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Change Your Ways:

Fostering Health Attitudes Toward Change Through

Selective Exposure to Online Health Messages

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Abstract

Health information is often sought online, despite varying credibility of online sources, and may shape health behaviors. The present investigation builds on the Selective Exposure Self- and Affect-Management model (Knobloch-Westerwick, 2015a) to examine selective exposure to online health information from low- and high-credibility sources and subsequent effects on attitudes toward health behaviors. In a lab study, 419 participants accessed online search results about health topics. The display varied messages in a 4 x 2 x 2 all within-subjects design, with topic as four-step factor (organic food, coffee, fruit and vegetable consumption, physical exercise) and source credibility (low vs. high) and issue stance (promoting vs. opposing health behavior) as two-step factors. Displayed messages either promoted or opposed the related behavior. Results showed that perceiving greater standard-behavior discrepancy (between recommended behavior standards and own behavior) fostered behavior-related attitudes through selective exposure to messages promoting that behavior. The effects from selective exposure to health messages on attitudes occurred regardless of associated source credibility.

Keywords: health information, online search, attitude change, behavioral standards, selective exposure, source credibility

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Altering attitudes and behaviors towards a healthier lifestyle is a paramount challenge in public health. Accordingly, public health communication initiatives aim to foster change toward healthful behaviors (Hornik, 2002). However, much research suggests that individuals generally avoid and ignore messages that challenge their current beliefs and behaviors, instead seeking out reinforcing content (Festinger, 1957). Selective exposure—defined as any systematic bias in which messages an individual chooses from those available (Knobloch-Westerwick, 2015a)—is a potential impediment to improving health behavior. Yet, health communication campaigns work from the premise that messages can be successfully delivered to individuals, leading to attitudinal and behavioral change (e.g., Prochaska & Velicer, 1997). In this article, we offer an alternative perspective, in which selective exposure to health information may actually produce change when driven by a self-improvement process. Self-improvement is a regulatory process where individuals strive to meet goals and standards—for example, a woman with New Year's resolutions to get into shape may buy fitness magazines to fuel her drive to exercise. Such motivation is in contrast to a self-consistency motivation in which individuals maintain and reaffirm existing thoughts and behaviors (Bandura, 2005)—for example, a parent who believes that dining out is most fun for the entire family may well seek out restaurant reviews that bolster that an existing habit of dining out.

To extend the research on health information exposure, we draw on the Selective Exposure Self- and Affect-Management (SESAM) model (Knobloch-Westerwick, 2015b), which positions regulation of the self-concept as key to explaining the individual's selection of media messages. To explore the notion that selective exposure can be guided by self-regulation needs

such as improving health behavior, the present investigation will examine how recognizing a need to change one's own health behavior might foster selective exposure to health messages that motivate the individual and promote change. Moreover, the extent to which the resulting selective exposure to health messages serves as a gateway for attitude and behavior change will be investigated.

Given that much health information exposure now occurs in online contexts (Fox & Duggan, 2013), where sources of very diverse credibility levels compete for attention (Hu & Sundar, 2010), the present study will consider the credibility of sources associated with health messages. Furthermore, the study's methodology draws from the selective exposure paradigm (Knobloch-Westerwick, 2015a), which uses unobtrusive observations of actual media exposure to measure selectivity. This technique provides highly precise and ecologically valid measures of selective exposure, avoiding the many pitfalls of self-reported exposure (Knobloch-Westerwick, 2015a; Prior, 2009; Romantan, Hornik, Price, Cappella, & Viswanath, 2008). Although many health communication studies have used self-report measures to assess seeking out and exposure to health information (e.g., Barbour, Rintamaki, Ramsey, & Brashers, 2012; Kahlor, 2007, 2010; Kim & Kwon, 2010; Niederdeppe, Frosch, & Hornik, 2008) recent studies using observational measures of health information seeking and exposure are relatively scarce (Hastall & Knobloch-Westerwick, 2013; Knobloch-Westerwick & Sarge, 2015; Rimal & Real, 2003; Turner, Rimal, Morrison, & Kim, 2006). The procedure provides a naturalistic yet controlled test of the hypotheses regarding selective exposure and its effects on attitudes.

In the following section, the SESAM model (Knobloch-Westerwick, 2015b) is introduced as theoretical framework, in addition to theoretical considerations regarding the common context of online health information seeking. Then, results are presented from an experiment that used a

behavioral measure of self-selected message exposure to test whether prior behavior and self-discrepancies would predict selective exposure to articles about four different health topics, and whether this selective exposure would produce attitudinal effects.

Health Information Exposure from a SESAM Model Perspective

Selective exposure refers to any systematic bias in which messages are received by audience members (Knobloch-Westerwick, 2015a; Sears & Freedman, 1967). Traditionally, the term has often been used more narrowly to coin a bias toward messages matching preexisting beliefs (Stroud, 2008). The notion that selective exposure to health messages can facilitate behavior change aligns with classic theorizing on selection and avoidance of information: Festinger's (1957) theory of cognitive dissonance suggests that individuals avoid information that clashes with preexisting cognitions—knowledge and beliefs, especially those about one's own behaviors. Importantly, Festinger's theory (1957) contained the notion that individuals may resolve high levels of dissonance by changing their cognitions and behaviors. That is, cognitive dissonance may not only be avoided by circumventing content that challenges preexisting views and behaviors; it may also lead to changes in beliefs and behaviors. This suggestion has not garnered much attention in communication research, which is dominated by the premise that media users primarily seek reinforcement (e.g., Slater, 2007). While a motivation to foster the status quo in one's views may indeed drive much of selective exposure, health communication researchers must take an interest in circumstances under which attitude-challenging messages may be attended to. Once individuals become motivated to resolve dissonance by changing their behavior (e.g., Prochaska & Velicer, 1997), they may seek out messages that promote that change.

The notion that individuals may seek out media messages to alter their behaviors has

been elaborated in a recently proposed theoretical model, the Selective Exposure Self- and Affect-Management (SESAM) model (Knobloch-Westerwick, 2015b). This model suggests that individuals selectively attend to media to regulate what aspects of the self are salient. After the selective exposure, the increased accessibility of a self-facet will render certain behaviors more likely. For example, a young man who plans to go the gym later may choose to watch a sports channel beforehand, to render athletic self-perceptions salient and feel energized for the workout.

If a self-discrepancy exists between a normative self (that the individual aspires to or wishes to adhere to) and the actual self, negative affective states result from this discrepancy (Higgins, 1987) and motivate behaviors: Possible behaviors related to selective exposure include bolstering self-consistency (along the lines of Festinger's cognitive dissonance theory) and self-enhancement through comparisons with other individuals or outgroups portrayed unfavorably (e.g., Knobloch-Westerwick & Hastall, 2010; Appiah, Knobloch-Westerwick, & Alter, 2013). Further, in efforts toward self-improvement, individuals may attend to messages on how to change toward more healthful behavior.

The present analysis will examine hypotheses on whether selective exposure to health information online can indeed affect attitudes and whether messages from high-credibility sources are particularly effective in this regard. The related first two hypotheses suggest that selected messages will have persuasive impact, depending on the source—a notion that goes back to classic works (e.g., Hovland & Weiss, 1951; Pornpitakpan, 2004). Further, our study will investigate whether these consequences of selective exposure originate in preexisting levels of the health behavior in question (indicating a self-consistency motivation) or in standard-behavior discrepancies between perceived recommended health behavior and one's actual behavior (indicating a self-improvement motivation). In other words, mediation effects via selective

exposure are proposed based on the SESAM model (Knobloch-Westerwick, 2015b), which emphasizes that individuals selectively attend media messages in the interest of self-management including changes in behavior.

