# The Impact of An Interactive Website on Depression Help-seeking Intentions: A Cross-sectional Online Experiment

Rachel Elizabeth McKenzie, Bo Feng

Submitted to: JMIR Mental Health
on: March 08, 2024

# *Table of Contents*

# The Impact of An Interactive Website on Depression Help-seeking Intentions: A Cross-sectional Online Experiment

Rachel Elizabeth McKenzie[1] MA; Bo Feng[1] PhD

[1]University of California, Davis Davis US

**Corresponding Author:**
Rachel Elizabeth McKenzie MA
University of California, Davis
1 Shields Ave
Davis
US

## *Abstract*

**Background:** Mental health conditions, such as depression, pose a significant burden to those affected. Support from mental health professionals can help with treatment and coping with symptoms. There are, however, a number of barriers that prevent individuals from receiving the support they need, including a lack of knowledge of sources of support.

**Objective:** This study examined the effectiveness of and the mechanisms through which message and modality interactivity features on a website about depression influence users' intentions to seek professional help for depression. In addition, we examined interactivity's relationship to central and peripheral processing by testing the moderating role of issue involvement, as well as the mediating roles of elaboration and absorption.

**Methods:** A 2 (Message Interactivity: High/Low) x 2 (Modality Interactivity: High/Low) factorial experiment was conducted, where participants (n = 611) were asked to view an interactive website about depression and professional treatment options. Participants also answered a survey to determine their levels of elaboration and absorption while viewing the website, as well as their intentions to seek professional help if they were to experience symptoms of depression.

**Results:** Message interactivity did not impact elaboration or intentions to seek professional help. High modality interactivity led to decreased absorption, and absorption fully mediated the relationship between modality interactivity and intentions to seek professional help. Elaboration was a significant, positive predictor of intentions. The interaction between message interactivity and modality interactivity did not have an impact on intentions to seek professional help.

**Conclusions:** Elaboration and absorption served as important mediators behind forming intentions to seek professional help for depression. Unexpectedly, modality interactivity had a negative effect on absorption, suggesting varying modality interactivity features may have differential impacts on cognition. The combination of message and modality interactivity features did not have an impact on intentions, demonstrating that including these types of message and modality interactivity features for aesthetic purposes or to peak viewers' interest will not substantially hinder the persuasiveness of a message.

(JMIR Preprints 08/03/2024:58099)
DOI: https://doi.org/10.2196/preprints.58099

## Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?

✓ **Please make my preprint PDF available to anyone at any time (recommended).**
Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
Only make the preprint title and abstract visible.
No, I do not wish to publish my submitted manuscript as a preprint.

2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?

✓ **Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).**
Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v
Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http

# Original Manuscript

## Original Paper

# The Impact of An Interactive Website on Depression Help-seeking Intentions: A Cross-sectional Online Experiment


## Abstract

**Background:** Mental health conditions, such as depression, pose a significant burden to those affected. Support from mental health professionals can help with treatment and coping with symptoms. There are, however, a number of barriers that prevent individuals from receiving the support they need, including a lack of knowledge of sources of support.
**Objective:** This study examined the effectiveness of and the mechanisms through which message and modality interactivity features on a website about depression influence users' intentions to seek professional help for depression. In addition, we examined interactivity's relationship to central and peripheral processing by testing the moderating role of issue involvement, as well as the mediating roles of elaboration and absorption.
**Methods:** A 2 (Message Interactivity: High/Low) x 2 (Modality Interactivity: High/Low) factorial experiment was conducted, where participants (n = 611) were asked to view an interactive website about depression and professional treatment options. Participants also answered a survey to determine their levels of elaboration and absorption while viewing the website, as well as their intentions to seek professional help if they were to experience symptoms of depression.
**Results:** Message interactivity did not impact elaboration or intentions to seek professional help. High modality interactivity led to decreased absorption, and absorption fully mediated the relationship between modality interactivity and intentions to seek professional help. Elaboration was a significant, positive predictor of intentions. The interaction between message interactivity and modality interactivity did not have an impact on intentions to seek professional help.
**Conclusions:** Elaboration and absorption served as important mediators behind forming intentions to seek professional help for depression. Unexpectedly, modality interactivity had a negative effect on absorption, suggesting varying modality interactivity features may have differential impacts on cognition. The combination of message and modality interactivity features did not have an impact on intentions, demonstrating that including these types of message and modality interactivity features for aesthetic purposes or to peak viewers' interest will not substantially hinder the persuasiveness of a message.


**Keywords:** Message Interactivity; Modality Interactivity; Elaboration; Absorption; Issue Involvement; Mental Health; Depression; Health Communication; Professional Help

## Introduction

It is well documented that mental health conditions pose a significant burden to both the individuals affected and the societies they live in. In 2019, 1 in 8 people were living with a mental health condition [1] and the World Health Organization reported a 25% increase in the prevalence of depression and anxiety worldwide as a result of the COVID-19 pandemic [2]. For individuals experiencing mental illness, help and support from mental health professionals can be a valuable resource in helping them cope with their symptoms and receive the care that they need [3]. There are, however, a number of barriers that can keep individuals from seeking help for mental illnesses, such as a lack of knowledge of the symptoms [4] and sources of support [5], as well as mental health

related stigma [6, 7]. In light of the fact that individuals also frequently engage in online health information seeking [8, 9], the purpose of this study is to explore how online information platforms can be designed to help individuals better overcome some of these barriers and increase individuals' intentions to seek professional mental health care.

## Website Interactivity

The online platform feature we are investigating in the current study is website interactivity. Drawing upon other scholars' definitions of technology interactivity [10, 11], we define website interactivity as the technological attributes of a website that allow users to communicate or exchange information either with the website or with other users of the website. This study focuses on two types of website interactivity: message interactivity and modality interactivity. Consistent with previous research, we define message interactivity as "affordances…[or actionable features] that enable users to interact with the system and/or with another user in a contingent manner to achieve a sense of dialogue" [p. 600, 10]. Examples of message interactivity include features of discussion forums that allow a user to receive responses from other users after posting on the forum. Modality interactivity, on the other hand, refers to the tools and features that allow users to access and control the modalities available on the interface [12]. An example of modality interactivity would be a zoom-in feature on a clothing website that allows users to examine more closely the fit or fabric of a piece of clothing. In the context of online depression information seeking, although we believe that both types of website interactivity might affect viewers' intention to seek professional help, we are proposing and testing the idea that each form of interactivity might affect the outcomes through somewhat different mechanisms. In the sections that follow, we elaborate on these proposed mechanisms.

