MY BLOGGER TOLD ME IT WAS OKAY:

PROCESSING AND PERSUASION OF YOUTH RISK BEHAVIOR VIA

PARASOCIAL INTERACTION AND HEALTH BELIEFS

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by

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The undersigned, appointed by the dean of the Graduate School, have examined the

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and hereby certify that, in their opinion, it is worthy of acceptance.

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DEDICATION

I dedicate this dissertation to my father, Nels Alfred Johnson (1950-2015), my

grandfather, Emmet John Fink (1916-2016), and my mother, Prudence Louise Fink

Johnson. Thank you also to numerous family members, friends, and faculty for support.

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ABSTRACT

This study explored how parasocial interaction (PSI) and health beliefs influence motivational processing of blog content among young women using a 2 (Stance: Anti, Pro) X 4 (Risk Behavior: E-Cigarette, Drinking, Product, Control) X 2 (Order) X 60 (Seconds) mixed factorial design experiment ($N = 63$). Using the theoretical frameworks of the terror management health model (TMHM) and the health belief model (HBM), the study predicted the effects of parasocial interaction, such that a higher level of parasocial interaction (PSI) the viewer experienced before exposure to the stimuli would lead to increased emotional response, attention and physiological arousal. Among other findings, participants with higher PSI for a beauty blogger had greater reported positive emotional response toward blog posts than those with lower PSI. Additionally, those with higher PSI reported the greatest self-reported positive emotion toward product, news, and video posts (control condition in this study), suggesting that a higher level of PSI led individuals to be more engaged with self-goals (vs. health-goals) within the TMHM. HBM variables (i.e., susceptibility, severity, barriers, and benefits) were also found to predict participants' PSI response, emotional response, physiological arousal, and attention.

Chapter 1 Introduction

While some argue that e-cigarettes are safe and help facilitate smoking cessation, others posit that promoting and selling e-cigarettes is a strategy to get around smoke free policies and thereby subvert public health interventions (Palazzolo, 2013). The offering and sale of e-cigarettes pose a significant health risk to both present smokers and those curious about smoking. It is troubling that e-cigarettes are deemed safe by never smokers and casual smokers in addition to smokers who use the product as a harm reduction strategy. According to Mitch Zeller, director of Center for Tobacco Products at the Food and Drug Administration, what is known about e-cigarettes is "the Wild, Wild West. It's buyer beware. We have e-cigarette users who are saying…it has helped me get off cigarettes. And…we have a doubling of the number of middle and high school kids who used the e-cigarettes between 2011 and 2012…there's absolutely no regulation of manufacture, sale or distribution of these products" (PBS NewsHour, 2014). The advertising and marketing efforts for e-cigarettes are also unregulated. Also using the "Wild West" metaphor, Stanton Glant, director of the Center for Tobacco Control Research and Education at the University of California San Francisco, said the marketing for e-cigarettes is "the Wild West. It's like cigarette marketing in the '50s" (NPR, 2013).

E-cigarette marketing, through product placement and sponsorships on social media (i.e. bloggers and ad content), has the potential to reach youth beyond non-regulated TV advertising. Social media and interactive entertainment can also reach youth in unique ways. A complimentary phenomenon today to e-cigarette popularity is the increasing influence of social media messages and technology reliance, especially in

American youth. For example, media use of today reflects media depictions of technology and interaction advancement. Entertainment narratives depict a future dystopia in which we will have relationships with Siri-like technology (i.e. *Her*) and in which we may recreate a dead loved one based on his or her social media activity (i.e. *Black Mirror*). *Black Mirror* creator explains his show is "all about the way we live now – and the way we might be living in 10 minutes' time if we're clumsy" (Brooker, 2011). Media is increasingly replacing or supplementing human interaction, evidenced by people's incessant monitoring and surveillance of social media, news, messages, calls, etc. This is especially true among young people as social networking platforms provide successful embedded tobacco interventions (Haines-Saah, 2015).

In this vein, social media followers can take on a "relationship" with a media personality via primarily one-way mediated communication (Colliander & Dahlén, 2011). A young woman, for example, can feel like she is a friend of her favorite blogger on Instagram or YouTube. Fashion bloggers' posts, for instance, are framed as very revealing of their personal lives and give followers a peek into their personal day-to-day activities (which could include e-cigarette use and other risky behavior). As social media followers begin to engage more and more with social and interactive media, relationships with media personalities could become increasingly important. This could be especially true when interpersonal relationships "in real life" might be rendered less successful as a social norm or construct (i.e. with an increasing reliance on technology as an alternative for forming pseudo-social connections). Following fashion and beauty bloggers may not be much better for physical and mental health than following models or famous people because they create unattainable ideals; they are filtered and edited versions of reality via

social media applications. Many of these bloggers engage in communications or promote products that lead to non-healthful thoughts and behaviors, such as negative body image, disordered eating, tanning, plastic surgery, body modification, etc. (Lunde, 2013). Could bloggers covertly sell e-cigarettes along with lofty beauty and body ideals? Media blogging could be an avenue to reach young media consumers or blog followers for the sale of harmful products that present health threats such as e-cigarettes. This research seeks to examine how media blogging can, through strategic communication, market e-cigarettes along with other recommendations (i.e. lifestyle, fashion, beauty, and life advice).