Attitude Change Following Selective Exposure

The SESAM model connects to empirical work on selective exposure and its consequences (see Knobloch-Westerwick, 2015b, for a more detailed elaboration). For instance, this line of work yielded that selective exposure to messages aligned with one's preexisting political attitudes makes one's political partisanship more salient and fosters political participation; further demonstration pertained to selective exposure to a weight loss message, which fostered tracking food intake behavior. The model suggests that dynamic changes of the self-concept—making different aspects of the self, affect, behaviors, etc., situationally accessible in the "working self"—both lead to and result from selective exposure to media messages that serve self-regulation purposes. Thus processes of such self-management are articulated as dynamically occurring in a series of phases (Figure 1), which represent the idea that individuals in a given situation, e.g., phase 1, will seek out certain messages to influence themselves, leading to subsequent media impacts, labeled "transaction" in phase 2 (such transactions will be examined through mediation analyses per H3 and H4 specified below, see also illustration in Figure 2).

Applying the SESAM more specifically to health message exposure, self-consistency motivation should channel selective exposure toward behavior-consistent health messages, reinforcing existing attitudes toward health behaviors. On the other hand, self-improvement motivation should channel selective exposure toward goal-consistent health messages, which in turn affects attitudes regarding health behaviors. Presenting participants a balanced variety of

messages both supporting and opposing particular health behaviors, and precisely measuring selective exposure to each kind of message during a realistic browsing session, will allow testing for systematic biases in message selection (Knobloch-Westerwick, 2015a). Furthermore, examining attitude change as a result of selective exposure provides an ecologically valid test of message effects, given that real-world selectivity is prevalent (McGuire, 1985) and shapes persuasion effects (Hastall & Knobloch-Westerwick, 2013; McGuire & Papageorgis, 1961; Schlosser & Shavitt, 2009).

H1: Greater selective exposure to messages pertaining to health behaviors fosters attitudes in line with the health behaviors promoted or opposed in these messages.

Online Health Information and Source Credibility

The SESAM model (Knobloch-Westerwick, 2015b) proposes that individuals select messages due in part to the expected effects of those messages. This allows for self-regulation via media use, where messages appraised as likely to produce particular media effects (e.g., activating the salience of a healthy behavior or one's own health-related behaviors) are thus chosen for their influence. The model harkens back to earlier concepts such as *gratifications sought*, in which media content is used because of its anticipated impacts on the individual (Palmgreen & Rayburn, 1982). Accordingly, not only should individuals choose health messages based on their support or opposition toward behaviors, but also because of additional factors that can shape message influence and effectiveness, such as source credibility (Pornpitakpan, 2004).

Accessing health information online has become common practice (Fox & Duggan, 2013) and will serve as context for the present analysis. This context brings source credibility of messages to the forefront because ample high-credibility and low-credibility health information sources are available online, which has crucial implications for the persuasiveness of a message.

Decades of research have shown that high-credibility sources have more persuasive impact (Pornpitakpan, 2004), which also has implications for whether a health message is accessed in the first place. For instance, based on Lowin's (1967) approach-avoidance model, individuals would only select an attitude-challenging message if it is coming from a low-credibility source and is easily refuted. In that case, the attitude-challenging message does not present a strong challenge to one's preexisting views and can be received without creating much cognitive dissonance (Festinger, 1957). Therefore, the influence of selected messages on subsequent attitudes is likely to differ by source credibility.

H2: The selective exposure effect on attitudes suggested in H1 is stronger for messages from high-credibility sources compared to messages from low-credibility sources.

Self-Consistency and Self-Improvement Processes in the SESAM Model

In the context of the present work, we draw on the larger SESAM model (illustrated in Figure 1) to conceptualize the following two independent and distinct motivations that may lead to selective exposure and attitude change: self-consistency and self-improvement. First of all, existing behaviors should be salient aspects of self-perception (working self and affect in phase 1 of Figure 1) and should lead to selective exposure to messages that are consistent with that behavior (selective exposure, interpretation, and responses in phase 1 of Figure 1). This self-consistency process should reinforce existing attitudes (working self and affect in phase 2 of Figure 1).

H3: Engaging more frequently in certain health behaviors increases selective exposure to messages promoting these health behaviors and, in turn, fosters attitudes in line with these messages (for self-consistency).

Additionally, in a separate process, individuals' self-perception regarding discrepancies

between what they actually do and what they should be doing regarding health behaviors (working self and affect in phase 1 of Figure 1) should instigate a self-improvement motivation. This should produce selective exposure to messages advocating the behavioral standard (selective exposure, interpretation, and responses in phase 1 of Figure 1), which should then change attitudes in the direction of the behavioral standard (working self and affect in phase 2 of Figure 1).

H4: The more individuals fall short of perceived recommended standards for certain health behaviors, the more time they spend on messages promoting these health behaviors, which in turn fosters attitudes in line with these messages (for self-improvement).

Method

Overview

A secondary data analysis of a study by Authors (2013) was conducted to test whether selective exposure to messages would alter attitudes toward health issues in the manner described by the SESAM model. Participants (N = 419) reported their baseline beliefs and behaviors regarding a range of health topics, including four target issues: consuming organic foods, drinking coffee, eating fruits and vegetables, and exercising. Then, after completing an unrelated study serving as a distractor task, study participants were presented with Internet search results for each of the four topics; each participant viewed every topic, in a within-subjects design. Each set of results featured four articles, which participants were free to browse at their own interest. The articles presented for each topic were manipulated in a 2 x 2 within-subjects design, where half of the articles were supportive of the behavior and half were oppositional, and where half of the articles' attributed sources were highly credible and half were

of low credibility. Selective exposure was unobtrusively measured in seconds spent on each article. After exposure, the measures from the baseline section of the study were re-administered.

Participants

Students from a large university in the Midwestern United States were recruited through online announcements posted by course instructors. In exchange for course credit, a total of 222 women and 197 men completed the study, M_{age} = 21.11 (SD = 3.11); 69.5% were White, 12.6% Black, 12.4% Asian, 1.7% Hispanic/Latino, and 3.8% other. The vast majority (92%) were daily Internet users and 73% reported spending three or more daily hours online.

Procedure

Setting and sequence. After arriving for a multi-study session and providing informed consent, each participant was seated at a private workstation in a computer lab. Participants were instructed that the entire session would consist of three separate studies, to be completed in sequence. In fact, the first "study" was a 5-min baseline section for the present research, the second study was indeed a separate, unrelated study utilized as a 15-min distractor, and the final study, which lasted about 20 min, consisted of the selective exposure and post-exposure sections of the present research. At the end of the entire session, participants were debriefed and assigned extra credit for participating.

Baseline. A series of items solicited participant attitudes regarding the four target health issues and eight distractor issues (e.g., artificial sweeteners) that disguised the focus of the study. Participants also reported their media use and demographic details.

Distractor. Participants then accessed an unrelated study in order to distract them from the health issues for 15 min. This was included to minimize any priming influence of pretest measures on selective exposure. The distractor study consisted of browsing an online news

magazine consisting of news articles unrelated to health topics. Participants could read about identity theft, nuclear power, burglary, gas prices, a Mars rover, retail self-checkout, regulation of coastal waters, and graffiti cleanup for a total of 4 min. Afterward, they evaluated headlines from the magazine and responded to a measure of trait coping.

