FACTORS INFLUENCING RESPONSES TO HEALTH BEHAVIOR CHANGE POSTS ON SOCIAL MEDIA

CORBIN RENO
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ABSTRACT

Social media has the potential to provide a variety of benefits to its users. Some studies have even been conducted to assess the role of social networking sites in health behavior change. However, nearly all of these studies study user engagement within private, moderated health-related sub-communities on social networking sites, in which members have similar goals and interests related to health behavior change. A limited amount of work examines the whether and how an individual can leverage his or her broader online social network to receive social support for health behavior change. However, little is known about moderators and mediators that influence whether and how people in one’s social network will respond to a request for support. This study seeks to examine these gaps through a fractional factorial survey experiment conducted with social media users. We found that post appropriateness, relationship to poster, type of behavior change, opinion of behavior change, and personal experience with the behavior change all contributed to the response a post received. Age group, use of other social media sites, and exposure to the behavior change did not have a significant effect on response.
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Chapter 1

Introduction

As of 2015, one of the most accessible and popular ways to share user-generated content online is through social media sites—especially when it comes to sharing information about oneself. Seventy-one percent of all Internet users in the U.S. are users of Facebook, and 2.5 million pieces of content are shared per minute on the social media site (Duggan et al., 2014) (Gunelius, 2014). Furthermore, 54% of Internet users in the U.S. have reported they create and share photos online (Duggan, 2013). While the specifics of various social networking platforms differ, typically there is support for sharing a variety of content types (e.g. messages, comments, photos) with a variety of audiences (e.g. the public, specific audiences, or between private parties). As these tools facilitate communication between people, recent research suggests that social media can provide a variety of benefits to users, particularly in the health domain (Ventola, 2014).

A common theme that threads through the previous work is the use of online health communities, mobile apps (“mHealth”), and health-focused subgroups within larger social networks (i.e., Facebook groups) to encourage support for those attempting to change their health behaviors. However less is known about the effectiveness of soliciting support from a broader social network audience that may not share similar interests in health behavior change. Specifically, what factors influence an audience’s propensity to respond to posts on social media about health behaviors?
This study seeks to unpack these questions, and provide insights about best practices for seeking support on social networks, and the design of UI and algorithmic components that lead to more effective user interactions. Using Facebook as the primary platform of investigation in this study, we examine moderators and mediators that influence whether a person responds to a health behavior change (HBC) post that shows up in their Facebook news feed. Using the Theory of Planned Behavior (Ajzen, 1985) as a foundation for our investigation, our research questions examine this problem in terms of TPB’s constructs, as shown in Figure 1.
Specifically, we investigate how age group, relationship to poster, behavior change contained in the post, appropriateness of post, opinion of the behavior, personal experience with the behavior, and prior exposure to the behavior all impact response. The findings of this study
may be used to tailor Facebook news feeds, better design support communities, and provide insight into future research on technology-mediated social support.

Table 1 – Research Questions for External Factors of the Model

<table>
<thead>
<tr>
<th>Model Construct</th>
<th>ID</th>
<th>Component</th>
<th>Research Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Characteristics</td>
<td>EFP-1</td>
<td>Age</td>
<td>Does one’s age group influence whether he or she will respond?</td>
</tr>
<tr>
<td>Tech Usage</td>
<td>EFT-1</td>
<td>Social Media Usage</td>
<td>Does an individual’s usage of other social media sites, in tandem with Facebook, influence response?</td>
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Table 2 – Research Questions for Internal Factors of the Model

<table>
<thead>
<tr>
<th>Model Construct</th>
<th>ID</th>
<th>Component</th>
<th>Research Questions</th>
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</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>IFA-1</td>
<td>Opinion</td>
<td>Does an individual’s opinion on the health behavior as a “world issue” impact response?</td>
</tr>
<tr>
<td></td>
<td>IFA-2</td>
<td>Personal Experience</td>
<td>Does an individual’s personal experience with the health behavior influence response?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>a. Does a current attempt at the behavior influence response?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>b. Does a past successful attempt influence response?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>c. What about a past failed attempt?</td>
</tr>
</tbody>
</table>
| IFA-3 | Secondhand Exposure | Does an individual’s secondhand exposure impact response?
   a. Does another’s current attempt at the behavior influence response?
   b. Does another’s past successful attempt at the behavior influence response?
   c. What about another’s past failed attempt? |
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<tr>
<td>IFS-1</td>
<td>Appropriateness</td>
<td>Does the perceived appropriateness of the post influence response?</td>
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<tr>
<td>IFS-2</td>
<td>Relationship</td>
<td>Does an individual’s relationship to the poster impact response?</td>
</tr>
<tr>
<td>IFS-3</td>
<td>Type of Behavior</td>
<td>Does the type of health behavior influence the likelihood of response?</td>
</tr>
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Chapter 2

Literature Review

This thesis sits at the intersection of health information sharing, social support, and health behavior change. As such, this literature review is structured to assess these areas and provide background for the study contained in this thesis. This literature review contains related works current through June 2015. First we begin with a discussion of behavioral sciences theory guiding the research investigation. Then we turn to current literature on health information sharing and health behavior change online.

2.1 Theory Guiding the Research

2.1.1 Social Support Theory

Our work seeks to examine the ways in which social media can be effective in providing social support to a person who needs it. Firstly, it is important to define what is meant by social support. Over the years, the term social support has been used extensively, both by those familiar with past literature and those who use it in a lay form. Social support has been defined and measured in countless ways. To better understand its decomposition, we look to a seminal work done by House (1988), which describes four broad types of supportive behavior leading to social support:

1. Emotional support – showing empathy, love, trust, and caring
2. Instrumental support – providing tangible aid and services that directly assist a person in need

3. Informational support – giving advice, suggestions, and information that a person can use to address problems.

4. Appraisal support – providing information that is useful for self valuation purposes

In the context of social media, individuals may experience any one of these kinds of social support. For the purposes of our study, we are measuring intentions to provide social support, where support is a poster-audience interaction indicating emotional, instrumental, informational, or appraisal support.

2.1.2 Theory of Planned Behavior

A classic and meaningful theory for this research is the Theory of Planned Behavior (Ajzen, 1985). It proposes that there are three factors predictive of behavioral intention: attitude towards behavior, subjective norm, and perceived behavioral control. From there, behavioral intention can help to predict actual behavior. Additionally, perceived behavioral control is also predictive of behavior, which is unlike the other initial factors. With the widespread acceptance of this model (over 36,000 citations on Google Scholar as of July 2015), this model will be a fundamental underpinning of the work done in this thesis, as it gives insight into our research questions. From Ajzen’s model, we can see that appropriateness (“subjective norm”) and opinion/exposure to behavior (“attitude towards behavior”) may play into audience response (the behavior itself).
2.2 Health Information Sharing on Social Media

A variety of studies have examined health information sharing on social media, particularly Facebook.