Particularly, this study explores how mediated messages related to e-cigarettes would influence cognitive and emotional response, and behavioral intention outcomes among women because women as a group may be an at-risk population. It specifically examines mediated messages delivered via a voice of a blogger who media users have familiar mediated interaction over time. It is well known that there are more negative effects of burn smoking on respiratory function in women than in men (Xu et al., 1994). More importantly, even though women typically begin smoking at an early age they do not become concerned about smoking effects until their mid-20s (McDermott, Dobson, & Owen, 2006). The overarching goal of this study is to examine how parasocial interaction (PSI) with a blogger (author) and health beliefs influence motivational processing of blog content among young women. In order to guide this research, the health belief model (Rosenstock, 1974) and the terror management health model (Arndt & Goldenberg, 2011) are employed as the theoretical frameworks. In this study, the health belief model variables—severity, susceptibility, barriers, and benefits are hypothesized to influence

audiences' processing of blog messages about e-cigarette use. Furthermore, within the terror management health model (TMHM), this study hypothesizes that during processing health content, individuals may act to serve self-motivations as opposed to health motivations in order to avoid thinking about mortality (Arndt & Goldenberg, 2011). This is based on the argument that parasocial interaction with message authors (bloggers) may amplify or multiply the self-motivation; if one has a greater parasocial interaction with a blogger promoting a risky behavior (e-cigarette use), that person will probably process the message more and view it as more favorable.

The overarching research question is whether parasocial interaction with a blogger and health beliefs influence the cognitive and emotional processing of risk behavior messaging (specifically blogger posts on e-cigarettes versus posts on drinking, beauty products, a news post on a beauty product, and a video of the blogger) due to the prevalence of self (vs. health) motivations driving behavior among young women. This research employs self-reported and psychophysiological measures (heart rate to indicate attention, skin conductance to indicate arousal/emotion, and EMGs) to explore cognitive and emotional processing of health communication (i.e., blog content). This is one of the first studies using such measures to explore processing effects of blog content in the health communication context. It was expected that the findings of the study would provide better understanding of the linkage between how the perception to characters in mediated messages and the message written by the character influence audiences' message processing, especially in the context of health related messages.

Chapter 2 Literature Review

The E-cigarette as a Threat to Health

Young people are in a period of life and in an environment that increase the risk of health compromising behaviors (Berg et al., 2011; Von Ah et al., 2004). These health risks include, but are not limited to, an increase in alcohol use and smoking (Berg et al., 2011; Von Ah et al., 2004). Studies show that initiating common, unhealthy behaviors, such as smoking tobacco, during this young adult stage in life, has long-term implications on health (Von Ah et al., 2004). The risk to this demographic makes it an important group to gain insights into understanding the impact of health messaging. For instance, 18.9% of American smokers are aged 18-24 and e-cigarettes represent a new product in the market that targets young people who are new smokers (CDC, 2012). Youth smokers are a particularly susceptible population to e-cigarettes because there is no FDA regulation.

The lack of regulation is problematic because the FDA has reported that there is a presence of carcinogens like nitrosamines and diethylene glycol in the e-cigarette cartridges and solutions (Food and Drug Administration, 2009). Also, e-cigarettes are only superficially or marginally better for health because the levels of harmful trace metals such as lead, chromium, and nickel that are found in the aerosols of e-cigarettes are comparable to cigarette smoke (Williams et al., 2013). Both cigarette and e-cigarette use is starting earlier in young adult life, so it is plausible that young people and college students are extremely susceptible populations to the health threats posed by both cigarette smoking and e-cigarette use. In regard to ever e-cigarette use among middle and

high school students, in the United States during 2011-2012, among all students in grades 6-12, ever e-cigarette use increased from 3.3% to 6.8% ($p < 0.05$); current e-cigarette use increased from 1.1% to 2.1% ($p < 0.05$) and current use of both e-cigarettes and conventional cigarettes increased from 0.8% to 1.6% ($p < 0.05$) (CDC, 2013).

More recently, e-cigarette use tripled in the 2013-2014 school year among middle and high school students (CDC, 2015). Additionally, high school student e-cigarette use (use on at least 1 day in the past 30 days) increased from 4.5 percent in 2013 to 13.4 percent in 2014 (CDC, 2015). While e-cigarette (and hookah) use is growing more and more, traditional tobacco use is decreasing, such as cigarette, cigar, smokeless tobacco, and tobacco pipe use among high school students (National Youth Tobacco Survey Results, 2014). Therefore, e-cigarette and hookah smoking is counteracting this decrease in burn smoking and other tobacco use (National Youth Tobacco Survey Results, 2014).