Selective exposure. Participants then began what was presented as a new study. They were to view a series of Internet search results that had presumably been generated by an online news portal based on several keyword searches. Instructions advised participants to "browse through the available articles and read whatever you find interesting." Each set of results consisted of four articles, and the articles' headlines and leads were presented as previews for each article on an overview page. From the overview page, participants could click through to read full articles. Every click was measured in seconds, providing an unobtrusive measure of selective exposure (Authors, 2003, 2013). Each set of search results was presented for 2 min, after which a pop-up button indicated that the reading time for that set of articles had elapsed. Participants clicked on the button to proceed, and were then introduced to the next set of results, for each new topic.

Post-exposure. Once the selective exposure section was completed, the study continued with a questionnaire. Participants were initially asked to recall the sources attributed to articles in search results for each health issue (mean accuracy was 50.32%, *SD* = 9.95). Then, the questions from the baseline section were re-administered, in which participants reported their attitudes regarding the targeted and distractor health issues. They also reported their own behavior relevant to each of the target issues, as well as their personal standards and perceptions of recommended standards. Participants were then debriefed as to the nature of the research.

Stimuli

Results page. The overview page for each topic was modeled after a typical web news portal, and presented previews for four articles that were listed as search results (see example screen shot in Appendix 1). The search terms for each set of results were "organic food," "coffee and health," "eating vegetables," and "working out," presented in that order. Each set of four results consisted of two articles advocating and two articles discouraging the behavior. Each article was also attributed to an either high- or low-credibility source, so that the issue support and source credibility manipulations were crossed in a 2 x 2 within-subjects design. The placement of article previews on each overview page was systematically counterbalanced to avoid any order effects of presentation. Each preview consisted of a headline, lead sentence, source name, source URL, and a link to read the full article.

Articles. The four selected health topics, for which positive and negative evidence is commonly presented in the popular press, were chosen based on high perceived relevance scores in a pretest survey among individuals drawn from the study's sample population. The two supportive and two oppositional articles for each topic were adapted from real articles and editorials that had appeared in mainstream print publications. Articles were revised to maximize similarity in tone, type of evidence offered, and length (headline and lead word count, M = 29.13, SD = 0.34, article word count, M = 714.75, SD = 25.22). A manipulation check conducted with a separate sample (N = 12, 50% women, M_{age} = 21.67, SD = 0.98) demonstrated that each issue-supportive article (headline and lead) was perceived to be very supportive (> 5.5 on a 7-point scale) and each issue-oppositional article (headline and lead) was perceived as very oppositional (< 3.5 on a 7-point scale), with significant pairwise comparisons between individual supporting and opposing articles. The headlines and leads for each article appear in Appendix 2.

Sources. The manipulation check with the above-mentioned separate sample for articles also included a survey of the perceived credibility of a diverse set of health websites, without reference to any topics or article headlines. The name and URL of each site was presented, and participants rated how credible they would expect each site to be, from 1 = *not at all* to 7 = *very much*. The eight sites that were used as *high-credibility* sources in the main study (e.g., American Dietetic Association—www.eatright.org) had mean credibility ratings > 4.83; the eight sites that were used as *low-credibility* sources (e.g., The Magic Pill—www.themagicpill.com) had mean credibility ratings < 2.83. Comparisons showed that the low- and high-credibility sources formed two significantly different groups. In the study, sources were assigned to articles with a Latin square design. This scheme uses systematic rotation to ensure that that article stance and source credibility were presented independently and manipulated as separate factors, while ensuring that both high- and low-credibility sources were assigned to both behavior-supporting and behavior-opposing stances for each topic.

Measures

Attitudes. Participants were asked to give their "opinion about a number of health topics" by indicating "what you believe to be the most accurate response. Please keep in mind that there are no 'right' or 'wrong' answers for these questions and that we are only interested in your personal views." Participants reported their attitudes toward a number of health topics, including the four topics of interest ("Organic food," "Coffee," Fruits and vegetables," and "Exercise") and eight distractor topics. Attitudes were measured with 9-point anchored single-item scales ranging from 1 = *Very bad* to 9 = *Very good*. These self-reported attitudes were also measured a second time, in the post-exposure section. There were significant changes in attitudes from baseline to post-exposure (see descriptives in Appendix 3). Attitudes toward coffee moved

from moderate to more negative, $t(417) = –2.48$, $p = .01$. Attitudes became less positive for organic food, $t(417) = –15.29$, $p < .001$, vegetables, $t(417) = –10.77$, $p < .001$, and exercise, $t(417) = – 9.52$, $p < .001$. Additionally, attitude importance was measured for the four target and eight distractor topics during the baseline survey, using 7-point anchored scales (1 = *Not at all important* to 7 = *Extremely important*).

Health behaviors. Participants were asked to indicate the frequency with which they engaged in each of the target health behaviors. As before, the four topics of organic food, coffee, fruits and vegetables, and exercise were included with eight distractor topics. Ten-point scales ranging from 0 to 9 were used measure behavioral frequency. Specifically, the scales for the target topics referred to the percentage of organic food consumed weekly (0 = *0-10%* to 9 = *90-100%*), the number of daily servings of coffee, and of fruits and vegetables, and the number of times spent exercising per week (0 = *0* to 9 = *9+*). Descriptive values are reported in Appendix 3.

Behavioral standards. The same 10-point scales used for reporting behavioral frequency were also used to measure perceptions of what experts recommended regarding the frequency of each health behavior. These perceived behavioral standards for organic food, coffee, fruits and vegetables, and exercise were used to calculate standard-behavior discrepancies for individuals, by subtracting the value for behavior frequency from the value for perceived behavioral standard frequency. For each topic, participants on average reported a shortcoming in their behavior with regard to perceived standards. The descriptive statistics for behavioral standards and standard-behavior discrepancies are reported in Appendix 3.

Selective exposure. The time spent browsing each of the web pages among the four sets of search results was recorded unobtrusively in seconds with software, yielding measures of

selective exposure to behavior-supporting versus behavior-opposing articles and high-credibility versus low-credibility articles for each health topic.

Browsing for each topic lasted 2 min, and began on the overview results page that featured previews for the four manipulated articles. Time was restricted to 2 min per topic because it corresponds to the typical time used to examine search results (Mitchell, Jurkowitz, & Olmstead, 2014) and to ensure comparability between participants. A fixed browsing time allows measurement of exposure times as proportion of time spent on each kind of message. On average, participants spent a total of 19.06 s (*SD* = 15.82) viewing each results overview page. Across all topics, they selected *M* = 6.90 (*SD* = 3.21) articles out of the 16 available, demonstrating that the browsing task allowed for selectivity in reading. If an article was clicked on for reading, an average of 72.77 s (*SD* = 30.90) was spent reading the article.

