The Number of Likes Associated with Given Health-Related Messages on Facebook: The Moderating Effect of Value Involvement

Dissertation

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By

Ji Young Lee, M.A.

Graduate Program in Communication

The Ohio State University

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Dissertation Committee:

Michael D. Slater, Advisor

David Ewoldsen

Brandon Van Der Heide
Abstract

Social media (e.g., Facebook) are often used to share health-related messages (e.g., in regard to drinking). It is also common for Facebook users, especially college students, to indicate that they like such messages through the liking feature on Facebook. Despite the wide use of consensus cues of this nature on social media, however, few studies have presented a conceptual definition of what constitutes a consensus cue (e.g., the number of “likes”). The present research attempted a clear definition of what constitutes a consensus cue on Facebook conceptually and operationally based on a careful review of the literature. Study 1 manipulated the number of likes associated a sunscreen message (i.e., no likes, 1 like, 2 likes, 15 likes, 34 likes, or 68 likes). The results showed a threshold point at which the number of likes functions as a consensus cue on Facebook. Participants tended to perceive the sunscreen message as having many likes when no likes, 15 likes, 34 likes, or 68 likes were posted to it compared to when 1 like or 2 likes were posted to it. Results also showed an interaction effect between the number of likes and issue involvement on behavioral intention. In the comparison between the no-likes and the 64-likes conditions, for participants high in issue involvement, the message with 68 likes tended to increase intentions to use sunscreen more than was the message without any likes. For participants low in issue involvement, the same message without any likes tended to increase their intentions more than the message with 68 likes.
The findings of Study 1 suggest that whether or not participants used a consensus cue might depend on the individuals’ characteristics and on the message type. Therefore, Study 2 crossed no likes vs. 1 like vs. 68 likes and an anti- vs. a pro-binge-drinking message to investigate the moderating effect of value involvement on the effect of the number of likes associated with such messages on college binge drinkers. The results showed significant interaction effects on descriptive norms and behavioral intentions. In processing an anti-binge-drinking message, binge drinkers low in value involvement tended to be influenced by such a cue, such that a large number of likes tended to reduce intentions to engage in binge drinking and descriptive norms more than did the absence of likes. For binge drinkers high in value involvement, a large number of likes tended to have a boomerang effect by increasing behavioral intentions and descriptive norms. In processing a pro-binge-drinking message, however, regardless of the number of likes or message type, binge drinkers low in value involvement tended not to be influenced by such a cue in regard to either behavioral intentions or descriptive norms. Similarly, binge drinkers high in value involvement tended to perceive that many of their peers engaged in binge drinking regardless of the number of likes. Theoretical and practical implications are discussed.
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Vita

2008............................... B.A. Telecommunication, Pennsylvania State University

2011............................... M.A. Media Studies, Pennsylvania State University

Publications


Fields of Study

Major Field: Communication
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Chapter 1: Introduction

Social media (e.g., Facebook) are often used to share health-related messages and photographs that refer to health risks and/or treatments (Rivis, Sheeran, & Armitage, 2006) by laypersons (i.e., those who are not medical experts) as well as health organizations and health professionals, including the Centers for Disease Control and Prevention (CDC). In particular, it is common for laypersons, including college students, to use their own social media profiles to post messages and/or photographs that are anti- or pro-health-risk behaviors. For instance, Moreno et al. (2010) conducted a content analysis of alcohol-related messages (e.g., personal descriptions of alcohol use) and photographs (e.g., photographs depicting people drinking alcohol) on adolescents’ social media profiles. According to a content analysis of 400 randomly selected profiles, 225 (56.3%) included alcohol-related messages and photographs, and there were 341 references to alcohol in total (Moreno et al., 2010).

Recent studies have tested the effect of health-related messages and photographs posted to Facebook profile pages on the willingness to engage in health-risk behaviors (Egan & Moreno, 2011; Huang et al., 2014; Litt & Stock, 2011; Moreno, Briner, Williams, Walker, & Christakis, 2009). For instance, in a longitudinal study of egocentric/personal friendship network data among adolescents, Huang et al. (2014)
found that among adolescents who were exposed to friends’ drinking or partying photographs on social media (e.g., Facebook), there was an increased likelihood of alcohol use. This effect was especially significant among adolescents who had close friends who do not drink alcohol. In their study on the effect of descriptive norms (i.e., what most people do in a given social group) on adolescents’ willingness to use alcohol, Litt and Stock (2011) manipulated the descriptive norms for alcohol use by asking participants in the alcohol-user condition to view the Facebook profile pages of four older peers: three pages with alcohol-related messages and photographs and one profile page with non-alcohol-related messages and photographs. Participants in the control condition, on the other hand, were asked to view three Facebook profile pages with non-alcohol-related messages and photographs and one profile page with alcohol-related ones. The researchers found that compared to those in the control condition, the participants in the alcohol-user condition were likely to have greater normative perceptions of alcohol use and a more positive attitude toward alcohol use, which further positively influenced their willingness to use alcohol.

Research studies to date have demonstrated that exposure to alcohol-related messages and photographs on Facebook increases the willingness to engage in health-risk behaviors (e.g., binge drinking). However, little attention has been paid to some interesting features on Facebook, including, for example, the effect of likes on the willingness to engage in health-risk behaviors. When individuals are exposed to messages on Facebook, they are exposed to the number of likes those messages have attracted.
However, whether and the extent to which likes influence perceived norms, attitudes, and behavioral intentions has yet to be determined.

Specifically, the like feature allows users to indicate that they like a message by simply clicking a button. This feature allows users to see how many others on Facebook like the message through the number of likes associated with it. For instance, if 1,000 users have indicated that they like a message, people reading the original message will also be exposed to this additional message following it: “1,000 people like this.” Therefore, from the perspective of the Heuristic Systematic Model (HSM) (Chaiken, 1980), given that it serves as the aggregate opinions of friends within a user’s network, the number of likes associated with a given message functions as a consensus cue.

This like feature is commonly used in health-related messages on Facebook. For instance, as of 2011, the American Cancer Society and the Centers for Disease Control and Prevention (CDC) had about 228,000 likes and 82,000 likes on their Facebook pages, respectively (Dolan, 2011).

Although the like features on Facebook are widely used, few studies have attempted to define this term conceptually. This lack of research on consensus cues in the context of social media has led to conceptual limitations as well as a relatively weak linkage between its conceptual and operational definitions. Thus, Study 1 focuses on conceptually and operationally defining the number of likes associated with a given message on Facebook from the perspectives of the Heuristic Systematic Model (HSM) (Chaiken, 1980), the Elaboration Likelihood Model (ELM) (Petty & Cacioppo, 1981,
1986), Attribution Theory (Kelley, 1967), and the norms approach (e.g., Deutsch & Gerard, 1955).

Whether or not a user considers the number of likes posted to a given health-related message in order to process it, however, may depend on either the individual’s characteristics (i.e., value involvement with alcohol use here) and/or message type (i.e., whether or not the message is counter-attitudinal). The HSM posits that individual differences are likely to influence the perceived reliability of heuristic cues; therefore, according to this view, the judgmental impact of heuristic cues increases as the perceived reliability of heuristic cues increases (Chaiken, Liberman, & Eagly, 1989). For instance, value involvement with alcohol use (i.e., personal commitment to alcohol use) varies among college binge drinkers (Slater, 2001). Such differences further influence how such drinkers process a drinking-related message (i.e., a counter-attitudinal message) (e.g., Lee, Slater, Tchernev, in press; Slater & Rouner, 1996), referred to as value-protective processing and value-affirmative-processing addressed in the Extended-Elaboration Likelihood Model (E-ELM) (Slater, 2002) and defensive processing addressed in the HSM (Chaiken et al., 1989). The different types of message processing may further influence the extent to which users perceive heuristic cues to be reliable and whether users draw on such cues in evaluating health-related messages on Facebook.

From the perspectives of the E-ELM (Slater, 2002), the HSM (Chaiken, 1980), and the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), therefore, Study 2 examines the possible moderating factors influencing participants’
normative perceptions of and responses to health-related messages in respect to value involvement.
Chapter 2: Study 1

Consensus Cues on Social Media

The first study aims to present an explication of consensus cues and to assess how different numbers of likes (relative to the national average of friends for a Facebook user) do or do not serve as consensus cues. Defined as a general agreement about an opinion or idea or the majority of opinions in a given group from Merriam-Webster, consensus can easily be found in everyday life, for example, in advertising (e.g., 90% of people who have used this product are satisfied with it) or politics (e.g., 80% of college students agree with the new smoking policy on campus). Further, from the perspectives of the HSM (Chaiken, 1980), consensus cues can trigger consensus heuristics (i.e., “If other people agree with something, then it’s probably true,” Chaiken, 1987, p.4). As a result, consensus cues are likely to help people consider what is normal in and expected by a given group as well as to make a simple decision (Chaiken, Liberman, & Eagly, 1989; Erb, Bohner, Hewstone, Werth, & Reinhard, 2006).

Consensus cues have been widely used to influence individuals’ attitudes (e.g., Giner-Sorolla & Chaiken, 1997; Maheswaran & Chaiken, 1991) and how they process information including the perceived credibility of a message (e.g., Chaiken & Stangor, 1987; Eagly & Chaiken, 1993). Over time, various types of consensus cues have gained a
presence, and, in fact, become an important, even an expected, feature in many online environments. For example, a well-known instance is the star rating that consumers give to products on shopping sites such as Amazon. In fact, people are likely to reach a conclusion about a product’s quality based on its rating. The effects of online consensus cues on message evaluation as well as on attitudes toward and behavioral intentions in regard to online messages have been widely demonstrated in various fields of communication, including online movie review sites (Flanagin & Metzger, 2013) and e-commerce (e.g., Dholakia & Soltysinski, 2001; J. H. Huang & Chen, 2006; Park & Lee, 2008;). Further, on social media (e.g., Facebook, Twitter, and YouTube), people can also find such consensus cues. For instance, Facebook features the number of likes, thereby allowing people to see how many people liked a given message.

The effect of consensus cues has been tested in research on mass communication settings (e.g., newspaper websites and e-commerce). However, in spite of its wide use on social media (i.e., the interplay of mass and interpersonal settings, for detail, Fogg, 2008), consensus cues on social media have received relatively little attention from scholars. This lack of research into consensus cues on social media means that there is some conceptual confusion over how to define consensus cues in this context. Specifically, few studies have presented a conceptual definition of what constitutes an online consensus cue, including in the context of Facebook. In other words, we do not know whether or the extent to which there are similarities or differences between how users perceive consensus cues in mass communication settings where the cues arise from postings/ratings by anonymous people and consensus cues in social media settings where
the cues arise from users connected in an existing social network. In addition, online consensus cues are likely to be referred to as bandwagon cues or endorsement cues (e.g., Fu & Sim, 2011; Metzger, Flanagin, & Medders, 2010) although these three concepts are distinct, as will be explained in a later section.

These issues, in turn, lead to conceptual limitations as well as to a relatively weak linkage between the conceptual and operational definitions of consensus cues. Further, with the failure to capture the concept of online consensus cues on, for example, Facebook, the focal context of the present study, it is also likely that there are some methodological limitations, including in regard to manipulating variables. Thus, the aim of this first study is to redefine the consensus cue on Facebook conceptually and operationally based on a careful review of the literature.

Previous Explications of Consensus Cues

*Aggregated opinions in a given group.*

From the perspectives of dual-process models, the ELM (Petty & Cacioppo, 1981, 1986) and the HSM (Chaiken, 1980), consensus cues can be referred to as a given group’s collective social endorsement. Specifically, both the ELM (Petty & Cacioppo, 1981, 1986) and the HSM (Chaiken, 1980) posit that when individuals process information, they use two distinct routes of information processing—central and peripheral routes—and two modes of processing—systematic processing and heuristic processing, respectively. Specifically, when the central route of processing/systematic
processing mode is activated, people are likely to elaborate a message carefully in order to evaluate it. In these cases, the message argument is likely to be critical in influencing how people evaluate a message. On the other hand, when the peripheral route of processing/the heuristic-processing mode is activated, people tend to rely heavily on cognitive heuristics or mental shortcuts from memory instead of elaborating a message in order to evaluate a message. Heuristic cues refer to “any variable whose judgmental impact is hypothesized to be mediated by a simple decision rule” (Chaiken et al., 1989, p. 216). Further, heuristic cues are used to judge a message and often lead to heuristics (Chaiken et al., 1989). One example of a heuristic cue is a consensus cue that leads to consensus heuristics. For example, a person may think “If other people believe it, then it’s probably true” (Chaiken, 1987, p. 4).

Similarly, based on the HSM framework, Giner-Sorolla and Chaiken (1997) and Todorov, Chaiken, and Henderson (2002) defined a consensus cue as “the presentation of the results of an opinion poll in which the majority of respondents agree with the advocated position” (Todorov et al., p. 197). Axsom, Yates, and Chaiken (1987) also defined consensus cues as information about the ostensible opinion of others that further leads to the following consensus heuristics: “If other people think the message is correct (incorrect), then it is probably valid (invalid)” (p. 31). In other words, this consensus cue implies correctness heuristics as well (i.e., “[The statement that] the majority of respondents agree is associated with a high probability that the advocated persuasive position is valid” (Todorov et al., 2002, p. 197). This heuristics further influences people’s perceptions of the credibility of a given message. Similarly, in their study on the
effect of consensus cues on consumers’ perceived credibility of a firm, Benedicktus and Andrews (2006) defined consensus cues as aggregated information about consumers and assumed that such cues can positively influence consumers’ perceived credibility of a firm.

One of the important considerations pertaining to aggregated opinions is the nature of the sample from which a consensus cue arises. The critical point in terms of whether the message recipient’s decision-making process is influenced is whether he/she has any relationship to the sample. Therefore, many studies have taken this consideration into account. For example, undergraduate students participating in a study were informed that poll results (i.e., a consensus cue) were based on the opinions of peer students (e.g., Darke et al., 1998; Giner-Sorolla & Chaiken, 1997). In another instance, Giner-Sorolla and Chaiken (1997) provided opinion poll results for a proposed mandatory essay-exam program as a consensus cue to their study participants. The undergraduate student participants in the study were informed that the opinion poll results were based on the opinions of students at the same school.

Another critical consideration in understanding the function and determining the validity of consensus cues from the HSM perspective is that of sample size (e.g., Darke et al., 1998). That is, according to the law of large numbers, opinion polls that draw on a large sample are likely to be perceived as more reliable estimates of consensus than are polls that draw on a small sample (Darke et al., 1998). For instance, Darke et al. (1998) found that study participants who were informed that their university was planning to implement comprehensive exams the following year were more likely to have a positive
attitude toward the exam proposal when they were told that 80% of a sample of 1,000 students agreed with the proposal than when they were told one of the following: that the same sample disagreed with the proposal, that 80% of a sample of 10 students agreed with it, or that 80% of a sample of 10 students disagreed with it. In particular, when the sample size of the poll was small (i.e., 10 students), the effect of the poll (i.e., the consensus cue) was likely to have no impact on the participants’ attitudes toward the exam proposal. In other words, for those high in issue involvement, the consensus cue based on small sample size was not likely to be perceived as reliable. It should be noted that these studies provided participants with information on percentages, rather than using absolute numbers such as those provided as the number of likes for a Facebook posting.

In addition, based on a focus group study, Metzger et al. (2010) found that participants were likely to use social- and group-based means of evaluation and cognitive heuristics to assess the credibility of online information. Specifically, most participants agreed that they were likely to perceive online messages or ratings of the messages as credible as the number of available testimonials or opinions (i.e., social information pooling) on a given website increased. In other words, the perceived reliability of online heuristic cues differs depending on the size of the sample, such that most participants agreed that when very few testimonials or opinions are available, they perceive these to be relatively less credible than when many testimonials or opinions are available.

In their recent study of movie review sites, Flanagin and Metzger (2013) suggested that the number of people who have contributed to the product rating is important in users’ assessments of the credibility of the rating. The researchers found that
under the user-generated review rating condition (vs. the expert-generated review rating condition), the number of people who had contributed to a rating (1 vs. 26 vs. 357) was positively associated with the participants’ perceived credibility of the review rating of a given movie and positively associated with the congruity between the participants’ ratings of the movie and the ratings from others. Specifically, when they saw that a large number of people had contributed to the review rating, the participants were more likely to perceive the rating as credible and to hold opinions congruent with the review rating than when they saw that a small number of people had contributed to the rating. Therefore, it is likely that the sample size is a critical factor in determining the extent to which people perceive a consensus cue as reliable.

*Information about how most people perform in a given situation.*

Attribution Theory (Kelley, 1967) posits that a given behavior can be attributed to a person, target or object, or situation. For instance, when people receive the message “Chris likes the anti-drinking message,” they may attribute it to the person (Chris), the target/object (the anti-drinking message), or the situation. Therefore, when people receive a health-related message, for example, they may attribute the large number of likes associated with the message to the health-related behavior/message and/or to the source of the message. Further, attributions are made based on the three factors of causal information: (1) consensus, (2) distinctiveness, and (3) consistency (Kelley, 1967). Specifically, from the perspective of Attribution Theory, consensus can be defined as the way in which most people perform in a given situation (Hansen & Donoghue, 1977).
Similarly, Krosnick and Sedikides (1990) defined consensus cues as statistical information about the way most people perform in a given situation. Unlike the definition from the HSM perspective, according to a definition based on Attribution Theory (Kelley, 1967), the sample of consensus information is not specifically identified—instead, the sample is perceived as a general population. Overall, it is often difficult to identify the sample that has generated consensus information.

Similarly, Erb et al. (2006) defined a consensus cue as information about how most other people perform or think in a given situation. Further, Erb et al. (2006) divided consensus cues into two dimensions: (1) inferred consensus cues and (2) explicit consensus cues. Specifically, inferred consensus cues can be referred to as a subjective representation of how most people, the majority vs. minority, behave and think in a given situation (Erb et al., 2006). On the other hand, the explicit consensus cues can be referred to as the statistical estimate of the consensus (e.g., 52% vs. 48%) (Erb et al., 2006).

Means to determine whether a behavior or opinion is considered a norm.

In studies about social norms, the notion of consensus has been used to determine whether a particular behavior or opinion is considered a norm (e.g., Kahneman, Knetsch, & Thaler, 1986; Maxwell & Ellen, 2010). As a result, similar to the definitions from Attribution Theory, consensus cues can be referred to as how most other people or the majority of the population behave and think in a given situation.
Consensus cue, Endorsement cue, and Bandwagon

In regard to the online environment, consensus cues are often referred to as endorsement cues or even bandwagon cues (e.g., Fu & Sim, 2011; Metzger et al., 2010). However, though related, these three concepts are distinct.

*Endorsement cues vs. consensus cues.*

Endorsement cues can be referred to as information derived from known others (e.g., friends, family members, experts). In other words, an endorsement cue is not necessarily information derived from many people, but it is always derived from known others. For instance, each Facebook user has a news feed where users can receive and post, like, and share messages posted by their Facebook friends to their own pages. For instance, if user A shares a message, his/her friends will receive that shared message in their own news feeds along with an indication that user A shared the message. In other words, based on this communication structure, user A’s friends know who shared the message. In such cases, the shared message is endorsed by user A (i.e., a friend in his/her Facebook network) and, therefore, can be considered an endorsement cue. In other words, an endorsement cue does not require collective social endorsement.

Given that consensus cues can be defined as the aggregated opinions of others in a given group, consensus cues differ from endorsement cues. Specifically, an endorsement cue does not require collective social endorsement, whereas a consensus cue does require endorsement of this nature. For instance, in the previous example about sharing a message on Facebook, user A’s friends may not perceive the shared message as the
aggregated opinion of friends in their Facebook network because only one of their friends has shared it. As a result, consensus heuristics will not be triggered by this endorsement cue (i.e., the shared message from a friend in one’s Facebook networks here). Therefore, consensus cues differ from endorsement cues in terms of whether information is based on collective social endorsement.

Given that user A can be considered a visual message source (i.e., those who deliver a message) rather than an original source of the message (i.e., those who produce a given message) (Sundar & Nass, 2001), endorsement cues can be similar to source proximity cues (i.e. “the distance of a message from its original source,” Lee & Sundar, 2013, p. 509). On this point, there are a number of studies on endorsement cues in the Internet environment where multiple source layers are present (e.g., DiMuzio & Sundar, 2012; Kang, Bae, Zhang, & Sundar, 2010; Lee & Sundar, 2013). For instance, online news articles often embed hyperlinks related to the original news article, such that even the hyperlinks can function as endorsement cues (DiMuzio & Sundar, 2012). Thus, it is reasonable to conclude that endorsement cues are closer in terms of definition to source proximity cues than to consensus cues.

Bandwagon cues vs. consensus cues.

