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**Impacts of Exemplification and Efficacy as Characteristics of an Online Weight Loss  
Message on Selective Exposure and Subsequent Weight Loss Behavior**

Abstract

The greatest obstacle for health campaigns is most likely a lack of adequate exposure (Hornik, 2002), as public health messages compete with a flood of alternative messages. In light of America's obesity epidemic, the present work examines message characteristics that may foster exposure to recommendations on healthful weight management. Drawing on social-cognitive theory and exemplification theory, the present three-session 2x2 experiment examined impacts of efficacy and exemplification, as characteristics of an online weight loss message, on selective exposure and change in recommended behavior. Exposure depended on both characteristics, as the exemplar, high-efficacy version resulted in longest and the base-rate, high-efficacy version in shortest exposure, while both low-efficacy versions fell in between. Change in recommended behavior was positive and significantly higher in exemplar message groups than for base-rate version groups, where the change was negative.

## **Impacts of Exemplification and Efficacy as Characteristics of an Online Weight Loss Message on Selective Exposure and Subsequent Weight Loss Behavior**

The greatest obstacle for campaigns that aim to improve Americans' health behaviors is most likely a lack of adequate exposure (Hornik, 2002), as public health messages compete with a flood of alternative messages (e.g., Pease, Brannon, & Pilling, 2006). Existing research on health messages relied on forced exposure in experimental designs, problematic exposure measures in field studies, or neglected the obstacle of selective exposure altogether (Morris, Rooney, Wray, & Kreuter, 2009). Yet framing messages such that they attract targeted individuals is a key goal in health communication. The current research studies what message framing strategies are most effective in attracting selective exposure, focusing on obesity reduction/prevention. In the following, obesity as a public health concern is linked to the phenomenon of selective exposure to messages. Further, the frameworks of social cognitive theory (Bandura, 2001) and exemplification theory (Zillmann, 1999) serve to derive predictions on what message characteristics should foster selective exposure to messages on healthful weight management recommendations and, in turn, affect weight management behavior. These predictions are then tested in a three-wave online experiment.

### **Obesity and Selective Exposure**

America faces a major obesity epidemic, presenting a serious health issue that contributes an estimated 300,000 preventable deaths per year (Mokdad, Marks, Stroup, & Gerberding, 2004). In 2009/10, 69% of U.S. adults were overweight or obese (Flegal, Carroll, Kit, & Ogden, 2012). While experts agree that weight is best reduced and controlled by following basic federal guidelines, such as the minimum amount of moderate-intense physical activity (Moore, Fulton, Kruger, & McDivitt, 2010) and recommended intake of fruit and vegetables (Thompson, et al.,

2011), only a quarter of the population are familiar with these suggestions that have been promoted through health education and campaign efforts for years. The low levels of knowledge of weight management recommendations reflect that the problem is not only lack of adherence. Public health institutions' guidance on weight management may not reach recipients effectively because it is drowned out by a flood of 'quick fix' dieting and exercise advice offered in advertising, popular magazines, and online (e.g., Campo & Mastin, 2007). For example, the cover of 'Health' Magazine (Jan./Feb. 2011) featured headlines such as "Drop 15 lbs fast! —Lose your first pound today; Burn 600 calories without trying; Flat belly foods—These carbs melt fat; Stop that binge—Quick fix." Exposure to the latter type of weight loss 'information' is almost inevitable, as it is so ubiquitous (Federal Trade Commission, 2002). The importance of exposure for successful nutrition education campaigns has been highlighted by Hornik and Kelly (2007) and appears to be reflected in this discrepancy of promotion efforts and low knowledge levels. Hence, the obesity epidemic could be better curbed if message designers discover what can be changed about campaign messages to attract more exposure and promote effective health behaviors necessary for long-term weight management success.

The construct of *selective exposure* may be of key importance for the obesity problem. Historically, the term *selective exposure* was often used to describe a preference for attitude-consistent messages; yet much recent work (e.g., Knobloch-Westerwick, Appiah, & Alter, 2008; Knobloch-Westerwick & Romero, 2011; Zillmann & Bryant, 1985) has extended the definition. The term thus refers to the phenomenon that when many choices are available to an individual, some are chosen more often than others. For example, if visitors to a website spent 20% of their time reading each one of five different available articles, they would have spent a proportional amount of time with each article. However, individuals usually exhibit a preference for certain

parts of a website, rarely spending equal amounts of time with all of the available content (Zillmann & Bryant, 1985). This phenomenon of selective exposure can be captured as *selection* of an outlet (i.e., TV channel or website) or specific messages (TV show or online article) and/or *time* spent with messages (ibid.); the present study focuses on *time spent* as selective exposure indicator. These two indicators are usually highly correlated (e.g., Zillmann, Knobloch, & Yu, 2001). In addition, the present study will examine what makes users select a message *early* in a media use session. Media users must select messages before they can fully realize what the message content entails; hence, they must base their selections on cues found, for instance, in a TV guide description of a program or in the heading of an article available for reading. These cues thus play a pivotal role in framing health messages to attract targeted individuals and will be examined experimentally in the present study. While social cognitive theory identifies efficacy and the use of models or exemplars as crucial components for health messages that are designed to change behavior (Bandura, 1977, 2004a), it has also been suggested that incorporating these characteristics in health articles might also increase an individual's likelihood to select and attend to such articles (Hastall & Knobloch-Westerwick, in press; Sarge & Knobloch-Westerwick, in press).