Given the two-factor manipulation of articles on issue stance and credibility, exposure was measured for each type of article (stance x credibility), in a within-subjects design. Furthermore, this design was repeated for each of the four health topics, resulting in a final 2 x 2 x 4 (stance x credibility x topic) within-subjects design for exposure variables. ANOVA models were conducted to assess the overall pattern of selective exposure to the health articles (cf. Authors, 2013). At a descriptive level, ANOVA tests show that more time was spent on articles opposing the behavior, $F(1, 418) = 98.75$, $p < .001$, $\eta_p^2 = .19$, $M_{\text{oppositional}} = 253$ s, $SD = 99$, versus $M_{\text{supportive}} = 164$ s, $SD = 94$. Participants also engaged in more selective exposure to high-credibility sources, $F(1, 418) = 10.69$, $p < .001$, $\eta_p^2 = .03$, $M_{\text{high-credibility}} = 224$ s, $SD = 103$, versus $M_{\text{low-credibility}} = 193$ s, $SD = 101$. Selectivity was also seen between topics, with participants spending more time on exercise articles than the others and less on organic food articles, $F(3, 1254) = 8.80$, $p < .001$, $\eta_p^2 = .02$. Finally, an interaction between stance and topic,

$F(3, 1254) = 32.95$, $p < .001$, $\eta_p^2 = .07$, which resulted from the fact that the overall preference for oppositional articles was not significant merely for the exercise topic.

Results

Effects of Selective Exposure on Attitude Change

The first set of analyses addresses H1, which suggests greater selective exposure to messages pertaining to health behaviors fosters attitudes in line with the health behaviors promoted or opposed in these messages, and H2, which proposed that this effect in H1 is stronger for messages from high-credibility sources compared to messages from low-credibility sources. A regression analysis for each health topic examined effects of selective exposure to (a) messages promoting the behavior from high-credibility sources, (b) messages promoting the behavior from low-credibility sources, and (c) messages opposing the behavior from high-credibility sources on health attitudes *after* exposure. Because the total browsing time was fixed, exposure to messages opposing the behavior from low-credibility sources was not included, to prevent multicollinearity; additional analyses showed that low-credibility opposing messages were not impactful, so they are not discussed further. This analysis approach served to examine main effects of the selective exposure categories and did not include interaction terms in the regression model. Within each topic, the analysis controlled for baseline attitude and attitude importance.

Table 1 summarizes the findings, which were very consistent across the four topics--selective exposure to messages *promoting* behaviors both from high-credibility sources (see betas in first column in Table 1, ranging between .10 and .33) and low-credibility sources (betas in second column in Table 1, ranging from .10 to .36) affected attitudes in line with the featured issue stance. These findings partially corroborate H1 (for articles supporting the behavior) but

not H2 because the message effects occurred regardless of source credibility, evident in the first and second columns of Table 1.

Effects of Selective Exposure Motives on Attitude Change Through Selective Exposure

Mediation analyses were conducted to see whether (a) behavior frequency (self-consistency as exposure motive) and (b) standard-behavior discrepancy (self-improvement as exposure motive) effected attitude change through selective exposure to behavior-promoting health messages. Given the lack of effects of behavior-opposing message exposure on attitudes, only behavior-promoting message exposure was tested as a possible mediator. Separate analyses were run for the four topics. Because there were two different predictor variables (a and b above), this resulted in eight mediation analyses. We utilized the approach suggested by Preacher and Hayes (2008), with either (a) behavior frequency or (b) standard-behavior discrepancy as independent variables, selective exposure to all messages promoting the behavior in minutes as the mediating variable, and post-exposure attitude as the dependent variable. As in the regression analyses, baseline attitude (using baseline attitudes as control variable is equivalent to using difference scores and yields the same coefficients) and importance served as control variables. Additionally, the mediation analyses with behavior frequency as independent variable controlled for standard-behavior discrepancy, while the mediation analyses with standard-behavior discrepancy as independent variable controlled for behavior frequency (per reviewer request) to assess the two predictor variable types' impact in comparison.

Figure 2 illustrates the setup of the mediation models and how the mediation models go beyond simple direct effects. Because mediation analyses were conducted for all four topics, the illustration in Figure 2 is generic and the detailed results are reported in Tables 2 and 3 due to

space limitations. A point estimate for an indirect effect was considered significant if zero was not included in the 95% bias-corrected confidence interval.

The first set of mediation analyses used behavior frequencies as independent variables to test H3. The key finding is that, for each of the four health lifestyle topics, behavior frequency had a significant mediation effect on attitude change through selective exposure to health messages promoting that behavior (mediation via *a*-*b* paths in Figure 2, point estimates reported in bottom row in Table 2). This consistent pattern supports H3. Hence, engaging more frequently in the health behaviors fostered selective exposure to messages promoting these health behaviors and, in turn, fostered attitudes in line with these messages (for self-consistency). The detailed findings are reported in Table 2.

In the interest of reporting on all paths in the mediation model (per Figure 2), we provide details beyond the testing of H3: Behavior frequency had significant effects on the selective exposure measures as mediator (X to M, *a* path; see first row with coefficients in Table 2) (parallel to findings reported by Authors, 2013). Further, selective exposure as mediator had an effect on attitude change (M to Y, *b* path; see second row with coefficients in Table 2), which parallels the findings from regression analyses reported above. The *c* and the *c'* paths (reported in the third and fourth row of Table 2) yielded significant coefficients for the topics of organic food and exercise only (methodological work on mediation analysis does not consider a significant total effect of the independent variable on the dependent variable a precondition for mediation effects; see Hayes, 2009).

Likewise, findings for mediation analyses with standard-behavior discrepancy as independent variable were very consistent and are reported in detail in the next two paragraphs and Table 3. So next, we discuss analyses regarding H4. Most importantly, for each of the four

health lifestyle topics, standard-behavior discrepancy had a significant indirect effect on attitude change through selective exposure to health messages promoting that behavior (mediation via paths *a* and *b* in Figure 2, point estimates reported in bottom row in Table 3). This consistent pattern supports H4. Thus, the more individuals fell short of perceived recommended standards for certain health behaviors, the more time they spent on messages promoting these health behavior, which in turn fostered attitudes in line with these messages.

In the interest of reporting on all paths in the mediation model (per Figure 2), we provide details beyond the testing of H4: For each of the four health lifestyle topics, standard-behavior discrepancy had a significant effect on the selective exposure measure as the mediator (X to M, *a* path, reported in first row with coefficients in Table 3) (parallel to findings reported by Authors, 2013). Further, selective exposure as mediator had effects on attitude change (M to Y, *b* path, reported in second row with coefficients in Table 3), which parallels the findings from regression analyses reported above (naturally these effects are equivalent to the selective exposure impacts in analyses regarding H3 in Table 2). The *c* and the *c'* paths, reported in third and fourth row with coefficients in Table 3, yielded significant coefficients for the topics of fruit and vegetable consumption and exercise only (again, work on mediation analysis does not consider a significant effect of the independent variable on the dependent variable a precondition for mediation effects; see Hayes, 2009).

Discussion

Drawing on the SESAM model (Knobloch-Westerwick, 2015b), the present analysis utilized data collected in an online search context to study selective exposure to health messages for four different topics. The results indicate that more time spent viewing messages promoting health behaviors led to a shift in attitudes toward the suggested health behavior. Somewhat

surprisingly, this effect did not depend on source credibility, as exposure to both messages from a highly credible source and messages from low-credibility sources had this effect. The observation that online users may *not* discount content from low-credibility sources is concerning, because plenty of dubious health advice exists online--this advice may impact health attitudes just as much as guidance from authoritative sources. The present findings imply that health campaigns must design that interventions stand out from a flood of questionable health claims, which is difficult if information recipients do not discriminate by source credibility.