The term bandwagon refers to individuals’ tendency to follow or imitate the beliefs and behaviors of others in order to conform to others (Bass, 1969; Simon, 1954). The MAIN model (Sundar, 2008) posits that interface affordances (modality, agency, interactivity, and navigability) are likely to help users process and evaluate online content
under conditions of information overload (i.e., digital media). The fundamental assumption of the MAIN model is that Internet users can be considered cognitive misers. Therefore, they are likely to process information heuristically rather than systematically. According to the MAIN model, each interface cue is conveyed through four affordances—modality, agency, interactivity, and navigability.

Bandwagon cues, in particular, are a manifestation of agency affordance (Sundar, 2008). In terms of agency affordance, the MAIN model posits that in digital media, unlike in traditional media, the identity of the source is blurry:

[T]he agency affordance of digital media capitalizes on this confusion and makes possible the assignment of sourcing to particular entities in the chain of communication, … from a collection of other users (e.g., polled opinions of one’s friends on Facebook) to oneself (e.g., one’s space in myyahoo.com or playlist on iPod), among many others (Sundar, 2008, p. 83).

Given that bandwagon refers to individuals’ tendency to follow or imitate the beliefs and behaviors of other in order to conform to others (Bass, 1969; Simon, 1954), bandwagon heuristics triggered by a bandwagon cue implies that a given user is likely to follow other users’ opinions and behaviors if a message has met with collective social endorsement (“if others think that this is a good story, then I should think so too,” Sundar, 2008, p. 83). For instance, on newspaper websites (e.g., New York Times), users can identify which articles others have most frequently viewed, emailed, shared on Facebook, and tweeted through the list features. Based on an econometric model, Fu and Sim (2011) found that on the Internet Archive (www.archive.org), a website for user-
generated digital content, video clips that had attracted a large number of views within a given length of time were more likely to attract more views than video clips that had attracted a small number of views over the same period. Bandwagon cues are, thus, similar to consensus cues in that both kinds of cues are based on collective social endorsement.

However, the definition of a bandwagon cue does not rely on sample size in establishing collective endorsement. For instance, on newspaper websites, although users can identify which articles others have most frequently viewed and emailed, no information is available about either the number of users who have visited the website or the number of users who have viewed and emailed the articles. In other words, although users draw on bandwagon cues in assessing the popularity of content among the following a site attracts, such cues lack any statistical information pertaining to sample size. Therefore, given that consensus cues include the sample size of the aggregated opinions of a given group, consensus cues differ from bandwagon cues.

*Consensus cues on Facebook redefined.*

Based on the discussion so far, the consensus cue on Facebook (i.e., the number of likes associated with a given message) can be tentatively defined as the aggregated opinions of the friends in a user’s Facebook network. On visiting a Facebook profile page, a user is simultaneously shown the number of Facebook friends associated with the page and the number of likes associated with a given message. In this case, users may perceive the number of likes differently depending on the potential size of the sample as
defined by the number of Facebook friends specified on the profile page. Suppose that 9 people liked a particular message. Now, suppose that the source of the message has 360 Facebook friends. In this case, users will take into account the entire possible sample size of 360 in determining how well-liked the message is. That is, they will perceive the message as having only a modest response, as only 2.5% of the friends in this Facebook network indicated that they like the message.

On the other hand, now suppose that the source of the message has 10 Facebook friends. In this case, people may perceive that many others liked the message, as 90% of the friends in the Facebook network of the source of the message liked it. In other words, how the number of likes is perceived depends at least to some extent on the number of friends one a Facebook user has. Therefore, the number of likes associated with a given message on Facebook can be considered as a consensus cue rather than a bandwagon cue or an endorsement cue.

Recall, however, that one does not expect all of someone’s Facebook friends to have seen any given post. Therefore, as I will discuss below, the denominator is inherently uncertain: if there is an assumption that about 25% of friends see any given post, then 9 users would represent a 10% response. Second, not liking does not indicate disagreement, but liking does represent an indication of enthusiasm with respect to the posting. So, in the Facebook context, relatively small numbers of likes relative to number of friends may be indicative of wide support. Therefore, one of the objectives of the present study is to obtain empirical evidence regarding the impact of various numbers of likes, relative to a given number of friends, including relatively small numbers of likes.
Operationalization of Consensus Cues

In Maheswaran and Chaiken’s (1991) study, consensus cues were manipulated as follows: study participants in the positive-consensus condition were provided with the consensus information that 81% of 300 Western consumers who had used a product were extremely satisfied with it and the consensus information that less than 3% were extremely dissatisfied with it. On the other hand, participants in the negative-consensus condition were provided with the consensus information that 20% of 300 consumers were extremely satisfied with it and that 50% of consumers were extremely dissatisfied.

Darke et al. (1998) also treated consensus cues as an independent variable and used opinion poll results as a consensus cue. Specifically, similar to Maheswaran and Chaiken (1991), Darke et al. (1998) provided consensus information: depending on the condition to which the participant was assigned, he/she was told that 80% of a sample of 1,000 students agreed/disagreed with a proposal or that 80% of a sample of 10 students agreed/disagreed with it.

In their study on the interaction effect between consensus cues and a person’s vested interests on the perceived reliability of consensus cues, Giner-Sorolla and Chaiken, (1997) treated a consensus cue as an independent variable. Specifically, undergraduate student participants received a consensus cue about a proposed mandatory essay-exam. Specifically, depending on the condition to which the participants were assigned, they were informed that 68% of students at their school were against/in favor of the proposal, 12% were against/in favor of the proposal, or that 20% had indicated no opinion.
In their study of movie review sites, Flanagin and Metzger (2013) considered the number of people who have contributed to the product rating as a consensus cue and manipulated it as follows: 1 vs. 26 vs. 357. In other words, depending on the condition in which they were placed, participants received consensus information that the product ratings were based on 1 user, 26 users, or 357 users.

From the perspective of Attribution Theory, Hansen and Donoghue (1977) investigated how consensus cues influence perceptions that a given behavior is attributed to a person or target/object. Specifically, in Hansen and Donoghue’s (1977) study, the consensus cue was based on the amount of a beverage left in cylinders by people who were apparently the participants’ peers. In this study, participants serving as observers were asked to watch a videotape of a confederate drinking the beverage. The experimenter then brought the confederate’s cylinder to observers and asked the observers to place the cylinder in a cabinet. Specifically, in the high-consensus condition, the cabinet held 16 cylinders, each of which contained 200–240 ml that is similar to the confederate’s cylinder. And, in the low-consensus conditions, the cabinet held 16 cylinders, each of which contained 110–130 ml much less than the confederate’s one. In other words, based on the amount of the beverage remaining in the confederate’s cylinder and that of 16 cylinders, the participants perceived that the drinking behavior is because of either the taste of beverage or the characteristics of the participants who drank the beverage.

Erb et al. (2006) argued that consensus cues have two dimensions: (1) inferred consensus cues and (2) explicit consensus cues. Inferred consensus cues were
operationalized as majority vs. minority, whereas explicit consensus cues were operationalized as either 52% vs. 48% or 86% vs. 14% (Erb et al., 2006).

In studies on social norms, consensus cues have been used as a basis for determining whether a given behavior or opinion is considered a norm (e.g., Kahneman et al., 1986; Maxwell & Ellen, 2010). For instance, Kahneman et al. (1986) consider a behavior to be a norm if more than 50% of the respondents responded that the behavior is either fair or unfair. On the other hand, Maxwell and Ellen (2010) used the cutoff point of 65% to determine consensus.

In contrast to previous studies in which an arbitrary cutoff point was used (e.g., Giner-Sorolla & Chaiken, 1997; Darke et al., 1998; Erb et al., 2006; Flanagin & Metzger, 2013; Maheswaran & Chaiken, 1991), Benedicktus and Andrews (2006) conducted a pilot study in order to understand how consumers perceive consensus cues and to obtain the numerical value of consensus cues based on absolute magnitude estimation (AME) (Gescheider, 1988). According to the AME, in any given situation, participants are likely to assign a number to a stimulus (Gescheider & Hughson, 1991). That is, participants are likely to match their psychological impression of the size of the number (i.e., psychological magnitude) to their impression of the size of the number of a stimulus (Gescheider & Hughson, 1991). Based on the AME, Benedicktus and Andrews (2006) asked participants to assume that they would purchase a book online and to indicate in a table format the percentages that would best represent (1) an ideal, (2) a desired, (3) an average/a typical, and (4) minimally acceptable level of satisfaction on the part of others about the online company/seller. Next, the participants were asked to indicate the four
levels of satisfaction on a Y-axis in a graph. The results revealed confidence intervals for the means of each satisfaction level: (1) ideal satisfaction: percentages in the mid- to high 90s; (2) desired satisfaction: percentages of between 84 and 88; (3) typical/average satisfaction: percentages in the mid- to high 70s; (4) lowest acceptable satisfaction: percentages in the mid-60s to low 70s.

Based on the results from this pilot study, Benedicktus and Andrews (2006) used 90–99% as a high consensus cue and 64–70% as a low consensus cue. Specifically, one of their independent variables was the consensus sequence: they used 90%, 94%, and 99% for each period as high consensus cues. However, this approach and such high metrics for consensus do not make sense in the social media environment, in which absence of a like may simply mean someone did not see a posting or thought it was fine but was not so enthusiastic as to take the trouble to indicate a like for that posting.

Consensus Cues on Social Media vs. Consensus Cues in Mass Communication Settings

Consensus cues can easily be found on social media (e.g., Facebook). For instance, Facebook shows the number of users who have indicated that they like any given message. In this sense, from the HSM perspective (Chaiken, 1980), the number of “likes” on a given message on Facebook can be considered as showing the extent to which there is collective social endorsement, which further leads to a consensus heuristics (“If other people believe it, then it’s probably true,” Chaiken, 1987, p. 4).

Consensus cues on social media, however, differ from those in mass communication settings (e.g., newspaper websites and e-commerce) in terms of the
sample of the consensus cue. In other words, on Amazon, anonymous people contribute to the product rating and, therefore, it is very difficult if not impossible to identify those who have contributed to the rating. On the other hand, on Facebook, given that Facebook friends are part of an existing social network, users can refer to the number of likes associated with a given message to determine whether or not friends in their Facebook networks like a message. As a result, it is likely that friends in a user’s Facebook network are perceived as more trustworthy and credible than anonymous people in other mass media settings (Chu & Kim, 2011). Further, this perceived credibility of the sample of consensus cues (friends in the user’s social networks vs. anonymous others) may influence perceptions of the consensus cue (Chu & Kim, 2011). Specifically, users may perceive the consensus cue based on friends in their social network to be more credible than the consensus cues based on anonymous others (Chu & Kim, 2011). In other words, depending on the sample of the consensus cue (i.e., the reference group), the effect of consensus in social media and the effect in mass communication settings may vary.

Therefore, in this section, I differentiate between how consensus cues on social media differ from consensus cues in other online media settings based on the following approaches: social norms and norm.

Norms and Norm Theory

Based on his well-known autokinetic (light movement) study, Sherif (1936) defined social norms as “customs, traditions, standards, rules, values, fashions, and all other criteria of conduct which are standardized as a consequence of the contact of
individuals” (p. 3). Specifically, Sherif (1936) explored how group norms are established through an autokinetic effect and how people learn these norms over time. Sherif (1936) found that individuals are likely to follow a group’s initial judgments considered as establishing group norms and that such norms remain even when the initial members of a group are absent. Similarly, in his series of studies on judging the length of lines, Asch (1951, 1956) found that the study participants were likely to conform to the majority’s view even when this view was patently incorrect. These studies tested the influence of norms on behavior based on the extent to which individuals are motivated to fit in with a group.

Although in the initial studies on norms, scholars were likely to confine norms to social standards, norms have more than one dimension (Shaffer, 1983). Deutsch and Gerard (1955), for instance, pointed out that “the is” (i.e., informational norms) meaning of social norms differs from “the ought” (e.g., normative norms) meaning of social norms. Specifically, Deutsch and Gerard (1955) defined normative norms as “an influence to conform with the positive expectations of another” (p. 629) and informational norms as “an influence to accept information obtained from another as evidence about reality” (p. 629).

Cialdini, Reno, and Kallgren (1990) considered informational norms to be descriptive norms and normative norms to be injunctive norms. Descriptive norms refer to “what most people do” in a given social group, i.e., “what is typical or normal” (Cialdini et al., 1990, p. 1015). Briefly, based on their definition, descriptive norms can be understood as follows: “If everyone is doing it, it must be a sensible thing to do”
(Cialdini et al., 1990, p. 1015). For instance, as shown in Asch’s (1951) study of inaccurate judgment of line lengths and Sherif’s (1936) study of light movements, people are likely to follow the crowd. In other words, people in a social group can learn the descriptive norms of that group by observing what most of its members do. The group members’ perceptions of what most of the others in the group do further influences group behavior as any given members imitate the actions of the majority in the group (Cialdini et al., 1990). However, in this case, there are no social sanctions for noncompliance (Lapinski & Rimal, 2005). For instance, suppose that you purchase a recently released product on Amazon. You may take a look at the product rating (i.e., star rating) and you may note the number of people who contributed to it. Now, assume that the product has a four-star rating and 5,000 purchasers of the product contributed to that rating. In this case, the star rating functions as a consensus cue. However, those anonymous 5,000 users are not personally related to you; therefore, you do not care whether or not those users approve or disapprove of your decision to purchase the product. In other words, in this case, the consensus cue in a mass communication setting serves as information about how most other anonymous people think about a given product or perform a certain behavior as a descriptive norm. Thus, descriptive norms can serve as a mental shortcut or heuristic cue when people process information and behave according to them (Cialdini, 1988).

Unlike descriptive norms for which there are no social sanctions for noncompliance (Lapinski & Rimal, 2005), injunctive norms refer to what are acceptable or unacceptable behaviors in a given social group as rules or beliefs (Cialdini et al.,
In other words, injunctive norms describe the perception of what should be done rather than the perception of what most others are doing (Cialdini et al., 1990).

Similar to injunctive norms, subjective norms featured in the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) refer to the normative perception of what should be done. As a result, subjective norms can be considered a type of injunctive norm (Rhodes, Ewoldsen, Shen, Monahan, & Eno, 2014). However, subjective norms primarily focus on the reference group. Therefore, they refer to a person’s perception that others in the reference group think she/he should behave in a given way.

Reference groups can refer to groups with which people identify, that are psychologically significant to people, and that people use as a standard of comparison for their own values (Newcomb, 1943). For instance, peers can be considered a reference group among adolescents and college students. Further, based on social networks with the purpose of maintaining relationships with and interacting within a social network (Boyd & Ellison, 2007; Ellison, Steinfield, & Lampe, 2007), Facebook enables users to easily identify whether their Facebook friends are important to them/within their peer group. It is plausible to assume, therefore, that friends in a user’s Facebook network can be considered a reference group for that user.

In addition, given that the majority of any given Facebook user’s social network consists of his/her peers, users may perceive the model of a particular behavior or opinion to be acceptable in his/her peers. Therefore, they may be likely to imitate the model’s behavior or opinion (Eyal & Rubin, 2003; Moreno, 2011). Specifically, through
observing the number of likes associated with a message, users can think and behave in socially acceptable ways based on what they observe from their peers on Facebook. For instance, if numerous peers like an adolescent’s pro-binge drinking message on Facebook, adolescents who are exposed to the message and the number of likes associated with it may perceive that drinking is acceptable among their peers. Thus, it is likely that when a reference group, on Facebook in this example, supports an issue or behavior, members of that group think about or engage in the behavior according to the reference group’s norms (Terry & Hogg, 1996).

Subjective norms, however, can also be defined as a person’s perceptions of what important people in their lives actually do as well as a person’s perceptions that important people in their lives think they should behave in a given way. Ajzen, Joyce, Sheikh, and Cote (2011) conceptualized subjective norms according to two dimensions: injunctive norms (i.e., “the perceived expectations of important others”) and descriptive norms in (i.e., “the perceived behaviors of important others”) (p. 105). Similarly, in the Prototype/Willingness Model (PWM) (Gibbons, Gerrard, Blanton, & Russell, 1998), based on the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), subjective norms are considered to be both “what significant others actually do” (Rivis et al., 2006, p. 485) and perceptions of how significant others’ respond to any given behavior.

Fogg (2008) posits that Facebook enables mass interpersonal persuasion, which focuses on influencing individuals’ thoughts and behaviors through social influence dynamics (e.g., conforming to others, giving compliments, presenting the self, etc.). In
addition, Litt and Stock (2011) investigated the effect of descriptive norms among one’s peers on the willingness to use alcohol among adolescents on Facebook. They found that the study participants who had viewed older peers’ alcohol-related profile pages were more likely than those who had viewed older peers’ non-alcohol-related pages to have greater normative perceptions of alcohol use among their peers.

In addition, in their cluster analysis of the influence of Facebook, Moreno, Kota, Schoohs, and Whitehill (2013) identified 13 clusters representing factors related to Facebook influences. Further, via a card-sorting task, the 13 identified clusters were categorized into four domains: comparison, connection, identification, and Facebook as an experience. Specifically, the comparison domain comprised two clusters: curiosity about others and Facebook’s role establishing social norms. This comparison domain describes Facebook as enabling users to observe what their peers think, how their peers behave, and what is popular, which further influences their perceived descriptive norms among their peers.

Consensus cues on Facebook may influence descriptive norms about a certain behavior or opinion among a user’s peers. For instance, when a user sees a large number of likes from his/her peers associated with a message depicting a given health-related behavior, he/she may surmise that the majority of his/her peers think that the health-related behavior is good. It is, thus, expected that the number of likes associated with a health-related message may function as information about how much peers like a message. Therefore, the user may perceive that his/her peers are very invested or not very
invested in the descriptive norms associated with a health-related behavior in accord with the number of likes.

Consensus cues on Facebook are based on the user’s reference group, whereas in mass communication settings they are based on anonymous others in the aggregate. It is likely, therefore, that consensus cues in the former context influence descriptive norms, whereas consensus cues on Facebook influence subjective norms and descriptive norms among the user’s Facebook friends.

It is, however, questionable whether users perceive the statistical estimate of consensus cues on Facebook and that on mass communication settings similarly. Specifically, the statistical estimate of any given consensus cue in mass communication settings is fixed within a certain range. For instance, on Amazon, the star rating ranges from 1 to 5 stars. As a result, if a large number of people contributed to the star rating and the product has a four-star rating, people are likely to perceive that the product is worth purchasing and vice-versa. In addition, studies that used opinion poll results as a consensus cue were likely to use arbitrary cutoff points between 0% and 100% (e.g., Darke et al., 1998; Giner-Sorolla & Chaiken, 1997; Maheswaran & Chaiken, 1991). Therefore, it is likely that people can easily perceive an opinion to be the opinion of the majority if 80% of the sample population either agreed or disagreed.

In the Facebook environment, however, there is no fixed range in terms of the number of likes. In other words, there is no upper limit to the number of likes a post can attract. However, given that a user’s news feed is updated whenever friends in the network post, like, and/or share a message, the period during which Facebook users can
be exposed to a certain message from a Facebook friend is limited unless they visit they friends’ profile pages. As a result, it is likely that for a message that attracted a relatively small number of likes (e.g., 23 or 34), users may perceive that many of their Facebook friends liked it.

On the other hand, it is also likely that if an ordinary message from a user’s friends attracted a very large number of likes, it may be perceived as unrealistic. For instance, suppose a user has 338 Facebook friends. If a message from that user attracts 34 likes, this means that 10% of the user’s friends liked the message. If a message from that same user attracts 270 likes, this means that 80% of the user’s friends liked the message. However, on Facebook, it may not be common for an ordinary message from Facebook users to attract 270 likes (i.e., 80% of user’s friends liked it).

This effect can be explained in reference to Kelley’s (1967) Attribution Theory, according to which any given behavior can be attributed to a person, target or object, or situation. As a result, based on Attribution Theory, if a message about an ordinary life from regular Facebook users attracts a very large number of likes, users may attribute the result to the person who posted the message (i.e., the person is very popular or famous) or people who liked the message (i.e., friends of the source of the message frequently like messages) rather than the message itself. Thus, it is expected that there will be a tipping/threshold point in regard to the number of likes that people consider to be plausible.

From the HSM (Chaiken, 1980) perspective, on the other hand, users are likely to perceive the message as more valid if a message is endorsed by many people. Thus, the
following is expected as well: the greater the number of likes associated with a given message on Facebook, the more positive the users’ perception of the number of likes. Therefore, we ask the following question:

**RQ1.** When the typical number of likes is relatively modest, how many likes are required to serve as a consensus cue?

**Likes and Norms**

Consensus implies that a message is correct or valid (Eagly & Chaiken, 1993). Festinger (1954) posits that in terms of social influence, in the absence of objective checks to evaluate correctness, people are likely to confirm their attitudes and perceptions based on those of their peers. In addition, based on Deutsch and Gerard’s dual-process theory about normative and informational influences, Cheung, Luo, Sia, and Chen (2009) posit that the aggregated opinions of others (e.g., the number of likes) can be considered one of the most significant normative determinants for evaluating the credibility of electronic word-of-mouth (eWOM). Similarly, Park and Lee (2008) posit that the number of reviews can enhance normative pressure, which further influences conformity in a group. In their study on the effect of eWOM on brand switching, Guoqing, Zhongke, Kai, and Xiaofan (2009) found that when the majority of a social group accepted a negative evaluation of a given product, study participants tended to perceive that people in their social group think they should not use the brand as subjective norms about the brand.