#### Message Characteristics Influencing Selective Exposure

##### *Efficacy*

The concept of efficacy was originally investigated in Bandura's (1977) social learning theory (later extended to social cognitive theory, Bandura, 1986) as a mechanism to predict and explain behavior—with two types in terms of expectations for behavior, “efficacy expectations” and “outcome expectations”. Efficacy expectations are beliefs that one can personally execute a behavior in order to elicit a certain outcome. Outcome expectations are beliefs about whether the

behavior itself will actually produce the expected outcome apart from an individual's capability to perform it. A behavior, however, is always task- and situation-specific and the expected outcome is often tied to a certain goal, thus both efficacy and outcome expectations vary by context (e.g., Hofstetter, Sallis, & Hovell, 1990).

Research investigating efficacy has found that behavior greatly depends on how an individual evaluates (1) own ability to perform a behavior and (2) the probability of the expected outcome (Bandura, 1977). Further, individuals pursue or put more effort into tasks they feel they can accomplish and associate positive outcomes with, while they avoid or put less effort into tasks for which they have less efficacy and negative outcome expectations (Bandura & Cervone, 1983; Maibach & Murphy, 1995). Bandura (1977; 1982; 1991) outlined four sources of information by which individuals' efficacy beliefs could be enhanced and that could be considered in message design: *Performance accomplishments* can increase efficacy beliefs pertaining to a behavior through one's own successful experience enacting that behavior. Enhanced efficacy beliefs due to *vicarious experience* entails seeing another person successfully modeling the behavior in question. *Verbal persuasion* is simply the idea that efficacy beliefs can be improved through suggestive influence. The fourth source, *emotional arousal*, references a negative impact on efficacy beliefs due to its association with heightened anxiety, which could serve as an indicator of vulnerability or incompetence regarding the behavior in question.

Empirical evidence shows that implementing these sources of efficacy information into messages or interventions increases efficacy beliefs and, subsequently, behaviors in question are more likely adopted (as discussed in Bandura 1982; 2004a; Chambliss & Murray, 1979; O'Leary, 1985). However, of initial interest to this study is the sparse amount of research conducted on the effect of efficacy sources' presence in messages on information selection

behaviors. Before positive behavioral outcomes can occur from exposure to information sources that increase efficacy beliefs, individuals must be willing to select this information. Therefore, it is of key importance to determine the impacts of efficacy, as a message characteristic, on selection.

Limited research has investigated efficacy beliefs and manipulations effect on information selection. The few studies that explore such efficacy impacts are in terms of information seeking intentions and behaviors and also take account of high or low risk perceptions. Recent work by Lee, Hwang, Hawkins, and Pingree (2008) showed that efficacy beliefs affected cancer information seeking, which in turn also affected subsequent efficacy beliefs. Furthermore, Rimal and Real (2003) found correlational evidence of a significant increase in self-reported information seeking behaviors among individuals with combined high efficacy and risk perceptions. Although, when efficacy beliefs about skin cancer were manipulated, the level of efficacy conveyed within the message had no effect on intention to seek information nor time spent seeking information.

Similarly, Turner, Rimal, Morrison, and Kim (2006) found no main effect of efficacy belief manipulation in messages on skin cancer or diabetes on time spent seeking information. Their study, however, applied a forced-exposure design in which participants could not select from different topics. The finding most pertinent to the current study is that those given the 'high risk' induction paired with a low efficacy message spent the most time searching for information (Turner, Rimal, Morrison, & Kim, 2006), which allows for speculation about what type of information was desired. Possibly, individuals confronted with a high risk that is difficult to prevent (per low efficacy message) will try to find as much information about effective protection as possible while avoiding messages without suggestions for protection behavior (see

Witte, 1992, for a discussion of moderating factors for receptiveness to information on threats). Indeed, the messages accessible in Turner et al.'s (2006) study provided much information about "prevention techniques" (ibid., p. 152) and were thus, most welcome among those who had initially received the experimental group with 'high risk, low efficacy' induction. Further, participants in their study were first primed with manipulated health messages and could then seek more information on the topic. To extend Turner et al.'s work, the present study investigates efficacy as a characteristic of the message available for selection, rather than a person characteristic (whether natural or induced). While participants in Turner et al.'s study could access only messages about one topic, the present work uses a selective exposure setting that allows exposure choices.

Based on social cognitive theory and the scarce previous research, relative to efficacy and outcome expectations, hypotheses can be generated. Specifically, if various sources of information that convey efficacy beliefs lead to increases in self-efficacy perceptions regarding the behavior in question (i.e., weight loss or management), it is plausible that individuals perceive such information as useful or appealing. A task such as selecting information that could be useful in achieving a behavior, or a source that presents positive outcome expectancies, might be pursued with greater effort when a person's efficacy toward the behavior is enhanced (Bandura & Cervone, 1983; Maibach & Murphy, 1995). Since efficacy is domain-specific (Hofstetter, Sallis, & Hovell, 1990) and considering the current study's focus on weight loss in a health context, if individuals are presented with messages that convey useful information that could increase their knowledge or skills and presents successful weight loss outcomes, they should be more motivated to select related information. Thus, it is suggested that messages conveying high efficacy would attract longer exposure (Knobloch-Westerwick, 2008).