While exposure to messages that promoted health behaviors influenced attitudes, no evidence emerged for attitude shifts resulting from exposure to messages opposing the behaviors. Presumably, most of the topics-related information the participants had been exposed to *beforehand* promoted the targeted health behaviors--so the oppositional articles that participants encountered during the research session may have been easily discounted but also perceived as novel, thus garnering attention. And while the overall high exposure to oppositional messages may seem surprising, it is important to note that behavior frequencies were not very high and behavior-standard discrepancies were even lower (see Appendix 2), so participants did not engage much in the related behaviors and were overall not particularly concerned about it. Nonetheless, *variation* in these indicators still predicted selective exposure, which in turn produced attitude shifts.

Specifically, the perceived discrepancy between actual behavior and recommended behavior emerged as influential: In line with the self-improvement hypothesis, the more individuals fell short of perceived standards for certain health behaviors, the more time they spent on messages promoting these health behavior, which in turn reinforced attitudes in line with these messages. This mediation effect of selective exposure corroborates the SESAM notion

that individuals utilize media messages to motivate themselves towards behavior change (self-improvement). Moreover, the self-consistency hypothesis was supported as well, because engaging more frequently in the health behaviors consistently produced attitude reinforcement via selective exposure to messages promoting these health behaviors. When considering the self-consistency and the self-improvement processes via selective exposure, they appeared to have roughly the same importance, with comparable coefficient sizes.

These findings suggest that the motivation to change is an important driving force in how media messages are selected and subsequently given the opportunity to influence the recipient. The SESAM model that guided the present project thus was found to provide a most fruitful framework to understand how media users select and utilize messages to shape their own behaviors. Self-consistency and self-improvement processes per the SESAM model were indeed evident and about equally important. This observation is particularly remarkable in light of the dominant notion that media messages are primarily sought out to reinforce the status quo (e.g., Slater, 2007).

Several limitations should be acknowledged. Despite the use of an observational measure of selective exposure, the study was reliant on single-item measures of health behaviors, standards, and attitudes. These measures are restricted in their reliability and validity for capturing the underlying concepts. However, the use of multiple health topics (and evidence of similar patterns of effects across topics) is a strength of the present study, helping mitigate the limitation of single-item self-reports for these variables. While more attention to differences among topics and related responses may be relevant for specific health campaigns, the present work is interested in the overarching process of individuals seeking self-consistency or self-improvement through selective exposure to health messages; future work and analyses could

focus on specific topics and then possibly provide guidance for campaign designers. Next, the four health topics were chosen for their relevance to the study population and some "mixed evidence" about these topics in health news (Nagler, 2014). However, all topics exhibited relatively high positive attitudes. It is plausible that the broader context of participants' exposure to these topics affected the preexisting attitudes and responses—for example, coffee as a topic yielded a more neutral baseline attitude and impacts for this topic were substantially larger than the other topics. Future research should consider a wider variety of health behaviors, including those where people hold weak or negative attitudes. Finally, while the time allowed for browsing mimicked typical online search sessions (Mitchell et al., 2014) and allowed comparison of the proportion of time spent on each message type, future research using this selective exposure paradigm (Knobloch-Westerwick, 2015a) could allow for variable browsing session durations.

The present study extends prior work (Author, 2013) by examining changes in *explicit* attitudes and by demonstrating that selective exposure mediates effects of perceived discrepancy between actual behavior and recommended behavior on attitude change. It is interesting to note that prior analyses (Author, 2013) showed different patterns for how selective exposure affected attitude accessibility as *implicit* measures. Effects of selective exposure on attitude accessibility depended on source credibility, whereas the present analysis with explicit attitude measures found effects on attitude change that were uniform and did not depend on source credibility. Given that source credibility was relevant for effects on an implicit measure but not for effects on change in explicitly reported attitudes, it appears that the more deliberate processing, as measured with self-reported attitudes, was not as influenced by source credibility. This pattern may reflect that central processing was more relevant for the change in explicit attitudes, whereas peripheral processing was more relevant for the implicit measures of attitude

accessibility—source credibility has often been thought of as a peripheral cue with greater implications for peripheral processing of persuasive messages (Petty & Cacioppo, 1984; Pornpitakpan, 2004). This interpretation is also supported by modest post-exposure source recall.

In addition to the self-consistency impact of selective exposure, the present investigation showed that selective exposure can foster attitude change (self-improvement hypothesis). This finding is particularly remarkable because media effects research only rarely finds actual shifts in attitudes. But a willingness to change may drive individuals toward messages that aid them in making necessary changes. Indeed, the resulting selective exposure fostered attitude shifts, which should help with forming intentions and ultimately performing the actual health behaviors. The present within-subjects experiment design was especially robust due to its multiple-message design and variation in message features (O'Keefe, 2015). The same pattern of effects was seen across all four health topics, and each set of search results also used multiple messages for each issue stance (with variation in source credibility). The consistent findings across a diverse and varied set of messages provide strong evidence for generalization (O'Keefe, 2015). The present findings show modest effect sizes (e.g., 8% to 48.5% of variance in post-exposure attitudes was explained by selective exposure), but this was produced by a short, single session. Future research should examine these processes over a longer period.

Another interesting question pertains to the extent to which self-consistency and self-improvement motivations may co-occur or are mutually exclusive. At least in the domain of political messages, individuals have been found to initially select attitude-consistent messages before being more open to attitude-challenging messages (Knobloch-Westerwick & Kleinman, 2012). In the health domain, it may depend on how explicitly messages support or challenge a health behavior—for example, many message may praise moderate eating as healthy and thus

appeal both to individuals that want to maintain their eating habits as well as to those who wish to reduce food intake slightly. Such messages could also be sought out by those who seek to both maintain and further improve good health habits. But then again, there will be clear-cut messages as in the present study, such as in cooking magazines that promote food indulgence on the one hand whilst beauty magazines often promote rigorous low-calorie diets. Especially when individuals choose to attend to such outlets for which clear health messages of a certain type can be anticipated, self-consistency and self-improvement motivations are unlikely to co-occur. Whether the one or the other motivation governs message selections and subsequent effects may well be a function of an individual's position in the "stages of change" toward health behavior improvements, as conceptualized by Prochaska and Velicer (1997).

More generally speaking, it is important to tackle the question of whether the pursued change actually translates into behavioral intentions and health behavior change. It is likely that repeated "self-improvement" and "self-consistency" selective exposure to messages promoting the desired behavior is crucial for achieving and maintaining a healthy lifestyle. As it stands, the SESAM model provides a fruitful perspective to specify the relevant motivations and processes in the health communication context, which helps message designers understand how message recipients approach and process the health information. While the present work shed light on the overarching patterns, the targeting of specific health behavior change will require thinking through how specific health issues relate to self-consistency and self-improvement motivations, which will vary for individuals with different behavioral habits and standard-behavior discrepancies. In doing so, it is important to remember that ultimately individuals will only be influenced by those messages that they *select* to consume.

References

Appiah, O., Knobloch-Westerwick, S., & Alter, S. (2013). Ingroup favoritism and outgroup derogation: Effects of news valence, character race, and recipient race on selective news reading. *Journal of Communication, 63,* 517-534. doi: 10.1111/jcom.12032

Bandura, A. (2005). The primacy of self-regulation in health promotion. *Applied Psychology, 54*, 245-254. doi: 10.1111/j.1464-0597.2005.00208.x

Barbour, J. B., Rintamaki, L. S., Ramsey, J. A., & Brashers, D. E. (2012). Avoiding health information. *Journal of Health Communication*, *17*, 212-229. doi: 10.1080/10810730.2011.585691

Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS scales. *Journal of Personality and Social Psychology, 67*, 319-333. doi: 10.1037/0022-3514.67.2.319

Festinger, L. (1957). *A theory of cognitive dissonance.* Stanford, CA: Stanford University Press.