Given our conceptualization, of the consensus cue on Facebook (i.e., the aggregated opinions of one’s peers in his/her networks) may lead to a consensus
heuristics that positively influences perceptions of subjective norms pertaining to a behavior depicted in a given message. Specifically, through observing the number of likes associated with a message, users can think and behave in socially acceptable ways accordingly. For instance, if numerous peers like an adolescent’s message about sunscreen on Facebook, other users exposed to the message and the number of likes associated with it may perceive that the use of sunscreen is acceptable among their peers. Thus, it is expected that holding other variables (e.g., the denominator of the number of friends) constant, the greater the number of likes associated with a message on Facebook the more positive the users’ perceptions of the subjective norms pertaining to the behavior depicted therein.

From the perspective of Attribution Theory (Kelley, 1967), however, if a message from Facebook users attracts a very large number of likes, users may attribute this number to the person who posted the message or people who liked the message rather than to the message itself. Therefore, we ask the following question:

RQ2. When the typical number of likes is relatively modest, does the number of likes influence users’ subjective norms relating to the behavior depicted in a given message?

In this sense, as we argued earlier, it is also plausible to assume that the number of likes associated with a given message may influence descriptive norms among one’s peers pertaining to a behavior depicted in the message. When a user sees a large number of likes from his/her peers associated with a message about using sunscreen, his/her perception of what most of his/her peers think about using sunscreen may be influenced
accordingly. It is, thus, expected that the number of likes associated with a message may function as information about whether or not most peers think using sunscreen is good. Therefore, users’ may become more positive in their perceptions of the descriptive norms relating to a behavior depicted in a given message among their peers as the number of likes posted to the message increases.

However, based on Attribution Theory (Kelley, 1967), we expect to identify a tipping/threshold point pertaining to the effect of the number of likes on users’ perceptions of descriptive norms among their peers relating to a behavior depicted in a given message. Therefore, we ask the following question:

**RQ3.** When the typical number of likes is relatively modest, does the number of likes influence users’ perceptions of descriptive norms among peers relating to the behavior depicted in a given message?

**Likes, Attitudes, and Perceived Credibility of a Message**

From the HSM perspective, consensus cues can lead to consensus heuristics (i.e., “If other people believe it, then it’s probably true,” Chaiken, 1987, p. 4). The effect of consensus cues on attitude has been widely tested in previous studies (e.g., Darke et al., 1998; Flanagan & Metzger, 2013; Giner-Sorolla & Chaiken, 1997). For instance, in Darke et al.’s (1998) study, depending on the condition to which they were assigned, the participants were told either that their university was planning to implement comprehensive exams the following year or in 10 years’ time. Further, the participants were also provided with consensus information: depending on the condition to which
they were assigned, the participants were told that 80% of first-year students either agreed or disagreed with the proposal and that the sample size of the poll was 10 or 1,000. Darke et al. (1998) found that regardless of the size of the poll, the participants were likely to have a positive attitude toward the exam proposal when they were told that 80% of students agreed with the proposal compared to when they were told that 80% of students disagreed with it. However, this consensus cue effect was found only among participants with low issue involvement who were told that the comprehensive exams would be activated 10 years later. Thus, it is likely that the greater the number of likes associated with a given message on Facebook the more positive the user’s attitude toward a behavior depicted in the message.

Based on Attribution Theory (Kelley, 1967), however, it is also plausible to assume that there is also a tipping/threshold point pertaining to the effect of the number of likes on a user’s attitude toward the behavior depicted in a given message. Therefore, we ask the following question:

**RQ4.** When the typical number of likes is relatively modest, does the number of likes influence users’ attitudes towards the behavior depicted in a given message?

Consensus heuristics implies that a message is correct or valid (Chaiken & Stangor, 1987; Eagly & Chaiken, 1993). In other words, the extent to which a message has been endorsed by others may influence users’ perceptions of its validity (Chaiken et al., 1989). In this case, through the number of likes associated with a given message on Facebook, users may perceive whether their peers consider a certain idea or behavior to be correct or acceptable or, indeed, the opposite.
Previous research has demonstrated that a user’s perception of the message’s validity is likely to become more positive as that message is endorsed by more people. For instance, in their recent study on online movie reviews, Flanagin and Metzger (2013) found that in the user-generated review rating condition, the number of people who had contributed to the rating (1 vs. 26 vs. 357) was positively associated with the participants’ perceptions of the credibility of the review rating of a given movie. Specifically, when the review rating was the result of contributions from a large number of people, the participants’ perceptions of the rating’s credibility was high compared to when the rating was the result of contributions from a small number of people. Therefore, it is plausible to assume that the greater the number of likes posted to a health-related message on Facebook the more positive users’ perceptions will be of the credibility of that message.

Again, based on the Attribution Theory (Kelley, 1967) framework, it is also expected, however, that if a message attracts a significantly large number of likes, users may not attribute this number to the message itself but to the person who posted the message or to the people who liked the message. Therefore, we ask the following question:

**RQ5.** When the typical number of likes is relatively modest, does the number of likes influence users’ perception of the credibility of a given message?

**Likes and Behavioral Intentions**

Consensus cues are likely to help people make a simple decision (Chaiken, Liberman, & Eagly, 1989; Erb et al., 2006). For instance, in Metzger et al.’s (2010) focus
group study, most of the participants indicated that they take a look at the number of reviews or testimonials as a way to guide their decision-making, including their purchases. This effect can be also explained by consensus heuristics addressed in the HSM (Chaiken, 1987). Specifically, consensus cues can lead to consensus heuristics whereby if most users of a given product have a positive attitude toward the product, it may be worth purchasing it. In this sense, it is also expected that the greater the number of likes posted to a given message on Facebook, the more positive the users’ behavioral intention in regard to the behavior depicted.

Again, from the Attribution Theory (Kelley, 1967) framework, however, the relationship between the number of likes and behavioral intentions toward the behavior depicted will not be linear. Thus, we ask the following question:

RQ6. When the typical number of likes is relatively modest, does the number of likes influence users’ behavioral intention toward the health-behavior depicted in a given message?

Issue Involvement

The ELM (Petty & Cacioppo, 1981, 1986) posits that the ability to process information (e.g., prior knowledge and cognitive resources) and the elaboration motivation are the primary factors that decide which route of processing is activated. The motivation, in particular, can be influenced by an individual’s degree of involvement in an issue. Similarly, the HSM (Chaiken et al., 1989) posits that based on motivation type
and the ability to process information (e.g., cognitive capacity), people process information differently via either systematic or heuristic processing.

Specifically, from the perspectives of the ELM (Petty & Cacioppo, 1981, 1986) and HSM (Chaiken, 1980) when a message is personally relevant and people have the ability to process it, they are likely to elaborate the message carefully by activating the central route of processing/systematic processing. In such cases, message argument is the critical factor in terms of the message’s impact on the study participants’ evaluation of the message. On the other hand, when the peripheral route of processing/the heuristic processing is activated because of a lack of motivation and/or ability to process a message, people tend to rely heavily on cognitive heuristics to evaluate the message and tend not to elaborate it. Therefore, people use a consensus cue differently depending on their level of involvement with the issue address in a given message.

For instance, in Darke et al. (1998) found that study participants perceive a consensus cue differently based on their level of issue involvement. Specifically, Darke et al. (1998) manipulated issue involvement by informing participants either that their university was planning to implement comprehensive exams the following year (i.e., high in issue involvement) or in 10 years’ time (i.e., low in issue involvement). Then, depending on their conditions, the participants were told that 80% of first-year students either agreed or disagreed with the proposal and that the sample size of the poll was 10 or 1,000. Darke et al. (1998) found that regardless of the size of the poll, those low in issue involvement were likely to have a positive attitude toward the exam proposal when they were told that 80% of students agreed with the proposal compared to when they were told
that 80% of students disagreed with it. For those with high issue involvement, on the other hand, attitudes toward the proposal varied depending on the size of the poll. Specifically, when told that 80% of 1,000 first-year students either agreed or disagreed with the proposal, those high in issue involvement were likely to have a positive or negative attitude, respectively, toward the proposal. However, the consensus cue had no effect on attitudes toward the proposal when the participants were told that 80% of 10 first-year students either agreed or disagreed with it.

In addition, Park, Lee, and Han (2007) found that those high in issue involvement were likely to be persuaded by an issue-relevant argument (e.g., the information provided by a product review), whereas those with a low level of issue involvement were likely to be influenced by consensus cues (e.g., the number of reviews). In their study about the effect of source cues in online news, Kang, et al. (2010) asked study participants in high-involvement conditions to read an online news article about a plan to decrease tuition and participants in low-involvement conditions to read an article about the subprime loan crisis. The online news articles in their study included both original and delivery sources by factorially varying the credibility of the original sources (high: New York Times vs. low: National Enquirer) and of the delivery sources (high: Google News vs. low: Drudge Report). They found that study participants high in issue involvement (i.e., those who read the news about the plan to decrease tuition) were likely to consider the credibility of both the original and delivery sources in evaluating the credibility of the news. On the other hand, participants low in issue involvement were likely to be influenced only by the credibility of the delivery source. Kang et al.’s (2010) results, in particular, can be
accounted for in reference to the HSM. From the perspectives of the HSM’s (Chaiken et al., 1989) hypothesis on the co-occurrence of systematic and heuristic processing, study participants high in issue involvement might process source cues systematically rather than heuristically, whereas those low in issue involvement might process the same source cues heuristically (Kang et al., 2010).

Therefore, it is plausible to assume that issue involvement may moderate the effect of a consensus cue on attitudes, norms, behavioral intentions, and the perceived credibility of a message. Thus, we expect the following:

**H1.** The effect of the number of likes on a user’s subjective norms (H1a), descriptive norms (H1b), attitudes (H1c), perceived credibility of a message (H1d), and behavioral intentions (H1e) will vary as a function of the extent to which they are involved in the behavior depicted in a given message.
Chapter 3: Method

The first study aims to understand how people respond to the number of likes associated with a given message. Specifically, Study 1 explored how many likes are required to serve as a consensus cue. In addition, the study tested the research questions and hypotheses about the effect of the number of likes on subjective norms, descriptive norms, attitude, perceived message credibility, and behavioral intention and the moderating effect of involvement on this relationship.

Study Design

A 1 x 6 (the number of likes: absence vs. 1 vs. 2 vs. 15 vs. 34 vs. 68) between subject design was used. Issue involvement was measured and treated as a continuous variable. In order to probe the multiple comparison, the number of likes was entered as a series of dummy variables with 64 likes as the reference category.

Participants

In total, 118 undergraduate students at a large Midwestern university participated in this study in exchange for extra course credit. Given that there may be a salient difference between Facebook users and non-Facebook users in regard to their perceptions of the number of likes (e.g., Lim & Van Der Heide, 2015), we excluded the latter from
this study. Of the 118 participants, 106 were Facebook users of 18 to 39 (\(M = 20.39, SD = 2.76\)) years of age. Of the 106 participants, 72.6\% were female and 27.4\% were male. Thus, data from these participants were used for analysis.

**Stimulus**

The study used mock Facebook screen shots by manipulating the number of likes (absence vs. 1 vs. 2 vs. 15 vs. 34 vs. 68). The number of likes varied depending on the conditions. For instance, participants in the 68-like condition were exposed to the message about sunscreen containing 68 likes, whereas participants in the absence condition were exposed to the same message without a like indicated (see Figure 1).

The study used a message recommending sunscreen use. Although the message was created by the researcher, the interview quote in the message was based on the actual interview with the well-known skin health expert, Kate Somerville, available on the Internet: [http://www.wellbeingnarrative.com/kate-somerville-kate-somerville-skin-health-experts-los-angeles](http://www.wellbeingnarrative.com/kate-somerville-kate-somerville-skin-health-experts-los-angeles). Specifically, in the stimuli, the account user posted a message stating that she managed getting an interview with Kate Somerville via Skype for her communication project. The account user, then, quoted Kate Somerville’s statement that applying sunscreen, with a minimum SPF of 30, prior to sun exposure is useful to promote skin and health and to prevent sun damages. After then, the account user noted that after the interview, she bought a big bottle of sunscreen with a SPF of 30 hoping that she keep looking good now and in the future. The message was identical across the
conditions. In addition to the message, an illustration of Kate Somerville relevant to the message was added in order to make the message more realistic.
Figure 1. A sample stimulus
Number of Facebook Friends

Given that the perception of the consensus cue on Facebook (i.e., the number of likes) can be influenced by the number of friends that one has, we will first determine the number of friends for the study stimuli. In addition, the Prominence-Interpretation theory of Web credibility (Fogg, 2003) posits that users evaluate the credibility of websites based on the following two processes: (1) prominence: whether or not a person notices an element of websites and (2) interpretation: how people evaluate the element of websites. In other words, if people do not notice any given element of a websites, they do not evaluate it. By looking at a Facebook profile page, users can identify how many Facebook friends the account owner has. Therefore, if they notice the number of Facebook friends, the information might influence their perception of the number of likes.

According to recent research, 338 is the mean number of Facebook friends that ordinary Facebook users have is 338 (Pew Research Center, 2014). Thus, we used 338 as the number of Facebook friends for the study stimulus. The number of Facebook friends was identical across conditions.

Number of Likes

Equal intervals between numbers may not be necessary given that 5 to 10 likes is different from 270 to 275 likes. In other words, based on our assumption, it is expected that users may not perceive 5 likes to be a consensus cue, whereas they may perceive 10 likes to be a consensus cue. On the other hand, users may perceive both 270 likes and 275
likes as unrealistic. Thus, we used numbers based on previous studies and theories rather than using equal intervals between numbers.

**Numbers 1 and 2 and the absence of likes.**

The numbers, 1 and 2 and the absence of like were chosen based on Milgram’s (1974) experiments. In a series of studies, Milgram (1974) demonstrated the effect of authority on obedience. Specifically, in these studies, there were two roles, teacher and learner, with the presence of an authority person (i.e., the experimenter with a gown) and, therefore, study participants were paired with another person who was actually confederate. In addition, although there were two roles, the participants were always assigned to the teacher, whereas the confederates were always assigned to the learner. The learners (i.e., the confederates of the study) were asked to sit on an electric shock generator chair and to learn a list of word pairs. Then, the participants assigned the role of teacher were asked to test the learners and to administer an electric shot whenever the learner gave a wrong answer. The level of the electric shot was raised each time the learner gave wrong answer in the range of 15 to 459 volts. When a participant refused to administer an electric shot to the learner, the experimenter provided a series of prods (e.g., “please continue”). Milgram (1974) found that the participants were likely to obey orders issued by a person in a position of authority.

In a later experiment, Experiment 17, Milgram (1974) tested the moderating effect of group conformity on obedience to authority. Specifically, this experiment was very similar to the previous one except that there were two more teachers who were also
confederates of the study and that those confederates refused to continue participating when the electric shots to be administered reached a certain level. Specifically, after a 150-volt shock was administered, teacher 1 refused further participation in the experiment. Likewise, when a shock/210-volt shock was administered, teacher 2 refused further participation in the experiment. Then, the experimenter ordered the participant (teacher 3) to administer an electric shot to the learner. He found that even when teacher 1 refused to continue participating that only 3 of the 40 participants indicated that they, too, wished to follow suit. On the other hand, the number of participants refusing to participate in the experiment further increased dramatically when teacher 2 refused to continue participating in the experiment. Specifically, 12 of the participants stopped participating in the study immediately after teacher 2 withdrew, and only 4 participants obeyed the experimenter to the extent that they completed the experiment. This result suggests that peers’ behaviors influence how a person behaves in any given situation.

Replicating Milgram’s (1974) experiments, Burger (2009) designed a study in which the participants were assigned to one of two conditions: (1) one learner (confederate) and one teacher (participant) or (2) one learner (confederate) and two teachers (confederate and participant). Similar to Milgram’s experiment, teacher 1 (confederate) refused to continue participating in the experiment after administering a 90-volt shot. Burger (2009) found no significant difference between the two conditions in terms of the rate at which the participants’ refused to participate in the experiment. Therefore, based on Milgram’s (1974) experiment and Burger’s (2009) study, the absence of likes and the numbers 1 and 2 were chosen for this present study.
We also chose the number 15. In his series of traditional line judgment studies, Asch (1955) found that the participants were likely to conform to the majority’s view even when this view was patently incorrect. Further, Asch (1955) tested the effect of the size of the majority on conformity by varying the size of the majority from 1 person to 15 people. Specifically, he found no conformity effect when there was one confederate providing wrong answers. However, when there were two confederates providing wrong answers, group conformity increased to 13%. Further, group conformity increased to 32% when three or more confederates provided wrong answers. Conformity, however, did not significantly increase when three more confederates provided wrong answers. Based on Asch’s (1955) experiment, we can expect that people may perceive 2 or 3 likes and 15 likes similarly and, therefore, conform to the behavior depicted in a given message. Therefore, we chose the number 15.

Numbers 34 and 68.

Given our definition of consensus cues on Facebook, the sample size of consensus cues is critical to influencing individuals’ perceptions of the consensus cue. Thus, we chose two numbers based on the ratio between the number of likes and the number of Facebook friends (i.e., 338).

In previous studies (e.g., Darke et al., 1998; Maheswaran & Chaiken, 1991), researchers manipulated consensus cues by providing opinion poll results whereby 80% of a certain number of people in a given group or 68% of a certain number of people in a
given group agreed or disagreed with a proposal. Based on such studies, we may use numbers, such as 270 and 176, indicating that 80% or 52% of friends in the Facebook network of the experiment account owner liked the message, respectively.

As we argued earlier, however, it is uncommon for an ordinary message from regular Facebook users to attract a large number of likes, such as 100 likes. Specifically, given the nature of Facebook, where a user’s news feed is updated whenever friends in the network post, like, and/or share a message, the period during which Facebook users can be exposed to a certain message from a Facebook friend is limited unless they visit their friends’ profile pages. In such case, it is plausible to assume that usually only a percentage of friends will see any given post. As a result, it is likely that having 80% of friends like an ordinary post from a user’s friends may be perceived as implausible.

In this sense, using the ratio of 80% or 52% of 338 friends who liked a given message may not make sense in the Facebook environment. In other words, the way people perceive the percentage of opinion poll results may differ from the way that people perceive the percentage on Facebook. It is, thus, plausible to assume that people may perceive the number of likes as large even when 10 or 20% of friends in their networks like a given message (i.e., 34 likes and 68 likes, respectively). Of course, there might be a tipping point at which the effect of the consensus cue on message perception becomes negative as the number of likes increases. However, given that this is not the primary focus of the present study, we do not consider significantly large numbers of likes (such as over 100 likes). Therefore, we chose the numbers 34 and 68 and designated 68 as the largest number of likes.
Procedure

The study was conducted online. All participants were asked to read a consent form and told that they had read a posting from an Ohio State University student taking a communication class. The participants were exposed to the same sunscreen-related message. However, the number of likes associated with the sunscreen-related message varied depending on the condition to which the participants were assigned (absence, 1, 2, 15, 34, or 68). After they had read the posting, the participants were asked to complete a questionnaire.

Measurement

*Issue involvement.*

Issue involvement was measured by asking participants to indicate the extent to which they felt the message was (1) involving, (2) personally relevant, and (3) interesting. Response options ranged from *not at all* (1) to *very much* (11) (Maheswaran & Meyers-Levy, 1990; Cronbach’s α = .89, M = 5.59, SD = 2.59).

*Perception of the number of likes.*

The perceived number of likes associated with a given health message was assessed by asking participants to indicate whether the message had attracted a lot of likes with response options ranging from *strongly disagree* to *strongly agree* (M = 5.76, SD = 3.00).
Attitude toward sunscreen use.

An 11-point semantic differential scale with eight pairs of adjectives (worthless/worthwhile, unnecessary/necessary, bad/good, unimportant/important, unpleasant/pleasant, harmful/beneficial, undesirable/desirable, foolish/wise), modified from Orbell and Kyriakaki (2008), was used to assess the participants’ attitudes toward sunscreen use (Cronbach’s $\alpha = .95$, $M = 7.88$, $SD = 2.29$).

Perceived credibility of the message.

The perceived credibility of the message was measured by asking the participants how well 17 adjectives (accurate, believable, biased, fair, objective, clear, coherent, comprehensive, concise, disturbing, important, informative, insightful, relevant, sensationalistic, timely, and well-written) described the message with response options ranging from describes very poorly (1) to describes very well (11) (Sundar, 1999) (Cronbach’s $\alpha = .90$, $M = 7.25$, $SD = 1.55$).

Perceived subjective norms relating to sunscreen use.