## Message interactivity and Elaboration

One mechanism through which message interactivity can promote intention to seek professional mental health care is by facilitating processing of mental health information on the website. The elaboration likelihood model [ELM; 13] can serve as a useful framework for investigating this mechanism. The ELM is a dual process model that posits two routes to persuasion dependent upon individuals' motivation and ability to carefully and thoughtfully consider the information provided to them. The first route is the central route, which occurs when individuals are motivated and have sufficient ability to consider the information presented, then engage in issue-relevant thinking during exposure to the message, a process called elaboration [13]. The second route is the peripheral route, which occurs for individuals who have low motivation (often due to low involvement) and low ability to engage in elaboration (due to lack of knowledge and/or distraction), but persuasion can still occur through the use of peripheral cues such as source credibility [13]. Although extant body of research has generated mixed findings regarding the role of message interactivity in persuasion, there appears to be relatively clearer rationale pointing to the positive impact of message interactivity on message elaboration. More specifically, the process of utilizing message interactivity features can increase individuals' likelihood of engaging in elaboration because of message contingency, or the back-and-forth interaction between the user and the interface [11, 14, 15]. User's involvement with the interface in this way would facilitate elaboration as compared to simply viewing the content [10]. Accordingly, we proposed the following hypotheses.

H1: Participants in the high message interactivity condition will report greater intentions to seek professional help compared to those in the low message interactivity condition.

H2: The effect of message interactivity on intention to seek professional help will be mediated by elaboration.

In the meantime, we expect that previously observed evidence indicating that high interactivity could potentially suppress systematic processing [16, 17] suggests a more nuanced

relationship between message interactivity and elaboration. From the perspective of ELM, issue involvement is a factor that can influence the nature of this relationship. Issue involvement is the extent to which individuals believe the issue at hand is important to them in some way and it impacts an individual's motivation to evaluate issue-relevant arguments as well as their likelihood of engaging in elaboration [13]. Existing research suggests that message interactivity positively promotes elaboration, though this effect may be present only for those with medium to low issue involvement [14].

The question then, is why message interactivity might not enhance elaboration for those with high issue involvement as well. Explanations for limited effects of interactivity on elaboration in the extant literature focus on cognitive capacity, specifically the limited capacity model of mediated message processing [18], arguing that the presence and use of interactive features depletes cognitive resources that would otherwise be available for scrutinizing the message [14, 19]. Drawing again on the ELM, we argue that for those with high issue involvement, interactive features added to the website might serve as a distraction from the issue related arguments. Distraction negatively impacts individuals' ability to process an argument, specifically by disrupting the number of thoughts that they have about the argument [13]. Therefore, even if someone experiences high issue involvement and is motivated to evaluate the argument presented, elaboration and subsequent attitude change may be impaired when their effort to engage with the content is disrupted. However, it is not clear at what point high involvement individuals will become overwhelmed, or if the high level of the message interactivity in this study will not be too high to interfere with high involvement individuals' engagement in elaboration. Based on the preceding consideration, we posed the following research questions:

RQ1: Will the relationship between message interactivity and intentions to seek professional help be moderated by issue involvement?

RQ2: Will the relationship between message interactivity and elaboration be moderated by issue involvement?

## Modality Interactivity and Peripheral Processing

Alongside research on message interactivity's effect on central processing are studies that point towards modality interactivity's positive impact on peripheral processing. It has been theorized that more modality interactivity features serve to expand the "perceptual bandwidth" [20], essentially increasing the number and variety of sensory channels available for interacting with users. This enhancement in sensory engagement can lead to a deeper level of immersion for website viewers, which can potentially foster more positive attitudes and stronger behavioral intentions toward the websites' subject matter [21]. Some empirical evidence has supported this notion [13, 21, 22, 23]. For example, in their 2014 study, Xu and Sundar manipulated modality interactivity by including images of the product–a camera–on the website and varying the extent to which participants could view and manipulate images of the camera. The study found that high modality interactivity led to more favorable attitudes towards the website and towards the product, as well as a greater likelihood of purchasing the product [21].

The more users' senses are being dedicated to paying attention to the website, the more likely they are to become absorbed in their website use [14]. Although various definitions of absorption exist, most converge on the notion that absorption is a state of immersion in the task, when an individual is consciously involved in and focused on the activity [14, 24]. In a persuasive context, absorption in the content heightens the affective cues associated with the website due to the previously mentioned expansion of perceptual bandwidth [12]. When modality interactivity features are included to improve the ease of use and the naturalness of

the website, and these features also encourage users to become absorbed in the use of the website, their positive assessments of the nature of the website are attributed to the website's message as well. The connection between absorption and the dominance of peripheral route processing in persuasion has also been demonstrated empirically by Oh and Sundar in their 2015 study of an anti-smoking message with both message and modality interactivity features. Modality interactivity was associated with greater absorption and agreement with the message, as well as a decrease in issue-relevant thoughts [14].

Complicating the relationship between modality interactivity, absorption, and persuasion is the varied operationalizations of absorption. The absorption measure created by Agarwal and Karahanna, for example, assessed five dimensions of absorption: temporal dissociation, focused immersion, heightened enjoyment, control, and curiosity[1]. Xu and Sundar (2014) also utilized Argarwal and Karahanna's (2000) measure of absorption, but considered it to be a measure for engagement with the website. Given that absorption has been primarily defined as a strong focus on an activity, we believe it should be distinguished from constructs such as engagement that include elements of control and enjoyment. A user can be entirely focused on browsing a website, losing track of time while blocking out distractions, and not find the process enjoyable. The goal of this study is thus to further test the role of absorption in peripheral processing while ensuring that the process of absorption is examined separately from related constructs such as engagement.

H3: Participants in the high modality interactivity condition will report higher intention to seek professional help compared to participants in the low modality interactivity condition.

H4: The effect of modality interactivity on intention to seek professional help will be mediated by absorption.

## Combining Message and Modality Interactivity

Few studies have directly compared the effectiveness of combined message and modality interactivity at multiple levels [14]. Considering the role that modality interactivity plays in promoting absorption and the potential for it to reduce cognitive resources available for processing the argument, as well as the risk of message interactivity distracting high involvement users, we present the follow research question in order to explore the effects of varying levels and combined types of interactivity on cognition and behavioral intentions.

RQ3: Will message interactivity and modality interactivity interact to influence absorption, elaboration, and intentions to seek professional help?