Fox, S., & Duggan, M. (2013, January 15). *Health online 2013.* Pew Research Internet Project. Retrieved from http://www.pewinternet.org/Reports/2013/Health-online.aspx

Hastall, M. R., & Knobloch-Westerwick, S. (2013). Severity, efficacy, and evidence type as determinants of health message exposure. *Health Communication, 28,* 378-388. doi: 10.1080/10410236.2012.690175

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs, 76*, 408-420. doi: 10.1080/03637750903310360

Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review, 94*, 319-340. doi: 10.1037/0033-295X.94.3.319

Hornik, R. C. (Ed.). (2002). *Public health communication: Evidence for behavior change.* Mahwah, NJ: Erlbaum.

Hovland, C. I., & Weiss, W. (1951). The influence of source credibility on communication effectiveness. *Public Opinion Quarterly*, *15*, 635-650. doi: 10.1086/266350

Hu, Y., & Sundar, S. S. (2010). Effects of online health sources on credibility and behavioral intentions. *Communication Research, 37*, 105-132. doi: 10.1177/0093650209351512

Kahlor, L. (2007). An augmented risk information seeking model: The case of global warming. *Media Psychology*, *10*, 414-435. doi: 10.1080/15213260701532971

Kahlor, L. (2010). PRISM: A planned risk information seeking model. *Health Communication*, *25*, 345-356. doi: 10.1080/10410231003775172

Kim, K., & Kwon, N. (2010). Profile of e-patients: Analysis of their cancer information-seeking from a national survey. *Journal of Health Communication*, *15*, 712-733. doi: 10.1080/10810730.2010.514031

Knobloch-Westerwick, S. (2015a). *Choice and preference in media use: Advances in selective exposure theory and research*. New York, NY: Routledge.

Knobloch-Westerwick, S. (2015b). The selective exposure self- and affect-management (SESAM) model: Applications in the realms of race, politics, and health. *Communication Research, 42*, 959-985. doi: 10.1177/0093650214539173

Knobloch-Westerwick, S., & Hastall, M. R. (2010). Please your self: Social identity effects on selective exposure to news about in- and out-groups. *Journal of Communication*, *60*, 515-535. doi: 10.1111/j.1460-2466.2010.01495.x

Knobloch-Westerwick, S., & Sarge, M. A. (2015). Impacts of exemplification and efficacy as characteristics of an online weight-loss message on selective exposure and subsequent

weight-loss behavior. *Communication Research, 42*, 547-568. doi: 10.1177/0093650213478440

Lowin, A. (1967). Approach and avoidance: Alternate modes of selective exposure to information. *Journal of Personality and Social Psychology, 6*, 1-9. doi: 10.1037/h0024531

McGuire, W. J. (1985). Attitudes and attitude change. In G. Lindzey & E. Aronson (Eds.), *Handbook of social psychology* (3rd ed., Vol. 2, pp. 233-346). New York, NY: Random House.

McGuire, W. J., & Papageorgis, D. (1961). The relative efficacy of various types of prior belief-defense in producing immunity against persuasion. *The Journal of Abnormal and Social Psychology, 62*, 327-337. doi: 10.1037/h0042026

Mitchell, A., Jurkowitz, M., & Olmstead, K. (2014, March 13). Audience routes: Direct, search & Facebook. *Pew Research Journalism Project.* Retrieved from http://www.journalism.org/2014/03/13/audience-routes-direct-search-facebook/

Nagler, R. H. (2014). Adverse outcomes associated with media exposure to contradictory nutrition messages. *Journal of Health Communication, 19*, 24-40. doi: 10.1080/10810730.2013.798384

Niederdeppe, J., Frosch, D. L., & Hornik, R. C. (2008). Cancer news coverage and information seeking. *Journal of Health Communication, 13*, 181-199. doi: 10.1080/10810730701854110

O'Keefe, D. (2015). Message generalizations that support evidence-based persuasive message design: Specifying the evidentiary requirements. *Health Communication, 30*, 106-113. doi: 10.1080/10410236.2014.974123

Palmgreen, P., & Rayburn II, J. D. (1982). Gratifications sought and media exposure: An expectance value model. *Communication Research, 9,* 561-580. doi: 10.1177/009365082009004004

Petty, R. E., & Cacioppo, J. T. (1984). Source factors and the elaboration likelihood model of persuasion. *Advances in Consumer Research, 11*, 668-672.

Pornpitakpan, C. (2004). The persuasiveness of source credibility: A critical review of five decades' evidence. *Journal of Applied Social Psychology, 34,* 243-281. doi: 10.1111/j.1559-1816.2004.tb02547.x

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40,* 879-891. doi: 10.3758/BRM.40.3.879

Prior, M. (2009). The immensely inflated news audience: Assessing bias in self-reported news exposure. *Public Opinion Quarterly, 73,* 130-143. doi: 10.1093/poq/nfp002

Prochaska, J. O., & Velicer, W. F. (1997). The transtheoretical model of health behavior change. *American Journal of Health Promotion, 12,* 38-48. doi: 10.4278/0890-1171-12.1.38

Romantan, A., Hornik, R., Price, V., Cappella, J., & Viswanath, K. (2008). A comparative analysis of the performance of alternative measures of exposure. *Communication Methods and Measures, 2,* 80-99. doi: 10.1080/19312450802062539

Rimal, R. N., & Real, K. (2003). Understanding the influence of perceived norms on behaviors. *Communication Theory, 13*, 184-203. doi: 10.1111/j.1468-2885.2003.tb00288.x

Schlosser, A. E., & Shavitt, S. (2009). The effect of perceived message choice on persuasion. *Journal of Consumer Psychology, 19*, 290-301. doi: 10.1016/j.jcps.2009.03.006

Sears, D. O., & Freedman, J. L. (1967). Selective exposure to information: A critical review.

Public Opinion Quarterly, 31, 194-213. doi: 10.1086/267513

Slater, M. D. (2007). Reinforcing spirals: The mutual influence of media selectivity and media effects and their impact on individual behavior and social identity. *Communication Theory, 17*, 281-303. doi: 10.1111/j.1468-2885.2007.00296.x

Stroud, N. J. (2008). Media use and political predispositions: Revisiting the concept of selective exposure. *Political Behavior, 30,* 341-366. doi: 10.1007/s11109-007-9050-9

Turner, M., Rimal, R. N., Morrison, D., & Kim, H. (2006). The role of anxiety in seeking and retaining risk information: Testing the risk perception attitude framework in two studies. *Human Communication Research, 32*, 130-156. doi: 10.1111/j.1468-2958.2006.00006.x.