Perceived subjective norms relating to sunscreen use were assessed using three 11-point scale items modified from Ajzen et al. (2011): “Most people who are important to me would think I should apply sunscreen every time I am going to be exposed to sunlight” on a scale anchored by strongly disagree/strongly agree; “Most people who are important to me would _________ me from applying sunscreen prior to sun exposure” on a scale anchored by strongly discourage/strongly encourage; and “Most people who
are important to me would _________ of my using sunscreen prior to sun exposure” on a scale anchored by *strongly disapprove/strongly approve* (Cronbach’s $\alpha = .82$, $M = 8.19$, $SD = 2.18$).

**Perceived descriptive norms relating to sunscreen use among peers.**

The perceived descriptive norms relating to sunscreen use among peers was measured using the four 11-point response scale items modified from Terry and Hogg (1996). The items were “How many undergraduate students at Ohio State University would think that using sunscreen prior to sun exposure is a good thing to do?” on a scale anchored by *none/all*; “How many undergraduate students at Ohio State University would apply sunscreen every time they are going to be exposed to sunlight?” on a scale anchored by *none/all*; “How much would most undergraduate students at Ohio State University agree that using sunscreen prior to sun exposure is a good thing to do?” on a scale anchored by *not at all/completely*; and “Think about undergraduate students at Ohio State University. What percentage of them do you think would apply sunscreen prior to sun exposure?” on a scale anchored by *0%/100%* (Cronbach’s $\alpha = .65$, $M = 6.15$, $SD = 1.40$).

**Behavioral intentions toward sunscreen use.**

Behavioral intentions were measured by four 11-point response scale items modified from Orbell and Kyriakaki (2008): “I intend to use sunscreen prior to sun exposure” on a scale anchored by *strongly agree/strongly disagree*; “How likely is it that
you will use sunscreen before being exposed to sunlight?” on a scale anchored by
unlikely/likely; “I intend to use sunscreen prior to sun exposure” on a scale anchored by
definitely intend/definitely do not intend; and “I plan to use sunscreen before being
exposed to sunlight” on a scale anchored by strongly agree/strongly disagree
(Cronbach’s $\alpha = .86$, $M = 6.49$, $SD = 2.44$).

Covariates.

Gender was controlled in this study given that previous studies have found that
there are gender differences in individuals’ attitudes and behaviors towards sunscreen use
(e.g., Abroms, Jorgensen, Southwell, Geller, & Emmons, 2003; Geller et al., 2002;
Lamanna, 2004). In their meta-analysis about skin cancer-related prevention and
screening behaviors, Kasparian, McLoone, and Meiser (2009) suggest that gender can be
considered as one of the most critical variables associated with sunscreen use. Given the
possible confounding issue, therefore, we controlled gender by asking participants to
indicate their gender.
Chapter 4: Results

Research Question 1

We first tested research question 1 concerning a threshold point at which the number of likes functions as a consensus cue on Facebook when the typical number of likes is relatively modest. Specifically, participants were asked to indicate whether the message attracted a lot of likes with response options from strongly disagree (1) to strongly agree (11). A one-way analysis of variance (ANOVA) with Dunnett’s test post-hoc comparisons was employed. A significant effect of conditions (i.e., the number of likes) on participants’ perception of the number of likes associated with the sunscreen message was found, $F(5, 100) = 7.08, p < .001$, partial $\eta^2 = .26$. As shown in Figure 2, participants in the no-like condition ($M = 6.41, SE = .64$), those in the 15-like condition ($M = 6.29, SE = .64$), those in the 34-like condition ($M = 7.37, SE = .61$), and those in the 68-like condition ($M = 7.33, SE = .68$) were more likely to perceive the message as having a lot of likes than did those in the 1-like condition ($M = 3.45, SE = .59$) and those in the 2-like condition ($M = 4.22, SE = .62$). Dunnett’s test post-hoc comparisons was employed to compare each condition with a 68-like condition as a reference group. Participants in the 68-like condition were significantly more likely to perceive the message as having a lot of likes than did those in 1-like condition (Diff score = -3.88) and
those in 2-like condition (Diff score = -3.11). No significant difference on the perceived number of likes was found between the reference group (i.e., the 68-like condition) and the rest of groups.

Figure 2. Main effect of the number of likes on perceived number of likes associated with a sunscreen message

Subjective Norms and Descriptive Norms about Sunscreen Use

Research Question 2 and Hypothesis 1a proposed that when the typical number of likes is relatively modest, the number of likes influences users’ subjective norms about sunscreen use and that issue involvement moderates the effect of the number of likes on
subjective norms, respectively. To examine the main effect of the number of likes and the interaction effect between the number of likes and issue involvement on subjective norms controlling for gender, an analysis of covariance (ANCOVA) was employed again. No significant main effect of the number of likes, $F(5, 93) = .97, p > .05$, partial $\eta^2 = .05$, and no significant interaction effect between the number of likes and issue involvement, $F(5, 93) = 1.06, p > .05$, partial $\eta^2 = .05$, were found on subjective norms about sunscreen use. Therefore, H1a was not supported.

Research Question 3 and Hypothesis 1b proposed that when the typical number of likes is relatively modest, the number of likes influences users’ descriptive norms about sunscreen use and that issue involvement moderates the effect of the number of likes on descriptive norms, respectively. An ANCOVA showed no significant main effect of the number of likes on subjective norms about sunscreen use, $F(5, 93) = .19, p > .05$, partial $\eta^2 = .01$, and no significant interaction effect between the number of likes and issue involvement on descriptive norms, $F(5, 93) = .23, p > .05$, partial $\eta^2 = .01$. Therefore, H1b was not supported.

Attitudes towards Sunscreen Use

Research Question 4 and Hypothesis 1c proposed that when the typical number of likes is relatively modest, the number of likes influences users’ attitudes towards sunscreen use and that issue involvement moderates the effect of the number of likes on attitudes, respectively. An ANCOVA was also employed. No significant main effect of the number of likes, $F(5, 93) = .58, p > .05$, partial $\eta^2 = .03$, and no significant interaction
effect between the number of likes and issue involvement, \( F(5, 93) = .35, p > .05 \), partial \( \eta^2 = .02 \), were found on attitudes. Therefore, H1c was not supported.

Perceived Credibility of the Message

Research Question 5 and Hypothesis 1d proposed that when the typical number of likes is relatively modest, the number of likes influences users’ perceived credibility of the message about sunscreen use and that issue involvement moderates the effect of the number of likes on the perceived credibility of the message, respectively. An ANCOVA revealed no significant main effect of the number of likes, \( F(5, 93) = .44, p > .05 \) partial \( \eta^2 = .02 \), and no significant interaction effect between the number of likes and issue involvement, \( F(5, 93) = .86, p > .05 \) partial \( \eta^2 = .04 \), on perceived credibility of the message. Therefore, H1d was not supported.

Behavioral Intentions toward Using Sunscreen

Research Question 6 and Hypothesis 1e proposed that when the typical number of likes is relatively modest, the number of likes influences users’ behavioral intentions towards sunscreen use and that issue involvement moderates the effect of the number of likes on behavioral intentions, respectively. To examine the main effect of the number of likes and the interaction effect between the number of likes and issue involvement on behavioral intention controlling for gender, an ANCOVA was first employed. Next, in order to further probe the multiple comparison, a series of OLS-based bootstrapped resampling estimations was employed to compare each condition with a 68-like condition...
as a reference group (Hayes, 2013; Preacher & Hayes, 2008) using SPSS PROCESS macro. Specifically, Model 1 in PROCESS was employed with 10,000 bootstrap resamples, and bias-corrected maximum likelihood confidence intervals (Hayes, 2009). Lastly, in order to investigate whether the main effect of the number of likes on intentions to use sunscreen at a specific value of issue involvement was statistically different from zero (i.e., a conditional effect of the number of likes at values of issue involvement), we further ran the data using the Johnson-Neyman technique (P. O. Johnson & Neyman, 1936) with Model 1 in the PROCESS macro (Hayes, 2013) for SPSS.

First, an ANCOVA revealed a significant main effect of the number of likes on intention to use sunscreen, $F(5, 93) = 3.15, p < .05$ partial $\eta^2 = .15$. As shown in Figure 3, the results showed a bell-shaped curve with a highest point at 2 likes, which indicates that a downward-sloping line on each side of the peak (i.e., 2 likes) was created. Specifically, intentions to use sunscreen increases as the number of like increases until it becomes 2. After the peak point, intention starts to reduce as the number of likes increases.
However, this main effect was qualified by a significant interaction effect between the number of likes and issue involvement on behavioral intention toward sunscreen use, $F(5, 93) = 4.32, p < .005$ partial $\eta^2 = .19$. In order to probe the multiple comparison, Model 1 with a series of OLS-based bootstrapped resampling estimations was employed (Hayes, 2013; Preacher & Hayes, 2008) using SPSS PROCESS macro. As the predictor, the number of likes was entered as a series of dummy variables with the 64-like condition as the reference category. Specifically, D1 coded the no-like condition, D2 coded the 1-like condition, D3 coded the 2-like condition, D4 coded the 15-like condition, and D5 coded the 32-like condition. The 68-like condition functioned as the reference group and received a code of 0 on D1, D2, D3, D4, and D5. Issue involvement was included as the moderator, whereas gender was entered as a covariate. In addition,
the rest of dummy variables were included as covariates when each dummy variable was entered as the predictor. For instance, when D1 was entered as the predictor, D2, D3, D4, and D5 were entered as covariates.

First, D1 was entered as the predictor, and issue involvement was entered as the moderator. In addition, gender, D2, D3, D4, and D5 were entered as covariates. The analysis showed that, on the whole, the number of likes and issue involvement did predict a significant portion of the variance in behavioral intention towards sunscreen use, $F(8, 97) = 7.44, R^2 = .38, p < .001$. Specifically, results revealed a significant interaction effect between the number of likes and issue involvement on behavioral intention in the comparison between the no-likes condition and the 64-likes condition ($b = -0.82, SE = .23, p < .001, 95\%$ Bootstrapped CI = [-1.27, -.36]). As shown in Figure 4, for participants high in issue involvement, the message without any likes was more likely to increase their intention to use sunscreen than did the message with 68 likes. For participants high in issue involvement, on the other hand, the exact opposite pattern was found, such that the message with 68 likes was more likely to increase their intention to use sunscreen than did the message without any likes.
Figure 4. Interaction effect between the number of likes and issue involvement on behavioral intention toward sunscreen use

Further, in order to investigate a conditional effect of the number of likes on behavioral intentions at values of issue involvement, the Johnson-Neyman technique (P. O. Johnson & Neyman, 1936) in the PROCESS macro (Hayes, 2013) for SPSS was used. A conditional effect of $X$ on $Y$ for different values of $M$ specially means that a coefficient quantifying the effect of $X$ on $Y$ would be linearly dependent on values of $M$ (Hayes, 2013). Therefore, the point estimate for the regression coefficient for the effect of $X$ is “conditional” on values of the moderator. As a result, in this analysis, we tested whether
the effect of the number of likes on intentions to use sunscreen at specific values of issue involvement was statistically different from zero.

Model 1 in PROCESS was employed with 10,000 bootstrap resamples to test this conditional effect. Specifically, D1 was entered as the predictor and issue involvement was included as the moderator. Again, gender, D2, D3, D4, and D5 were entered as covariates. As shown in Figure 5, the result indicated that the 95% bootstrapped confidence bands for the conditional effect of the number of likes on behavioral intentions were entirely below or above zero when issue involvement was lower than 3.3901 or greater than 7.5903. The result suggested that the number of likes significantly influences intentions to use sunscreen among those with scores below 3.3901 and those with scores above 7.5903 on issue involvement. Among those with scores between 3.3901 and 7.5903 on issue involvement, there was no statistically significant association between the number of likes and behavioral intentions.
Figure 5. Regions of significance for the conditional effect of the number of likes on intentions to use sunscreen (Y-axis) as a function of issue involvement (X-axis)

Note. The Y-axis indicates values of regression coefficients of the number of likes on intentions to use sunscreen.

Again, to examine the patterns of the interaction effect between the number of likes and issue involvement on behavioral intention for the rest of dummy variables, Model 1 with a series of OLS-based bootstrapped resampling estimations was employed (Hayes 2013; Preacher & Hayes 2008) using SPSS PROCESS macro. No significant interaction effect between the number of likes and issue involvement was found on behavioral intention for D2 (i.e., a comparison between 1-like condition and 68-like condition) \(b = .33, SE = .21, p > .05, 95\% \text{ Bootstrapped CI} = [-.08, .75] \), D3 (i.e., a
comparison between 2-like condition and 68-like condition) \((b = .36, SE = .20, p > .05, 95\% \text{ Bootstrapped CI} = [-.03, .74])\), D4 (i.e., a comparison between 15-like condition and 68-like condition) \((b = .34, SE = .25, p > .05, 95\% \text{ Bootstrapped CI} = [-.83, .16])\), and D5 (i.e., a comparison between 34-like condition and 68-like condition) \((b = -.20, SE = .21, p > .05, 95\% \text{ Bootstrapped CI} = [-.62, .22])\). Therefore, \(H1e\) was partially supported.
Chapter 5: Discussion of Study 1

Summary of Results

The findings reported in Study 1 reveal a threshold point at which the number of likes functions as a consensus cue on Facebook when the typical number of likes is relatively modest. Specifically, the participants were likely to perceive the sunscreen message as having a lot of likes when no likes, 15 likes, 34 likes, or 68 likes were posted to it compared to when 1 like or 2 likes were posted to it. The analyses further indicated that the participants in the 68-likes condition were significantly more likely to perceive the message as having attracted a lot of likes than were those in the 1-like condition and those in the 2-likes condition.

Unexpectedly, the results of Study 1 did not show the main effect of the number of likes and the interaction effects between the number of likes and issue involvement on subjective norms and descriptive norms in regard to or attitudes toward sunscreen use.

The findings of Study 1, however, showed a bell-shaped curve with the highest point at 2 likes in the relationship between the number of likes and behavioral intentions to use sunscreen. Specifically, the intentions to use sunscreen increases as the number of likes increases until it becomes 2. After the peak point, the behavioral intentions starts to decrease as the number of likes increases. This main effect, however, was qualified by a
significant interaction effect on behavioral intentions between the number of likes and the issue involvement. In the comparison between the no-likes condition and the 68-likes condition, the results indicates that issue involvement moderates the effect of the number of likes on behavioral intentions. Specifically, for participants high in issue involvement, the message to which 68 likes were posted was more likely to increase their intention to use sunscreen than was the message without any likes. However, for participants low in issue involvement, the message without any likes was more likely to increase the behavioral intentions to use sunscreen than was the message with 68 likes.

The analyses, however, did not find an interaction effect between the number of likes and the level of issue involvement on behavioral intention for the rest of the dummy variables with 68 likes as a reference group.

Limitations

Our findings clearly indicate that neither 1 like nor 2 likes is large enough to function as a consensus cue, whereas 15 likes, 34 likes, and 68 likes are all large enough to function as such. Interestingly, in the case of the absence of likes, the participants also tended to perceive the message as having attracted a lot of likes. A possible explanation for this finding is that no comparable message with likes was presented in this experiment. Thus, Study 2 utilized three messages, one target message and two neutral messages. Specifically, similar to Study 1, a certain number of likes were posted to the target message depending on the condition. In addition, the two neutral messages (not relevant to the target message) were also given two and three likes in the expectation that
participants would view the absence of likes, or the presence of only a single like, as minimal, and that they would view 68 likes as a large number of likes by comparison.

Although participants in the no-like condition tended to perceive the message as having attracted a lot of likes, the interaction effect between the number of likes and issue involvement on intentions to use sunscreen indicated that for those low in issue involvement, the message without any likes was more likely to increase their intentions to use sunscreen than did message with 68 likes. The opposite patterns were also revealed for those high in issue involvement. One possible explanation of the inconsistent findings might be that the number of likes might be too sensitive to be considered a reliable heuristic cue in the context of Facebook, at least in the absence of any anchors regarding how many likes to expect for a given post. The HSM posits that one of prerequisites for activating heuristic processing is the reliability of a given heuristic cue. In this case, it is expected that the number of likes might not have the expected impact unless recipients are processing systematically, due to their level of involvement. Suggesting a single route for information processing, the unimodel (Kruglanski & Thompson, 1999) posits that message arguments are not fundamentally different from heuristic cues in the persuasion process, rather they differ in terms of length and complexity. As a result, when such differences are controlled for, cue-based persuasion and argument-based persuasion have similar effects on persuasion for those high in issue involvement. For instance, in a series of studies, Kruglanski and Thompson (1999) created lengthy and complex heuristic information (i.e., source expertise), and found that it yielded a persuasive effect for those high in issue involvement rather than those low in issue involvement. For future research,
therefore, it would be worthwhile to test 1) whether the number of likes can be considered a reliable cue in the context of Facebook by varying the message strength and 2) whether the number of likes only makes the predicted difference if involvement prompts systematic processing.

Unlike Park et al.’s (2007) results, the results of Study 1 show that compared to when no likes were present, participants high in issue involvement were more likely to be influenced by a large number of likes associated with a sunscreen message such that the participants’ intentions to use sunscreen increased than were participants low in issue involvement. Such findings can be accounted for in reference to the HSM (Chaiken et al., 1989).

The HSM (Chaiken et al., 1989) posits that systematic processing and heuristic processing can co-occur. In this sense, consistent with Kang et al.’s (2010) results, it is plausible to assume that participants high in issue involvement might process the consensus cue (i.e., the number of likes) systematically rather than heuristically. In other words, for those high in issue involvement, a large number of likes might function as an addictive effect by boosting the strength of the argument in a given message.

In regard to those low in issue involvement, on the other hand, it may be that the opposite pattern resulted given that Study 1 did not consider other types of involvement (i.e., value involvement).

Previous research (e.g., B. T. Johnson & Eagly, 1989; Slater, 2002) suggests that the notion of involvement should not be confined to issue involvement. The E-ELM (Slater, 2002), for instance, posits that the important factor influencing message
processing is how much people value an issue (e.g., sunscreen use) rather than whether or
not people have similar levels of issue involvement (e.g., whether they use or do not use
sunscreen). In other words, from the perspective of the E-ELM (2002), it is plausible to
assume that when people read a personally relevant message, they may differ from each
other in regard to how they process this message based on their respective goals and
values. Similarly, the HSM (Chaiken et al., 1989) posits that depending on the type of
motivation, people may or may not use heuristic cues to make judgments about messages.
Thus, Study 2 was conducted in order to examine the moderating effect of value
involvement on the effects of the number of likes and message type on attitudes toward
and behavioral intentions toward as well as norms relating to a health behavior depicted
in a given health-related message.
Chapter 6: Study 2

From the findings of the first study, we assume that whether or not use a heuristic cue (i.e., the number of likes here) may depend on either the individual’s characteristics and/or message type (Chaiken et al., 1989). Thus, from the perspectives of the E-ELM (Slater, 2002), the HSM (Chaiken, 1980), and Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), a second study was conducted to examine the moderating effect of value involvement on the effect of the number of likes and message type on health information processing in the context of binge drinking on Facebook.

Binge Drinking

Binge drinking is defined as consuming five or more standard drinks for men and consuming four or more standard drinks for women in about two hours (National Institute on Alcohol Abuse and Alcoholism (NIAAA), 2004). College binge drinking is especially common in that about half of college students who drink are likely to engage in binge drinking (NIAAA, n.d.). In addition, given that drinking-related messages are often found on Facebook, the second study investigates the effect of the number of likes on college binge drinkers’ attitudes, subjective norms, and behavioral intentions towards binge drinking.
Extended-Elaboration Likelihood Model (E-ELM)

The ELM (Petty & Cacioppo, 1986) tends to focus on one type of involvement (i.e., issue involvement) although involvement has more than one dimension (B. T. Johnson & Eagly, 1989; Slater, 2002). B. T. Johnson and Eagly (1989) suggest that there are three types of involvement: 1) impression-relevant involvement (to maintain a socially acceptable opinion), 2) outcome-relevant involvement, and 3) value-relevant involvement. Outcome-relevant involvement, in particular, is related to the attainment of a particular goal addressed in the ELM. For instance, those high in outcome-relevant involvement with a given issue (e.g., drinking here) are likely to consider the issue to be important to achieve their personal goals (e.g., the goal to change their drinking behavior) (B. T. Johnson & Egaly, 1989). On the other hand, value-relevant involvement refers to “the psychological state that is created by the activation of attitudes that are linked to important values” (B. T. Johnson & Eagly, 1989, p. 290). For instance, among binge drinkers, the degree to which they have made a personal commitment to alcohol (i.e., their value involvement with alcohol) varies (Slater, 2001). Specifically, some binge drinkers engage in such behavior because drinking alcohol is important in their lives. It is, however, possible that some binge drinkers engage in such drinking behavior because others do so rather than because they personally value the behavior (Slater, 2001).