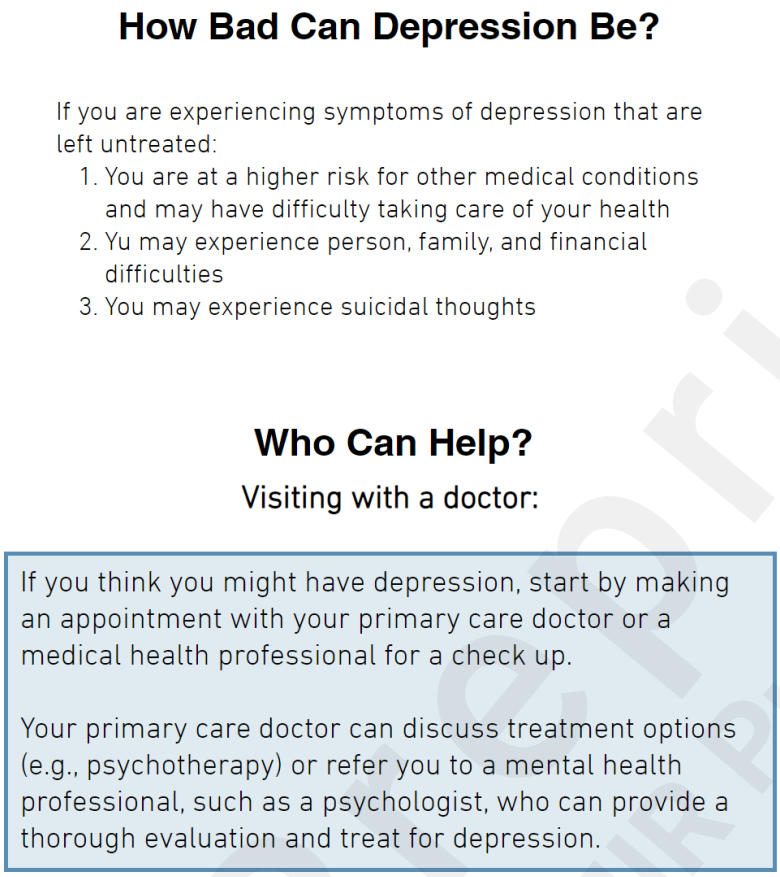
## Methods

The current study was part of a larger experiment which was pre-registered on the Open Science Framework (Link to OSF) and followed a 2x2x2 factorial design where participants were assigned to one of eight conditions. Message interactivity (low vs. high) was crossed with modality interactivity (low vs. high) and argument strength (low vs. high). The current study focused only on the two types of interactivity. The high message interactivity condition contains a read more/read less button after each section, whereas the low message

[1] Temporal dissociation addresses a reduced ability to keep track of time while engaging with the modality (e.g., "I often spend more time on the Web than I had intended"[24]). Focused immersion refers to the extent to which users are immersed in the modality and if they are easily distracted (e.g., "While using the Web, I am able to block out most other distractions"[24]). Heightened enjoyment measures how much fun the users have (e.g., "I have fun interacting with the Web"), control measures if users feel like they have control over the modality (e.g., "The Web allows me to control my computer interaction"), and curiosity asks the extent to which the modality excites the users' curiosity (e.g., "Using the Web arouses my imagination") [24]

interactivity condition does not contain this feature (Figure 1). The high modality interactivity condition allowed participants to advance through the three slideshows presented at their own pace and in the low modality condition, participants were only able to watch the slideshows (Figure 2). See Multimedia Appendix 1 for links to the full stimuli.

Figure 1.
*Low Message vs. High Message Interactivity Conditions*



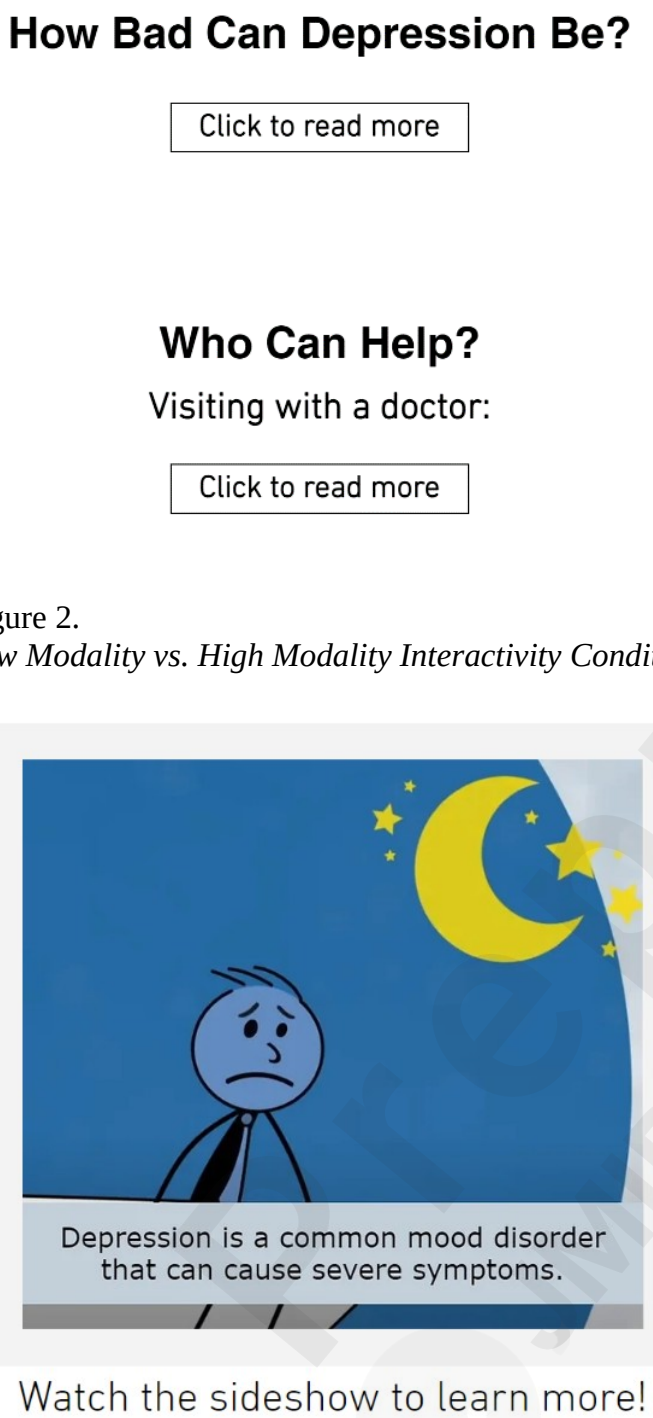
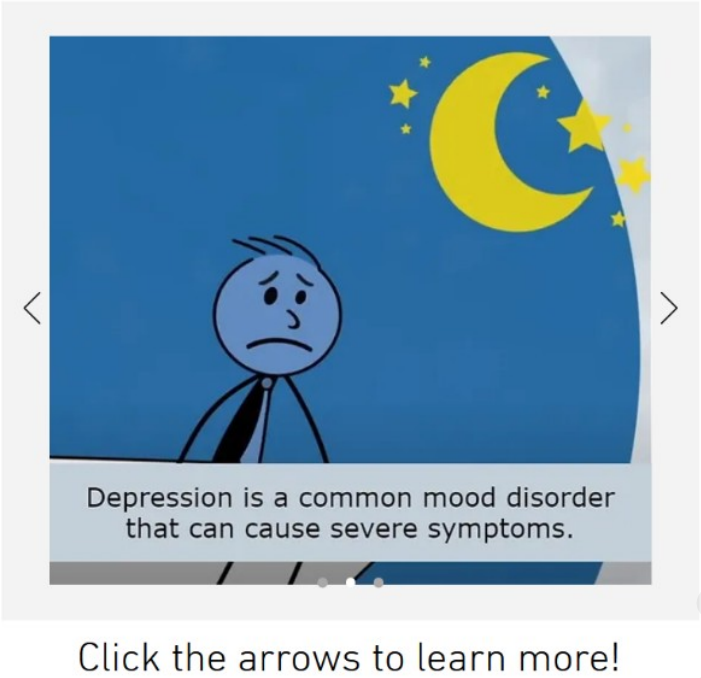