H1: High efficacy articles about weight loss are viewed (a) earlier and (b) longer than low efficacy articles.

### *Exemplification*

The notion behind one particular source of information that conveys efficacy outlined in social cognitive theory, *vicarious experience*, has been explored as an influential message characteristic apart from its efficacy-inducing role. The concept highlights the importance of behavior models. Exemplars serve as models of behavior influencing others' behaviors through social learning (Bandura, 2004b). Exemplars are a type of qualitative information presentation, typically defined as cases of individual behaviors or specific instances utilized to represent a more general phenomenon. Zillmann (1999, p. 74) defined them as follows:

“In conveying information about the flow of happenings in the so-called real world it always has been deemed appropriate, if it was not plainly recognized as a necessity, to cut this flow into manageable chunks and to isolate and focus on some events at the expense of attention to occurrences in between [...] Such grouping implies that each and every grouped event, to the extent that it shares all essential attributes with the remaining grouped events, is capable of representing the group at large--meaning, that it is capable of providing reliable information about all other events in this group and thus about the group itself. It is this capacity of individual events that defines them as exemplars of an event group.”

Previous work has also explored an alternate method of information presentation that can convey similar ideas quantitatively. It is a format that describes ideas based on numeric quantities as opposed to characteristics of specific cases. Messages that emphasize quantitative, general information are often referred to as base-rate or statistical messages (Ajzen, 1977). Base-rate information naturally has diagnostic, adaptive value because it presents generalizable information (Kahneman & Tversky, 1973). These characteristics of base-rate information suggest that individuals attach utility to base-rate weight loss information and thus, consistent with information utility theory's assumptions, they should prefer it over exemplars (Knobloch-Westerwick, 2008). However, research has shown that there are times when preference for

exemplars and narratives contradict this assumption. Quantitative information can present a cognitive challenge that reduces some individuals' willingness to process a message, which can subsequently reduce message effects (Yalch & Elmore-Yalch, 1984). Further, Zillmann (1999) describes exemplars as concrete and vivid presentations of information. His exemplification theory suggests that these characteristics, often associated with enjoyment consequences, attract more attention as opposed to more abstract, pallid presentations such as base-rate messages.

The research on exemplification has parallels to narrative persuasion research (Dillard, 2010), although exemplification could pertain to a single example within a text that overall lacks a narrative structure. Yet the preference for exemplars mirrors the common preference for narrative formats that has also been observed in health contexts. The recent application of narrative to health communication efforts has mostly focused on its ability to influence processing and subsequent effects (Hinyard & Kreuter, 2007; Winterbottom, Bekker, Conner, & Mooney, 2008). However, a scant amount of research suggests expectations conveyed by narrative formats may better grasp interest or attention. Specifically, cues that the message is a narrative may signal that the information is less hostile or threatening, because the persuasive intent is masked and perceived risks are subtle (Moyer-Gusé, 2008; 2010). Slater and Rouner (1996) demonstrated this preference for narrative formats due to their less threatening nature in a finding where individuals were more willing to process value incongruent messages provided they were presented in a narrative format. Similarly, Moyer-Gusé (2010) found that those most vulnerable or at risk for sexually transmitted diseases were more likely to select related information in a dramatic narrative program as opposed to news.

In brief, use of exemplars should enhance messages' attractiveness and entertainment value as opposed to base-rate information. Additionally, based on narrative persuasion work, the

ability of exemplars to mask persuasive intent and other threatening aspects of health information should increase individuals' willingness to select health information. Therefore, we hypothesize that recipients favor weight loss articles with exemplars over base-rate articles.

H2: Exemplar articles about weight loss are viewed (a) earlier and (b) longer than base-rate information articles.

### Impacts of Selective Exposure on Weight Loss Behavior

Going beyond health messages exposure, it is important to consider its subsequent impacts on behavior. Thus the following section discusses efficacy and exemplification as message characteristics that may impact health behavior, as a result of prior selective exposure, to derive further hypotheses.

#### *Efficacy*

Several studies outside of health communication have examined consequences of unobtrusively observed selective exposure (e.g., Knobloch-Westerwick & Hastall, 2010; Knobloch-Westerwick & Meng, 2011); research on consequences of health information seeking is scarce and has used correlational designs (e.g., Lee et al., 2008). However, the question of what outcomes can occur after selective exposure should be of extreme interest in general, but especially in the field of health communication, given the crucial goal to improve individuals' well-being. For instance, behavior change after selective reading of an efficacy message might differ from change experienced after forced-exposure to an efficacy message, as examined in previous research.

Efficacy as a message component has a far-reaching significance for behavioral effects (as mentioned above), apparent from its key role in models of persuasion (e.g. Witte, 1992) and behavior change theories (e.g., Rosenstock, Strecher, & Becker, 1988) as well as its utility in the development of specific health efficacy beliefs (e.g., Lee et al., 2008). Thus, the present study

extends the work on efficacy's influence in the health communication context relative to a weight loss behavior. Efficacy was also found to play a crucial role in weight loss and maintenance (see review by Elfhag & Rossner, 2005); several successful weight loss interventions were designed to convey efficacy (e.g., Chambliss & Murray, 1979; Kreuter & Wray, 2003; Weinberg, Hughes, Critelli, England, & Jackson, 1984). Based on Bandura's theory of efficacy relative to behavior change and the previous research outlined above, exposure to a high efficacy message, promoting efficacy perceptions for a weight loss behavior, should lead to increases in an individual's adoption of the behavior.