2.2.1 Types of Content Shared

One genre of study is in which a health expert shares information with an audience of people seeking behavior change. For example, Merchant et al. (2014) conducted a study that involved a Facebook page directed at overweight and obese college students. Over 21 months, a health coach posted 1816 unique messages to the page and the authors measured the outcomes. Almost three-fourths of all posts were interacted with at least once, and one-fourth had 1-2 interactions. Three percent of all posts had 20 or more interactions. In terms of the type of posts, polls were the most popular (97.5% interacted with) followed by photos (80.3%) (Merchant et al., 2014). This study shows some support for Facebook as a medium to deliver weight loss interventions with the help of a health coach, and that the composition of shared content impacts interaction. Relatedly, Cavallo et al. (2014) conducted a study of physical activity promotion online, testing whether special purpose Facebook groups were more effective at engaging participants than health-related posts on individual Facebook walls. In this study, a moderator manually recorded all interactions of the participants, and activity was not limited to just posts—comments, likes, and posting links were all included as activity. The most common activity within the Facebook group was responding to discussion boards in the group; however, the most
common activity outside the group was the action of liking a post (Cavallo et al., 2014). A key takeaway is that discussion board posts elicited more responses, and that moderator-posted items received more responses. The posts on participant walls were not by the moderator, but by the participant or another participant. This raises the question for this thesis: in what contexts is it worthwhile to encourage health-related talk on Facebook and other social media? Which garner the greatest and most useful responses? What are the best ways to encourage interaction in environments in which there is no professional health coach?

### 2.22 Why Is (and Isn’t) Social Media Being Used

A body of work focuses on the perspectives of participants using social media for health-related support—either with or without a professional moderator. These studies investigate the purposes for using these tools and what is gained out of the experience. Newman et al. (2011) examined how and with whom users of online health communities (OHCs) and Facebook shared health information. The authors interviewed fourteen people for 90 minutes each, and found that receiving and providing emotional support is the most common goal for using OHCs (Newman, Lauterbach, Munson, Resnick, & Morris, 2011). Many participants noted that a distinct benefit of an OHC over Facebook is that most of the users in that community are going through similar struggles. One participant noted that positivity is very present in OHCs, versus Facebook where one can be met with negativity and sarcasm. Though, OHCs did not serve the preference of every individual, and some desired more personal interactions. However, the overall trend was that participants were often apprehensive to post health-related goals to Facebook because they may be criticized (Newman et al., 2011). For our study, we examine this
claim further by identifying moderating and mediating variables that influence audience reaction to a health-related post involving behavior change.

Most closely related to the methods of this thesis study, Epstein et al. (2014) investigated the “why” of sharing personal informatics data (with a health angle), and use this initial work to investigate the types of content that are more likely to receive a response from a social media audience. In this work, the authors first identified five main reasons to share personal informatics data: (1) request for information, (2) desire for emotional support, (3) seeking motivation or accountability from audience, (4) motivating or informing the sharing audience, and (5) impression management (in other words, where users want to be perceived a certain way) (Epstein, Jacobson, Bales, McDonald, & Munson, 2014). The authors also created a design framework for sharing personal informatics data, which consists of several dimensions. These dimensions can be further broken down into operational factors (Epstein et al., 2014).

2.23 Social Norms

Social norms about media use are also an area of study. Diving further into this idea of self-disclosure on Facebook, Bazarova (2012) researched disclosure perceptions on Facebook, including perceived appropriateness of the disclosure method. In the study, the author gauged perception by showing Facebook users messages (either public wall posts or private messages) while varying message intimacy, private-public disclosure, and disclosure context (Bazarova, 2012). Consistent with intuition, Bazarova found that disclosures in a private context (private message) were considered more intimate than disclosures in a public context (wall post). The author also found that messages posted in the public view with high intimacy were seen as less
appropriate than the private counterpart. From these findings, one can posit that the individual’s perceived intimacy of a planned message can impact whether the user will post the message or not (Bazarova, 2012). The findings of this study are relevant to our work because some individuals view their health as an intimate matter. Based on this study, one would expect that if the audience perceives something as intimate that they may also consider it inappropriate. From this, we have evidence to include appropriateness in our model.

Jung et al. (2013) looked into various factors of Facebook users, such as their frequency of asking for help, attentiveness to Facebook friends, number of strategies used in posting, and social capital (Jung, Gray, Lampe, & Ellison, 2013). On a five-point scale (1 = never, 5 = very often), Facebook users averaged a 2.88 (very close to the “sometimes” anchor) value for “frequency of asking for help.” The authors also measured “Signals of Relational Investment,” which is a metric to estimate how much a Facebook user pays attention to his/her Facebook friends. On this scale, users averaged a 4.09 out of 5, which means the users surveyed are fairly attentive to their Facebook friends. Bridging and bonding social capital were measured to be similar values (3.77 and 3.68, respectively, on a 10-point scale) at a low-moderate level. Social capital was measured via Williams’ Internet Social Capital Scales. All of these measurements were used to construct two slightly different negative binomial regressions, where the dependent variable is number of responses to post. In both regressions, the factors that were statistically significant at 0.05 were frequency of asking for help and number of strategies used. Ultimately, these results were not as meaningful as expected, but this study provides some evidence that audience responses on Facebook may not be related to the social capital a user may experience (Jung et al., 2013). For our study, this finding is important because even users who do not perceive social capital on Facebook may still receive responses from the audience. Additionally,
since the previous study found that social capital is not related to audience response, social capital does not belong in our model directly as a factor.

2.24 Studies of Social Media Audience

Studies of social media usage, whether or not for health purposes, suggest that relationships are an important factor in whether and how content gets a response. Burke and Kraut (2014) examined how social network tie strength changes based on the type of interaction. The authors seek to identify if meaningful social interactions are enhanced or displaced by Facebook. The problem was framed as a prediction problem, and the authors chose a variety of communication factors to predict the answer to “How close to you feel to [name of person]?” Participants chose anywhere from zero to six friends from a random picking that they “discuss important matters with, really enjoy socializing with, or anyone you feel especially close to.” The researchers achieved a fairly high R\(^2\) value of 0.87, however they included an additional month-lagged variable, the tie strength from the previous month (which was found from the surveys given to participants). But, the authors note that tie strength can be inferred from site use. Tie strength was the strongest predictor with a value of 0.76, and the next strongest was whether or not the people were family, followed by if they’re in a relationship together. The control variables accounted for 85% of the variance explained (Burke & Kraut, 2014). For this thesis, the main takeaway is that family/relationship of the dyad is relatively important to tie strength.

More specifically related to health behavior change posts online, a limited number of studies investigate perspective of the audience of support messages (rather than the person
seeking support). Returning to the earlier discussion (Epstein et al., 2014), in addition to creating a design framework, the researchers also conducted two studies to investigate what influences interaction with health-related social media posts.: a collected tweets study (CT) and a generated tweets study (GT) (Epstein et al., 2014). In the CT study, Epstein et al. randomly sampled 5,000 tweets that contained the hashtag “#RunKeeper.” Each tweet was coded for 10 features, which quantitatively describe the tweet. Three regression analyses were run to predict: whether a tweet received a reply, the number of favorites it received, and the number of retweets it received. From these models, only one predictor emerged as statistically significant at the 0.05-level for the first and second regression (aside from the intercept): whether the tweet contained user-generated. For the third regression, there was also only one statistically significant factor aside from the intercept, and it was whether or not the tweet contained the default picture (Epstein et al., 2014).