Given the lack of differentiation between the types of involvement (e.g., value-involvement) in the ELM, Slater (2002) proposed the E-ELM. The E-ELM posits that people process a message differently depending on their respective goals or motivations (e.g., value defense, value reinforcement, entertainment, information/skill, surveillance,
and self-interest assessment). From the perspective of the E-ELM, therefore, it is likely that when people read a personally relevant message (e.g., when binge drinkers read an anti-binge drinking message) that they may process the same personally relevant message differently based on their respective goals and values. In other words, depending on how much they value drinking, some binge drinkers may process the message in a biased way, whereas other binge drinkers may elaborate the same message carefully.

The E-ELM (Slater, 2002) specifically posits five types of processing based on individuals’ goals or motivations: (1) value-protective processing (processing that “attacks one’s values,” p. 182), (2) value-affirmative processing (processing “that reinforces one’s value system,” p. 182), (3) outcome-based processing (processing that is based on outcome relevance), (4) didactic processing (processing that is based on task importance or intrinsic interest), (5) information scanning (processing that is based on information-seeking intensity), and (6) hedonic processing (processing that is based on identification with characters within a narrative context).

Regarding value-protective processing and value-affirmative processing, the E-ELM (Slater, 2002) posits that the point of whether or not people have similar levels of issue involvement is less important. Instead, according to the E-ELM (Slater, 2002), the most important factor influencing how people process messages is value-involvement, which influences the extent to which people value a behavior (e.g., drinking). Slater (2002) refers to those who engage in binge drinking because drinking alcohol is important in their lives as binge drinkers high in value involvement with alcohol, whereas those who engage in such drinking behavior because of drinking norms rather than
because of their personal liking of drinking as binge drinkers low in value involvement with it.

Based on the framework posited by the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), attitudes and subjective norms are two critical factors that influence behavioral intentions such that it is plausible to assume that binge drinkers high in value involvement may have a strong attitude toward binge drinking that may further influence their behavioral intentions regarding this behavior. Binge drinkers low in value involvement, on the other hand, may have pro-subjective norms about binge drinking because they engage in this behavior based on their perception that their peers are doing so rather than based on their own favorable attitudes toward the behavior. In other words, from their perceptions of their peers’ binge-drinking behavior, they perceive this behavior as acceptable and valid behavior among their peers (i.e., the person perceives that his/her peers think he/she should engage in binge-drinking behavior). In addition, given their perception of how their peers behave, i.e., whether or not most of their peers engage in binge drinking, it is also plausible to assume that for those low in value involvement, descriptive norms relating to binge drinking among their peers can be also a critical determinant influencing their behavioral intentions.

Slater (2002), further, posits that binge drinkers high in value involvement may use value-protective processing when they receive anti-binge-drinking messages because such message are discrepant with/attack their values in regard to alcohol. Binge drinkers low in value involvement, on the other hand, may use value-affirmative processing when
they receive the same anti-binge-drinking messages because such messages are congruent with their values.

Such value-involvement-based information processing can be further linked to information processing based on different types of motivations addressed in the HSM. Thus, the next section addresses the distinct types of motivation proposed in this model.

**Heuristic Systematic Model (HSM)**

In addition to the relative personal relevance of any given issue, the sufficiency principle of the HSM posits that (1) the discrepancy between a person’s actual confidence and his/her desired confidence for a certain judgment-relevant task has an impact on his/her motivation to engage in message processing and (2) that such motivation, in turn, influences the mode of message processing (Chaiken et al., 1989; Chaiken, Giner-Sorolla, & Chen, 1996). For instance, systematic processing is activated when there is a large discrepancy between actual and desired confidence, i.e., when a person’s actual confidence is lower than his/her desired confidence level (Todorov et al., 2002).

Based on the sufficiency principle, the HSM further posits that there are three types of motivation (i.e., accuracy motivation, defense motivation, and impression motivation) and that these distinct types of motivation further influence the mode of message processing (i.e., systematic, heuristic, or biased) selected (Chaiken et al., 1989, 1996; Todorov et al., 2002).
Accuracy motivation.

Accuracy motivation refers to the desire to achieve a valid and accurate attitude that is consistent with the reality toward a judgment-relevant issue (Chaiken et al., 1989). Based on this definition, the accuracy motivation can be considered “an open-minded processing” (Chen, Duckworth, Chaiken, 1999, p. 45). Given the sufficiency principle suggesting that a large discrepancy between actual and desired confidence leads to the activation of systematic processing, binge drinkers low in value involvement can be considered as having a high accuracy motivation. Specifically, binge drinkers low in value involvement engage in binge drinking based on their pro-subjective norms about binge drinking rather than their true attitude toward the behavior. In other words, it is plausible to assume that binge drinkers low in value involvement may want to have a (valid) attitude toward binge drinking consistent with their peers’ behaviors or the valid attitudes among their peer groups. Therefore, they may process anti-binge-drinking messages systematically.

The HSM, further posits that systematic processing and heuristic processing can co-occur via various mechanisms—additivity, bias, and attenuation (Chaiken et al., 1989). In particular, the additivity hypothesis predicts that message arguments as well as heuristics can both influence individuals’ attitudes toward a message. The unimodel (Kruglanski & Thompson, 1999) also postulates that when people have a high accuracy motivation, they are likely to use open-minded processing without cognitive closure, which, in turn, may lead to extensive information processing through considering both message factors and heuristic cues. In particular, on Facebook, the number of likes can be
considered consensus cues that lead to consensus heuristics implying the correctness and validity of a message. Specifically, if a message is endorsed by many people, the user’s perception of the message’s validity is likely to increase (Chaiken et al., 1989). In this sense, given that argument strength and heuristic cues can increase people’s confidence about achieving a valid attitude toward binge drinking and subjective norms relating to the behavior that are consistent with their peers’ behaviors, it is plausible to assume that binge drinkers low in value involvement are highly influenced by such heuristic cues as well as by message arguments.

*Defense motivation.*

In contrast to the accuracy motivation, the defense motivation can be considered “a closed-minded motivation” (Todorov et al., 2002, p. 202) because it is based on the idea that individuals desire to form attitudes and beliefs congruent with their existing attitudes and beliefs and their perceived material interest (Chaiken et al., 1996). The defense motivation is further related to individuals’ value-related involvement, as their goals are to confirm the validity of their existing attitudes and beliefs and to disconfirm the validity of attitudes that are not congruent with their own (Chen et al., 1999; Todorov et al., 2002). In this sense, the defense motivation may occur especially when people receive a counter-attitudinal message rather than an attitude-consistent message. Further, it is plausible to assume that defense-motivated processing posited in the HSM (Chaiken et al., 1989) is similar to the value-protective processing posited in the E-ELM (Slater, 2002).
Given that the defense motivation functions to confirm an attitude that is congruent with a person’s values and beliefs and to disconfirm incongruent attitudes, the HSM posits that people who are processing information based on the defensive motivation are likely to use heuristic cues selectively depending on whether or not the heuristic cues are congruent with their attitudes (Chen et al., 1999). For instance, in their study on the effect of individuals’ vested interests on the selective use of heuristic cues, Giner-Sorolla and Chaiken (1997) found that study participants were more likely to perceive a consensus cue (i.e., the result of the poll) to be reliable and less likely to criticize it when the cue was congruent with their vested interests than when it was not.

In this sense, it is plausible to assume that binge drinkers high in value involvement do not use heuristic cues that do not accord with their values in regard to alcohol, whereas they use heuristic cues that do accord with their values. For instance, suppose that an anti-binge-drinking message posted on Facebook has attracted a large number of likes. In this case, for binge drinkers high in value involvement, the large number of likes indicating that most of their peers support the behavior (i.e., anti-binge drinking, here) is not congruent with their values in regard to alcohol. As a result, binge drinkers high in value involvement may not use the cue to process the information. Thus, upon receiving a counter-attitudinal message, such binge drinkers may not consider consensus cues but instead resort to biased processing based on their values and attitudes toward alcohol.

On the other hand, if they are exposed to a pro-binge-drinking message with a large number of likes that is consistent with their attitudes and values on this subject, they
would be likely to use this cue to support their attitude toward binge drinking. They would be likely to do this because this cue would be congruent with their values relating to alcohol.

Given that binge drinkers low in value involvement are likely to engage in binge drinking not because of their own favorable attitudes toward binge drinking but because of their perceptions of their peers’ behavior, such binge drinkers may not consider anti-binge-drinking messages to be counter-attitudinal. In addition, the accuracy motivation, the desire to have a valid attitude toward binge drinking consistent with peers’ binge-drinking behavior, may lead binge drinkers low in value involvement to process such information systematically. From the HSM and the unimodel perspective, therefore, regardless of message type, binge drinkers low in value involvement may be highly motivated to process anti-binge-drinking messages. Therefore, if this is the case, they would be likely to elaborate consensus cues in an effort to achieve an attitude toward binge drinking that would be considered valid by their peers. If this logic proves correct:

**H1.** Compared to the effect of a small number of likes, the effect of a large number of likes on binge drinkers’ attitudes toward binge drinking (H1a), subjective norms about binge drinking (H1b), descriptive norms about binge drinking among their peers (H1c), and behavioral intentions in regard to binge drinking (H1d) varies as a function of the extent to which binge drinkers value alcohol use and as a function of whether the cue is congruent with their value.

In other words, regardless of whether a cue is congruent with their values of alcohol use, for binge drinkers low in value involvement, a large number of likes (vs. a
small number of likes) will have a positive impact on their attitudes toward, subjective norms about, descriptive norms about, and behavioral intentions related to engaging in binge drinking. For binge drinkers high in value involvement, when the cue is congruent with their values, a large number of likes (vs. a small number of likes) will have a positive impact on their attitudes, subjective norms, descriptive norms, and behavioral intentions, whereas whether the number of likes is large or small will not make any difference to attitude toward the message, perceived message credibility, attitudes, subjective norms, descriptive norms, and behavioral intentions when the cue is not congruent with this value.

In a similar sense, consensus cues can also influence users’ attitudes towards the message as well as their attitudes towards a behavior depicted in the message given the HSM perspective. In particular, given that the number of likes shows how many others have indicated that they like a given message as a consensus cue, users may perceive whether the majority of their peers in their social networks like the message itself. Again, given our earlier arguments from the HSM (Chaiken, 1987) and E-ELM (Slater, 2002), thus, it can be expected that value involvement can moderate such an effect. Specifically, it is expected that given the accuracy motivation, the desire to have a valid attitude toward a given message consistent with peers’ attitudes, binge drinkers low in value involvement may use such a cue regardless of whether the cue is associated with anti- or pro-binge drinking messages. Binge drinkers high in value involvement (with a defense motivation), on the other hand, may not use the consensus cue if the cue does not accord with their values in regard to alcohol use (e.g., a large number of likes associated with an
anti-binge drinking message here), whereas they may use the cue if the cue accords with their values (e.g., a large number of likes associated with a pro-binge drinking message).

If this logic proves correct:

**H2.** Compared to the effect of a small number of likes, the effect of a large number of likes on binge drinkers’ attitudes toward a given binge drinking-related message varies as a function of how much binge drinkers value alcohol use and as a function of whether the cue is congruent with their value.

From the perspective of the HSM, the extent to which a message has been endorsed by others (a large number of likes associated with a given message here) may influence users’ perceptions of its validity (Chaiken et al., 1989). In particular, as we argued earlier in Study 1, through the number of likes associated with a given health message, users may perceive whether the message is credible or not.

Given our earlier arguments from the HSM (Chaiken, 1987) and E-ELM (Slater, 2002), it may also plausible to assume that such an effect is further moderated by value involvement. Specifically, it is expected that binge drinker low in value involvement may use a consensus cue (the number of likes here) to evaluate the credibility of a given message regardless of whether the cue is congruent with their values in regard to alcohol use, given that they process information based on the accuracy motivation. On the other hand, binge drinkers high in value involvement may not use a consensus cue to evaluate the credibility of a given message if the cue is not congruent with their value of alcohol use, and may use such a cue if the cue is congruent with their value of alcohol use.

Therefore, it can be asked:
RQ1. Is the effect of the number of likes on perceived credibility of a given binge drinking-related message contingent on both the types of messages and extent of value involvement with alcohol use.

Assessing the effects of the number of likes on secondary audiences.

Accuracy motivation and defensive motivation are likely to explain binge drinkers’ motivations. Abstainers and moderate drinkers, however, can also be exposed to anti-binge-drinking and pro-binge drinking messages on Facebook. Their message processing can be explained based on impression motivation.

The HSM refers to impression motivation as an individual’s desire to achieve attitudes and beliefs that are socially acceptable and/or that can be satisfied via their current social goals in interpersonal contexts. As a result, when people interact with another person whose opinion is clearly known (e.g., whether a person posts an anti-binge-drinking or a pro-binge drinking message and/or whether a person likes such messages), those who are highly motivated in regard to impressions are likely to use “Go along to get along” heuristics to express the same opinion as other people have expressed (Chen & Chaiken, 1999, p.78). In addition, similar to those who are defensive-motivated, people with a high impression motivation also use heuristic cues selectively (Todorov et al., 2002).

Self-monitoring refers to the degree to which people use social comparison information and cues as guidelines for monitoring their own communication and communicative adaptation (Snyder, 1974). Specifically, those who are high self-monitors are likely to be conscious of social appropriateness, to be sensitive to how others view
them in social situations, and to attend to cues to guide how they present themselves (Snyder, 1974). As a result, high self-monitors often behave based on subjective norms (Prislin & Kovrlija, 1992). Low self-monitors, on the other hand, tend not to be concerned about how others see them and instead consider only their own attitudes toward, feelings about, and dispositions in regard to their behavior (Snyder, 1974; Snyder & DeBono, 1985).

In this sense, based on the HSM, high self-monitors may have a high impression motivation to hold socially acceptable attitudes in terms of processing personally irrelevant information. In addition, given that high self-monitors are motivated to form socially acceptable attitudes and beliefs, a consensus cue may be important for them. Therefore, it is plausible to assume that non-binge drinkers who are high self-monitors are highly influenced by a large number of likes that indicates acceptable attitudes, subjective norms, descriptive norms, and behavioral intentions in regard to binge drinking among the peers in their network.

On the other hand, when they process personally irrelevant message, low self-monitors may have a low impression motivation because compared to high self-monitors they do not much care about others’ attitudes and behaviors about a given issue. From the perspective of the HSM, however, low self-monitors may also use consensus cues (i.e., the number of likes) to judge information, such that they engage in heuristic processing for this purpose. As a result, compared to high self-monitors, low self-monitors may be less influenced by consensus cues. If this logic proves correct:
H3. The effects of the number of likes on attitudes towards binge drinking (H3a), subjective norms about binge drinking (H3b), descriptive norms about binge drinking (H3c), behavioral intentions in regard to binge drinking (H3d), attitudes towards a given binge drinking-related message (H3e), and perceived message credibility (H3f) are greater for non-binge drinkers who are high self-monitors than for non-binge drinkers who are low self-monitors.
Chapter 7: Method

From the perspectives of the E-ELM, the HSM, and the Theory of Reasoned Action, this study tested how binge drinkers use a specific consensus cue (i.e., the number of likes associated with a given message) to process and evaluate a message about binge drinking depending on their value involvement with alcohol (i.e., their personal investment in alcohol use) and their motivations. Further, the study also investigated this effect on binge drinkers’ attitudes toward binge drinking, subjective norms about binge drinking, descriptive norms about binge drinking, and behavioral intentions in regard to binge drinking.

Design Overview

To test such effects, the study used a 3 (number of likes: absent vs. 1 like vs. 68 likes) × 2 (message type: anti-binge drinking vs. pro-binge drinking) between subject design. Value involvement for binge drinkers and self-monitoring for non-binge drinkers in particular were measured and treated as a continuous covariate and tested as a moderator.
Participants

In total, 264 undergraduate students at a large Midwestern university participated in the study in exchange for extra course credit. Similar to Study 1, data from Facebook users were used for analysis. Specifically, 237 participants (63.3% female) aged from 18 to 56 (\( M = 20.62, SD = 3.42 \)) were identified as Facebook users and included in the data analysis.

Stimulus

The study used mock Facebook screen shots by manipulating the number of likes (absent vs. 1 like vs. 68 likes) and the type of message (anti- vs. pro-binge drinking) (see Figure 6 for the anti-binge drinking message and Figure 7 for the pro-binge drinking message). Specifically, all the participants were exposed to three messages: two neutral messages not relevant to drinking (i.e., waking up and the weather) and one target message (i.e., an anti- or a pro-binge drinking message depending on the condition to which the participant was assigned). The two neutral messages and the number of likes associated with them were identical across conditions. The number of likes posted to the target message varied depending on the condition. Specifically, based on the results of Study 1, absence, 1 like, and 68 likes were chosen for this study. The participants in the absence conditions were exposed to either an anti- or a pro-binge drinking message without any likes posted to it. The participants in the 1-like condition were exposed to the same messages with one like posted to each of those messages. The participants in the
68-likes conditions were exposed to the same messages as in the other two conditions but with 68 likes posted to each message.

The neutral messages were given two and three likes in an effort to manipulate the participants’ responses as follows: so that the participants would view the absence of likes, or the appearance of only a single like, as minimal, and so that they would view 68 likes as a large number in comparison. In other words, the messages and the number of likes associated with them were designed with the expectation that the participants would perceive the following: (1) no likes indicates that no one indicated likes for the target message and (2) 68 likes indicates that many people indicated likes for the target message.

In regard to message type, the messages were either anti- or pro-binge drinking. Similar to Study 1, although the messages were created by the researcher of this study, the messages were based in the information about calories in alcohol, available on the Internet, http://rethinkingdrinking.niaaa.nih.gov/toolsresources/caloriecalculator.asp. Specifically, in the stimuli, the account user posted a message stating that the account user read an article about binge drinking for his/her communication project. According to the article, drinking four to five drinks in a two-hour period constitutes binge drinking and drinking means consuming a lot of extra calories from the alcohol and can lead to the consumption of fatty foods. In the anti-binge-drinking condition, the account user agreed with the article and recommended limiting alcoholic drinks. The account user in the pro-binge-drinking condition, on the other hand, disagreed with the article and recommended drinking large quantities of alcohol. In addition to the target message, an illustration
showing a bottle of beer and a hamburger relevant to the target message was added in order to make the target message more realistic. All the participants, therefore, were exposed to the same illustration, although some saw it in the context of an anti-binge-drinking message and others in the context of a pro-binge-drinking message.
Figure 6. A sample stimulus for anti-binge drinking
Today, for my communication class project, I read a ridiculous article indicating that drinking 4 to 5 drinks in a two-hour period is considered binge drinking. Seriously, do you think drinking 4 or 5 drinks in two hours is too much? The most hilarious part was they said drinking may lead to eating lots of extra calories from the alcohol and eating fatty foods. It indicates that a 12 oz glass of regular beer contains about 150 calories. Do you know what this means? If you drink 5 beers, it means you consume 750 calories (equivalent to a Burger King Whopper). If the 5 beers are “light,” they are more like a Big Mac. Does this mean that having a Whopper or Big Mac for lunch is fine but drinking and enjoying my college life is not? We just are having another Whoopie, one that can lead to our memorable good times! To enjoy the true college life, it is worth to binge drink. Let’s party!

Figure 7. A sample stimulus for pro-binge drinking
Procedure

In session 1, all the participants were asked to read a consent form and answer a questionnaire online, which asked questions pertaining to their issue involvement with alcohol, value involvement in regard to alcohol (personal investment in alcohol use), the amount they drink on average, their Facebook use, and their demographic background. After they had completed the questionnaire, the participants were asked to create their own study IDs using their birth year and the last four digits of their primary phone number. Three days later, each participant received an email asking them to participate in session 2, which included a link to the study. In session 2, each participant was randomly assigned to one of the six experimental conditions and told that he/she would read postings from an Ohio State University student taking a communication class. Depending on the condition to which they were assigned, the participants were exposed to either a pro- or an anti-binge-drinking message along with the two neutral messages.

Although the number of likes associated with the two neutral messages was the same in all the conditions, the number of likes associated with the target message varied depending on the condition. Next, participants were asked to complete a questionnaire, including their attitudes toward the message, the perceived credibility of the message, and their attitudes, subjective norms, descriptive norms, and behavioral intentions in regard to engaging in binge drinking. Then, the participants were asked to write down the study ID created in Session 1.
Measurement

Type of drinkers.

The participants were asked to indicate how many drinks they normally consume on drinking occasions. Then, based on the definition provided by the National Institute on Alcohol Abuse and Alcoholism (NIAAA, 2004), each participant was categorized as either a non-binge drinker or a binge drinker. Specifically, similar to Lee et al. (in press), the male participants were identified as binge drinkers if they reported drinking five or more drinks per occasion, whereas the corresponding figure for the female participants was four or more drinks per occasion. The rest of the participants were coded as non-binge drinkers. The results show that 149 participants were identified as binge drinkers, whereas 88 participants (i.e., 68 moderate drinkers and 20 abstainers) were identified as non-binge drinkers.

Value involvement with alcohol consumption.