H3: The efficacy conveyed by weight loss articles affects media users' behavior through selective exposure to the message, such that high efficacy messages induce longer exposure than low efficacy messages and as a result foster greater increase in the recommended weight loss behavior two weeks after exposure.

#### *Exemplification*

Featured exemplars can act as models of behavior from which individuals can learn (Bandura, 2001). Modeling of behavior through specific cases or personal examples has been shown to aid persuasion (Singhal, Cody, Rogers, & Sabido, 2004). Exemplars increase the likelihood of relating to the content or characters, which in turn, fosters adoption of beliefs and behaviors (Bandura, 1986; 2004b). Application of this social cognitive theorizing can be seen in entertainment formats that embed exemplars performing promoted behaviors to induce behavior change (for review, Singhal et al., 2004).

Exemplification theory is another area of study that provides evidence of the persuasive capability of exemplars in the health communication context (Zillmann, 1999; 2006). It has been applied in many efforts to change beliefs about safety and health (reviewed by Zillmann, 2006).

In addition, it has been demonstrated that the use of exemplars is more successful than the presentation of base-rate information at changing estimates of the prevalence of events, perceptions of health risks, and protective behaviors such as weight control (Zillmann, Perkins, & Sundar, 1992). Regarding long-term effects, prior work suggests “the comparatively pallid, abstract nature of base-rate information allows the series of exemplars to dominate impression formation, and that this dominance grows over time because of stronger fading and poorer accessibility of the pallid information” (Zillmann, Gibson, Sundar, & Perkins, 1996, p. 431) and has found exemplification impacts two weeks after exposure.

Furthermore, narrative persuasion research suggests that embedding educational exemplars in a narrative plot makes persuasive intent less apparent and possibly reduces reactance reactions (Moyer-Gusé, 2008; Moyer-Gusé & Nabi, 2010; Slater & Rouner, 2002). With exemplars’ vividness, concreteness and emotion-evoking value (Zillmann, 1999), greater involvement with a story or topic should reduce counter-arguing and enhance the acceptance of a message (Green & Brock, 2000). Hence, a message presented with an exemplar modeling a healthy or rejecting an unhealthy behavior may induce a similar behavior change.

According to social cognitive theory, exemplification theory, and narrative persuasion literature, exemplars modeling a weight loss behavior should increase the likelihood that an individual would adopt the recommended behavior.

H4: Exemplification in weight loss articles affects media users’ behavior through selective exposure to the message, such that exemplar messages induce longer exposure than base-rate messages and as a result foster greater increase in the recommended weight loss behavior two weeks after exposure.

## Method

*Overview*

An experiment manipulated two message characteristics—efficacy (low vs. high) and exemplification (base-rate information vs. exemplar)—in a weight loss article lead in an online health magazine (see Table 1). Data were collected from participants in three waves over a three-week period. The first wave involved the collection of baseline information pertaining to the target behavior of tracking food intake, embedded in distracter questions to avoid sensitization, via an online survey. The second wave was a selective exposure session, with a 6-minute period for browsing an overview page with article leads and article pages, and a questionnaire administered in a computer lab. During the browsing, participants were shown one of the four weight loss article lead versions (based on random assignment) and could select to access and read the full weight loss article. The third online wave essentially repeated the baseline measures to capture potential lasting impacts of selective exposure to the weight loss message.<sup>1</sup>

*Participants*

Two hundred and fifty-one undergraduate students from a large, Midwestern university participated in the study. Fifteen were excluded from the analysis because their sex was not reported leaving a sample consisting of 236. Additionally, another 39 participants were excluded because their website activity reflected 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 these remaining 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 featured a link to a survey website on which they were asked to create an account using an unidentifiable user login and password. The login was kept consistent for each participant and used to track data across waves. For this first session, after the participants created their account, they logged in and completed a questionnaire that collected baseline information, such as participants' demographics, health behaviors and related health perceptions. 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. Participants were first greeted by an experimenter and then taken to a small private room with a computer. Next the experimenter initiated the participants' fully computerized session.

The first screen page instructed participants for the browsing task, after which they were taken to an online health magazine displaying eight article leads. The instructions described the magazine as a 'prototype.' During the scheduled browsing time of six minutes, the participants were able to browse and read the health article leads and their corresponding full articles as they pleased while this webpage activity was unobtrusively logged by software. Participants were shown an online health magazine with one of the four weight loss article lead versions (based on random assignment) and could select to access and read the full weight loss article. The weight loss article was competing for participants' selection with seven additional health articles

embedded in the online magazine (see details in the section 'Experimental Stimuli' below). After the scheduled time elapsed, participants were asked to rate their impressions of the articles based on *credible, important, biased, interesting, timely, well-written, and relevant* (7-point scales), which merely served to provide closure. Additionally, they answered a few items repeated from the baseline questionnaire.

*Post questionnaire.* Two weeks after participants' lab session, they were sent the link to the survey website to complete the third session. The questionnaire was virtually identical to the one participants completed in the first session to investigate any changes in beliefs or behaviors. The participants were then thanked and debriefed.