Figure 2.
*Low Modality vs. High Modality Interactivity Conditions*




## Participants

The study recruited a total number of 610 participants ranging in age from 18 to 80 years old (mean 32, SD 15). The participants consisted of 247 (40.6%) White, 186 Asian/Pacific Islander (AAPI; 30.5%), 106 (17.4%) Hispanic, 37 (6.1%) Black, 11 (1.5%) Indigenous, and 6 (1%) Middle Eastern. The majority of participants (61%, n=372) identified themselves as female, 37.7% as male (n=230), and 1.3% identified as non-binary or other (n=8). A majority of participants reported minimal (n= 292, 47.9%) or mild symptoms of depression (n= 150, 24.6%). 85 experienced moderate symptoms (14%), 50 experienced moderately severe symptoms (8.2%), and 33 reported experiencing severe symptoms of depression (5.3%; 25). Additional demographic information can be found in Table 1. Participants were recruited utilizing MTurk and from a large west coast university's undergraduate research participation portal. Approval for all protocols was obtained prior to starting the study from the institutional review board at the authors' institution.

Participants qualified if they answered no to at least one of the following two questions: a) "Have you ever gone to your primary care doctor due to concerns or questions about your mental health?" and b) "Have you ever seen a mental health professional due to concerns or questions about your mental health?" All undergraduate students received extra credit for their participation but were removed from the final data set if they did not meet the qualifications (n=193). MTurk participants were compensated $0.30 USD for answering the pre-screening questions. Of the MTurk participants who met the qualifications, 468 completed the experiment and were compensated $0.75 USD. Participants who took longer than 3 hours (n=18) or less than 8 minutes (n=176) to complete the survey-experiment were removed from the analysis based on an average reading speed of 200-400 wpm [26, 27]. After removing those that did not reach the end of the survey (n=1) or pass the embedded attention checks (n=110), a final total of 610 participants were included in data analysis (MTurk n=316, Undergraduate n=294).

Table 1. Additional Descriptive Statistics

| | n(%) | M | SD |
|---|---|---|---|
| **Age** | | 31.91 | 15.31 |

| | | | |
|---|---|---|---|
| **Intentions to seek professional help** | | 5.19 | 1.18 |
| **Elaboration** | | 5.28 | .98 |
| **Absorption** | | 4.45 | 1.06 |
| **Issue Involvement** | | 5.18 | 1.19 |
| **Gender** | | | |
| Male | 230 (37.7) | | |
| Female | 372 (61) | | |
| Non-binary | 5 (.8) | | |
| Other | 3 (.5) | | |
| **Race** | | | |
| White | 247 (40.6) | | |
| Black | 37 (6.1) | | |
| Hispanic | 106 (17.4) | | |
| Native American | 9 (1.5) | | |
| AAPI[a] | 186 (30.5) | | |
| Middle Eastern | 6 (1) | | |
| Other | 18 (3) | | |
| **Depression Symptoms (PHQ-9)** | | | |
| **Depression Knowledge** | | | |
| **Condition**[b] | | | |
| High message, high modality | 156 (25.6) | | |
| Low message, high modality | 154 (25.2) | | |
| High message, low modality | 144 (23.6) | | |
| Low message, low modality | 156 (25.6) | | |

*Note*. [a]Asian American and Pacific Islander
[b]Message = Message Interactivity
Modality = Modality Interactivity

## Pre-Exposure Survey

### *Issue Involvement*

Issue involvement was measured with an adapted version of Zaichkowsky's (1985) involvement scale consisting of 8 items. Participants rated the degree to which they agreed or disagreed with eight statements from 1-strongly disagree to 7-strongly agree. Sample items include "The issue of depression is important to me" and "the issue of depression means nothing to me" (reverse coded) [28]. Participants' responses to the items were averaged with higher scores indicating greater issue involvement (mean 5.18, SD 1.19, Cronbach α=.905).

## Stimuli

After participants complete the pre-exposure survey, they were presented with a window containing the website and the instructions to review the content until they were ready to answer questions about it. The information on depression and mental health treatment included on the website was adapted from the National Institute of Mental Health's website and informational videos on depression and anxiety [3, 29, 30] and covers symptoms of depression, risk factors, and the benefits of seeking professional help.

## Post-Exposure Survey

### *Professional Help Seeking Intentions*

Intention to seek professional help for depression was measured by asking participants to rate the extent to which they agreed or disagreed with three statements from 1-strongly disagree to 7-strongly agree, adapted from Elhai et al. (2008), including "I would obtain professional help if I were experiencing symptoms of depression" and "I would find relief in psychotherapy if I were experiencing symptoms of depression" and "Psychotherapy would be valuable for me if I were to experience symptoms of depression" [31]. Participants were also asked the likelihood of them reaching out to five different sources (mental health professional, psychologist, psychiatrist, counselor, and primary care doctor) if they were experiencing symptoms of depression (1-extremely unlikely to 7-extremely likely). Both scales were averaged to form an overall intentions measure to be used in the analysis (mean 5.19, SD 1.18, Cronbach $\alpha$=.902).

### *Elaboration*

Self-reported elaboration was measured using a scale adapted from Kahlor et al. (2003). Participants were asked the degree to which they agreed or disagreed with seven items from 1-strongly disagree to 1-strongly agree, including "I thought about what actions I myself might take based on what I read," "I related the information on the website to my own life," and "I didn't spend much time thinking about the website as I read through it" (reverse coded) [32]. Items were averaged and higher scores indicated greater elaboration. Internal reliability increased from Cronbach $\alpha$=.782 to $\alpha$=.814 without the item "I skimmed through the website" (reverse coded). This indicates that the extent to which one skims through a website isn't a strong indicator of elaboration; accordingly, this item was removed from the scale (mean 5.28, SD .98, Cronbach $\alpha$=.814).

### *Absorption*

Absorption was measured using a 10-item scale modified from Agarwal and Karahanna (2000) that included two dimensions, temporal dissociation and focused immersion. The temporal dissociation dimension included items such as "I lost track of time while using the website" and "I spent more time using the website than I had planned". The focused immersion dimension included items such as "while using the website, I was immersed in what I was doing" and "while using the website, I was able to block out most other distractions" [24]. Participants indicated the extent to which they agreed with the items from strongly disagree to strongly agree. The ten items were averaged, with higher scores indicating greater absorption (mean 4.45, SD 1.06, Cronbach $\alpha$=.858).