Weinstein, N. D. (1979). Seeking reassuring or threatening information about environmental cancer. *Journal of Behavioral Medicine, 2*, 125-139. doi: 10.1007/BF00846662

Weinstein, N. D. (1985). Reactions to life-style warnings: Coffee and cancer. *Health Education & Behavior, 12*, 129-134. doi: 10.1177/109019818501200201

Yan, C., Dillard, J. P., & Shen, F. (2010). The effects of mood, message framing, and behavioral advocacy on persuasion. *Journal of Communication, 60,* 344-363. doi: 10.1111/j.1460-2466.2010.01485.x

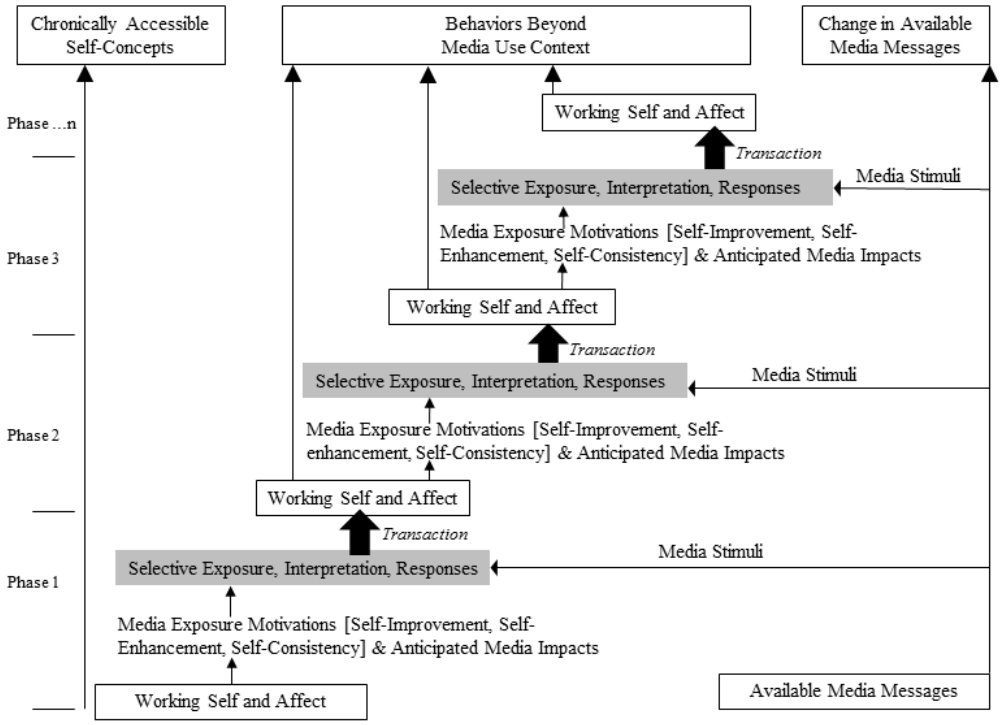

Figure 1. The Selective Exposure Self- and Affect-Management (SESAM) model (adopted from Knobloch-Westerwick, 2015b)

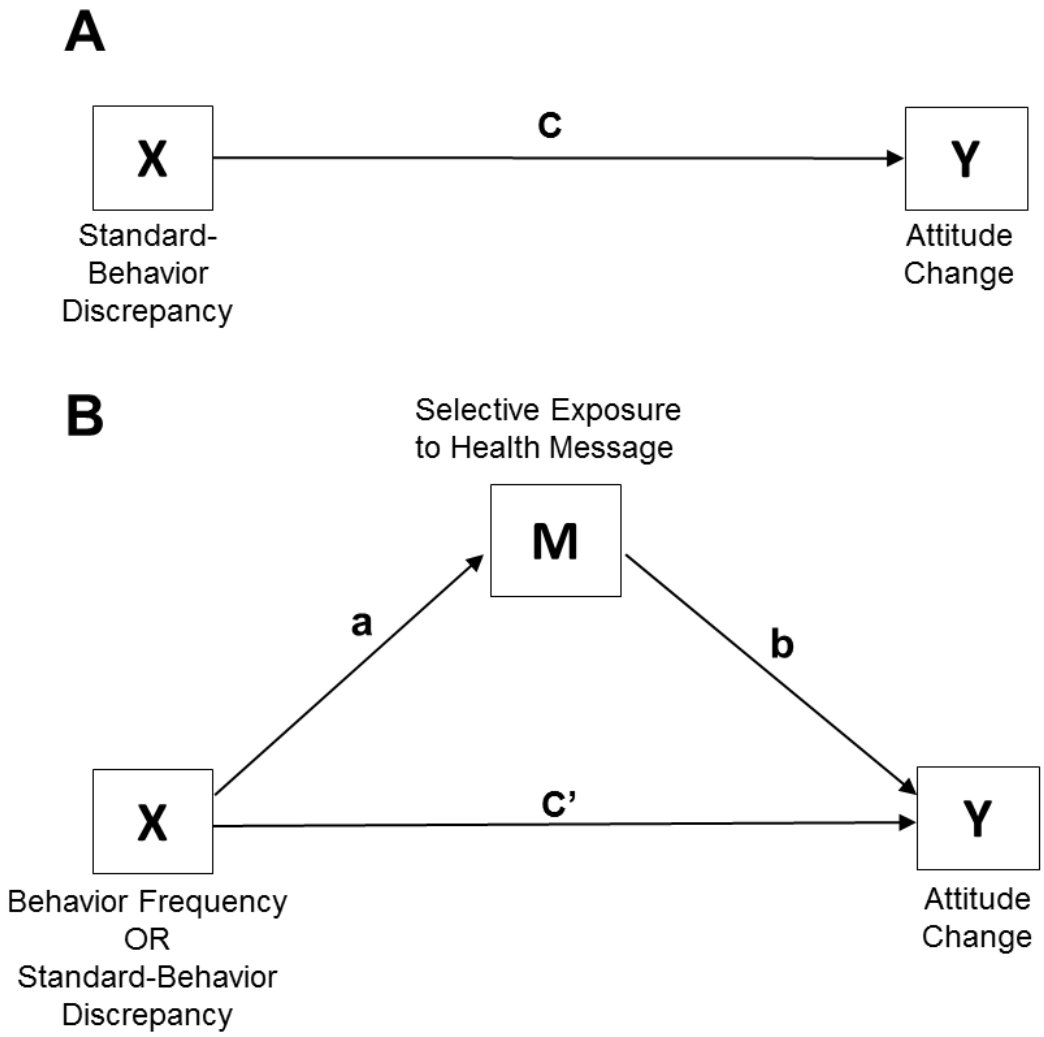

Figure 2. (A) Illustration of a direct effect. *X* affects *Y*. (B) Illustration of a mediation design. *X* is hypothesized to exert an indirect effect on *Y* through *M*

Table 1

Selective Exposure Effects on Post-Exposure Attitudes by Message Type (Promoting Behavior vs. Opposing Behavior) and Source Credibility (beta weights)

Topic	Selective Exposure Measures			Control Variables		Adjusted R^2
	Message Promoting Behavior, High-Credibility Source	Message Promoting Behavior, Low-Credibility Source	Message Opposing Behavior, High-Credibility Source	Baseline Attitude	Attitude Importance	
Organic Food	.18***	.10*	-.06	.21***	.19***	.16***
Coffee	.33***	.36***	.07	.48***	.11**	.49***
Fruit & Vegetables	.19**	.13*	-.01	.27***	.15***	.15***
Exercise	.10*	.15*	.02	.24***	-	.08***

Note. Betas with one asterisk are significant at $p < .05$, with two asterisks at $p < .01$, with three asterisks at $p < .001$. A dash indicates that coefficients were not significant. Measures for selective exposure to attitude-discrepant messages from low-credibility sources were not included in the model to avoid multicollinearity.