### *Experimental Stimuli*

Stimuli messages were embedded in an online magazine. To emulate realistic features of an actual site, the format was adopted from an online health 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 placement of the article leads on the overview page was randomized for each participant to avoid order effects. The other topics were skin cancer, drug abuse, smoking cessation, eating disorder, depression, 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 and merely served as alternative reading material, competing for exposure time along with the weight loss message.<sup>2</sup>

All leads 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.

Table 1 specifies the article leads' variations for efficacy and exemplification in the weight loss article lead. Exemplar versions featured an individual along with a quote, whereas base-rate versions featured statistics. Low efficacy versions implied that measures to address a health issue were difficult or not very effective, whereas high efficacy versions suggested that these measures were easy or effective. The article lead versions were highly comparable. Each headline consisted 4-5 words ( $M = 4.18$   $SD = 0.64$ ) and the leads featured 41-50 words ( $M = 45.88$ ,  $SD = 2.12$ ). To avoid different levels of appeal or identification by recipient gender through the representation of a same-sex character, gender-ambiguous names such as Chris were used in exemplar versions. The article leads (each featuring between 41 and 50 words) presented on the overview page were the first paragraph in the full text of the articles, while the main body of the articles remained identical across the four versions for a topic and consisted of 363-369 words ( $M = 366.63$ ,  $SD = 1.90$ ).

It was ensured that the article lead text did not feature any statements that would not converge with other parts of the article, despite text differences along experimental treatments. However, because the exemplification manipulation required very different article openings in the article lead, each article featured a transition paragraph between lead and main body text of 55-59 words ( $M = 57.59$ ,  $SD = 1.07$ ). The texts featured in transitions broadly reiterated the lead information and then led into the topic information in the main body text.

### *Measures*

*Selective exposure.* To capture selective exposure, hyperlink use was tracked to record time spent (in seconds) on the overview page as well as with each article. Weight loss was

among the three most popular topics, with selective exposure to the articles on stress and safe sex similarly high (exposure times for these three topics did not differ significantly). Average exposure time for the weight loss article was  $M = 57.50$  ( $SD = 42.85$ ) and  $M = 73.08$  ( $SD = 34.51$ ) when only considering the 155 participants that had accessed it. The analyses, however, included all participants, as those who had not accessed weight loss information simply allotted zero selective exposure for the target message. In addition to selective exposure for the entire browsing task, we examined whether a message was selected early in the media use session (addressing H1a and H2a) by analyzing selective exposure during the first minute of the browsing session specifically.

*Weight loss behavior.* Health behaviors were assessed with single-item measures in sessions 1 and 3, prompting participants with "Within the last 15 days, how often did you..." regarding 18 health behavior items including "track your eating to lose weight." The response options were *not at all*, *occasionally (on 1—5 days)*, *often (on 5—10 days)*, *frequently (on 11—15 days)*. The average score for the weight loss behavior, tracking eating, was  $M = 1.10$  ( $SD = 1.16$ ) for session 1 and  $M = 1.08$  ( $SD = 1.15$ ) for session 3. Behavior change as a variable was based on individual differences between responses regarding tracking eating at the two time points (T3 minus T1), for which the averages were  $M_{T1} = 1.10$  ( $SD = 1.16$ ) and  $M_{T3} = 1.08$  ( $SD = 1.15$ ). For the analyses, a standardized score of this difference between measurement points served to represent change in promoted behavior. Tracking eating was relatively common at base-line—while it was significantly less frequent than exercising and feeling overwhelmed, its frequency did not differ from feeling stressed, practicing safe sex and condom use among those who reported to have had sex in the past 15 days, but it was significantly more frequent than having sex.

*Stimuli Assessment*

*Stimuli pretest.* Additional undergraduate students ( $n = 47$ ) were recruited from the same university. They had an average age of  $M = 22.11$  ( $SD = 2.45$ ) and were predominantly female (81%). Paper questionnaires presented the four manipulated article lead versions to different respondents and included the following questions pertaining to response efficacy, self-efficacy, exemplar presentation, and base-rate information: “Does this news lead indicate that there are *effective means* to influence habits with regard to body weight control?/Does this news lead indicate that *you are able to influence* your habits with regard to body weight control?/This article features examples and case descriptions/This article features many numbers and statistics.” All responses were given on a 7-point scale, ranging from *strongly disagree* to *strongly agree*.

Efficacy and exemplification manipulations served as between-group factors to assess the effectiveness of message variations. An ANOVA pertaining to the efficacy manipulation employed response efficacy and self-efficacy as repeated measures. The ANOVA pertaining to exemplification used the difference between the ratings for the two related statements (“examples and case descriptions” minus score for “many numbers and statistics”). The main effects for the manipulations were significant and as desired, with no other significant impacts or interactions. The average for both efficacy items was 3.40 ( $SD = 1.53$ ) for the low efficacy version and 4.84 ( $SD = 1.19$ ) for the high efficacy version,  $F(1, 43) = 12.5$ ,  $p = .001$ , partial  $\eta^2 = .225$ , while the exemplification score was -1.50 ( $SD = 1.96$ ) for the base-rate version and 3.13 ( $SD = 1.66$ ) for the exemplar version,  $F(1, 43) = 75.5$ ,  $p < .001$ , partial  $\eta^2 = .637$ .