Value involvement was measured using seven 11-point Likert scale items ranging from strongly disagree to strongly agree (Slater & Rouner, 1996). Items were as follows: “If I were unable to drink anymore, I would feel a personal loss”; “Alcohol—beer, wine, or liquor—plays an important role in my enjoyment of life”; “A social occasion without alcohol is as enjoyable to me as one with alcohol (reverse-coded)”; “I really look forward to a drink or two in the evening or on weekends”; “Something beneficial is missing from social occasions when alcohol is not served”; “Drinking alcohol is simply part of a normal social life”; and “In general, I value the contribution of alcoholic beverages to the
quality of my life” (Cronbach’s α = .87, \( M = 5.37, SD = 2.07 \)). Value involvement was
normally distributed (Skewness = -.07, Kurtosis = -.75). Given Hayes’s (2005)
recommendations that the practice of a median split or mean split without a strong
rationale may lead to the loss of information and to a tendency to disregard the
differences within groups, value involvement was treated as a continuous variable.

*Message likability.*

Message likability was accessed using an 11-point semantic differential scale with
three pairs of adjectives (not at all enjoyable/very enjoyable, not at all appealing/very
appealing, not at all likable/very likable) adopted from Slater et al. (2006) (Cronbach’s α
= .95, \( M = 5.01, SD = 2.41 \)).

*Attitude toward binge drinking.*

Using an 11-point semantic differential scale with four pairs of adjectives
(worthless/worthwhile, unnecessary/necessary, bad/good, unimportant/important,
unpleasant/pleasant, harmful/beneficial, undesirable/desirable, foolish/wise), modified
from Orbell and Kyriakaki (2008), we measured attitude toward binge drinking
(Cronbach’s α = .96, \( M = 4.56, SD = 2.30 \)).

*Perceived credibility of the message.*

The perceived credibility of the message was measured by asking participants
how well 17 adjectives (accurate, believable, biased, fair, objective, clear, coherent,
comprehensive, concise, disturbing, important, informative, insightful, relevant, sensationalistic, timely, and well written) described the message with response options ranging from describes very poorly (1) to describes very well (11) (Sundar, 1999; Cronbach’s α = .90, M = 6.21, SD = 1.58).

Perceived subjective norms about binge drinking.

Three items using 11-point response scale modified from Ajzen et al. (2011) were used to assess perceived subjective norms about binge drinking: “Most people who are important to me would think I should drink five or more drinks within a couple hours” on a scale anchored by strongly disagree/strongly agree; “Most people who are important to me would __________ me from drinking five or more drinks within a couple hours” on a scale anchored by strongly discourage/strongly encourage; and “Most people who are important to me would __________ of drinking five or more drinks within a couple hours” on a scale anchored by strongly disapprove/strongly approve (Cronbach’s α = .93, M = 3.87, SD = 2.31).

Perceived descriptive norms about binge drinking among their peers.

Using four 11-point response scale items modified from Terry and Hogg (1996), we measured the perceived descriptive norms about binge drinking among their peers: “How many undergraduate students at Ohio State University would think that drinking five or more drinks within a couple hours is a good thing to do?” on a scale anchored by none/all; “How many undergraduate students at Ohio State University would drink five
or more drinks within a couple hours?” on a scale anchored by none/all; “How much would most undergraduate students at Ohio State University agree that drinking five or more drinks within a couple hours is a good thing to do?” on a scale anchored by not at all/completely; and “Think about undergraduate students at Ohio State University. What percentage of them do you think would drink five or more drinks within a couple hours?” on a scale anchored by 0%/100% (Cronbach’s α = .83, M = 6.97, SD = 1.58).

Behavioral intention toward engaging in binge drinking.

Four items using 11-point response scale modified from Orbell and Kyriakaki (2008) were used to assess behavioral intention toward engaging in binge drinking: “I intend to drink five or more drinks within a couple of hours” with response options ranging from strongly disagree to strongly agree; “How likely is it that you will drink five or more drinks within a couple of hours?” with response options ranging from very likely to very unlikely; “I intend to limit my drink to four or less drinks within a couple of hours” with response options ranging from definitely do not intend to definitely intend; and “I plan to drink five or more drinks within a couple hours” with response options ranging from strongly disagree to strongly agree (Cronbach’s α = .85, M = 4.80, SD = 2.57).

Self-monitoring.

Self-monitoring was measured using the following twenty five items with response two options, truth and false, adopted from Snyder (1974): “I find it hard to
imitate the behavior of other people”; “My behavior is usually an expression of my true inner feelings, attitudes, and beliefs”; “At parties and social gatherings, I do not attempt to do or say things that others will like”; “I can only argue for ideas which I already believe”; “I can make impromptu speeches even on topics about which I have almost no information”; “I guess I put on a show to impress or entertain people”; “When I am uncertain how to act in a social situation, I look to the behavior of others for cues”; “I would probably make a good actor”; “I rarely need the advice of my friends to choose movies, books, or music”; “I sometimes appear to others to be experiencing deeper emotions than I actually am”; “I laugh more when I watch a comedy with others than when alone”; “In a group of people I am rarely the center of attention”; “In different situations and with different people, I often act like very different persons”; “I am not particularly good at making other people like me”; “Even if I am not enjoying myself, I often pretend to be having a good time”; “I'm not always the person I appear to be”; “I would not change my opinions (or the way I do things) in order to please someone else or win their favor”; “I have considered being an entertainer”; “In order to get along and be liked, I tend to be what people expect me to be rather than anything else”; “I have never been good at games like charades or improvisational acting”; “I have trouble changing my behavior to suit different people and different situations”; “At a party I let others keep the jokes and stories going”; “I feel a bit awkward in company and do not come across as well as I should”; “I can look anyone in the eye and tell a lie with a straight face (if it is for a good purpose)”; and “I may deceive people by being friendly when I really dislike them.” Participants’ responses of each item were further coded as 1 if their response
corresponds to the keyed response and coded as 0 if their response does not correspond to the keyed response. Then, all of their coded responses were added. Similar to value involvement, self-monitor was treated as a continuous variable.

Covariates.

In previous studies, scholars (e.g., B. T. Johnson & Eagly, 1989; Slater, 2002) have differentiated value involvement from outcome-relevant involvement and impression-relevant involvement. Outcome-relevant involvement is based on meeting a certain goal. This means that unlike value involvement, for a person with a high level of outcome-relevant involvement in regard to an issue, it is important to achieve a specific goal or goals associated with that issue (B. T. Johnson & Eagly, 1989). For instance, if a binge drinker has the goal of changing his/her drinking behavior (i.e., a high level of outcome-relevant involvement), an anti-binge drinking message can be highly relevant (Lee et al., in press). As a result, similar to Lee et al.’s (in press) study, outcome-relevant involvement in the present study was controlled for by asking the participants how important it was for them to change their drinking habits with response options ranging from not at all important (1) to very important (11) (Braverman, 2008; $M = 2.64$, $SD = 2.37$).

Frequency of alcohol use and gender were also controlled for in this study. Frequency of alcohol use, in particular, was controlled for in terms of possible differences between binge drinkers who consume alcohol nearly every day and binge drinkers who consume alcohol once a month in regard to responses to binge-drinking-
related messages. Frequency of alcohol use was assessed by asking the participants to indicate how often they had consumed alcoholic beverages in the previous 30 days with the following response options: not at all; less than once a month; once a month; less than once a week but more than once a month; once a week; two times a week; three times a week; four times a week; and every day/nearly every day.
Chapter 8: Results

As a manipulation check, perceived number of likes on given health messages was measured by asking participants to indicate whether the message attracted a lot of likes with response options from *strongly disagree* (1) to *strongly agree* (11) ($M = 5.61$, $SD = 2.90$). A one-way analysis of variance (ANOVA) with Dunnett’s test post-hoc comparisons was employed. A significant effect of conditions (i.e., the number of likes) on participants’ perception of the number of likes associated with the binge drinking related message was found, $F(2, 231) = 14.74, p < .001$. As shown in Figure 8, participants in the 68-like condition ($M = 7.03$, $SE = .32$) were more likely to perceive the message as having a lot of likes than did those in the no-like condition ($M = 4.96$, $SE = .29$) and those in the 1-like condition ($M = 4.92$, $SE = .33$). Dunnett’s test post-hoc comparisons was employed to compare each condition with the 68-like condition as a reference group. Participants in the 68-like condition were significantly more likely to perceive the message as having a lot of likes than did those in the no-like condition (Diff score = -2.12) and those in the 1-like condition (Diff score = -2.09).
Attitude towards Engaging in Binge Drinking

Hypothesis 1a proposed that the effect of the number of likes on attitudes toward binge drinking varies as a function of message type and value involvement. To examine the three-way interaction effects between the number of likes, message type, and value involvement on attitudes towards engaging in binge drinking, controlling for outcome-relevant involvement, gender, and frequency of alcohol use, an analysis of covariance (ANCOVA) was employed. No significant three-way interaction effect between the number of likes, message type, and value involvement, $F(2, 134) = .91, p > .05$ partial $\eta^2 = .01$, was found on attitudes towards engaging in binge drinking. H1a, thus, was not supported.
Subjective Norms about Binge Drinking

Hypothesis 1b proposed that the effect of the number of likes on subjective norms about binge drinking varies as a function of message type and value involvement. To examine the three-way interaction effects between the number of likes, message type, and value involvement on subjective norms about binge drinking, controlling for outcome-relevant involvement, gender, and frequency of alcohol use, an ANCOVA was employed again. No significant three-way interaction effect between the number of likes, message type, and value involvement, \( F(2, 134) = 1.33, p > .05 \) partial \( \eta^2 = .02 \), was found on subjective norms about binge drinking. H1b, thus, was not supported.

Descriptive Norms about Binge Drinking

An ANCOVA was first employed to examine H1c about the three-way interaction effect between the number of likes, message type, and value involvement on descriptive norms, controlling for outcome-relevant involvement, gender, and frequency of alcohol use. Then, in order to further probe the multiple comparison, a series of OLS-based bootstrapped resampling estimations was used to compare each condition with the 68-like condition as a reference group (Hayes, 2013; Preacher & Hayes, 2008) using SPSS PROCESS macro with Model 3. Last, the Johnson-Neyman technique (P. O. Johnson & Neyman, 1936) with Model 3 in the PROCESS macro (Hayes, 2013) was employed to investigate whether the interaction effect of the number of likes and message type on descriptive norms at a specific value of value involvement was statistically different from zero.
An ANCOVA revealed a significant three-way interaction effect between the number of likes, message type, and value involvement on descriptive norms about engaging in binge drinking, $F(2, 134) = 4.01, p < .05$ partial $\eta^2 = .06$. In order to probe the multiple comparison, Model 3 with a series of OLS-based bootstrapped resampling estimations was employed (Hayes, 2013; Preacher & Hayes, 2008) using SPSS PROCESS macro. As the predictor, the number of likes was entered as a series of dummy variables with the 68-like condition as the reference category. Specifically, D1 coded the no-like condition and D2 coded the 1-like condition. The 68-like condition functioned as the reference group and received a code of 0 on D1 and D2. Message type and value involvement were included as the moderators, whereas outcome-relevance involvement, frequency of alcohol use, and gender were entered as covariates. In addition, as recommended by Hayes and Preacher (2014), the other dummy variable was included as a covariate when each dummy variable was entered as the predictor. For instance, when D1 was entered as the predictor, D2 was entered as a covariate.

First, D1 was entered as the predictor, and message type and value involvement were entered as the moderators. In addition, outcome-relevance involvement, frequency of alcohol use, gender, and D2 were entered as covariates. The analysis showed that, on the whole, the number of likes, message type, value involvement, outcome-relevance involvement, frequency of alcohol use, and gender did not predict a significant portion of the variance in descriptive norms about binge drinking, $F(11, 137) = 1.17, R^2 = .09, p > .05$. The results further revealed no significant three-way interaction effect between the number of likes, message type, and value involvement on descriptive norms about binge
drinking in the comparison between the no-like condition and the 68-like condition ($b = -0.07, \ SE = .26, p > .05, 95\% \ Bootstrapped\ CI = [-.57, .44])$.

Second, D2 was entered as the predictor, and message type and value involvement were entered as the moderators. In addition, outcome-relevance involvement, frequency of alcohol use, gender, and D1 were entered as covariates. The analysis showed that, on the whole, the number of likes, message type, value involvement, outcome-relevance involvement, frequency of alcohol use, and gender did predict a significant portion of the variance in behavioral intention towards engaging in binge drinking, $F(11, 137) = 2.15, \ R^2 = .15, p < .05$. Specifically, results revealed a significant 3-way interaction effect between the number of likes, message type, and value involvement on descriptive norms in the comparison between the 1-like condition and the 68-like condition ($b = 0.73, \ SE = .28, p < .05, 95\% \ Bootstrapped\ CI = [.17, 1.28])$.

As shown in Figure 9, for binge drinkers low in value involvement, the anti-binge drinking related message with 68 likes tended to reduce their descriptive norms about binge drinking among their peers compared to the same message with 1 like. For those high in value involvement, on the other hand, the same anti-binge drinking message with 68 likes was more likely to increase their descriptive norms about binge drinking than did the same message with 1 like. In other words, for those low in value involvement, a large number of likes associated with an anti-binge drinking message is effective to reduce their descriptive norms, whereas for those high in value involvement, the same large number of likes associated with an anti-binge drinking message functions as a boomerang effect by increasing descriptive norms about binge drinking among their peers.
Interestingly, however, when the message was a pro-binge drinking related message, the number of likes did not make any difference on descriptive norms about binge drinking for both those low in value involvement and those high in value involvement. In other words, regardless of value involvement and the number of likes, they tended to perceive many of their peers engage in binge drinking when they were exposed to the pro-binge drinking message.

![Graph showing three-way interaction effect](image)

Figure 9. Three-way interaction effect of the number of likes (i.e., 1 like vs. 68 likes), message type, and value involvement on descriptive norms about binge drinking

Next, in order to investigate a conditional effect of the number of likes and message type at values of value involvement, the Johnson-Neyman technique in the
PROCESS macro (Hayes, 2013) for SPSS was employed again. A conditional effect of $XM$ interaction on $Y$ for different values of $W$ means that a coefficient quantifying $XM$ interaction would be linearly dependent on values of $W$ (=higher order moderator) (Hayes, 2013). Therefore, the point estimate for the regression coefficient for $XM$ interaction is “conditional” on values of $W$ (moderator). In other words, if three-way interaction is significant, any two conditional effects of $XM$ interaction for different values of $W$ are significantly different from each other (Hayes, 2013). As a result, in this analysis, we tested whether the effect of the number of likes x message type on descriptive norms at a specific value of value involvement was statistically different from zero.

Model 3 in PROCESS was employed with 10,000 bootstrap resamples to test this conditional effect. Specifically, D2 was entered as the predictor, and message type and value involvement were entered as the moderators. Again, outcome-relevance involvement, frequency of alcohol use, gender, and D1 were entered as covariates. As shown in Figure 10, the analysis showed that the 95% bootstrapped confidence bands for the conditional effect of the number of likes and message type were entirely below or above zero when value involvement is less than 3.5504 or greater than 8.2097. The result suggested that the interaction effect between the number of likes and message type was significantly related to descriptive norms about binge drinking among binge drinkers with scores below 3.5504 and binge drinkers with scores above 8.2097 on value involvement. Among binge drinkers with scores between 3.5504 and 8.2097 on value involvement,
there was no statistically significant relation between the number of likes and message type on descriptive norms about binge drinking. H1c, thus, was partially supported.

Figure 10. Regions of significance for the conditional effect of the number of likes x message type on descriptive norms (Y-axis) as a function of value involvement (X-axis)

Note. Y-axis indicates values of regression coefficients of the number of likes x message type on descriptive norms.

Behavioral Intentions toward Engaging in Binge Drinking

Hypothesis 1d proposed that the effect of the number of likes on binge drinkers’ intentions to engage in binge drinking varies as a function of the extent to which binge
drinkers value alcohol use (i.e., value involvement) and as a function of whether the cue is congruent with their value (i.e., anti- vs. pro-binge drinking messages), respectively.

To examine the three-way interaction effect between the number of likes, message type, and value involvement on behavioral intentions, controlling for outcome-relevant involvement, gender, and frequency of alcohol use, an ANCOVA was first employed. Next, in order to further probe the multiple comparison, a series of OLS-based bootstrapped resampling estimations was employed to compare each condition with a 68-like condition as a reference group (Hayes, 2013; Preacher & Hayes, 2008) using SPSS PROCESS macro. Specifically, Model 3 in PROCESS was employed with 10,000 bootstrap resamples, and bias-corrected maximum likelihood confidence intervals. Lastly, in order to investigate whether the interaction effect of the number of likes and message type on intentions to engage in binge drinking at a specific value of value involvement was statistically different from zero (i.e., a conditional effect of the number of likes and message type at values of value involvement), we further ran the data using the Johnson-Neyman technique with Model 3 in the PROCESS macro (Hayes, 2013) for SPSS.

First, an ANCOVA revealed a significant three-way interaction effect between the number of likes, message type, and value involvement on behavioral intention toward engaging in binge drinking, $F(2, 134) = 3.67, p < .05$ partial $\eta^2 = .05$.

In order to probe the multiple comparison, Model 3 with a series of OLS-based bootstrapped resampling estimations was employed (Hayes, 2013; Preacher & Hayes, 2008) using SPSS PROCESS macro. As the predictor, the number of likes was entered as
a series of dummy variables with the 68-like condition as the reference category. Specifically, D1 coded the no-like condition and D2 coded the 1-like condition. The 68-like condition functioned as the reference group and received a code of 0 on D1 and D2.

First, D1 was entered as the predictor, and message types and value involvement were entered as the moderators. In addition, outcome-relevance involvement, frequency of alcohol use, gender, and D2 were entered as covariates. The analysis showed that, on the whole, the number of likes, message type, value involvement, outcome-relevance involvement, frequency of alcohol use, and gender did predict a significant portion of the variance in behavioral intention towards engaging in binge drinking, $F(11, 137) = 6.70$, $R^2 = .35$, $p < .001$. Specifically, results revealed a significant three-way interaction effect between the number of likes, message type, and value involvement on behavioral intention in the comparison between the no-like condition and the 68-like condition ($b = -0.86$, $SE = .33$, $p < .05$, 95% Bootstrapped CI = [.20, 1.51]).

As shown in Figure 11, for binge drinkers low in value involvement, the anti-binge drinking related message with 68 likes tended to reduce their intentions to engage in binge drinking compared to the same message without any likes. For binge drinkers high in value involvement, on the other hand, the same anti-binge drinking related message with 68 likes was more likely to increase their intention to engage in binge drinking than did the message without any likes. In other words, for those high in value involvement, a large number of likes associated with an anti-binge drinking message was likely to function as a boomerang effect by increasing their intentions, whereas for those low in value involvement, the same large number of likes associated with an anti-binge
drinking message was likely to be effective to reduce their intentions as a persuasive effect.

Interestingly, however, when the message was a pro-binge drinking message, the patterns were quite different. For binge drinkers low in value involvement, the number of likes did not make any difference on behavioral intentions. For those high in value involvement, on the other hand, the pro-binge drinking related message without any likes was more likely to increase their intention to engage in binge drinking than did the same message with 68-like. In other words, in the case of the pro-binge drinking message, the absence of likes tended to function as a boomerang effect by increasing their intentions among binge drinkers high in value involvement.
Figure 11. Three-way interaction effect of the number of likes (i.e., no likes vs. 68 likes), message type, and value involvement on behavioral intentions towards engaging in binge drinking.

Next, in order to investigate the conditional effect of the number of likes and message type at values of value involvement, the Johnson-Neyman technique in the PROCESS macro (Hayes, 2013) for SPSS was employed. In other words, we tested whether the effect of the number of likes x message type on intentions to engage in binge drinking at a specific value of value involvement was statistically different from zero. Model 3 in PROCESS was employed with 10,000 bootstrap resamples to test this conditional effect. Specifically, D1 was entered as the predictor, and message type and value involvement were entered as the moderators. Again, outcome-relevance involvement, frequency of alcohol use, gender, and D2 were entered as covariates. As
shown in Figure 12, the analysis showed that the 95% bootstrapped confidence bands for the conditional effect of the number of likes and message type were entirely above zero when value involvement is greater than 5.6389. The result indicated that the interaction effect between the number of likes and message type was significantly related to intentions toward engaging in binge drinking only among binge drinkers with scores above 5.6389 on value involvement. Among binge drinkers with scores from and below 5.6389 on value involvement, there was no statistically significant relation between the number of likes and message type on intention.
Figure 12. Regions of significance for the conditional effect of the number of likes x message type on behavioral intentions (Y-axis) as a function of value involvement (X-axis)

Note. Y-axis indicates values of regression coefficients of the number of likes x message type on behavioral intentions.