The authors used the descriptive findings from the CT study to tailor the GT study (Epstein et al., 2014). They varied nine different parameters when conducting the GT study, which resulted in 102 different styles of tweets. A factorial design was employed to test all styles, and 97 participants were involved and they each examined five tweets. Data was analyzed in a similar way to the CT study, using regression. The authors found that user-generated text on tweets receive more replies and favorites, and system-generated text receives fewer retweets. Tweets with pictures did not show a difference in replies, favorites, or retweets in the CT study; however, tweets with pictures were seen as less boring and more interesting in the GT study (Epstein et al., 2014). However, the work does not provide insight into how relationship to the poster, as well as audience beliefs, attitudes, and perceived norms regarding health behavior change influence audience engagement.
In a study involving the “onlookers of social media,” Ploderer et al. (2012) theorize a type of person known as the “ambivalent socializer;” that is, a person who is both “keen but also reluctant to engage with others on social media” (Ploderer, Smith, Howard, Pearce, & Borland, 2012). The authors explain the idea, or thought process, of a person wanting to change but yet also stay the same—thus affecting the way they interact with others on social media regarding some kinds of behavior change. The authors study their theory of the ambivalent socializer through the health behavior change of smoking cessation. They note that many studies show that people become non-smokers together, suggesting a positive influence with family, friends, and co-workers. Although it can be inferred that family and friends are often integral to an individual quitting smoking, ambivalent socializers do not usually take to the social media channels populated by these people. Instead, ambivalent socializers seek support from individuals unknown to the quitter. With these characteristics in mind, the authors give a set of recommendations to design social media for ambivalent socializers, including structural socializing, incidental socializing, eavesdropping, and trace sensing (Ploderer et al., 2012). Our study does not seek to explicitly design for ambivalent socializers, but from the audience perspective the idea of structural socializing is relevant. User interface cues that signify someone is trying to change a health behavior may encourage audience response.

Finally, there is research that provides some insight into the connections between one’s perception of self and how they respond to others in social media settings. Toma (2010) investigated social networks’ ability to contribute to self-affirmation. Self-affirmation theory is the notion that people need to think of themselves as “good” and “appropriate” yet regard others with harsh criticism (Toma, 2010). Participants had to create a 3-5 minute speech, record it via webcam, and submit it to an “evaluator”, then take a survey for an “unrelated study.” The
evaluator always gave the same feedback regardless of the speech, and the survey was actually pertinent to the feedback given. The four-treatment randomized study involved: (1) Facebook self-affirmation; (2) Facebook control, (3) classic self-affirmation; and (4) classic control. For treatment (1) participants were told to review their own profile, and treatment (2) required participants to review a stranger’s profile. The participants in treatment (2) reviewed the same profiles as in treatment (1), which is why it is considered a control group. The treatment groups outside Facebook ranked nine values (such as art, relationships, business, etc.) in importance. The self-affirmation group wrote about the most important value to them, whereas the control group wrote about why their lowest-ranked value was important to the average college student. The authors found that participants who examined their own profiles (T1) were more accepting of the evaluator’s feedback and overall felt more positive emotions (Toma, 2010). The findings of this study are important to our work because it provides support for “appropriateness” as a factor in our model. This study shows that appropriateness of a post can have an impact on audience response on social media.

2.3 Literature Summary

From reviewing the literature on health information sharing and health behavior change, a few key insights emerge. First, from research done within health forums, there is evidence to suggest social support can be received when someone self-discloses emotions and events—but that most people do not use forums for social support, they use them more for informational support (Kauw et al., 2015) (Wang, Kraut, & Levine, 2015). From this, it could be helpful to look into social media as a way to gain social support online by self-disclosure. This finding is
important because an audience is more likely to respond when self-disclosure is involved, so our study aims to examine if self-disclosing about behavior change online leads to audience engagement. It seems to hold true on forums based on the literature, so investigating the phenomenon on social media would be a worthwhile extension.

There is substantial research done on health information sharing on social media. Much of the work done in this area investigates social capital, or the benefits gained from using social media. The overall trend from the research done in social capital on social media is that social capital increases as social media usage increases (Burke, Kraut, & Marlow, 2011) (Yoder & Stutzman, 2011) (Jung et al., 2013) (Lampe, Gray, Fiore, & Ellison, 2014) (Liu, Venkatanathan, Goncalves, Karapanos, & Kostakos, 2014). For our study, these findings provide support that social media activity can provide social capital as responses from the audience. We wish to investigate more specifically the factors that influence response.

Relationship emerges as an important factor in health information sharing on social networks (Skeels, Unruh, Powell, & Pratt, 2010) (Spink, Wilson, & Ulvick, 2012) (Burke & Kraut, 2014). From this, we can reason that relationship is an important factor in how an audience responds on social media.

In summary, several factors were common in the literature that could be related to social support and response. In the works that studied these factors, they were done on either (1) outside of a social network or (2) within a sub-community in a social network. Studying the impact of these factors within a standard, non-specialized social network such as Facebook would have implications that relate to the platform as a whole. It is in this area that the enclosed study will focus.
Table 3 – Model Constructs Tied to Literature Citations

<table>
<thead>
<tr>
<th>Model Construct</th>
<th>Citation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriateness of a post</td>
<td>(Toma, 2010) (Bazarova, 2012)</td>
</tr>
<tr>
<td>Type of behavior in post (post content)</td>
<td>(Merchant et al., 2014) (Pechmann, Pan, Delucchi, Lakon, &amp; Prochaska, 2015)</td>
</tr>
<tr>
<td>Peer’s personal experience with the behavior</td>
<td>(Ajzen, 1985) (Newman et al., 2011)</td>
</tr>
<tr>
<td></td>
<td>(Cavallo et al., 2014)</td>
</tr>
<tr>
<td>Peer’s prior exposure to behavior change</td>
<td>(Ajzen, 1985)</td>
</tr>
<tr>
<td>Relationship to poster</td>
<td>(Skeels et al., 2010) (Spink et al., 2012)</td>
</tr>
<tr>
<td></td>
<td>(Burke &amp; Kraut, 2014)</td>
</tr>
<tr>
<td>Peer’s opinion on behavior</td>
<td>(Ajzen, 1985)</td>
</tr>
</tbody>
</table>

Chapter 3

Methods

3.1 Hypotheses

A number of hypotheses were developed to investigate the research questions.

**H1. Effect of Appropriateness (IFS-1):** Individuals who perceive a post as appropriate are more likely to interact with it compared to posts that are viewed as inappropriate.

**H2. Effect of Social Media Usage (EFT-1):** Individuals who are active on multiple social media sites are more likely to interact with a post than their less-active counterparts.
H3. **Effect of Age (EFP-1):** Individuals who are in a young age group are more likely to respond to a post compared to their older counterparts.

H4. **Effect of Relationship (IFS-2):**

   a. Individuals who view a post made by a family member are more likely to respond compared to the acquaintance case.

   b. Individuals who view a post made by a close friend are more likely to respond compared to the acquaintance case.

H5. **Effect of Type of Behavior Change (IFS-3):** Individuals who receive a treatment with a behavior change that is relatable and positive (exercise more) will be more likely to respond than individuals who receive a treatment with a behavior change that is not as relatable (smoking cessation).

H6. **Effect of Opinion on Behavior Change (EFA-1):** Individuals who perceive the behavior change as an important world issue are more likely to respond compared to those who do not.

H7. **Effect of Behavior Experience (EFA-2):**

   a. Individuals who are currently attempting to achieve the behavior change in the post are more likely to respond compared to those who are not.

   b. Individuals who have attempted to achieve the behavior change in the post are more likely to respond compared to those who have not.

   c. Individuals who are currently attempting to achieve the behavior change in the post are more likely to respond compared to those who are not.

H8. **Effect of Behavior Exposure (EFA-3):** Individuals who have been exposed to the behavior are more likely to respond compared to those who have not been exposed.
3.2 Survey Design

Using Qualtrics, a popular online survey creation software, a survey was constructed to test out a total of nine conditions. The survey was broken into 5 pages: consent, demographic and qualification questions, attention check, initial questions, follow-up questions, and survey completion. The survey in its entirety can be found in the appendix of this thesis.