Table 2

Mediation Analysis of Indirect Effects of Behavior Frequency on Post-Exposure Attitudes Through Selective Exposure to Behavior-Promoting Health Messages

	Model A: Organic Food		Model B: Coffee		Model C: Fruits and Vegetables		Model D: Exercise	
Model Path Estimates	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
X to M (a)	.068*	.019	.110***	.028	.059*	.026	.100***	.028
M to Y (b)	.504***	.139	1.16***	.117	.289**	.093	.225*	.092
Total X to Y (c)	.235***	.054	.356	.076	.016	.051	.162**	.053
Direct X to Y (c')	.200***	.054	.229	.069	-.001	.050	.139**	.053
Indirect Effects	Effect	Symmetric CI	Effect	Symmetric CI	Effect	Symmetric CI	Effect	Symmetric CI
X to M to Y	.034*	[.013, .068]	.128*	[.056, .224]	.017*	[.004, .042]	.022*	[.005, .051]

Note. Coeff. stands for unstandardized coefficient, S.E. for standard error, CI for bootstrapped bias-corrected 95% confidence interval. One asterisk indicates significant at $p < .05$, two asterisks $p < .01$, three asterisks $p < .001$.

Table 3

Mediation Analysis of Indirect Effects of Standard-Behavior Discrepancy on Post-Exposure Attitudes Through Selective Exposure to Behavior-Promoting Health Messages

	Model A: Organic Food		Model B: Coffee		Model C: Fruits and Vegetables		Model D: Exercise	
Model Path Estimates	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
X to M (a)	.057***	.016	.172***	.025	.067**	.003	.116***	.023
M to Y (b)	.504***	.139	1.16***	.117	.289**	.093	.225**	.092
Total X to Y (c)	.042	.045	.293	.067	.148***	.043	.151**	.048
Direct X to Y (c')	.014	.045	.092	.150	.123**	.043	.124*	.012
Indirect Effects	Effect	Symmetric CI	Effect	Symmetric CI	Effect	Symmetric CI	Effect	Symmetric CI
X to M to Y	.029*	[.011, .054]	.200*	[.128, .280]	.019*	[.005, .043]	.026*	[.006, .056]

Note. Coeff. stands for unstandardized coefficient, S.E. for standard error, CI for bootstrapped bias-corrected 95% confidence interval. One asterisk indicates significant at $p < .05$, two asterisks $p < .01$, three asterisks $p < .001$.

Appendix 1: Example of Search Results Page.

Appendix 2: Headlines and Leads for Behavior-Supporting and -Opposing Health Articles

Topic	Support	Oppose
Organic Food	**Organic Food: Fewer Pesticides:** A detailed scientific analysis of organically grown fruits and vegetables shows that they contain a third as many pesticide residues as conventionally grown foods do.	**Organic Not Nutritionally Better:** There is no evidence that organic foods are nutritionally superior to conventionally produced food, according to a study in The American Journal of Clinical Nutrition.
	Organics Rich in Nutrients: Evidence finds that organic crops contain increased nutrients. Analysis of organic tomatoes, apples and peaches revealed greater concentrations of vitamin C, polyphenols, betacarotene and flavonoids.	**The Organic Food Fad:** In 1952, Martin Gardner characterized organic as a food fad without scientific justification. Sixty years later, science shows that organic is expensive but not healthier.*
Coffee	**Coffee Benefits Equal Vegetables:** The regular drinking of coffee is likely to contribute as many health-giving antioxidants to a person's diet as fruit and vegetables, new research results suggest.	**Coffee Is Addictive, Mind-Altering:** Caffeine addicts may try their best to give up their coffee habit – but usually are not able to, even when it threatens their very well-being.
	Guilt-Free Pleasure of Coffee: With coffee shops seemingly on every corner, and a continued increase in American coffee consumption, the news about coffee's effects on health is surprisingly good.	**Coffee: Real Health Risks:** Like smokers and drug users, those who consumer large amounts of caffeine may also suffer from harmful repercussions down the line, a recent study found.
Fruits and Vegetables	**Eating Vegetables: Makes Big Difference:** If Americans want to be healthy, fruits and vegetables are their best friends. New scientific reports demonstrate the science behind the value of eating more.	**Fruit, Vegetable: No Cancer Shield:** A major study tracking eating habits of 478,000 Europeans suggests that consuming lots of fruits and vegetables has little if any effect on preventing cancer.
	Nutrition: Can't Beat Plant-Based: Those in the know consider fruits and vegetables the healthiest foods around. A diet rich in fresh produce can make people happier, healthier and longer-lived.	**Produce Causes Food Illnesses:** For consumers who took nutritionists' advice and began eating more fruits and vegetables, word that this is risking their lives can come as a shock.
Exercise	**Exercise Supports Health, Longevity:** Fitness can slow or reverse many effects of aging. Many people are realizing that their medical fate lies in their commitment to an exercise routine.	**Heavy Workouts Damage Health:** For some Americans, exercise can become something of an obsession, pursued despite physical injuries, damaged relationships and time stolen from work, family and social activities.
	Physical Activity Prevents Diseases: Regular moderate workouts may help fight off colds and flu, reduce the risk of certain cancers and chronic diseases and slow the process of aging.	**Too Much Exercise Hurts:** Exceeding recommended amounts of almost all prescribed health practices, from the rigorous to the most innocuous exercise programs and beneficial diets, poses definite health risks.

Note. *After pretesting, the last sentence was changed (originally: "Nearly 60 years later, science evidence has not changed at all.") to increase negativity. Articles were perceived as having the desired differences in their level of topic support, all pairwise differences $p < .01$; in contrast, all articles were perceived as having similar levels of credibility and interest, all pairwise differences *n.s.* A post-hoc power analysis shows that with 16 repeated measures (assuming $r = .50$ between observations) and $N = 12$, power to detect a medium effect ($f = .30$) was very good at .98, while power to detect a small effect ($f = .10$) was poor at .16.

Appendix 3: Descriptive Statistics

Measure	Organic Food *M* (*SD*)	Coffee *M* (*SD*)	Vegetables *M* (*SD*)	Exercise *M* (*SD*)
Preexposure Attitude	8.06 (1.41)[a]	4.94 (2.06)[b]	8.74 (0.64)[c]	8.81 (0.74)[d]
Postexposure Attitude	6.53 (1.96)[a]	4.69 (2.30)[b]	7.95 (1.58)[c]	8.13 (1.45)[d]
Importance	4.61 (1.95)[a]	3.63 (2.09)[b]	6.16 (1.32)[c]	6.36 (1.21)[d]
Personal Behavior	3.20 (2.01)[a]	2.15 (1.57)[b]	4.13 (1.65)[c]	4.73 (1.98)[d]
Standard Perception	4.62 (2.27)[a]	2.49 (1.48)[b]	5.82 (1.83)[c]	5.37 (1.45)[d]
Standard-Behavior Discrepancy	1.43 (2.17)[a]	0.34 (1.66)[b]	1.69 (1.93)[a]	0.65 (2.16)[b]
Total Exposure to Topic Articles (s)	102 (21)[a]	104 (18)[b]	104 (18)[b]	106 (19)[c]

Note. Means and percentages within a row with different superscripts differ at $p < .05$. Response options range from 1-9 for attitude, 1-7 for importance, and 0-9 for behavior, standard, and discrepancy. Total exposure is the sum of time spent on any of the four topical articles (i.e., total browsing time of 120 s minus the time spent on the overview of search results).