This study particularly explores e-cigarette initiation in women because this group is an at-risk population. Addressing e-cigarette smoking among college-aged women is a timely and pertinent issue because the health risks to the respiratory function by tobacco and "burn" smoking are known to be greater for women than for men (Xu, Li, & Wang, 1994; Thun, Carter, & Feskanish, 2013). As the danger of lung cancer related death in male smokers has stabilized since the 1980s, it continues to grow in female smokers (Thun et al., 2013). Acknowledging that young female smokers are an at-risk population, this study is concerned with e-cigarette smoking initiation in this susceptible population.

The media environment is saturated with messages that could both help and hurt this population. For instance, beauty blogs can build self-esteem, but could also encourage unhealthy behaviors such as e-cigarette use or vaping as modeled by certain

bloggers. The terror management health model explains how individuals seek to enhance the self and enhance health for the self. However, these goals can be at odds. In the media context, using social media (i.e. viewing bloggers' posts) could be both helpful and hurtful to body image.

With the unregulated environment of social media advertising, e-cigarette advertising could creep into mediated content on social media more and more. This creates a conflict between social media's ability to market self-enhancement products that could help and harm health (i.e. e-cigarettes could encourage smoking and could also help tobacco smokers quit). This study also compares the effects of blog posts on e-cigarettes versus posts on drinking, beauty products, a news post on a beauty product, and a video on the blogger. These are used as comparison messages because beauty products are commonly and often discussed by the blogger used in the stimuli. Drinking posts were also compared because drinking is a normative behavior among college women, with nearly a third of college women in the U.S. self-reporting as binge drinkers in a national survey (White & Hingson, 2014). E-cigarette use and alcohol use may also be connected in that alcohol use could be a gateway drug to e-cigarette use or vice versa (Lessard et al., 2014). The potential gateway effect of e-cigarettes is an additional problematic phenomenon. Since motivated cognition has often been used to explore health communication (Lang, 2006) and specifically tobacco (Leshner, Bolls, & Thomas, 2009), this study employs that approach.

Employing The Motivated Cognition Approach

This study employs the experiment grounded in an embodied motivated cognition theoretical approach (LC4MP; Lang, 2000; 2006; 2009; Bolls, Wise, & Bradley, 2012); psychophysiological measures were used in an exploratory way to ascertain how health messages embedded within a blog environment would impact implicit emotional and cognitive processing. According to the Limited Capacity Model of Motivated Mediated Message Processing (LC4MP), message processing is defined as the interaction between message and human (audience), and it is essential to communicate relevant information about a behavior, brand or a product in a motivationally significant way to tap into fundamental and emotional human needs.

Within the framework of the LC4MP, humans are considered as information processors with a limited cognitive capacity to allocate cognitive resources to process information and two motivational systems—appetitive/approach and aversive/avoidance, which influence resource allocation to processing information. It is assumed that humans carry out actions through or over time. In terms of media, the LC4MP assumes that media transmit "varying streams" of sensory information and that in communication a message or medium interacts with the individual recipient in an "ongoing, dynamic, continuous" nature (Lang, 2009, p. 194). These assumptions about the media imply that the structural features and content of a message (or sensory information), for example, influence an individual's cognitive processing. That is, message processing is the interaction between the mediated message and the human mind. The limited capacity of the mind, the motivational aspect of processing, and the temporal nature of the interaction or reaction to the mediated message all impact the mind and media interaction. In other words, in

order for a message to "work," or to communicate relevant information properly, it must present the message in such a way that it recognizes the motivational aspects of the brain and the limited capacity of the mind to process information through the stages of encoding, storage, and retrieval, which relates to recall. If the message is encoded and stored successfully (depending on message features or trait variables of the individual, for instance, like self-motives, health beliefs, and parasocial interaction), a person is more likely to recall (or retrieve) the message or information from the message.

In Leshner, et al. (2011), the authors concluded that scholars in the future must continue to manipulate specific aspects of messages and "observe patterns of emotional and cognitive processing as a result of message exposure" in order to understand cognitive and emotional processes (p. 87). This requires physiological measures to infer latent psychological responses to media, which have been borrowed from other disciplines (Lang et al., 2009). With that, the LC4MP has organized past research on psychology and processing into discrete categories of interest, such as attention, emotion, and arousal (Lang et al., 2009). This research measured these three variables through psychophysiological measures and self-report measures explained in the Method chapter.