The consent page of the survey contained standard information about social science research at Penn State. Purpose, procedures, duration, compensation, confidentiality, and contact information were found on this page. The survey participant was instructed to read this page, and if he or she consented, the participant would continue to the next page.

Though the survey was anonymous, we still wanted to know about who was taking our survey. Additionally, this page served to qualify the participant for the survey. Participants were asked about their gender, age group, highest level of education, and race. The last question on the page asked: “Which of these social networking sites have you used in the past 12 months?” and required the participant to tick boxes next to popular social networking sites that they have used. On this page, we were checking to ensure that (1) the participant was over the age of 18 and (2) the participant has used Facebook before. In recruiting, participants were not told that the survey would be about Facebook because we did not want a participant to lie in order to take the survey for its compensation. Those participants who did not qualify were directed to the end of the survey and none of their data was saved.

An attention check question was included on the next page due to the nature of the study being online and on Mechanical Turk. The question was preceded by a paragraph, which
instructed the participant to choose “None of the above” for the answer to the following question. If the participant did not read the paragraph, he or she would have simply answered the question without following directions. Those participants who did not follow the directions from the paragraph were directed to the end of the survey and none of their data was saved.

The following page included a short vignette, a screenshot of a Facebook post, and several questions about the vignette and screenshot. Below is an example of a vignette and Facebook post:

*Figure 2 – Example Vignette and Facebook Post*

Think of a friend who you speak to regularly and trust—someone you consider a close friend. Your close friend has been smoking for many years. Your close friend tells you that he/she is going to try to quit smoking. Imagine that your close friend posts the following on Facebook, and hasn't posted about this topic before:

**Your Close Friend**

3 hrs

Trying to kick the habit! I’m quitting smoking, and I’m very hopeful that I’ll be successful.

Like · Comment · Share

Based on the treatment the participant received, he or she saw a different vignette and Facebook post (all nine treatments can be found in the appendix). A loop and merge block was used in Qualtrics to randomly assign a participant to a treatment. Each treatment involved: (1) a behavior change and (2) a relationship to the poster. The behaviors included were: smoking cessation, weight management, and increasing exercise. The behaviors chosen were as a result of the literature review, where these behaviors emerged as popular to study (smoking = 8 articles,
weight management = 11 articles, exercising = 10 articles). Even more articles were found for each behavior in the broad field but were not included in the literature review due to lack of relevance. The relationships included were: close friend, family member, and acquaintance.

Table 4 – Number of Participants by Treatment

<table>
<thead>
<tr>
<th>Behavior Change</th>
<th>Relationship</th>
<th>Participants Included in Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quitting Smoking</td>
<td>Close Friend</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>Family Member</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>Acquaintance</td>
<td>94</td>
</tr>
<tr>
<td>Eating Healthy</td>
<td>Close Friend</td>
<td>102</td>
</tr>
<tr>
<td></td>
<td>Family Member</td>
<td>111</td>
</tr>
<tr>
<td></td>
<td>Acquaintance</td>
<td>92</td>
</tr>
<tr>
<td>Exercising More</td>
<td>Close Friend</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>Family Member</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>Acquaintance</td>
<td>111</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td></td>
<td><strong>877</strong></td>
</tr>
</tbody>
</table>

The first three questions focused on the participant’s opinion, personal experience, and exposure to the behavior. Participants were asked if they believed the behavior was an important world issue (opinion), if they had ever attempted the behavior (personal experience), and if they had ever known anyone who attempted the behavior (exposure). Next, a 7-point Likert scale item
was presented for the participant to rate how appropriate he/she thought the post was, where 1 = absolutely inappropriate and 7 = absolutely appropriate.

Then, participants were asked to choose which ways he/she would engage with or respond to the Facebook post. A total of 8 choices were shown to the participant, including a “none of the above” option. Participants could choose any of the 7 nonexclusive options or choose only “none of the above.”

Table 5 – Post Response Options

<table>
<thead>
<tr>
<th>On-Platform Options</th>
<th>Offline Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Like</td>
<td>• Text Message</td>
</tr>
<tr>
<td>• Comment</td>
<td>• Phone Call</td>
</tr>
<tr>
<td>• Share</td>
<td>• In-Person Contact</td>
</tr>
<tr>
<td>• Private Message</td>
<td></td>
</tr>
</tbody>
</table>

The on-platform response options were assembled as a result of the functionality that Facebook provides. The offline options were brainstormed by the research team and supplemented by informal interviews. Although there are other ways that a participant may want to interact with the Facebook post, we chose to limit those to common communication methods.

Next, two questions were presented to the participant, asking if he or she would change their response choices if similar posts were seen (1) occasionally and (2) very frequently. Based on the answer to these questions, the participant would be shown another set of response options to choose from if he/she said their original way of engaging would change.
Some conditional follow-up questions were asked: if the participant said he/she had personal experience with the behavior change, they would then answer if they were successful in their behavior change or not. Additionally, if they were exposed to the behavior (knew someone who was attempting the behavior change) then they also responded if that person was successful or not. Finally, if the participant noted that he/she had personal experience, then the survey showed two more questions: (1) a 5-point Likert scale item for how likely the participant is to attempt the behavior in the future, and (2) a sliding scale item from 0-100 for how confident the participant feels that he/she could achieve the behavior in the Facebook post.

The last page of the survey thanked the participant for their time, and gave them a randomly generated completion code. This completion code was required to receive payment on Mechanical Turk. The survey also offered a short debriefing of the purpose of the study.

3.3 Participants and Recruitment

Participants were recruited from Amazon Mechanical Turk. Mechanical Turk is a site that aggregates and facilitates the completion of “HITs,” or human intelligence tasks—tasks that require a human to complete. Mechanical Turk has many uses, such as human categorization, sentiment analysis, and surveys. Participants were paid $0.15 for approximately three minutes of their time.

A total of 1,299 survey participants were recruited. As stated in 3.3, there were some screen-out procedures used. Although Qualtrics does not provide specific details when a participant is screened out, there were 422 participants screened out. In summary, we were left
with 877 participants who were not screened out—these participants’ responses comprise the data for analyses conducted later.

Our sample included more females than males (41% male, 59% female). The majority of participants were in the 25-44 age group, and around a third from the 18-24 age group (18-24: 29%, 25-44: 57%, 45-64: 13.1%, Over 65: 0.9%). Our sample was fairly educated, with a third having four-year degrees and another third having “some college” (Less Than High School: 0.2%, High School / GED: 8.2%, Some College: 32.8%, 2-year College Degree: 12.2%, 4-year College Degree: 34.3%, Master’s Degree: 9%, Doctoral Degree: 1.6%, Professional Degree (JD, MD): 1.6%).