To further probe this interaction, we selected binge drinkers with scores above 5.6389 on value involvement, and ran the data again using SPSS PROCESS macro (Hayes, 2013). Model 1 in PROCESS was employed with 10,000 bootstrap resamples to test the effect of the number of likes (i.e., no likes vs. 68 likes) on behavioral intentions as a function of message type. D1 was entered as the predictor, and message type was included as the mediator. Outcome-relevance involvement, frequency of alcohol use, gender, D2, and value involvement were entered as covariates.
The analysis showed a significant interaction effect between the number of likes and message type on behavioral intention in the comparison between the no-like condition and the 68-like condition ($b = 2.41, SE = .85, p < .01, 95\%$ Bootstrapped CI = [.70, 4.11]). Further, the results revealed that for those with scores above 5.6389 on value involvement, the number of likes significantly influence intentions to engage in binge drinking when the message was an anti-binge drinking message ($b = -1.35, SE = .66, p < .05, 95\%$ Bootstrapped CI = [-2.67, -.03]), but not when the message was a pro-binge drinking message ($b = 1.06, SE = .61, p > .05, 95\%$ Bootstrapped CI = [-.16, 2.27]). Specifically, as shown in Figure 13, the result showed that for those with scores above 5.6389 on value involvement, the intentions to engage in binge drinking was more likely to increase when the anti-binge drinking message contained 68 likes than when the same anti-binge drinking message did not contain a like as a boomerang effect.
Figure 13. The effect of the number of likes (i.e., no likes vs. 68 likes) on behavioral intentions as a function of message type for binge drinkers with scores above 5.6389 on value involvement

Second, D2 was entered as the predictor, and message type and value involvement were entered as the moderators in the comparison between the 1-like condition and the 68-like condition. In addition, outcome-relevance involvement, frequency of alcohol use, gender, and D1 were entered as covariates. The analysis showed that, on the whole, the number of likes, message type, value involvement, outcome-relevance involvement, frequency of alcohol use, and gender did predict a significant portion of the variance in behavioral intention towards engaging in binge drinking, $F(11, 137) = 6.39$, $R^2 = .34$, $p <$
The results, however, revealed no significant three-way interaction effect between the number of likes, message type, and value involvement on behavioral intention in the comparison between the 1-like condition and the 68-like condition ($b = -0.60$, $SE = .38$, $p > .05$, 95% Bootstrapped CI = [-1.34, .14]). H1d, therefore, was partially supported.

Attitudes towards Health Messages

Hypothesis 2 proposed that the effect of the number of likes on attitudes toward binge drinking-related messages varies as a function of message type and value involvement. To examine the three-way interaction effects between the number of likes, message type, and value involvement on attitudes towards the messages, controlling for outcome-relevant involvement, gender, and frequency of alcohol use, an ANCOVA was employed. No significant three-way interaction effect between the number of likes, message type, and value involvement was found on attitudes towards the messages, $F(2, 134) = 1.08$, $p > .05$ partial $\eta^2 = .02$. H2, thus, was not supported.

Perceived Credibility of a Given Health Message

An ANCOVA was also used to test Research Question 1 about the three-way interaction effects between the number of likes, message type, and value involvement on perceived credibility of the binge drinking-related messages. No significant three-way interaction effect between the number of likes, message type, and value involvement, $F(2, 134) = .81$, $p > .05$ partial $\eta^2 = .01$, was found on the perceived credibility of the messages.
Non-Binge Drinkers

Hypothesis 3 proposed that the effects of the number of likes on attitudes towards binge drinking (H3a), subjective norms about binge drinking (H3b), descriptive norms about binge drinking (H3c), behavioral intentions in regard to binge drinking (H3d), attitudes towards a given binge drinking-related message (H3e), and perceived message credibility (H3f) are greater for secondary audiences (i.e., non-binge drinkers) who are high self-monitors than for secondary audiences who are low self-monitors. Controlling for outcome-relevant involvement, gender, and frequency of alcohol use, an ANCOVA was employed. No significant three-way interaction effect between the number of likes, message type, and value involvement was found on attitudes, $F(2, 73) = 1.15, p > .05$ partial $\eta^2 = .03$, subjective norms, $F(2, 73) = 1.64, p > .05$ partial $\eta^2 = .04$, descriptive norms, $F(2, 73) = .67, p > .05$ partial $\eta^2 = .02$, behavioral intentions, $F(2, 73) = 2.38, p > .05$ partial $\eta^2 = .06$, attitudes toward the message, $F(2, 73) = 1.48, p > .05$ partial $\eta^2 = .04$, and perceived credibility of the message, $F(2, 73) = .13, p > .05$ partial $\eta^2 = .00$. Therefore, H3 was not supported.
Chapter 9: Discussion of Study 2

Summary of Results

Unexpectedly, the results of Study 2 did not show three-way interaction effects between the number of likes, message type, and value involvement on attitude toward the message, perceived credibility of the message, or attitudes toward and subjective norms in regard to engaging in binge drinking.

The findings of Study 2, however, showed a significant three-way interaction effect between the number of likes, message type, and value involvement on descriptive norms pertaining to binge drinking among peers in the comparison between the 1-like condition and the 68-likes condition. Specifically, as expected, compared with their perceptions based on the anti-binge-drinking message with only 1 like, binge drinkers relatively low in value involvement tended to perceive the anti-binge-drinking message with 68 likes as meaning that their peers refrained from frequent binge drinking. However, those relatively high in value involvement tended to perceive their peers engage in binge drinking a lot when they read the anti-binge drinking message with 68 likes compared to when they read the same message with 1 like. While the appearance of the interaction suggested possible boomerang effects of the anti-binge drinking message with 68 likes on those relatively high in value involvement by increasing their descriptive
norms about peers’ binge drinking behavior, such boomerang effects did not reach statistical significance when the interaction was probed.

Interestingly, in the case of the pro-binge drinking message, the number of likes did not make any difference to the descriptive norms pertaining to binge drinking for those low in value involvement or for those high level in value involvement. In other words, regardless of the number of likes, the pro-binge drinking message tended to increase binge drinkers’ descriptive norms about their peers’ binge drinking behaviors.

In the comparison between the no-like condition and the 68-like condition, however, the analysis did not find a significant three-way interaction effect between the number of likes, message type, and value involvement on descriptive norms about binge drinking.

In sum, in the case of the anti-binge drinking message, for those low in value involvement, a large number of likes is effective in reducing their descriptive norms relating to binge drinking among their peers. By comparison, in the case of the anti-binge-drinking message, for those high in value involvement, the same large number of likes functions as a boomerang effect by increasing descriptive norms. For the pro-binge drinking message, though, regardless of value involvement and the number of likes, the participants tended to perceive many of their peers as engaging in binge drinking. The possible boomerang effect of the anti-binge drinking message with 68 likes indicated on those relatively high in value involvement, however, did not reach statistical significance. Such effect was only found in the comparison between the 1-like condition and the 68-likes condition.
In addition, the results demonstrate that the effect of the number of likes on behavioral intentions towards engaging in binge drinking varies as a function of the extent to which binge drinkers value alcohol use (i.e., value involvement) and as a function of whether the consensus cue (i.e., the number of likes) on a given message is congruent with their value (i.e., anti- vs. pro-binge drinking messages).

Specifically, in the comparison between the no-likes condition and the 68-likes condition, the three-way interaction effect between the number of likes, message type, and value involvement on behavioral intention toward engaging in binge drinking provides support for the hypothesis that for binge drinkers relatively low in value involvement, the anti-binge drinking related message with 68 likes tended to reduce their intentions to engage in binge drinking compared to the same message with no likes. For those high in value involvement, on the other hand, the same anti-binge drinking message with 68 likes tended to function as a boomerang effect by increasing their intentions to engage in binge drinking compared to the same anti-binge drinking message with no likes. Unexpectedly, however, in the case of the pro-binge drinking message, for those low in value involvement, the number of likes does not make any difference to their intentions to engage in binge drinking. For those high in value involvement, on the other hand, the pro-binge drinking message with no-likes was more likely to increase their intentions than was the same message with 68 likes. In other words, for binge drinkers low in value involvement, the large number of likes associated with an anti-binge drinking message had a persuasive effect because it reduced their intention to engage in binge drinking, whereas for those high in value involvement, the same large number of
likes associated with the same anti-binge drinking message set off a boomerang effect by increasing their behavioral intention. In the case of the pro-binge drinking message, for those low in value involvement, the number of likes did not have any discernible effect on their intentions, whereas for those high in value involvement, an absence of likes is likely to have a boomerang effect by increasing their intention. While the appearance of the interaction suggested a possible persuasive effect of the anti-binge drinking message with 68 likes on those relatively low in value involvement by reducing their intentions to engage in binge drinking, such a persuasive effect did not reach statistical significance.

In the comparison between the 1-like condition and the 68-likes condition, however, the analysis did not find a significant three-way interaction effect between the number of likes, message type, and value involvement on behavioral intention toward engaging in binge drinking. The results, therefore, clearly demonstrate that the effect of the number of likes on behavioral intention in regard to and descriptive norms relating to engaging in binge drinking is contingent both on the type of messages and value involvement.

Limitations and Future Research

This present study has limitations. First, the analyses showed inconsistent results in testing the three-way interaction effects between the number of likes, message type, and value involvement on behavioral intentions and descriptive norms. Such findings, however, suggest that a threshold point at which the number of likes functions as a consensus cue might differ between behavioral intentions and descriptive norms.
Specifically, the results indicated that the threshold point of the effect of the number of likes on behavioral intention is relatively low compared to the effect on descriptive norms. The findings, thus, suggest that more concise theories and models are needed to test such effects in the context of Facebook.

From the perspective of the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975)—according to which behavioral intentions are influenced by attitudes or subjective norms or both—we used Model 12 in PROCESS with 10,000 bootstrap resamples as the basis for conducting an additional analysis to test the indirect effect of the number of likes, message type, and value involvement on behavioral intention through attitudes toward and subjective norms relating to binge drinking (Hayes, 2013). Specifically, D1/D2 was entered in the model as the predictor, whereas D2/D1, outcome-relevant involvement, gender, and frequency of alcohol use were entered as the covariates in the comparison between messages with no likes and those with 68 likes and between those with 1 like and those with 68 likes, respectively. Message type and value involvement were entered as the moderators, whereas attitudes and subjective norms were entered as the mediators. The analysis showed no indirect effect of the number of likes, message type, or value involvement on behavioral intentions through attitudes (95% bias-corrected confidence interval of [-.20, .64]) or on subjective norms (95% bias-corrected confidence interval of [-.02, .25]). No significant indirect effect of the number of likes, message type, and value involvement found on behavioral intentions through attitudes (95% bias-corrected confidence interval of [-.79, .19]) and subjective norms (95% bias-corrected confidence interval of [-.04, .25]).
Another limitation of the present study, therefore, is the inability of the model to explain the mechanism underlying the relationship between the number of likes, message type, and value involvement on behavioral intentions. Such findings suggest that there is another critical variable that scholars should consider when testing the theory in the Facebook environment: the extent to which the user identifies with the person who has posted the message in question on social media.

Specifically, given that social media can be considered to be entertainment media, it is plausible to assume that people use hedonic processing in the E-ELM (Slater, 2002) when they receive a message in the context of social media. The E-ELM (Slater, 2002) posits that when using hedonic processing, people are less likely to counterargue than when using other models of processing. When people use hedonic processing, in particular, identification with a character is likely to influence the motivation to generate a counterargument to a given message (Slater, 2002). Identification with a character refers to an individual’s perception of another person as similar to themselves or as a person with whom they may have a social relationship (Slater & Rouner, 2002). As a result, “while identifying with a character, an audience member imagines him- or herself being that character and replaces his or her personal identity and role as audience member with the identity and role of the character within the text” (Cohen, 2001, p. 251). In other words, a person who has strongly identified with a character is less likely to be motivated to generate a counterargument than a person who has not identified strongly with a character. The counterargument, the thoughts generated by individuals against persuasive
messages, may further lessen the persuasive effect of a given message (Petty & Cacioppo, 1986; Slater & Rouner, 2002).

In this sense, it is plausible to assume that in the context of social media, the critical factors influencing persuasion may be identification with the person who has posted the message on social media. Specifically, on Facebook, for instance, people have a friend relationship with other Facebook users, and based on profiles of their friends and postings from their friends, they may more strongly identify with some friends more than with others. In other words, a user with a strong identification with a certain Facebook friend may generate fewer counterarguments and be more persuasively influenced by postings from that friend than by postings from friends with whom he/she less strongly identifies. For future research, therefore, it would be interesting to test (1) the moderating effect of identification with the source of a given health-related message on the interaction effects of the number of likes, message type, and value involvement on behavioral intentions and (2) the indirect effect of the number of likes, message type, value involvement, and identification with the source of a given message on behavioral intentions through attitudes and subjective norms.
Chapter 10: General Discussion

Theoretical Implications

The present study demonstrated how differences in value involvement with alcohol use influence the use of a consensus cue (i.e., the number of likes) to process attitude-consistent messages and counter-attitude messages. Specifically, theories and models drawn extensively in previous studies focused on the effect of online cues are likely to disregard the kind of motivation users have to process information. For instance, the MAIN model (Sundar, 2008) assumes that Internet users are cognitive misers, such that they are likely to rely on interface cues to both evaluate sources of information and to process information. Similarly, Social Information Processing Theory (Walther, 1992) is likely to confine motivations to one type: the desire to form impressions of other people. However, the respective notions that people process information heuristically online and that they act according to only one type of motivation online are counterintuitive and certainly open to debate.

In contrast with those of established models and theories and by extending the E-ELM (2002), this study demonstrates how differences in value involvement with alcohol use (i.e., personal investment in alcohol use) moderate the effect of a consensus cue (i.e.,
the number of likes) on behavioral intentions in regard to binge drinking and descriptive norms relating to binge drinking.

Specifically, consistent with prior research (Slater & Rouner, 1996; Slater, 2001; Lee et al., in press), study findings show that college binge drinkers vary depending on extent of their value involvement with alcohol use. Slater (2001) posits that binge drinkers differ in regard to their commitment to alcohol and further differentiates between two types of binge drinkers based on this commitment (i.e., value involvement): binge drinkers high in value involvement vs. binge drinkers low in value involvement. Binge drinkers high in value involvement love drinking and, therefore, have a favorable attitude toward binge drinking. Binge drinkers low in value involvement, on the other hand, engage in binge drinking not because of their favorable attitude toward alcohol but because of their perception that other people have such an attitude (Slater, 2001). The study findings further revealed that such differences in the extent of value involvement influences the ways people use a consensus cue to process both attitude-consistent and counter-attitude messages.

Our findings are also consistent with the HSM showing that there is a difference between using a consensus cue to process an anti-binge drinking message and a pro-binge drinking message between binge drinkers high in value involvement with alcohol (i.e., those high in defense motivation) and binge drinkers low in value involvement (i.e., those high in accuracy motivation). Specifically, the study’s findings show that in processing an anti-binge-drinking message, binge drinkers low in value involvement are likely to be influenced by such a cue, such that a large number of likes is more likely to reduce their
intention to engage in binge drinking and to reduce their descriptive norms pertaining to binge drinking than did the absence of likes. Binge drinkers high in value involvement (with a defensive motivation), on the other hand, were not likely to use the same cue (large number of likes) to process the anti-binge drinking message, as this cue would not accord with the value they assigned to alcohol. Further, the results revealed that in such a case the large number of likes tended to have a boomerang effect whereby those high in value involvement showed an increased intention to engage in binge drinking and the level of their descriptive norms in regard to this behavior also increased. Such findings clearly demonstrate how differences in value involvement influence how college binge drinkers use the focal consensus cue in processing an anti-binge drinking message.

In regard to how college binge drinkers processed the pro-binge-drinking message, however, the results indicate that regardless of the number of likes, binge drinkers with a low in value involvement tended not to be influenced by such a cue in regard to intentions and descriptive norms. Similarly, binge drinkers high in value involvement tended to perceive that many of their peers engaged in binge drinking regardless of the number of likes. Such findings suggest that in the case of the pro-binge drinking message, binge drinkers regardless of the extent of their value involvement are unlikely to be influenced by the number of likes.

In contrast to results reported in the literature for the social norms approach, the results reported herein show that for those high in value involvement, the absence of likes associated with a pro-binge drinking message appears to have a boomerang effect by increasing their intention to engage in the behavior. This finding can be explained in
reference to the Optimal Distinctiveness Theory (Brewer, 1991). According to this theory (Brewer, 1991), any given person has two conflicting needs in regard to his/her relationship with a group: the need to assimilate with his/her in-group and the need to differentiate from others. As a result, people try to establish and maintain an optimal balance between these two needs within and between social groups (Brewer, 2003). Further, if a group is perceived as constituting the majority rather than the minority, people are likely to be motivated to be distinctive from the group (Brewer, 2003). Imhoff and Erb (2009), for instance, found that people high in need for uniqueness were more likely to be influenced by a minority opinion than by a majority opinion.

In this sense, it is expected that binge drinkers high in value involvement may be motivated to be unique or distinctive in relation to the majority when they read the pro-binge drinking message to which no likes have been posted. In other words, it may be that binge drinkers high in value involvement (1) perceive from the absence of likes that the majority of their peers do not engage in binge drinking and, therefore, (2) respond by increasing their intention to engage in binge drinking in order to differentiate themselves from the majority.

Study findings indicate that the number of likes influences descriptive norms about binge drinking among their peers but not subjective norms. Specifically, for binge drinkers low in value involvement, an anti-binge drinking message with 68 likes was more like to reduce their perception that their peers engage in binge drinking a lot than did the message with 1 like. The findings are consistent with previous studies (e.g., Litt & Stock, 2011; Moreno et al., 2013). For instance, Litt and Stock (2011) found that the
study participants who had viewed older peers’ alcohol-related profile pages on social media were more likely than those who had viewed older peers’ non-alcohol-related pages to have greater perceptions of alcohol use among their peers. The findings, thus, suggest that the number of likes on Facebook influences users’ perceived descriptive norms about the health behavior depicted in a given message as enabling users to observe what their peers behave and think.

**Practical Implications**

Social media, including Facebook, have been widely used as a tool whereby users share information about their risk behaviors. For instance, a recent anti-smoking campaign, known as the “Truth” Campaign funded by the American Legacy Foundation, reflects this phenomenon. The campaign discourages young adults and youth from posting photographs that portray their smoking behaviors and from liking such postings given that such postings and the likes associated with them may negatively influence their peer group’s attitudes toward, norms relating to, and intentions toward smoking. Findings of this study offer support for the assumption that regardless of the number of the likes and of the extent of their value involvement, when college binge drinkers read a pro-binge-drinking message they tend to perceive that many of their peers engage in binge drinking.

Our results further suggest that health planners would be wise to consider trying out strategies other than posting photographs portraying risky behaviors and liking such postings. That is they need to consider the level of investment in the risky health behavior
(i.e., value involvement) for their targeted audiences when they create health campaigns. Specifically, the present study shows that for those with a high in value involvement, an absence of likes associated with a pro-binge drinking message compared to a large number of likes tended to have a boomerang effect by increasing their intentions to engage in binge drinking. In other words, for binge drinkers high in value involvement, even such a pro-binge drinking message without any likes may backfire given that they might have a desire to be distinctive from the majority.

In addition, people often share health messages designed to discourage their friends on Facebook from engaging in certain risk behaviors. The Truth Campaign also encourages people to overlap their Facebook profile picture with their logo in order for support the anti-smoking campaign. However, there is very little research on the effects of such prevention-related postings on at-risk audiences. Of course, given that peer norms are considered one of the most significant factors influencing youth and young adults’ initiation into smoking (e.g., Chassin, Presson, Montello, Sherman, & McGrew, 1986; Sarason, Mankowski, Peterson, & Dinh, 1992; Simons-Morton, Haynie, Crump, Eitel, & Saylor, 2001), such a campaign might be effective in reducing the likelihood of smoking being initiated among members of this population. In the case of current smokers, however, it is questionable whether such a campaign has a persuasive effect given that their motivations to smoke may differ, for example, smoking to be social or smoking for pleasure. The findings reported in the present study, in fact, suggest that even prevention-related postings (i.e., anti-binge drinking messages) may have a boomerang effect for at-risk audiences. Specifically, the findings show that college binge drinkers high in value
involvement (i.e., those who engage in binge drinking because they like drinking) are likely to increase their intention to engage in binge drinking when a large number of likes were posted to the anti-binge drinking message. In this sense, it is also plausible to assume that the Truth Campaign has a similar boomerang effect among current smokers who smoke not because their peers do so but because they like smoking. Thus, it is necessary for health planners to consider the level of value involvement when creating health campaigns on social media.

Limitations and Future Research

One limitation of the present study is that the study only used one type of risky health behavior (i.e., binge drinking) to test the moderating effects of value involvement on the effects of the number of likes and message type on behavioral intentions toward and descriptive norms relating to binge drinking. Therefore, in order to render the results more generalizable, it is necessary to determine whether the findings reported herein are replicable with other types of risky behaviors (i.e., smoking and unprotected-sex) among at-risk audiences who differ in terms of the level of value involvement.