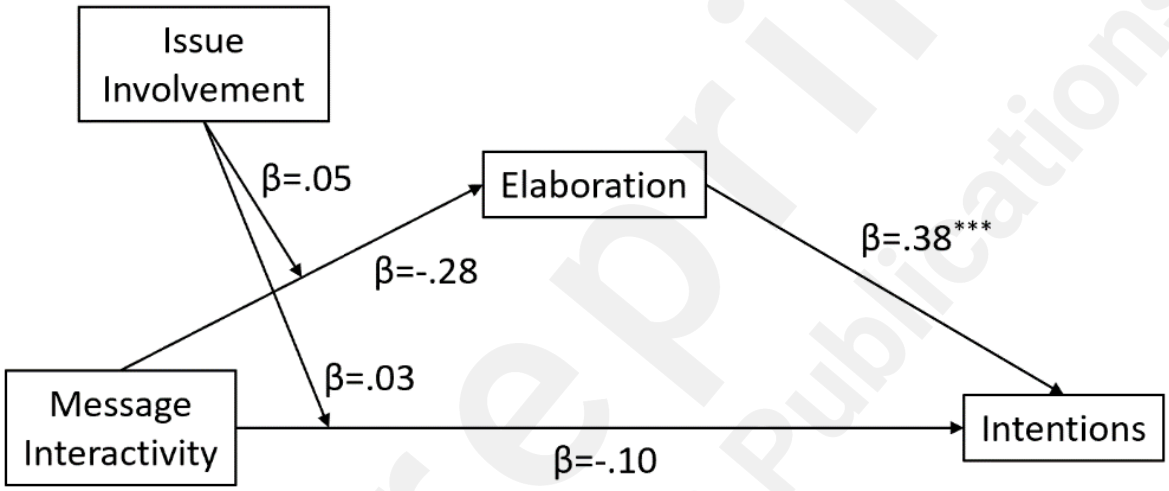
## Results

H1 and H3 predicted that message interactivity and modality interactivity would have a positive impact on intentions to seek professional help. The total effects of message and modality interactivity on intentions to seek professional help were analyzed using one-way ANOVAs, and the analysis of variance showed there was no significant difference between low (n=306, M=5.16, SD=1.15) and high levels of message interactivity (n=296, mean 5.21, SD 1.21) in intentions to seek professional help (F(1,600)=.254, p=.614). Additionally, there was no significant difference between low (n=296, mean 5.19, SD 1.21) and high levels of modality interactivity (n=306, mean 5.18, SD 1.15) in intentions to seek professional help (F(1,600)=.007, p=.935). Thus, H1 and H3 were not supported.

The PROCESS macro for SPSS by Andrew Hayes [33] was used to test two models. Model 8

(Figure 3; $R^2$=.102, F(4,597)=16.87, p<.001) was used to test relationship between message interactivity and intentions to seek professional help, as well as the mediating role of elaboration between message interactivity and intentions (H2), and moderating role of issues involvement in both the relationship between message interactivity and intentions (RQ1) and the relationship between message interactivity and elaboration (RQ2). Regarding RQ1 and RQ2, the interaction between message interactivity and issue involvement did not significantly predict elaboration (β=.054, p=.388) nor intentions to seek professional help (β=.027, p=.728). H2 predicted that elaboration would mediate the relationship between message interactivity and intentions. The moderated mediation was assessed at three levels of issue involvement: average involvement and one standard deviation above and below the mean. Regardless of the level of issue involvement, elaboration was not a significant mediator of the relationship between message interactivity and intentions with the index of moderated mediation = .02 (95% CI -.04;.08), so H2 was not supported.

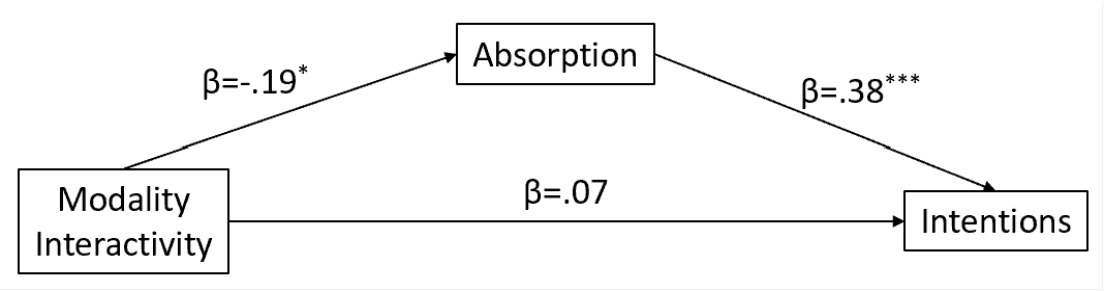
Figure 3.
*The Relationship Between Message Interactivity and Intentions to Seek Professional Help*




Note: *** p<.001

Model 4 was used to test the relationship between modality interactivity and intentions to seek professional help, as well as the mediating role of absorption (Figure 4; $R^2$= .116, F(2,599)=39.46, p<.001). H4 predicted that the relationship between modality interactivity and intentions to seek professional help would be mediated by absorption. Modality interactivity was negatively associated with absorption (β=-.19, p=.0259) and absorption was positively associated with intentions (β=.38, p<.001). There was no direct effect of modality interactivity on intentions to seek professional help (β=.07, p=.472), thus, the relationship was fully mediated by absorption (Indirect Effect=-.07; 95% CI -.138;-.010). While absorption served as a mediator between modality interactivity and intentions to seek professional help, the impact of modality interactivity on absorption was in the opposite direction as predicted, providing partial support for H4.

Figure 4.
*The Relationship Between Modality Interactivity and Intentions to Seek Professional Help*




Note: * p=.0259

*** p<.001

The interaction between message and modality interactivity was assessed using a multivariate general linear model. The interaction had a significant effect on absorption (F(1,602)=4.241, p=.040), but not elaboration (F(1,602)=1.496, p=.222) or intentions (F(1,602)=3.315, p=.076). The low message, low modality interactivity condition was associated with the highest level of absorption (mean 4.61, SD .99), followed by high message, low modality interactivity (mean 4.48, SD 1.14) and high message, high modality interactivity (mean 4.47, SD 1.08). The condition with the lowest level of absorption was low message, high modality interactivity (mean 4.25, SD 1.01; Table 2).

Table 2. Average Intentions, Issue Involvement, Elaboration, and Absorption by Condition

| | High Message, High Modality | | Low Message, High Modality | | High Message, Low Modality | | Low Message, Low Modality | |
|---|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | M | SD | M | SD |
| **Total Intentions** | 5.29 | 1.09 | 5.07 | 1.20 | 5.13 | 1.33 | 5.25 | 1.09 |
| Attitude | 5.55 | 1.11 | 5.00 | 1.33 | 5.32 | 1.18 | 5.55 | 1.01 |
| Behavior | 5.20 | 1.22 | 5.00 | 1.33 | 5.06 | 1.50 | 5.15 | 1.28 |
| **Issue Involvement** | 5.31 | 1.13 | 5.08 | 1.28 | 5.16 | 1.24 | 5.17 | 1.11 |
| **Elaboration** | 5.32 | .99 | 5.19 | .94 | 5.26 | 1.11 | 5.33 | .85 |
| **Absorption** | 4.47 | 1.08 | 4.25 | 1.01 | 4.48 | 1.14 | 4.61 | .99 |
| Temporal dissociation | 3.92 | 1.31 | 3.64 | 1.30 | 3.98 | 1.34 | 4.14 | 1.24 |
| Focused immersion | 5.15 | 1.17 | 5.01 | 1.13 | 5.10 | 1.24 | 5.19 | 1.14 |