The sample was predominantly white (White: 77%, Black or African-American: 7.1%, Hispanic: 5.8%, Asian: 7%, Native American: 1.3%, Native Hawaiian or Pacific Islander: 0.2%, Other: 1.7%). Also, we had a significant amount of Twitter users, as well as users of other social networks (Twitter: 60.5%, LinkedIn: 43.6%, Pinterest: 49%, Google+: 37.3%, Tumblr: 26.7%, Instagram: 46.5%).
Chapter 4

Results

4.1 H1: Effect of Appropriateness

The appropriateness item on the survey is measured using a Likert scale (ordinal data), and response was coded as “true” or “false”. Thus, the appropriate test here is a Chi-square test. The results of the test showed that there is a statistically significant relationship between appropriateness and whether or not an individual would respond to a health behavior change post (\(X^2 = 98.975, N = 877, p < .001\)). From here, we can now further examine each group within appropriateness using adjusted residuals to determine which are driving the effect. The adjusted residuals are summarized below:

Table 6 – Adjusted Residuals for Level of Appropriateness

<table>
<thead>
<tr>
<th>Level of Appropriateness</th>
<th>Did Not Respond</th>
<th>Responded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolutely Inappropriate</td>
<td>0.3</td>
<td>-0.3</td>
</tr>
<tr>
<td>Inappropriate</td>
<td>0.9</td>
<td>-0.9</td>
</tr>
<tr>
<td>Slightly Inappropriate</td>
<td>4.5</td>
<td>-4.5</td>
</tr>
<tr>
<td>Neutral</td>
<td>7.9</td>
<td>-7.9</td>
</tr>
<tr>
<td>Slightly Appropriate</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Appropriate</td>
<td>-5.1</td>
<td>5.1</td>
</tr>
</tbody>
</table>
Those groups that are driving the statistically significant effect have an adjusted residual absolute value of greater than 1.96. From the table, we can see that the neutral, appropriate, slightly inappropriate, and absolutely appropriate levels satisfy this condition. The most significant group is neutral, where its direction indicates that if a post’s perceived appropriateness is neutral, it is more likely that an individual will not respond. Directly relating to H1, we see that if a post is perceived as appropriate or absolutely appropriate, it is more likely to receive a response. And from that, we are able to reject the null hypothesis.

4.2 H2: Effect of Social Media Usage

To examine social media usage, we look to the multiple-response question that asks the participant which social media sites he or she has used in the last 12 months. To test this, we must use binary multiple logistic regression because our independent variables are binary in nature (0 = has not used that social media site, 1 = has used that social media site). None of the coefficients in the logistic regression model emerged as statistically significant (p > 0.05), and thus the model itself was also not statistically significant. We are unable to reject the null hypothesis.

4.3 H3: Effect of Age

To test the effect of age, we must look at the age item in the survey, which groups participants into one of four categories. The appropriate test here is a Chi-square test. The results
of the test were not statistically significant ($X^2 = 4.927, N = 877, p > .05$), so it can be reasoned that age does not influence whether an individual will respond or not. Therefore, we cannot reject the null hypothesis.

4.4 H4: Effect of Relationship

Each participant received a different treatment, which varied the relationship and type of behavior in each post. To investigate the effect of relationship on response, a separate variable was created to identify the relationship that a participant received in their post as part of the treatment (1 = family member, 2 = close friend, 3 = acquaintance). As with examining the effect of appropriateness, a Chi-square test was used to test statistical significance. The test concluded that there is a statistically significant relationship between response and type of relationship of the poster ($X^2 = 50.771, N = 877, p < .05$). From here, we can further investigate using adjusted residuals:

Table 7 – Adjusted Residuals for Type of Relationship

<table>
<thead>
<tr>
<th>Type of Relationship</th>
<th>Did Not Respond</th>
<th>Responded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Close Friend</td>
<td>-4.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Family Member</td>
<td>-2.4</td>
<td>2.4</td>
</tr>
<tr>
<td>Acquaintance</td>
<td>7.0</td>
<td>-7.0</td>
</tr>
</tbody>
</table>
We can see that the most significant difference is when viewing an acquaintance’s post, where an individual is very unlikely to respond. For the close friend and family member groups, an individual is likely to respond. A potentially counterintuitive finding here is that a person is more likely to respond to a close friend than a family member. However, since the absolute value of the adjusted residual on family member is greater than 1.96, we are still able to reject the null hypothesis.

4.5 H5: Effect of Type of Behavior Change

Although it is difficult to posit which behavior change will lead to more responses, one theory is that those behavior changes that are more relatable will receive more responses. Exercising more can be viewed as a relatable behavior to accomplish, compared to quitting smoking, which only applies to a subset of people. To test this, a Chi-square test was used and a statistically significant relationship was found ($X^2 = 16.195, N = 877, p < .05$). To see what is driving this relationship, we must examine the adjusted residuals:

Table 8 – Adjusted Residuals for Type of Behavior Change

<table>
<thead>
<tr>
<th></th>
<th>Did Not Respond</th>
<th>Responded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quitting Smoking</td>
<td>-3.9</td>
<td>3.9</td>
</tr>
<tr>
<td>Eating Healthy</td>
<td>-1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Exercise More</td>
<td>2.8</td>
<td>-2.8</td>
</tr>
</tbody>
</table>
From the above results, we see that those responding to the *Eating Healthy* behavior were no more or less likely than to do so by chance. It can be reasoned that participants were indifferent on this behavior change type. However, for both the *Quitting Smoking* and *Exercise More* behaviors, we see a significant difference. For those posts about smoking cessation, individuals were more likely to respond. And for those posts about exercising more, participants were actually less likely to respond. Although we can reject the null hypothesis, this evidence contradicts H5. In fact, it seems that the opposite effect is occurring.

### 4.6 H6: Effect of Opinion on Behavior Change

As reflected in our model as a component of “attitude”, we wanted to determine if a certain issue is important to an individual. For the three behavior changes we examined (smoking cessation, weight management, and exercising more), it is not uncommon for an individual to have a strong opinion on the behavior change. For example, although an individual personally may have not attempted a behavior change, they may feel it is important in the world due to the global and public health effects. To investigate this and its effect on response, we conducted a Chi-square test. Fisher’s exact test was not used because the sample size was substantial and none of the observed counts were lower than 5. The results show that there is a statistically significant relationship between the *ImportantWorldIssue* survey item and whether the participant responded or not ($X^2 = 32.693, N = 877, p < .05$). Because there are only two levels in each variable examined, there is only one adjusted residual value (positive and negative), which is 5.7 (Responded * ImportantWorldIssue = Yes) and -5.7 (Did Not Respond * ImportantWorldIssue = No). From this we are able to reject the null hypothesis.
**4.7 H7: Effect of Behavior Experience**

Having a personal experience with a certain health behavior (or health behavior change) can change an individual’s view on another’s HBC post on Facebook. To further examine this, we can analyze the survey item that asks if the participant has personally attempted the behavior. A Chi-square test reveals that there is a relationship between the answer to that survey item and response ($X^2 = 7.517, N = 877, p < .05$). Adjusted residuals were 2.7 (Responded * Attempted Behavior) and -2.7 (Did Not Respond * Have Not Attempted Behavior). So, it is more likely that an individual will respond to a HBC post on Facebook if he or she has attempted the behavior before. To further examine this, there was a follow-up question for those participants who did report that they have attempted the behavior. It is a multiple response question asking if they are currently attempting, have attempted in the past and succeeded, or have attempted in the past and have not succeeded. A binary logistic regression analysis was conducted, but the model created was not statistically significant ($p > 0.05$). The specific experience with the behavior (currently attempting, previously succeeded, previously failed) does not seem to be predictive of response, however the overall experience (have attempted or have not attempted) with the behavior does show a relationship. While there is no evidence for H7a, H7b, or H7c, there is evidence for an overall effect that is noteworthy.

**4.8 H8: Effect of Behavior Exposure**

Similar to H7, having been exposed to the behavior may influence an individual’s response. However, upon further analysis with a Chi-square test, no statistically significant relationship was found ($X^2 = 1.328, N = 877, p > .05$). It is very possible that no effect was found
because out of the 877 participants, 698 participants marked that they knew someone who had attempted the behavior. With nearly 80% of participants choosing one option (across all treatments), it would be inherently hard to find a significant effect between “responded” and “did not respond.”
Chapter 5

Discussion and Conclusion

This work has a variety of implications, primarily to informing the individual seeking support.