*Stimuli perceptions.* To gain further insight into weight loss message perceptions based on article leads varying in efficacy and exemplification, additional data were collected through

an online questionnaire that displayed the leads and gathered evaluations thereof. The 104 additional participants (60% female, average age  $M = 21.5$ ,  $SD = 1.97$ ) were drawn from the same undergraduate student population as the stimuli pretest and main study participants. They rated one of the lead versions on 7-point scales (ranging from ‘not at all’ to ‘very’) for anticipated article characteristics (interesting, enjoyable, informative, entertaining, helpful, relevant for your own life, relevant for most people) and for perceived intent of the article (inform the reader, influence the reader, teach the reader a lesson, entertain the reader).

A factor analysis (PCA, varimax) was conducted across a factor for *educational* (.81 factor loading), *inform the reader* (.80), *helpful* (.78), *influence the reader* (.70), and *teach the reader a lesson* (.68), explaining 48% of the variance, and a second factor for *entertaining* (.86), *enjoyable* (.82), and *entertain the reader* (.73), explaining 13% variance. Other items (*Interesting*, *Relevant for your own life*, and *Relevant for most people*) had high loadings on both factors and were thus not utilized further. For both factors, new variables were calculated based on averages of associated items and labeled *instructiveness* and *entertainment value*. The first variable was particularly relevant because ANOVAs (controlling for recipient sex based on findings on relevance of gender for body weight satisfaction; e.g., Austin, Haines, & Veugelers, 2009) with both new variables yielded only one manipulation main effect on *instructiveness*,  $F(1, 96) = 12.77$ ,  $p = .002$ , partial  $\eta^2 = .099$ . Exemplar versions were perceived as less *instructive* ( $M = 4.27$ ,  $SD = 1.22$ ) than base-rate versions ( $M = 5.03$ ,  $SD = .90$ ). No significant associations were found for the efficacy versions and instructiveness nor the entertainment variable with either manipulation.

## Results

### *Impacts on Selective Exposure*

Selective exposure to weight loss articles is examined in this first set of results reported, pertaining to the first two hypotheses. To address H1a and H2a, an ANOVA was conducted with selective exposure time during the first minute of the browsing task as the dependent variable, the message characteristics as between-group factors, 'track eating' behavior as a covariate to control for preexisting engagement in the promoted behavior and BMI as another covariate. It yielded a significant impact in line with H1a,  $F(1, 189) = 3.86, p = .05, \text{partial } \eta^2 = .020$ . During the first minute of browsing, participants viewing the high efficacy weight loss article spent on average 10.98 ( $SD = 17.51$ ) seconds on this message, compared to  $M = 6.80$  ( $SD = 14.59$ ) for the low efficacy version. The impact suggested in H2a, however, was not significant ( $p = .105$ ), although during the first minute of browsing, participants viewing the exemplar weight loss article spent on average 10.75 ( $SD = 17.46$ ) seconds on this message, compared to  $M = 6.61$  ( $SD = 14.65$ ). The interaction between the two between-group factors did not approach significance,  $p = .775$ .

To address H1b and H2b, another ANOVA was conducted with selective exposure time across the entire browsing period as the dependent variable, the message characteristics as between-group factors, 'track eating' behavior as a covariate to control for preexisting engagement in the promoted behavior and BMI as another covariate. H1b, which predicted weight loss articles portraying high efficacy would attract longer exposure among participants than weight loss articles with low efficacy, was not supported,  $p = .794$ . Exemplification, on the other hand, emerged as a significant message characteristic affecting length of selective exposure,  $F(1, 189) = 4.98, p = .027, \text{partial } \eta^2 = .026$ . Thus, in line with H2b, participants spent a significantly longer amount of time with weight loss articles using exemplification ( $M = 62.78; SD = 42.34$ ) than articles utilizing a base-rate format ( $M = 51.48; SD = 42.61$ ). However, this

result was further qualified by an interaction between the two message characteristics,  $F(1, 189) = 3.78, p = .053$ , partial  $\eta^2 = .020$  (illustrated in Figure 1 and detailed in Table 2). Among participants who encountered the high-efficacy message, the exemplar version fostered longer exposure, whereas the base-rate version led to shorter reading time. The difference between these two groups was drastic, as the former group spent about 150% of exposure time on the weight loss message relative to the latter group. Among participants who saw the low-efficacy message, the exemplification manipulation did not affect selective exposure.

#### *Indirect Effects of Message Characteristics on Behavior Change through Selective Exposure*

To examine the mechanism through which message characteristics induce behavior change as proposed in H3 and H4, mediation analyses based on Preacher and Hayes (2008) were conducted with selective exposure as the projected mediator. No significant effects emerged in the mediation analysis regarding H3 (except for the control variable of track eating behavior at T1), which used efficacy as the independent variable. Thus the following analysis reported in detail pertains to H4.