## Post-hoc Analyses

Considering the absorption had two dimensions, temporal dissociation and focused immersion, and that professional help seeking intentions included behavioral items and attitude based items, follow up analyses were conducted where each model was tested using the individual dimensions of each scale. For temporal dissociation, five items were averaged and high scores indicated greater temporal dissociation (mean 3.92, SD 1.30, Cronbach α=.864). The four items to indicate focused immersion were averaged as well with high scores indicating greater focused immersion (mean 5.12, SD 1.17, Cronbach α=.817). Temporal dissociation and focused immersion were positively correlated (Pearson r=.44, p<.001). The two items “I would find relief in psychotherapy if I were experiencing symptoms of depression” and “Psychotherapy would be

valuable for me if I were to experience symptoms of depression" were averaged to form the attitude dimension (mean 5.10, SD 1.33, Cronbach α=.860) and the remaining six items (e.g., "How likely would you be to seek help from a mental health professional") were averaged to form the behavioral intentions dimension (mean 5.42, SD 1.14, Cronbach α=.901). Attitudes and behavioral intentions towards seeking professional help were positively correlated (Pearson r=.56, p<.001).

There was no significant difference between low and high levels of message interactivity in attitudes (F(1,600)=.247, p=.620) nor behavioral intentions to seek professional help (F(1,608)=.067, p=.796). Additionally, there was no significant difference between low and high levels of modality interactivity in attitudes (F(1,600)=.001, p=.971) nor behavioral intentions to seek professional help (F(1,608)=.050, p=.823). There was no substantial change in the significance of the relationship tested in H2, RQ1, and RQ2 regarding message interactivity, elaboration, and intentions to seek professional help when attitudes and behavioral intentions were considered separately. This was the case for H3 and H4 as well. However, when absorption was considered as temporal dissociation and focused immersion (Figure 5; $R^2$= .116, F(3,598)=26.27, p<.001), modality interactivity was a significant negative predictor of temporal dissociation (β=-.29, p=.0071) but not focused immersion (β=-.08, p=.4294). Temporal dissociation (β=.22, p<.001) and focused immersion (β=.16, p=.0002) were both significantly positively associated with intentions to seek professional help. The relationship between modality interactivity and intentions to seek professional help was mediated by temporal dissociation (Indirect Effect=-.06; 95% CI -.117;-.016).

Lastly, the interaction between message and modality interactivity had a significant effect on attitudes towards seeking professional help (F(1,602)=6.914, p=.009) and temporal dissociation (F(1,602)=4.590, p=.033), but not behavioral intentions (F(1,602)=1.821, p=.178) nor focused immersion (F(1,602)=1.463, p=.227). The high message, high modality (mean 5.55, SD 1.11) and low message, low modality interactivity conditions (mean 5.55, SD 1.01) were highest in attitudes towards seeking professional help, followed by high message, low modality interactivity (mean 5.32, SD 1.18), then low message, high modality interactivity (mean 5.28, SD 1.23). The low message, low modality interactivity condition was associated with the highest level of absorption (mean 4.14, SD 1.24), followed by high message, low modality interactivity (mean 3.98, SD 1.34) and high message, high modality interactivity (mean 3.92, SD 1.31). The condition with the lowest level of absorption was low message, high modality interactivity (mean 3.64, SD 1.30). See multimedia appendix 2 for full statistical results regarding the post-hoc analyses.

## Discussion

The current study aimed to investigate whether and how website design features such as message interactivity and modality interactivity might impact individuals' experience with online information regarding depression and their intention to seek professional help for depression. Overall, results of this study indicate that message and modality interactive features on the website did not directly impact intentions to seek professional help for depression. Additionally, message interactivity was not associated with elaboration, regardless of issue involvement. Temporal dissociation mediated the relationship between modality interactivity and intentions to seek professional help, but in the opposite direction as predicted with modality interactivity being negatively associated with temporal dissociation. Lastly, elaboration and absorption are significant, positive predictors of intentions to seek professional help.

The lack of a main effect of message interactivity and modality interactivity on intentions to seek professional help for depression lends itself to a few potential explanations. The first is that the relationship between website features and intentions to engage in the website's recommendations is more nuanced. While this study explored two mediators, elaboration and absorption, previous research on message and modality interactivity has pointed to a number of other potential mediators, such as attitudes towards the website, that could potentially function in different directions, resulting

in ‘null’ main effects of the website features [34, 35, 36]. Another potential explanation for the limited effects of interactivity rests with the fact that the difference between the low and high levels for this study was the presence or absence of a single feature. Due to our concern that certain modality manipulations would lead to participants missing out on information on the website if they did not engage with the interactive feature, the strength of our modality interactivity feature may have been impacted in an effort to control the amount of information participants were provided. Considering that previous work on website interactivity has found high levels of interactivity may actually backfire [11], the lower strength of our message and modality interactivity conditions were also reflected in the results regarding RQ3, where combining high message interactivity and high modality interactivity did not have any detrimental impacts on intentions.

Absorption was the only cognitive mediator related to interactivity levels, with modality interactivity negatively predicting absorption, temporal dissociation in particular. The presence of modality interactivity features can potentially lead to information scanning behaviors, and attention may have been diverted from the content of the message [37]. The inclusion of arrows on the slideshows and allowing the participants to click through them at their own pace may have allowed the participants to spend less time on the content presented in the slideshow than those in the low modality interactivity condition who had to watch the slideshow at its pre-set pace. In this study, absorption was a significant, positive predictor of intentions to seek professional help, so it would be important for future research or health campaigns to have features that facilitate participants’ absorption. Additionally, modality interactivity features may be more beneficial if they are theoretically related to the content presented. For example, when shopping online for clothing it can help a consumer to make a decision about a purchase if they are able to zoom in on images to see the texture of the fabric or to better see how the clothing fits the model. Other examples from extant research include increasing anthropomorphism in studies of human-computer interaction [38] or being able to interact with other users while completing an eHealth intervention [39].

Recent research on the relationship between modality interactivity and the ELM suggests that central processing can still prevail, but in a biased manner where the presence of modality interactivity acts as a heuristic cue to improve users’ willingness to invest time and effort into the website, thus increasing the likelihood of elaboration [12, 37, 40]. Alternatively, when it comes to the specific interactive features used in this study, absorption and elaboration may not be key mechanisms for how engaging with the website leads to persuasion. While there have been some studies that demonstrate the mediating role of these cognitive variables, such as Oh and Sundar (2015) linking message interactivity with elaboration and modality interactivity with absorption, Yang and Shen’s (2018) meta-analysis provided little evidence for interactive features aiding user cognitions [11, 14]. These mixed results suggest that the ELMs proposed mechanisms for persuasion through central route processing may be important for processing of the argument, but the process may not be aided by all interactive features. Future research could both examine additional mediators, as well as what other message features interact with message and modality interactivity to lead to persuasion outcomes, because mixed findings regarding cognitive variables as mediators may be the result of the interaction between other message features present in the stimuli and the message/modality interactivity features [e.g., if the website is informational or educational; 41].