5.1 Effects of External Factors

At the brainstorming stages of this study, we expected to see some sort of deviations among age groups with respect to response (EFP-1). But, from the analysis that was conducted, no evidence was shown to support that hypothesis. Age does not seem to influence whether an individual chooses to respond to a health behavior change post or not.

The other external factor we examined was social media usage in conjunction with Facebook (EFT-1). From the analysis conducted, no meaningful relationships emerged. It can be reasoned that the sheer usage of other social media sites will not impact response. A future study could more effectively measure social media usage by examining user activity (hours spent on social media, number of interactions on social media, etc.).

5.2 Effects of Internal Factors

Consistent with what one might expect, whether an individual feels a behavior change is an important world issue does influence their response—they are more likely to respond if they
feel it is an important issue (IFA-1). And following the same line of thinking, if someone has personally attempted to achieve a certain behavior they are also more likely to respond (IFA-2). However, when diving deeper in the “personal experience” effect, no additional significant effects were found based on if the participant was currently attempting, succeeded, or failed (IFA-2a, IFA-2b, IFA-2c). One may interpret this to mean that it only matters if the individual has had a personal experience with the behavior; it matters not the specifics of the personal experience.

One’s behavior exposure does not influence response (IFA-3, IFA-3a, IFA-3b, IFA-3c). Although this is initially counterintuitive, but based on the data collected it makes sense. The majority of people surveyed have known someone who has attempted the behavior, yet still whether they responded or not varied.

The effect of appropriateness is as expected (IFS-1). In general, the more appropriate a post is, the more likely it is to receive a response. From the perspective of Facebook versus an online health community, it would be wise for those individuals who engage in perceived “inappropriate” health behaviors (such as illegal drug use) to seek help in an online health community. Although friends and family can be a great source of support for people struggling with health problems, it may not be a great idea to seek that support on Facebook. Conversely, for those wishing to have a little encouragement or praise before their daily run or before enjoying their favorite green smoothie, Facebook is not a bad option. Friends, family, and acquaintances on Facebook tend to respond better to those appropriate and “more positive” life choices.

Another finding in the appropriateness space is the inherent skew at the neutral level of appropriateness. For those participants who felt a post was neutral, they very often did not
respond to the post. This finding may seem a bit ambiguous, but the effect was too large to omit from discussion. An interpretation of this result: for individuals who are indifferent on the appropriateness of a post, they will more often choose not to respond. No significant effects were found at the absolutely inappropriate, inappropriate, or slightly inappropriate levels.

Consistent with the literature, relationship emerged as a factor in the decision to respond to a post (IFS-2). Three relationship types were examined (family member, close friend, and acquaintance), and the observed effects were mostly intuitive. Participants were more likely to respond to their friends and family than an acquaintance. Even though each relationship showed a statistically significant effect, acquaintance drove the overall significance more. The interpretation here is simple: loading up your Facebook friend list with a lot of people you do not know significantly will not drive more support. The common saying “quality over quantity” seems to have merit in this case.

The final factor to examine in the decision to respond to a post is the type of behavior change (IFS-3). Two out of the three types of behavior change exhibited a statistically significant effect on response (the Quitting Smoking and Exercise More behaviors). The Eating Healthy behavior did not receive any more or less responses than by chance. Exercise More behavior generally received fewer responses, whereas Quitting Smoking generally received more responses. One interpretation of this directionality could be that participants cared for the health of their peers, and thus they wanted to show support for someone trying to end a destructive behavior (smoking). The other side of this, exercising more, could have been viewed as a beneficial behavior and the participants may have felt that the poster did not require any support or communication if they’re already doing “the right thing.”
5.3 Design Recommendations

From the findings in our study, we extrapolate design recommendations. These recommendations benefit the health intervention space, as well as any health program involving the use of social networks.

**The use of social media in health interventions may not always be beneficial, and could potentially be harmful to participants.** Each health intervention should consider the use of social media, but they are in no way needed in every intervention. If participants do not receive responses on social media, similar to if they do not receive social support in their offline life, there could be a negative impact on their well-being and stress levels (Cohen & Wills, 1985). We found that appropriateness, opinion of the behavior, and type of behavior in the post have a significant effect on response. Intervention creators should consider how the average Facebook user would perceive a certain health condition before integrating social media. If possible, some preliminary research could be done to assess appropriateness and overall opinion on the health condition.

**Simple audience tailoring can be effective.** This study examined the relationship factor as it relates to responses on Facebook. If the goal of integrating social media into an intervention is to receive responses and support from others, intervention managers are strongly advised to tailor the audience of posts. Our study found that acquaintances receive far fewer responses than a close friend or family member—so controlling visibility of a post to only close friends and family is a favorable option. On Facebook, one can identify his/her family members, which allows for easy audience tailoring. For close friends, intervention participants could manually choose who they want to see their health-related posts.
More advanced audience tailoring can be even more effective, and less of a burden on the user. The key to more advanced audience tailoring rests in the realm of machine learning, and a strong benefit of the following recommendations is that they require no configuration by the user. Although Facebook does do a customize a user’s News Feed already, having an algorithm to estimate tie strength between two Facebook users would be powerful. The underlying assumption is that the stronger the tie, the more interested the users are in each others’ shared content, and would therefore engage with the content more often. Specifically showing health behavior change posts to users who care about the poster would result in more responses.

Another advanced method to tailor audience could be by using topic modeling. Topic modeling is a machine learning process that models the underlying topics, or themes, of textual content. Topic modeling (or “author modeling”) has been done on user profiles on social media to examine the topics a given user is sharing in his/her posts. For example, Hong and Davison utilized the popular Latent Dirichlet Allocation (LDA) topic modeling method to identify Twitter users based on the category of their tweets (Hong & Davison, 2010). A similar approach could be used on Facebook, but taken one step further: users that typically share posts relating to health could be shown their peer’s health behavior change posts to encourage responses from a like-minded audience.

5.4 Limitations and Future Research

This study is not without its limitations. To start, the primary method of data collection was a survey—which requires participants to self-report. It is possible that when reading the
questions, the participant responded in a way that they “should” or “plan to”—but it may not be how they respond in reality. A better design would take data directly from Facebook. However, this kind of design is somewhat unreasonable: it requires access to a large amount of Facebook profiles (which can violate privacy), relationships among the Facebook profiles, and for the profiles to contain health behavior change posts. Additionally, Sherman found that intention is predictive of behavior, so this limitation may not be a large constraint on the study (Sherman, 1980).

While the sample size was substantial, there was not much in variety of participants. A vast majority was white and educated, which is not very representative of the large variety of users on Facebook. A future study could seek more diversity in participants.

Additionally, in analysis we were examining response as a proxy for support. While it is optimistic to believe all responses would be positive, there is the real possibility that a comment, text message, or phone call could be destructive (though a “Like” only has a positive connotation). People may feel the need to express some sort of negative opinion about a behavior change that ends up hurting the poster’s feelings. A future study could incorporate a “positive,” “neutral,” or “negative” indicator when a participant is choosing to respond, to better describe the interaction occurring.

When giving the options of response type, it is possible that a survey participant would have wanted to respond in some other way. Although we feel as though the important options are there, the participant may have wanted another response method and chose “none of the above” instead—which is a misrepresentation of the participant’s intent (he/she did want to respond, just not by any of the methods listed). Future work could allow for an “other” option, which would more accurately capture intent to respond.
Although this research covers three common behaviors and three key relationships, there is more of each to be studied. For relationships, there could be more specificity achieved in each level. Instead of “family member,” a participant could be asked about their mother, sibling, father, and so on. “Close friend” can be further dissected into a male or female friend, and whether you have known this friend for a long time or not. A study could be done that looks into these more specific relationships, or looks into other types of behavior change.