Individuals' track eating behavior from T3 served as the dependent measure while controlling for baseline level at T1 (see Allison, 1990, for considerations on this approach), exemplification (dichotomous variable, with 1 for the exemplar version group and 0 for the base-rate version group) served as the independent variable, and selective exposure to weight loss articles (in minutes) served as the mediator. The control variable of track eating behavior at T1 naturally had a strong impact on track eating behavior at T3, coefficient = .63,  $p < .001$ . Exemplification had a marginally significant impact on selective exposure ( $p = .078$ ), with .17 more minutes or 10.45 more seconds on average devoted to exemplar articles compared to the base-rate versions. Selective exposure, in turn, had a marginally significant impact ( $p = .096$ ) on

track eating behavior, with a .16 increments increase on a 4-point scale per selective exposure minute. The total effect of exemplification on behavior change yielded a coefficient of .24 and was significant ( $p = .05$ ). The direct effect from exemplification on behavior change, with a coefficient of .22, was not significant ( $p = .097$ ). However, the mediation analysis revealed that the indirect effect of exemplification on track eating change through selective exposure to weight loss messages was significant, with a point estimate of .0277 and a 95% BCa (bias-corrected and accelerated) bootstrap confidence interval of .004 to .117.

### Discussion

The current study investigated how efficacy and exemplification as message characteristics affect selective exposure to weight loss articles. Results revealed that message efficacy fostered selective exposure early in the session (H1a supported) but did not impact selective exposure across the entire browsing period (H1b not supported). On the other hand, message exemplification fostered longer exposure across the entire browsing period (supporting H2b), as individuals spent significantly more time with weight loss articles featuring exemplars as opposed to those presenting base-rate information, but its impact on early selection was not significant (H2a not supported). Further, high efficacy conveyed in the lead with an exemplar version led to particularly long exposure, but if high efficacy was combined with base-rate information, selective exposure was comparatively brief. In addition, we examined how message exposure, in turn, influenced changes in tracking food intake as recommended behavior. Efficacy as article feature did not affect behavior through exposure length (H3 not supported); however, exemplification in weight loss messages increased the recommended behavior reported two weeks after exposure, which was mediated by exposure length (supporting H4). A mediation analyses demonstrated that exemplification as a message characteristic had an indirect effect on

behavior through length of selective exposure.

Regarding implications for health message design, these findings suggest that weight loss messages with exemplification attract longer exposure, in particular if this characteristic is combined with high efficacy. Efficacy as message feature appears to foster exposure early in a message browsing session, but overall exemplification produced stronger increase in exposure. In turn, exemplification was also effective in inducing change regarding the promoted health behavior—an effect that was mediated by selective exposure to the weight loss message. Accordingly, the use of exemplars should foster exposure and subsequent desired behavior change.

Additional data on message perceptions shed some light on the lack of message efficacy impacts. The present efficacy manipulation, despite a successful manipulation check as the result of the pretest, did not influence perceived instructiveness or entertainment value of the article, whereas exemplar versions were perceived as less instructive than the base-rate versions. While prior work manipulated efficacy such that greater indicated efficacy produced longer selective exposure (Knobloch-Westerwick, 2008), the present manipulation of efficacy did not produce this effect—possibly because it did not affect perceptions of how useful or informative the article was. Future work should explore how different perceptions of efficacy manipulations affect length of exposure.

While the present findings are promising for designing more effective weight loss messages, it needs to be acknowledged that the sample consisted of young adults only. Other age groups may respond differently to efficacy and exemplars as message features. However, it is important to note that weight problems are common among students as weight gain is typical during college years (e.g., Gow, Trace, & Mazzeo, 2010), and attempts to reduce body weight



were frequent. Furthermore, message characteristics' impacts on selective exposure may depend on personal views of a particular topic: Participants reported relatively high levels of self-efficacy regarding the weight loss topic, while other health concerns may be perceived as more threatening, which could result in different exposure and avoidance patterns (see Lee et al., 2008, for cancer information use). Lastly, the two-week frame, while impressive as a long-term impact, is still short in the context of long-term weight loss, and the impacts we measured relied on only reported behavior change without evidence of actually improved weight management.

Future research should not only extend the present work to additional health topics but also explore underlying mechanisms. For instance, the reduction of reactance is a suggested mechanism that plays a role in why narrative messages are more often selected and have an effect on behavior change (Moyer-Gusé, 2010). The current stimuli post-test on message perceptions speaks for this possibility, because articles that seemed less 'instructive' were preferred. Other suggested mechanisms are the vividness, concreteness, and the emotional-arousing value of exemplar messages. Exemplification theory posits these factors as reasons why exemplar messages are more likely to be selected (Zillmann, 1999). If these perceptions are found to be true about exemplars this would provide more concrete evidence for exemplification theory's proposition.

The obesity prevalence in America is at a high, with deadly consequences (Flegal et al., 2012; Mokdad et al., 2004). The persuasive appeals of messages recommending ineffective weight loss strategies may override the messages advocating effective ones. Content analyses of magazines have shown that they promote weight loss behavior that is not in line with public health recommendations (Ellison, White, & McElhone, 2011) but use exemplars and high-efficacy message very frequently (Sarge & Knobloch-Westerwick, 2012). If such commercially

motivated messages utilize high-efficacy exemplar formats, they should attract much exposure, according to our findings. On the other hand, high-efficacy base-rate formats common to public health messages appear to deter recipients, rendering them ineffective or even harmful by reducing the recommended behaviors. Based on the present findings, the common format of weight messages from public health institutions—often much statistical information, suggesting high efficacy—results in avoidance. Encountering base-rate information even reduced desirable weight control behavior. Accordingly, these campaigns are likely to have slim, if not even a negative impact on the obesity epidemic in America. While the present work focused on weight management as a health topic, public health initiatives in other health domains likely face the same impediments from lack of selective exposure.