Additionally, the relative familiarity of a health behavior depicted in a given message might influence the likelihood whereby users draw on a consensus cue to evaluate the message and the health behavior. The HSM posits that people are more likely to rely on heuristic cues (e.g., consensus cues) when the topic is not familiar than when the topic is familiar. Specifically, Chaiken and Maheswaran (1994) suggest that for topics that are not familiar, people are likely to perceive the majority’s argument as better
than the minority’s argument. Thus, it would be interesting to test such effects in regard to unfamiliar health topics (e.g., colon cancer) as well as in regard to familiar health topics.

Another limitation is that although the study focuses on only one type of consensus cue on Facebook, this forum actually provides several kinds of consensus cues, for example, the number and nature of the comments posted to a given message. In particular, through this comments function, users can comment on a post and identify how many others have commented on it. From the perspective of the HSM, the number of comments can, therefore, be considered a consensus cue, which further leads to consensus heuristics (many reviews/comments are good, Park & Kim, 2009). In such case, it would be interesting to test how many comments are required to serve as a consensus cue in the context of Facebook based on the social norms approach that this study used.

Further, previous studies have tested the effect of the number of comments on the perceived credibility of a given message (e.g., Metzger et al., 2010), attitudes toward a message (Kim & Sundar, 2011), and on purchase intentions (e.g., Gupta & Harris, 2010; Park & Kim, 2009; Park & Lee, 2009; Park, Lee, & Han, 2007). For instance, based on a focus-group interview, Metzger et al. (2010) found that study participants were likely to use the number of reviews to assess the credibility of health-related messages as well as of product-related messages. Specifically, they argued that as the number of reviews associated with a given message increase so does the perceived credibility of the message.
In this sense, it is unclear all types of consensus cues have the same effect on Facebook users’ evaluations of a given health-related message and the health behaviors depicted in the message and on the persuasive effect of the message. For instance, in their study on e-commerce, Sundar et al. (2008) found that the types of consensus cues—star rating, number of reviews, and sales rank—differ in regard to impact on users’ judgments of a product. Specifically, their results indicate that the star ratings and sales ranks positively influence study participants’ perceptions of others’ opinions of a product (positive or negative), which in turn, lead to purchase intentions. The number of reviews, on the other hand, influences perceptions of others’ opinions of a product only under the high sales condition. These results suggest that users perceive the respective types of consensus cues differently, which influences their evaluations of the message and the persuasive effect of the message. Future research, thus, might test how different types of consensus cues (e.g., the number of comments) influence users’ perceptions of the credibility of a given health-related message, attitudes toward, norms relating to, and behavioral intentions in regard to a health behavior described in the message.

In addition, unlike the number of likes, which are entirely numerical, the comments function offers qualitative as well as quantitative information (Park & Kim, 2009). In particular, compared with likes, comments are richer in information in regard to argument quality, valence, sidedness, and consistency (Willemsen, Neijens, Bronner, & De Ridder, 2011). For instance, in terms of comment valence and argument quality, users can also be exposed to others’ comments on the post, which provide additional information, including whether others hold positions in support of or against the post and
whether the argument quality of the comments is weak or strong, respectively. In addition, people can obtain information about how many other people have positively or negatively commented on a given message in terms of comment consistency.

Further, from the perspectives of the ELM and HSM, such differences in comment valence, argument quality, and comment consistency influence users’ evaluations of the comments and the persuasive effect of the comments. For instance, in the eWOM literature, review/comment consistency refers to the extent to which the valence of a current review is congruent with the valence of other reviews (Cheung et al., 2009; Zhang & Watts, 2003). In this sense, comment consistency can serve as a consensus heuristic cue. For instance, suppose that of twenty comments associated with an anti-binge drinking message on Facebook, only one is negative. In this case, users may perceive that the majority of commenters agree with the anti-drinking message, and, therefore, the negative comment must not be credible. Thus, regardless of the negative review, users may follow the opinion of the majority. For future studies, thus, it would be interesting to test how comments posted on a given counter-attitudinal message and attitude-consistent message, varying comment quality, comment valence, and/or comment consistency, influence users’ information processing on Facebook.

Further, users are simultaneously exposed to such different types of consensus cues (e.g., the number of likes and the number of comments) when they read a message on Facebook. In such cases, it is unclear whether users consider all the available information in processing and evaluating a message or whether they refer to just one piece of information on Facebook. Previous studies have investigated the effects of the
simultaneous presence of multiple pieces of information, including interface cues, on perceived message credibility, impression formation, attitudes toward, and behavioral intentions in regard to a topic described in the message (e.g., Lee & Sundar, 2013; Lim & Van Der Heide, 2013; Sundar, Knobloch-Westerwick, & Hastall, 2007; Van Der Heide, D’Angelo, Schumaker, 2012; Walther, Liang, Ganster, Wohn, & Emington, 2012). For instance, in their recent Twitter study, Lee and Sundar (2013) found that the study participants were likely to perceive health messages to be more credible when they received the messages from a professional with many followers than when they received the same messages from a professional with few followers or from a layperson with many followers. The researchers explained these findings based on the cue-cumulation effect. Specifically, the cue-cumulation effect assumes that all available cues rather than one particular cue can trigger heuristics and that such heuristics triggered by all available cues have an addictive effect that enhances the perceived credibility of a message. For instance, users may perceive a message as more credible when there are two positive pieces of information (e.g., a large number of likes and a large number of positive comments) than when there is just one positive cue (e.g., a large number of likes or a large number of positive comments). Similarly, the effect on users’ attitudes toward and behavioral intentions in regard to the message may be boosted when two positive cues are available compared to when only one positive cue is available (Lee & Sundar, 2013). In this case, it is questionable how these different types of consensus cues interactively influence users’ health-information processing on Facebook. Therefore, it would be interesting to test the interaction effects between different types of consensus cues on
health-information processing along with the effect of value involvement among at-risk audiences.

Motivation to use the like function may vary, and the difference in motivation may further influence the use of the number of likes in processing of a given message. In other words, there might be users to indicate their liking of a certain message on Facebook because they really like/enjoy it. However, people use social networks, including Facebook, with the purpose of maintaining relationships with and interacting within a social network (Boyd & Ellison, 2007; Ellison et al., 2007). In this case, it is also possible that users indicate their liking of a certain message for social support rather than their true attitude toward the message. Future research, thus, might 1) explore the types of motivation to use the like function in the context of Facebook and 2) test how different types of motivation influence users’ perceptions of the number of likes associated with a given message.

Conclusion

In conclusion, the present study focuses on redefining a consensus cue conceptually and operationally from the perspective of the HSM (Chaiken, 1980) in the context of Facebook. In addition, the study offers an explanation of the complex patterns of influence between value and issue involvement, normative influence, and likes. The study findings based on three-way interaction effects are quite complex. These findings, however, are the complex realities that health communicators face in the current context. Specifically, results show that at-risk audiences use an online consensus cue differently
depending on whether or not the cue is congruent with their values and the extent to which they value the risk behavior. Thus, this study’s findings may have the potential to contribute a more concise model in the area of health communication and to guide applied health communication efforts online.
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Appendix A: Survey Instruments and Question Wordings for Study 1

**Perceived Credibility of a Message.** Please indicate how well the following words describe the message that you read.

1. **Believable**  
   Describes very poorly: 1 2 3 4 5 6 7 8 9 10 11  Describe very well

2. **Accurate**  
   Describes very poorly: 1 2 3 4 5 6 7 8 9 10 11  Describe very well

3. **Biased**  
   Describes very poorly: 1 2 3 4 5 6 7 8 9 10 11  Describe very well

4. **Objective**  
   Describes very poorly: 1 2 3 4 5 6 7 8 9 10 11  Describe very well

5. **Fair**  
   Describes very poorly: 1 2 3 4 5 6 7 8 9 10 11  Describe very well

6. **Sensationalistic**  
   Describes very poorly: 1 2 3 4 5 6 7 8 9 10 11  Describe very well

7. **Clear**  
   Describes very poorly: 1 2 3 4 5 6 7 8 9 10 11  Describe very well

8. **Comprehensive**  
   Describes very poorly: 1 2 3 4 5 6 7 8 9 10 11  Describe very well

9. **Concise**  
   Describes very poorly: 1 2 3 4 5 6 7 8 9 10 11  Describe very well

10. **Disturbing**  
    Describes very poorly: 1 2 3 4 5 6 7 8 9 10 11  Describe very well

11. **Important**  
    Describes very poorly: 1 2 3 4 5 6 7 8 9 10 11  Describe very well
12. Informative
Describes very poorly 1 2 3 4 5 6 7 8 9 10 11 Describe very well

13. Insightful
Describes very poorly 1 2 3 4 5 6 7 8 9 10 11 Describe very well

14. Relevant
Describes very poorly 1 2 3 4 5 6 7 8 9 10 11 Describe very well

15. Timely
Describes very poorly 1 2 3 4 5 6 7 8 9 10 11 Describe very well

16. Well-Written
Describes very poorly 1 2 3 4 5 6 7 8 9 10 11 Describe very well

17. Coherent
Describes very poorly 1 2 3 4 5 6 7 8 9 10 11 Describe very well

**Manipulation Check.** Please indicate your thought about the number of likes associated with the message.

The message attracted a lot of likes.
Strongly disagree 1 2 3 4 5 6 7 8 9 10 11 Strongly agree

**Issue Involvement.** While reading the message, how much did you feel that it was_____?

1. Involving
Not at all 1 2 3 4 5 6 7 8 9 10 11 Very much

2. Personally relevant
Not at all 1 2 3 4 5 6 7 8 9 10 11 Very much

3. Interesting
Not at all 1 2 3 4 5 6 7 8 9 10 11 Very much

**Attitudes towards Sunscreen Use.** For me to use sunscreen every time I am likely to be exposed to sunlight over the next year would be:

Worthless 1 2 3 4 5 6 7 8 9 10 11 Worthwhile
Unnecessary 1 2 3 4 5 6 7 8 9 10 11 Necessary

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Subjective Norms. Please indicate your level of agreement with the following statements.

1. Most people who are important to me would think I should apply sunscreen every time I am going to be exposed to sunlight.
   Strongly disagree 1 2 3 4 5 6 7 8 9 10 11  Strongly agree

2. Most people who are important to me would _________ me from applying sunscreen prior to sun exposure.
   Strongly discourage 1 2 3 4 5 6 7 8 9 10 11  Strongly encourage

3. Most people who are important to me would _________ of my using sunscreen prior to sun exposure.
   Strongly disapprove 1 2 3 4 5 6 7 8 9 10 11  Strongly approve

Descriptive Norms. Please indicate your thoughts about the following questions.

1. How many undergraduate students at Ohio State University would think that using sunscreen prior to sun exposure is a good thing to do?
   None 1 2 3 4 5 6 7 8 9 10 11  All

2. How many undergraduate students at Ohio State University would apply sunscreen every time they are going to be exposed to sunlight?
   None 1 2 3 4 5 6 7 8 9 10 11  All

3. How much would most undergraduate students at Ohio State University agree that using sunscreen prior to sun exposure is a good thing to do?
   Not at all 1 2 3 4 5 6 7 8 9 10 11  Completely

4. Think about undergraduate students at Ohio State University. What percentage of them do you think would apply sunscreen prior to sun exposure?
   0% 1 2 3 4 5 6 7 8 9 10 11 100%
Behavioral Intentions. Please indicate the likelihood of each of the following.

1. I intend to use sunscreen prior to sun exposure.
   Strongly disagree  1  2  3  4  5  6  7  8  9  10  11  Strongly agree

2. How likely is it that you will use sunscreen before being exposed to sunlight?
   Very likely        1  2  3  4  5  6  7  8  9  10  11  Very unlikely

3. I intend to use sunscreen prior to sun exposure.
   Definitely do not intend  1  2  3  4  5  6  7  8  9  10  11  Definitely intend

4. I plan to use sunscreen before being exposed to sunlight.
   Strongly disagree  1  2  3  4  5  6  7  8  9  10  11  Strongly agree

Facebook Use. Do you currently use Facebook?

1. Yes
2. No

Gender. What is your gender?

1. Male
2. Female
Appendix B: Survey Instruments and Question Wordings for Study 2

Session 1.

**Outcome-Relevant Involvement.** How important is it for you to change your drinking habits?

Not at all 1 2 3 4 5 6 7 8 9 10 11 Very much

**Value involvement.** Please indicate your agreement or disagreement with the following sentences.

1. If I were unable to drink anymore, I would feel a personal loss.
   Strongly disagree 1 2 3 4 5 6 7 8 9 10 11 Strongly agree

2. Alcohol -beer, wine, or liquor- plays an important role in my enjoyment of life.
   Strongly disagree 1 2 3 4 5 6 7 8 9 10 11 Strongly agree

3. A social occasion without alcohol is as enjoyable to me as one with alcohol.
   Strongly disagree 1 2 3 4 5 6 7 8 9 10 11 Strongly agree

4. I really look forward to a drink or two in the evening or on weekends.
   Strongly disagree 1 2 3 4 5 6 7 8 9 10 11 Strongly agree

5. Something beneficial is missing from social occasions when alcohol is not served.
   Strongly disagree 1 2 3 4 5 6 7 8 9 10 11 Strongly agree

6. Drinking alcohol is simply part of a normal social life.
   Strongly disagree 1 2 3 4 5 6 7 8 9 10 11 Strongly agree

7. In general, I value the contribution of alcoholic beverages to the quality of my life.
   Strongly disagree 1 2 3 4 5 6 7 8 9 10 11 Strongly agree
Drinking. Do you ever drink alcoholic beverages (beer, wine, liquor, etc.)?

1. Yes
2. No

Frequency of Drinking. How often have you had alcoholic beverages in the past 30 days?

1. Not at all
2. Less than once a month
3. Once a month
4. Less than once a week but more than once a month
5. Once a week
6. Two times a week
7. Three times a week
8. Four times a week
9. Every day/Nearly every day

Amount of Drinking. For the following questions, one drink can be thought of as about one bottle of beer (12 oz.), or 6 oz. of wine, or a shot of liquor. On days when you do drink, how many drinks do you have (a drink is a 6 oz glass of wine, a 12 oz bottle or can of beer, or 1 ½ oz of liquor straight or in a mixed drink, e.g. count a double as two drinks)?

1. Less than one (e.g., a half serving)
2. 1
3. 2
4. 3
5. 4
6. 5
7. 6
8. 7 or more

Self-Monitoring. Please indicate your level of agreement with the following statements.

1. I find it hard to imitate the behavior of other people.
   True/False
2. My behavior is usually an expression of my true inner feelings, attitudes, and beliefs.
   True/False

3. At parties and social gatherings, I do not attempt to do or say things that others will like.
   True/False

4. I can only argue for ideas which I already believe.
   True/False

5. I can make impromptu speeches even on topics about which I have almost no information.
   True/False

6. I guess I put on a show to impress or entertain people.
   True/False

7. When I am uncertain how to act in a social situation, I look to the behavior of others for cues.
   True/False

8. I would probably make a good actor.
   True/False

9. I rarely need the advice of my friends to choose movies, books, or music.
   True/False

10. I sometimes appear to others to be experiencing deeper emotions than I actually am.
    True/False

11. I laugh more when I watch a comedy with others than when alone.
    True/False

12. In a group of people I am rarely the center of attention.
    True/False

13. In different situations and with different people, I often act like very different persons.
    True/False

14. I am not particularly good at making other people like me.
    True/False
15. Even if I am not enjoying myself, I often pretend to be having a good time.
   True/False

16. I'm not always the person I appear to be.
   True/False

17. I would not change my opinions (or the way I do things) in order to please
   someone else or win their favor.
   True/False

18. I have considered being an entertainer.
   True/False

19. In order to get along and be liked, I tend to be what people expect me to be rather
   than anything else.
   True/False

20. I have never been good at games like charades or improvisational acting.
   True/False

21. I have trouble changing my behavior to suit different people and different
   situations.
   True/False

22. At a party I let others keep the jokes and stories going.
   True/False

23. I feel a bit awkward in company and do not come across as well as I should.
   True/False

24. I can look anyone in the eye and tell a lie with a straight face (if it is for a good
   purpose).
   True/False

25. I may deceive people by being friendly when I really dislike them.
   True/False

**Facebook Use.** Do you currently use Facebook?

1. Yes
2. No
**Gender.** What is your gender?

1. Male
2. Female

**Session 2.**

**Attitudes towards a Message.** Thinking back to the message about drinking that you read, please indicate your overall impression of the message.

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<tr>
<td>Not at all appealing</td>
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<tr>
<td>Not at all likable</td>
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<td>Very enjoyable</td>
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**Perceived Credibility of a Message.** Please indicate how well the following words describe the message about drinking that you read.

1. Believable
   Describes very poorly | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
   Describe very well

2. Accurate
   Describes very poorly | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
   Describe very well

3. Biased
   Describes very poorly | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
   Describe very well

4. Objective
   Describes very poorly | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
   Describe very well

5. Fair
   Describes very poorly | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
   Describe very well

6. Sensationalistic
   Describes very poorly | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
   Describe very well

7. Clear
   Describes very poorly | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
   Describe very well

8. Comprehensive
   Describes very poorly | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
   Describe very well
9. Concise
Describe very poorly 1 2 3 4 5 6 7 8 9 10 11 Describe very well

10. Disturbing
Describe very poorly 1 2 3 4 5 6 7 8 9 10 11 Describe very well

11. Important
Describe very poorly 1 2 3 4 5 6 7 8 9 10 11 Describe very well

12. Informative
Describe very poorly 1 2 3 4 5 6 7 8 9 10 11 Describe very well

13. Insightful
Describe very poorly 1 2 3 4 5 6 7 8 9 10 11 Describe very well

14. Relevant
Describe very poorly 1 2 3 4 5 6 7 8 9 10 11 Describe very well

15. Timely
Describe very poorly 1 2 3 4 5 6 7 8 9 10 11 Describe very well

16. Well-Written
Describe very poorly 1 2 3 4 5 6 7 8 9 10 11 Describe very well

17. Coherent
Describe very poorly 1 2 3 4 5 6 7 8 9 10 11 Describe very well

**Manipulation Check.** Please indicate your thought about the number of likes associated with the message.

The message about drinking attracted a lot of likes.
Strongly disagree 1 2 3 4 5 6 7 8 9 10 11 Strongly agree

**Attitudes towards Binge Drinking.** For me to drink five or more drinks within a couple hours would be:

Worthless 1 2 3 4 5 6 7 8 9 10 11 Worthwhile
Unnecessary 1 2 3 4 5 6 7 8 9 10 11 Necessary
Bad 1 2 3 4 5 6 7 8 9 10 11 Good
Unimportant 1 2 3 4 5 6 7 8 9 10 11 Important
Unpleasant 1 2 3 4 5 6 7 8 9 10 11 Pleasant
Harmful 1 2 3 4 5 6 7 8 9 10 11 Beneficial
Subjective Norms. Please indicate your level of agreement with the following statements.

1. Most people who are important to me would think I should drink five or more drinks within a couple hours.
   Strongly disagree 1 2 3 4 5 6 7 8 9 10 11 Strongly agree

2. Most people who are important to me would _________ me from drinking five or more drinks within a couple hours.
   Strongly discourage 1 2 3 4 5 6 7 8 9 10 11 Strongly encourage

3. Most people who are important to me would _________ of drinking five or more drinks within a couple hours.
   Strongly disapprove 1 2 3 4 5 6 7 8 9 10 11 Strongly approve

Descriptive Norms. Please indicate your thoughts about the following questions.

1. How many undergraduate students at Ohio State University would think that drinking five or more drinks within a couple hours is a good thing to do?
   None 1 2 3 4 5 6 7 8 9 10 11 All

2. How many undergraduate students at Ohio State University would drink five or more drinks within a couple hours?
   None 1 2 3 4 5 6 7 8 9 10 11 All

3. How much would most undergraduate students at Ohio State University agree that drinking five or more drinks within a couple hours is a good thing to do?
   Not at all 1 2 3 4 5 6 7 8 9 10 11 Completely

4. Think about undergraduate students at Ohio State University. What percentage of them do you think would drink five or more drinks within a couple hours?
   0% 1 2 3 4 5 6 7 8 9 10 11 100%

Behavioral Intentions. Please indicate the likelihood of each of the following.

1. I intend to drink five or more drinks within a couple hours.
   Strongly disagree 1 2 3 4 5 6 7 8 9 10 11 Strongly agree
2. How likely is it that you will drink five or more drinks within a couple hours?
   Very likely 1 2 3 4 5 6 7 8 9 10 11 Very unlikely

3. I intend to limit my drink to four or less drinks within a couple hours.
   Definitely do not intend 1 2 3 4 5 6 7 8 9 10 11 Definitely intend

4. I plan to drink five or more drinks within a couple hours.
   Strongly disagree 1 2 3 4 5 6 7 8 9 10 11 Strongly agree