Finally, this study does not identify and examine every factor that could contribute to response—that would be unreasonable. However, there are some additional factors that could be included in a future study. Whether the poster has told the reader about their behavior change could have an impact on response. And, every kind of health behavior has an associated health risk or benefit: could that affect response? Each post could also have different features, such as containing an image, link, video, emotional appeal, or health fact—it is possible these features impact response as well.
Appendix A

Survey
INFORMED CONSENT FORM FOR SOCIAL SCIENCE RESEARCH

The Pennsylvania State University
Title of Study: Health Behaviors on Social Media
IRB #: STUDY00002788

Principal Investigator:
Corbin Reno
College of Information Sciences and Technology
cfr5045@ist.psu.edu

Advisor:
Dr. Erika Poole
College of Information Sciences and Technology
epoole@ist.psu.edu

1. Purpose of the Study: The purpose of this research study is to explore how people feel about seeing certain health behaviors posted to Facebook.

2. Procedures to be followed: After reviewing this information and deciding to participate, you will be asked to complete a questionnaire. This information will not be associated with your answers to the questionnaires, and no other identifying information will be collected.

3. Duration: It will take approximately 3 minutes to complete the questionnaire.

4. Compensation: You will be compensated $0.15 for your time through Amazon Mechanical Turk.

5. Statement of Confidentiality: Your participation in this research is confidential. The data will be stored and secured in a password protected file and/or within a locked office, as applicable. Your confidentiality will be kept to the degree permitted by the technology used. In the event of any publication or presentation resulting from this research, no personally identifiable information will be disclosed. The Pennsylvania State University’s Office for Research Protections, the Institutional Review Board and the Office for Human Research Protections in the Department of Health and Human Services may review records related to this research study. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared.

6. Right to Ask Questions: Please contact cfr5045@ist.psu.edu with questions, complaints, or concerns about this research. You can also call the following number if you feel this study has harmed you. If you have any questions, concerns, problems about your rights as a research participant or would like to offer input, please contact Penn State's Office for Research Protections (ORP) at (814) 865 - 1775. The ORP cannot answer questions about research procedures. Questions about research procedures can be answered by the research team.

7. Voluntary Participation: Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer. Because the results of the study could be affected if the full purpose is known prior to your participation, the purpose of the study cannot be explained to you at this time. You will have an opportunity to receive a complete explanation purpose following completion of the study.

8. Qualification: You must be 18 years of age or older to take part in this research study. If you agree to take part in this research study, please select the ">>" button. By clicking the ">>" button, you agree to participate in this study.
Demographics and Qualification

Please answer the following qualifying questions.

What is your gender?
- Male
- Female

What is your age?
- Under 18
- 18-24
- 25-44
- 45-64
- Over 65

What is the highest level of education you have completed?
- Less than High School
- High School / GED
- Some College
- 2-year College Degree
- 4-year College Degree
- Masters Degree
- Professional Degree (JD, MD)
- Doctoral Degree

Which race do you identify with primarily?
- White
- Black or African-American
- Hispanic
- Asian
- Native American
- Native Hawaiian or other Pacific Islander
Which of these social networking sites have you used in the past 12 months?

- Twitter
- Facebook
- LinkedIn
- Pinterest
- Google+
- Tumblr
- Instagram
- None of these

Attention Check

Recent research on decision making shows that choices are affected by context. Differences in how people feel, their previous knowledge and experience, and their environment can affect choices. To help us understand how people make decisions, we are interested in information about you. Specifically, we are interested in whether you actually take the time to read the directions; if not, some results may not tell us very much about decision making in the real world. To show that you have read the instructions, please ignore the question below about how you are feeling and instead check the “none of the above” option as your answer.

Please check all the words that describe how you are currently feeling.

- Interested
- Distressed
- Excited
- Upset
- Guilty
- Scared
- Hostile
- Enthusiastic
- Proud
- Irritable
- Alert
- Inspired
- Enthusiastic
- Nervous
- Determined
- Attentive
- Scared
- Hostile
- Enthusiastic
- Proud
- Irritable
- Alert
- Inspired
- Enthusiastic
- Nervous
- Determined
- Attentive
- Scared
- Hostile
- Enthusiastic
- Proud
- Irritable
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- Alert
- Inspired
- Enthusiastic
- Nervous
- Determined
- Attentive

Vignette and Initial Questions

$\{\text{Im://Field/1}\}$

Do you personally feel that the behavior found in the Facebook post is an important issue in the world?

- Yes
- No

Have you personally attempted to achieve this behavior?
Yes
No

Do you know someone who has attempted to achieve this behavior?

Yes
No

How appropriate is this post for social media?

<table>
<thead>
<tr>
<th>Appropriateness</th>
<th>Absolutely Inappropriate</th>
<th>Inappropriate</th>
<th>Slightly Inappropriate</th>
<th>Neutral</th>
<th>Slightly Appropriate</th>
<th>Appropriate</th>
<th>Absolutely Appropriate</th>
</tr>
</thead>
</table>

In what ways would you respond to or engage with this post if it is the first time you’re seeing it on Facebook?

- [ ] Like the post
- [ ] Comment on the post
- [ ] Share the post with others
- [ ] Send a private Facebook message to the poster
- [ ] Contact the poster via text message
- [ ] Contact the poster via phone call
- [ ] Contact the poster in-person
- [ ] None of the above

Now, imagine that this is not the first time you’re seeing this person post about this behavior. However this time, imagine they have posted about it, but only occasionally. Would this change the way you respond to or engage with the post compared to your original choices?

Yes
No

Again, imagine that this is not the first time you’re seeing this person post about this behavior. However this time, imagine they have posted about it very frequently. Would this change the way you respond to or engage with the post compared to your original choices?

Yes
No
To finish the survey, please answer the follow-up questions on this page.

Below is the Facebook post and information from the previous page for your reference:

$\{\text{Image://Field/1}\}$

In what ways would you respond to or engage with the post, if the poster has posted about it only occasionally?

- [ ] Like the post
- [ ] Comment on the post
- [ ] Share the post with others
- [ ] Send a private Facebook message to the poster
- [ ] Contact the poster via text message
- [ ] Contact the poster via phone call
- [ ] Contact the poster in-person
- [ ] None of the above

In what ways would you respond to or engage with the post, if the poster has posted about it very frequently?

- [ ] Like the post
- [ ] Comment on the post
- [ ] Share the post with others
- [ ] Send a private Facebook message to the poster
- [ ] Contact the poster via text message
- [ ] Contact the poster via phone call
- [ ] Contact the poster in-person
- [ ] None of the above

Which statement(s) best describe your personal experience with behavior found in the Facebook post?

- [ ] I am currently attempting to achieve this behavior.
- [ ] I have tried to achieve this behavior in the past, and have succeeded.
- [ ] I have tried to achieve this behavior in the past, and have not succeeded.
- [ ] None of the above
Which statement(s) best describe your exposure to the behavior found in the Facebook post?

- [ ] I know someone who is currently attempting to achieve this behavior.
- [ ] I know someone who has attempted to achieve this behavior, and has succeeded.
- [ ] I know someone who has attempted to achieve this behavior, and has not succeeded.
- [ ] None of the above

Rate how likely you are to attempt the behavior in the near future.

