest for the present analysis, the other articles were also manipulated for efficacy and exemplification, such that each participant saw two low efficacy exemplar leads, two high efficacy exemplar leads, two low efficacy base-rate leads, and two high efficacy base-rate leads, with combinations of these features rotated across topics. Furthermore, the positioning of the article leads on the overview page was randomized to prevent sequence effects.

Article Leads and Texts

Table 1 specifies the article lead variations for efficacy and exemplification in the weight loss article lead. The exemplar version featured an individual along with a quote, whereas the base-rate version featured statistics. The low efficacy version implied that measures to address a health issue were difficult or not very effective, whereas the high efficacy version suggested that these measures were easy or effective. The article lead versions used for the online health magazine were highly comparable. Each headline consisted 4-5 words ($M = 4.18$, $SD = 0.64$) and the leads featured 41-50 words ($M = 45.88$, $SD = 2.12$). Every lead featured a hyperlink that allowed access to the corresponding full text article. The same masthead and navigation bar, repeating the article leads from the overview page, was still present while the article texts were shown.

The texts were compilations of health articles pulled from various Internet sources. To avoid different levels of appeal or identification by recipient gender through the representation of a same-sex character, gender-ambiguous names were used in exemplar versions, such as Chris. The article leads presented on the overview page were the first paragraph in the full text of the articles, while the main body of the articles was always identical across the four versions for a topic and consisted of 363-369 words ($M = 366.63$, $SD = 1.90$). However, because the exemplification manipulation required very different article openings in the article lead, each article featured a paragraph between lead and main body text of 55-59 words ($M = 57.59$, $SD = 1.07$) that allowed for a transition. The texts featured in transitions reiterated the article lead information more broadly and led into the general topic.

Appendix C

Transitions and Body Texts of Stimuli Messages

Transition from Exemplar Lead Versions

When the extra pounds indeed started to feel like a burden, Chris went on a nutritional regimen. “I cut out most empty calories from my diet such as fast food, sweets, soda etc, and really focuses on eating clean nutrient dense food”, Chris said, “I also started weight lifting and regular cardio workouts to burn off excess fat”.

Transition from Base-Rate Lead Versions

Food intake control and exercise changes hold emotional and physical implications, but all for good aspects. Statistics show that 80% of dieters, who are doing cardio to burn fat, can strengthen their muscles and become stronger. And actually cutting empty calories from fast food, sweets, and soda has been associated with long-term weight loss for 75% of dieters.

Body Text

Simply speaking, the general obesity problem is down to the over consumption of calories and inadequate physical activity. In practice, this is due to the increasingly sedentary nature of life in western societies, where people have become increasingly dependent on motorized modes of transport and children are less likely to engage in energy-expending activities, preferring passive pastimes like watching television instead. In addition, the increase in fast food and convenience food consumption has risen due to the hectic lifestyle led by people nowadays. This is especially obvious in Japan, as the increasing westernization of diet has led to a sharp increase in the prevalence of obesity.

What can you do to ensure long-term weight loss and overall physical and mental health?

- Eat smaller meals and more frequently throughout the day. Don’t bother with depriving yourself between meals or with calorie counting. It’s recommended to eat 6 to 11 servings a day, depending on your calorie needs, from the bread, cereal, rice, and pasta group—even when trying to lose weight. Pay attention to your serving sizes—one serving is equal to 1 slice of bread, 1 ounce of ready-to-eat cereal, or ½ cup of pasta, rice, or cooked cereal. Try to avoid high-fat toppings and choose whole grains, like: whole wheat bread, brown rice and oatmeal.
- Use prepackaged or pre-portioned snacks and meal replacements to aid in controlling and monitoring caloric intake. They are easy to incorporate into your life.
- Take a multi-vitamin or supplement to ensure you are receiving essential vitamins and minerals missing from your daily diet.
- Exercise regularly since it is necessary to the weight loss formula. It has beneficial effects on overall body weight, body composition and cardiovascular health and it also improves self-esteem and energy levels.
- Find a healthy life balance, which is crucial to sustaining long-term results: family, work, faith, exercise, study etc.

As you develop a healthier lifestyle, one that is necessary to achieve long-term weight goals, you will be less likely to think of these changes as a diet. Over time, you will feel more energetic and seeing the results of a long-term plan will continue to encourage you to stick with it!