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### Endnotes

<sup>1</sup> It should be noted that additional data on self-efficacy were collected but not included in the present analysis due to space limitations. Self-efficacy did not mediate the reported behavior change (see Sarge & Knobloch-Westerwick, in press, for further analyses).

<sup>2</sup> Given that the combination of manipulations for the eight displayed articles was randomized for each participant, any systematic interaction between the manipulation of the weight loss article and the other displayed articles is extremely unlikely due to the high number of possible manipulation combinations. The 197 participants were presented with 192 different manipulation combinations; five of the possible combinations occurred twice. Additionally, the placement of the article leads on the overview page was randomized for each participant to avoid order effects, which further reduces the likelihood of systematic interactions of the weight loss article manipulation with the manipulations of other displayed articles.

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

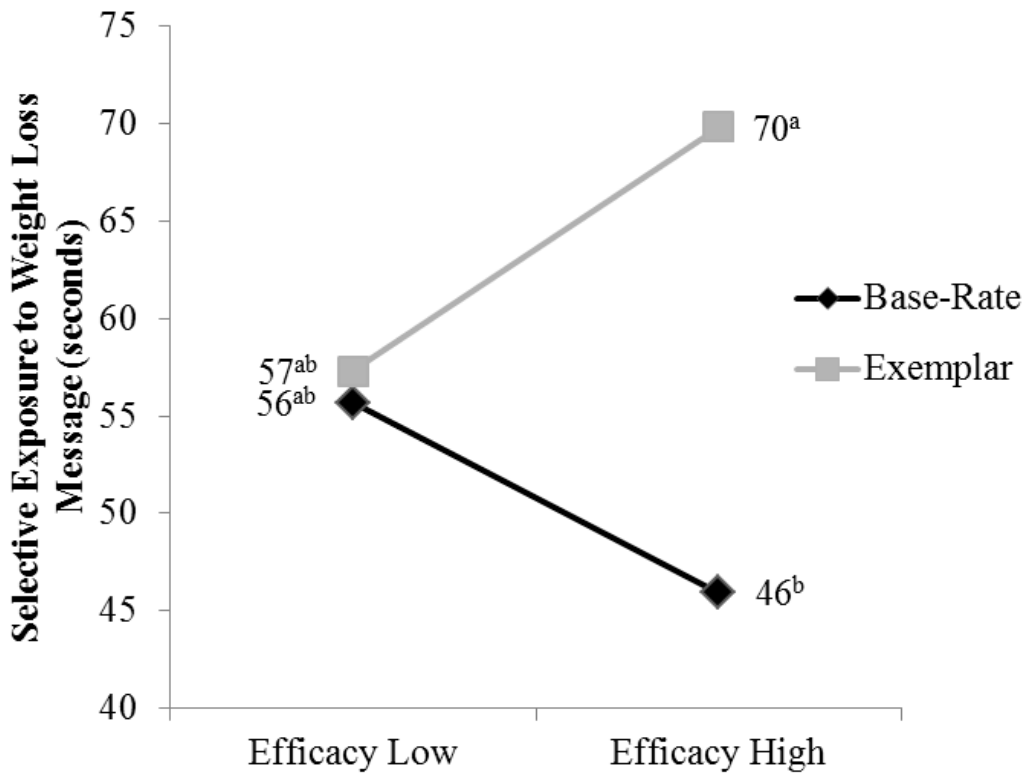
	Low Efficacy	High Efficacy
Exemplar	<p>SLIMMING DOWN IS SIMPLY TOUGH                      [news lead]                      Chris Medley struggles with losing those excessive pounds! Having decided to slim down, Chris tracks food intake and exercise every day. Budgeting in small portions of favorite foods should help to not feel deprived but ultimately, Chris’ weight stays in the overweight category.                      [transition]                      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                      [news lead]                      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.                      [transition]                      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                      [news lead]                      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.                      [transition]                      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                      [news lead]                      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.                      [transition]                      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**

**Impacts of Weight Loss Message Characteristics on Selective Exposure and Change in Promoted Behavior (*M*, *SD* in brackets)**

	Exemplification		Total
	Base-Rate Information	Exemplar	
Selective Exposure (s)			
Efficacy			
Low Efficacy	55.83 (42.44)	58.76 (43.26)	57.20 (42.64)
High Efficacy	45.70** (42.67)	68.51** (40.87)	59.09 (42.91)
Total	51.69* (42.61)	63.92* (42.08)	58.09 (42.67)
Change in Promoted Behavior (z-scores of difference between T3 and T1)			
Efficacy			
Low Efficacy	-.08 (1.26)	.14 (.98)	.02 (1.14)
High Efficacy	-.26 <sup>+</sup> (.80)	.12 <sup>+</sup> (.80)	-.03 (.82)
Total	-.15* (1.11)	.13* (.88)	0.00 (1.00)

*Note.* Means with two asterisks differ at  $p = .005$ , with one asterisk at  $p < .05$ , with plus sign at  $p = .07$ . Sidak correction for multiple comparisons.



**Figure 1: Selective Exposure to Weight Loss Message as a Function of Exemplification and Suggested Efficacy**

*Note.* Estimated means with different superscripts differ at  $p < .05$ , with Sidak correction for multiple comparisons.