## Limitations and Recommendations for Future Research

There are certain limitations and related potential areas of future research associated with this study. The first limitation is that only two relatively low levels of interactivity were assessed, and as discussed in the previous section, these levels were simplified compared to previous studies. In order to discern if higher levels of interactivity have a potential to backfire, future research would benefit from continuing to employ at least three levels of interactivity. Another limitation is the use of MTurk and college student samples. While limited in certain ways such as demographic characteristics, undergraduates were sampled due to college students’ vulnerability to mental illness–

US adults aged 18 to 25 had the highest prevalence of major depression in 2021 [42]–and their potential to benefit from receiving the mental health information provided in the study. MTurk was used to improve the age, income, and education range of the college student sample, however MTurk samples have still been shown to be limited representations of the general US population [43, 44], and future research would benefit from a more diverse sample considering attitudes towards and experience with mental illness can vary greatly depending on demographic characteristics such as race/ethnicity [45, 46].

Additionally, this study focused on depression, which is one of the most common mental illnesses in the United States [3]. Thus, participants in general may be more familiar with depression and its treatment options and future studies could provide information on mental illnesses that are less common, less known, or potentially hold more stigma. Additionally, future research could target populations that are more vulnerable to depression or less likely to seek help if they experience symptoms of depression.

## Conclusion

In summary, this study assessed the persuasive impact of a website about depression by examining the differential cognitive mechanisms through which message and modality interactivity influenced intentions to seek professional help for depression. Message interactivity was not significantly associated with issue involvement or elaboration, modality interactivity negatively predicted absorption, and elaboration and absorption were both positively associated with intentions to seek professional help. While message and modality interactivity did not influence elaboration and absorption as predicted, the results of this study support the role of elaboration and absorption in forming behavioral intentions. Additionally, the inclusion of these types of message and modality interactivity features for aesthetic purposes or to peak viewers' interest are not likely to substantially hinder the persuasiveness of a message.

## References

1. World Health Organization. (2022, June 8). *Mental disorders*. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/mental-disorders#:~:text=In%202019%2C%201%20in%20every,of%20the%20COVID%2D19%20pandemic.
2. World Health Organization. (2022a, March 2). *Covid-19 pandemic triggers 25% increase in prevalence of anxiety and depression worldwide*. World Health Organization. https://www.who.int/news/item/02-03-2022-covid-19-pandemic-triggers-25-increase-in-prevalence-of-anxiety-and-depression-worldwide
3. U.S. Department of Health and Human Services. (2023, September). *Depression*. National Institute of Mental Health. https://www.nimh.nih.gov/health/topics/depression
4. Gulliver, A., Griffiths, K. M., & Christensen, H. (2012). Barriers and facilitators to mental health help-seeking for young elite athletes: A qualitative study. *BMC Psychiatry*, *12*(1), 157. PMID: 23009161
5. Ijadi-Maghsoodi, R., Bonnet, K., Feller, S., Nagaran, K., Puffer, M., & Kataoka, S. (n.d.). Voices from Minority Youth on Help-Seeking and Barriers to Mental Health Services: Partnering with School-Based Health Centers. *Ethnicity & Disease*, *28*(Suppl 2), 437–444. PMID: 30202197
6. Byrow, Y., Pajak, R., Specker, P., & Nickerson, A. (2020). Perceptions of mental health and perceived barriers to mental health help-seeking amongst refugees: A systematic review. *Clinical Psychology Review*, *75*, 101812. PMID: 31901882
7. Clement, S., Schauman, O., Graham, T., Maggioni, F., Evans-Lacko, S., Bezborodovs, N., Morgan, C., Rüsch, N., Brown, J. S. L., & Thornicroft, G. (2015). What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and

qualitative studies. *Psychological Medicine*, *45*(1), 11–27. PMID: 24569086
8. Hu, X., Bell, R. A., Kravitz, R. L., & Orrange, S. (2012). The Prepared Patient: Information Seeking of Online Support Group Members Before Their Medical Appointments. *Journal of Health Communication*, *17*(8), 960–978. PMID: 22574697
9. Jacobs, W., Amuta, A. O., & Jeon, K. C. (2017). Health information seeking in the digital age: An analysis of health information seeking behavior among US adults. *Cogent Social Sciences*, *3*(1), 1302785. https://doi.org/10.1080/23311886.2017.1302785
10. Sundar, S. S., Bellur, S., Oh, J., Jia, H., & Kim, H.-S. (2016). Theoretical Importance of Contingency in Human-Computer Interaction: Effects of Message Interactivity on User Engagement. *Communication Research*, *43*(5), 595–625. https://doi.org/10.1177/0093650214534962
11. Yang, F., & Shen, F. (2018). Effects of Web Interactivity: A Meta-Analysis. *Communication Research*, *45*(5), 635–658. https://doi.org/10.1177/0093650217700748
12. Oh, J., Kang, H., Sudarshan, S., & Lee, J. A. (2020). Can Liking, Commenting, and Sharing Enhance Persuasion? The Interaction Effect between Modality Interactivity and Agency Affordances on Smokers' Quitting Intentions. *Health Communication*, *35*(13), 1593–1604. PMID: 31418280
13. Petty, R. E., & Cacioppo, J. T. (1986). The Elaboration Likelihood Model of Persuasion. In R. E. Petty & J. T. Cacioppo (Eds.), *Communication and Persuasion: Central and Peripheral Routes to Attitude Change* (pp. 1–24). Springer. https://doi.org/10.1007/978-1-4612-4964-1_1
14. Oh, J., & Sundar, S. S. (2015). How Does Interactivity Persuade? An Experimental Test of Interactivity on Cognitive Absorption, Elaboration, and Attitudes: Persuasive Effects of Interactivity. *Journal of Communication*, *65*(2), 213–236. https://doi.org/10.1111/jcom.12147
15. Sicilia, M., Ruiz, S., & Munuera, J. L. (2005). EFFECTS OF INTERACTIVITY IN A WEB SITE: The Moderating Effect of Need for Cognition. *Journal of Advertising*, *34*(3), 31–44. https://doi.org/10.1080/00913367.2005.10639202
16. Ahn, J., Choe, M.-J., Kim, C. Y., & Noh, G. Y. (2021). Website Interactivity's Effects on Revisit Intention: A Moderated-Mediation Analysis of the Particulate Matter Issue in South Korea. *International Journal of Human–Computer Interaction*, *37*(8), 772–782. https://doi.org/10.1080/10447318.2020.1843295
17. Lee, E.-J., & Shin, S. Y. (2012). Are They Talking to Me? Cognitive and Affective Effects of Interactivity in Politicians' Twitter Communication. *Cyberpsychology, Behavior, and Social Networking*, *15*(10), 515–520. https://doi.org/10.1089/cyber.2012.0228
18. Lang, A. (2000). The Limited Capacity Model of Mediated Message Processing. *Journal of Communication*, *50*(1), 46–70. https://doi.org/10.1111/j.1460-2466.2000.tb02833.x
19. Tao, W., Li, Z. C., Chen, Z. F., & Ji, Y. G. (2021). Public responses to nonprofit social media messages: The roles of message features and cause involvement. *Public Relations Review*, *47*(2), 102038. https://doi.org/10.1016/j.pubrev.2021.102038
20. Reeves, B., & Nass, C. (2000). Perceptual user interfaces: perceptual bandwidth. *Communications of the ACM*, 43(3), 65-70.
21. Daugherty, T., Li, H., & Biocca, F. (2008). Consumer learning and the effects of virtual experience relative to indirect and direct product experience. *Psychology & Marketing*, *25*(7), 568–586. https://doi.org/10.1002/mar.20225
22. Schlosser, A. E. (2003). Experiencing Products in the Virtual World: The Role of Goal and Imagery in Influencing Attitudes versus Purchase Intentions. *Journal of Consumer Research*, *30*(2), 184–198. https://doi.org/10.1086/376807
23. Xu, Q., & Sundar, S. S. (2014). Lights, Camera, Music, Interaction! Interactive Persuasion