<table>
<thead>
<tr>
<th>Likelihood of attempting behavior</th>
<th>Extremely Unlikely</th>
<th>Unlikely</th>
<th>Neutral</th>
<th>Likely</th>
<th>Extremely Likely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Rate how confident you are that you can achieve the behavior found in the Facebook post, where 0 is "not confident" and 100 is "very confident."

<table>
<thead>
<tr>
<th>Confidence in achieving behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

Survey Completion

Congratulations, you have completed the survey! Thank you for taking this survey. We appreciate your participation!

In this study, we are interested in examining what factors contribute to one's intention to respond to a post on Facebook about health behaviors. Your participation has helped us gain valuable insights that may help people achieve their health behaviors.

Here is your completion code: $\{\text{Field/survey\_code}\}$

**But wait, you're not done yet!**

In order to receive compensation for this survey on Mechanical Turk, please click the ">>" button below, and then enter the completion code into Mechanical Turk. You must both click the ">>" button AND enter the completion code into Mechanical Turk to receive compensation.
Appendix B

Participant Treatments

Think of a friend who you speak to regularly and trust—someone you consider a close friend. Your close friend has been smoking for many years. Your close friend tells you that he/she is going to try to quit smoking. Imagine that your close friend posts the following on Facebook, and hasn't posted about this topic before:

![Your Close Friend](image.jpg)

**Your Close Friend**

3 hrs

Trying to kick the habit! I'm quitting smoking, and I'm very hopeful that I'll be successful.

Like · Comment · Share

Imagine that one of your family members has been smoking for many years. Your family member tells you that they are trying to quit smoking. Imagine your family member posts the following on Facebook, and hasn't posted about this topic before:

![Your Family Member](image.jpg)

**Your Family Member**

3 hrs

Trying to kick the habit! I'm quitting smoking, and I'm very hopeful that I'll be successful.

Like · Comment · Share

Think of someone you consider an acquaintance (someone you know slightly, but would not consider a friend). You are aware that this acquaintance has been smoking for many years, but is now trying to quit smoking. Imagine that your acquaintance posts the following on Facebook, and hasn't posted about this topic before:
Think of a friend who you speak to regularly and trust-- someone you consider a close friend. This close friend has been struggling with their weight for many years. Your close friend tells you that he/she is trying to eat healthier to maintain a healthier weight. Imagine that your close friend posts the following on Facebook, and hasn't posted about this topic before:

Your Close Friend
3 hrs

Trying to kick the habit! I'm quitting smoking, and I'm very hopeful that I'll be successful.

Like · Comment · Share

Think of someone you consider an acquaintance (someone you know slightly, but would not consider a friend). You are aware that this acquaintance has been struggling with his/her weight for many years, but is now trying to eat healthier to maintain a healthier weight. Imagine that your acquaintance posts the following on Facebook, and hasn't posted about this topic before:

Your Acquaintance
3 hrs

Imagine that one of your family members has been struggling with their weight for many years. Your family member tells you that he/she is trying to eat healthier to maintain a healthier weight. Imagine that your family member posts the following on Facebook, and hasn't posted about this topic before:

Your Family Member
3 hrs

Eating healthy! It's something I have to work at everyday, but I'm hoping it will pay off.

Like · Comment · Share
Think of a friend who you speak to regularly and trust-- someone you consider a close friend. This close friend has been very inactive and sedentary for many years. Your close friend tells you that he/she is trying to exercise more to get active. Imagine that your close friend posts the following on Facebook, and hasn't posted about this topic before:

**Your Close Friend**
3 hrs

Eating healthy! It's something I have to work at everyday, but I'm hoping it will pay off.

Like · Comment · Share

Imagine that one of your family members has been very inactive and sedentary for many years. Your family member tells you that he/she is trying to exercise more to get active. Imagine that your family member posts the following on Facebook, and hasn't posted about this topic before:

**Your Family Member**
3 hrs

I need to work out more! Really have to increase how often I exercise, I hope it will pay off.

Like · Comment · Share

Think of someone you consider an acquaintance (someone you know slightly, but would not consider a friend). You are aware that this acquaintance has been very inactive and sedentary many years, but is now trying to exercise more to get active. Imagine that your acquaintance posts the following on Facebook, and hasn't posted about this topic before:

**Your Acquaintance**
3 hrs

Eating healthy! It's something I have to work at everyday, but I'm hoping it will pay off.

Like · Comment · Share
I need to work out more! Really have to increase how often I exercise, I hope it will pay off.

Like · Comment · Share
BIBLIOGRAPHY


http://doi.org/10.1145/2470654.2470657


http://doi.org/10.2196/jmir.3869


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West Newton, PA 15089

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EDUCATION
The Pennsylvania State University  Schreyer Honors College
M.S. in Information Sciences and Technology
Interdisciplinary Graduate Minor in Computational Science
B.S. in Information Sciences and Technology
Honors Thesis: Exploring Peer Intention to Respond to Health Behavior Change on Facebook
B.S. in Finance, Smeal College of Business

EXPERIENCE
Teaching Assistant, SRA 497A: IST Statistics  Penn State College of IST
University Park, PA  August 2014 – May 2015
• Held office hours to help students one-on-one when they are having difficulty with course concepts
• Asked by instructor to be Teaching Assistant again for spring 2015 if possible

Project Analytics Intern  Verizon Wireless
Bedminster, NJ  June 2014 – August 2014
• Created a dashboard implementation plan to report on key performance indicators of IT projects
• Consolidated a complex manual process for reporting into an automated and streamlined process

Teaching Assistant, IST 210: Database Applications  Penn State College of IST
University Park, PA  January 2014 – May 2014
• Taught laboratory sessions once a week; assisted the instructor in teaching three times a week
• Received stellar ratings from both the instructor and students in all categories of teaching

Cognitive Systems Engineering Intern  Resilient Cognitive Solutions
Pittsburgh, PA  May 2013 – August 2013
• Designed an application to streamline the Systems Engineering to Software Engineering handoff
• Consulted with public and private sector clients to design cognitively-driven software solution
• Contributed to business proposals by identifying requirement gaps in the current state of the art

IT Program Management Intern  Central Intelligence Agency
McLean, VA  May 2012 – August 2012
• Managed CIA’s Data Visualization software portfolio, evaluating software for business needs
• Led an enterprise-wide IT upgrade project while working with an external vendor
• Acquired a software product to empower decision analyst workflows and grounded rationales
• Received a Challenge Coin award not typically given to interns, for exemplary work ethic

Application Development Intern  Dollar Bank
Pittsburgh, PA  May 2011 – August 2011
• Met with various internal clients to retrieve requirements for an application development request
• Developed new and insightful data-driven reports to uncover untapped customer bases
• Debugged existing programs reported as malfunctioning or inefficient, and developed a solution

SKILLS:
General: Project Management, Program Management, Task Analysis, Process Improvement
Data Analysis: Predictive Modeling, Information Visualization, Research Methods, Cluster Analysis
Development: Java, Python, PHP, JavaScript, SQL, UML, XML, JSON, HTML, CSS, Various APIs

LEADERSHIP:
Communications Director, Penn State THON  April 2014 – Current
• Manage strategic communications and university relations for the largest student-run philanthropy
• Disseminate information to 15,000 students to facilitate revenues of $13 million per year

Technology Director, Penn State Homecoming  November 2012 – November 2013
• Oversaw all technological needs of the largest student-run parade celebration in the country
• Supervised a team of 8 Analysts and Developers; distributed IT projects by priority