in E-commerce. *Communication Research*, *41*(2), 282–308. https://doi.org/10.1177/0093650212439062
24. Agarwal, R., & Karahanna, E. (2000). Time Flies When You're Having Fun: Cognitive Absorption and Beliefs about Information Technology Usage. *MIS Quarterly*, *24*(4), 665–694. https://doi.org/10.2307/3250951
25. Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of general internal medicine*, *16*(9), 606-613. PMID: 11556941
26. Brysbaert, M. (2019). How many words do we read per minute? A review and meta-analysis of reading rate. *Journal of Memory and Language*, *109*, 104047. https://doi.org/10.1016/j.jml.2019.104047
27. Liu, R., Patel, B. N., & Kwon, M. (2017). Age-related changes in crowding and reading speed. *Scientific Reports*, *7*(1), Article 1. PMID: 28811585
28. Zaichkowsky, J. L. (1985). Measuring the Involvement Construct. *Journal of Consumer Research*, *12*(3), 341–352. https://www.jstor.org/stable/254378
29. National Institute of Mental Health (NIMH). (2019, January 25). *Generalized and Social Anxiety Disorders – Join a Study* [Video]. YouTube. Link unavailable.
30. National Institute of Mental Health (NIMH). (2020, March 5). *Mental Health Minute: Depression* [Video]. YouTube. https://www.youtube.com/watch?v=lQhpetkwWnM
31. Elhai, J. D., Schweinle, W., & Anderson, S. M. (2008). Reliability and validity of the Attitudes Toward Seeking Professional Psychological Help Scale-Short Form. *Psychiatry Research*, *159*(3), 320–329. PMID: 18433879
32. Kahlor, L., Dunwoody, S., Griffin, R. J., Neuwirth, K., & Giese, J. (2003). Studying Heuristic-Systematic Processing of Risk Communication. *Risk Analysis*, *23*(2), 355–368. PMID: 12731819
33. Hayes AF. Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach. 2nd ed. Guilford Publications; 2018.
34. Jin, E., & Oh, J. (2020). The Effects of Interactivity on the Attitudes and Intentions about Second-hand Smoke: Comparison of Two Mechanisms. *International Journal of Human–Computer Interaction*, *36*(4), 307–315. https://doi.org/10.1080/10447318.2019.1636509
35. Niu, Z., Willoughby, J. F., Coups, E. J., & Stapleton, J. L. (2021). Effects of Website Interactivity on Skin Cancer–Related Intentions and User Experience: Factorial Randomized Experiment. *Journal of Medical Internet Research*, *23*(1), e18299. PMID: 33439131
36. Ott, H. K., Vafeiadis, M., Kumble, S., & Waddell, T. F. (2016). Effect of Message Interactivity on Product Attitudes and Purchase Intentions. *Journal of Promotion Management*, *22*(1), 89–106. https://doi.org/10.1080/10496491.2015.1107011
37. Oh, J., Ahn, J., & Lim, H. S. (2019). Interactivity as a Double-Edged Sword: Parsing Out the Effects of Modality Interactivity on Anti-Smoking Message Processing and Persuasion. *Journalism & Mass Communication Quarterly*, *96*(4), 1099–1119. https://doi.org/10.1177/1077699019835911
38. Burgoon, J. K., Bonito, J. A., Bengtsson, B., Cederberg, C., Lundeberg, M., & Allspach, L. (2000). Interactivity in human–computer interaction: A study of credibility, understanding, and influence. *Computers in Human Behavior*, *16*(6), 553–574. https://doi.org/10.1016/S0747-5632(00)00029-7
39. Camerini, L., & Schulz, P. J. (2012). Effects of Functional Interactivity on Patients' Knowledge, Empowerment, and Health Outcomes: An Experimental Model-Driven Evaluation of a Web-Based Intervention. *Journal of Medical Internet Research*, *14*(4),

e1953. PMID: 22810046
40. Occa, A., & Morgan, S. E. (2022). The role of cognitive absorption in the persuasiveness of multimedia messages. *Computers & Education*, *176*, 104363. https://doi.org//10.1016/j.compedu.2021.104363
41. Yang, F., & Shen, F. (2019). Involvement without Knowledge Gain: A Meta-Analysis of the Cognitive Effects of Website Interactivity. *Journal of Broadcasting & Electronic Media*, *63*(2), 211–230. https://doi.org/10.1080/08838151.2019.1622341
42. U.S. Department of Health and Human Services. (2023, July). *Major depression*. National Institute of Mental Health. https://www.nimh.nih.gov/health/statistics/major-depression
43. Walters, K., Christakis, D. A., & Wright, D. R. (2018). Are Mechanical Turk worker samples representative of health status and health behaviors in the U.S.? *PLOS ONE*, *13*(6), e0198835. PMID: 29879207
44. Zack, E. S., Kennedy, J., & Long, J. S. (2019). Can Nonprobability Samples be Used for Social Science Research? A cautionary tale. *Survey Research Methods*, *13*(2), Article 2. https://doi.org/10.18148/srm/2019.v13i2.7262
45. Bailey, R. K., Mokonogho, J., & Kumar, A. (2019). Racial and ethnic differences in depression: Current perspectives. *Neuropsychiatric Disease and Treatment*, *15*, 603–609. PMID: 30863081
46. Wong, E. C., Collins, R. L., McBain, R. K., Breslau, J., Burnam, M. A., Cefalu, M. S., & Roth, E. (2021). Racial-Ethnic Differences in Mental Health Stigma and Changes Over the Course of a Statewide Campaign. *Psychiatric Services*, *72*(5), 514–520. PMID: 33691488

# Supplementary Files

# Multimedia Appendixes

Links to stimuli websites.
URL: http://asset.jmir.pub/assets/1056acdac50e1321f8962ee990fb9ea8.docx

Post-hoc analysis results.
URL: http://asset.jmir.pub/assets/5d78773e63d74c14169ba27e721dc469.docx