Attention, emotional response, and arousal occur as a part of human survival, and in service to appetitive (often indicated by positive or approach responses) and aversive (i.e., avoid response) motivational systems. Since humans are limited capacity processors (Lang, 2006) and process information over time at a very fast and perhaps automatic rate to stay alive (Lang, 2006; Bargh & Chartrand, 1999; Ohman et al., 2000), self-report simply cannot 'tell' the researcher how the mind is processing the information on a second to second (or even shorter basis). Furthermore, some researchers argue that we are

sometimes not fully aware of what we truly feel or think and therefore self-reporting of cognitive and emotional activities can fail to be accurate (Grimes, 1990). Additionally, emotional response as indicated by action potentials coming from muscle fibers in bipolar connections can be too fleeting for individuals to consciously appraise or report (Tassinary & Cacioppo, 2000). Thus, this current study employs the motivated cognition approach (or LC4MP) as the general framework by employing psychophysiological along with self-reported measures. A full description about these measures is detailed in the Method chapter.

Terror Management Health Model

The terror management health model (TMHM) posits that individuals are motivated to both enhance and protect the sense of self and are motivated to protect health (even though sometimes these motivations could be in conflict) (Arndt & Goldenberg, 2011). This is done in an effort to avoid terror and negatively valenced emotions toward awareness and thinking about death and mortality (Arndt & Goldenberg, 2011; Cooper, Goldenberg, & Arndt, 2010). An example in which the self-motive is prioritized above health would be when a smoker might avoid fear messages about smoking and engage in the smoking behavior. Accepting or adopting unhealthy messages or messages that improve the self could be another example (i.e. engaging in e-cigarette use for fun or other social reasons—not as a smoking cessation harm reduction strategy). Doing such behaviors (i.e. adopting e-cigarette use as a smoking initiation behavior) is a form of affirming the value of the self (Arndt & Goldenberg, 2011). TMHM posits that non-conscious mortality thoughts may lead to avoidance of pro-health behavior and anything that addresses creature aspects of the body (Arndt & Goldenberg, 2011). This

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study proposes that bloggers can enable young women to avoid healthy behavior by emphasizing self-improvement of beauty and image. Self-expansion is another process through which bloggers can persuade self-enhancement behaviors via one-way mediated relationships.

Self-expansion is a significant concept in the social psychology field (i.e. related to the notion of self-growth). Self-determination theory implies that growth occurs with the fulfillment of basic psychological needs such as autonomy, competence, and relatedness; self-growth also occurs via intrinsic motivation and internalization (Deci & Ryan, 2000). Individuals can self-expand via close relationships (Mattingly & Lewandoski, 2013). For instance, in a long-term, serious relationship, the significant other gives the other person meaning to his or her life through stories and narration (McAdams, 2008) and provides opportunities for new experiences and growth (Mattingly & Lewandoski, 2013). Human beings are motivated to broaden their sense of selves with the aims of increasing self-efficacy, reaching goals, and lessening boredom (Aron & Aron, 1997). However, some research suggests that the self is able to expand outside of a true interpersonal relationship (Mattingly & Lewandowski, 2013). This study argues that individuals can self-expand and grow through engagement in parasocial interaction and pararelationships (i.e. pseudo relationships with media personae).

Throughout history (at least since the 20th century), people have formed relationships with fictional characters, spirits and celebrities, making the idea of a connection to characters on a television show one that is not unusual, though not clearly understood by researchers or even the viewers themselves (Giles, 2002). One study found people unable to understand their extreme dismay at the death of Princess Diana though

they had not personally known her because they had discounted the idea that they had

formed a relationship with her through mediated communication (Giles & Naylor, 2000).

Some viewers, immersed in what seems like a real, though one-sided relationship, begin

to desire to emulate their favorite characters, newscasters and other media figures. For

example, as *Gossip Girl* gained popularity in its prime time television slot, blogs and

micro-blogs began posting pieces of clothing the main characters wore after and/or

during each show.

Relationships between media users and media figures (even fictional characters

found in books or cartoons) are referred to as parasocial relationships. These relationships

often feel real to the media consumer but are one-sided interpersonal relationships that

are thought to be multi-dimensional (Horton & Wohl, 1956) with each type of interaction

resulting in an explanation or illumination about some piece of the media relationship

(Giles, 2002). The study of parasocial relationships has focused largely on such

relationships leading to media consumption under the uses and gratifications paradigm

(Giles, 2002). Little research has focused on the behaviors that may result from such

relationships, especially in the case of e-cigarette initiation behavior.

Parasocial Interaction

Early studies suggest that identification can be a key component or factor for

audience membership and show liking (Lonial & Van Auken, 1986; Slaby & Frey 1975).

Literature has also suggested that individuals can form parasocial relationships, which are

essentially social responses and pseudo-interactions with TV and film characters

(Schramm & Wirth, 2010). It has been more specifically defined as involving media

personalities having a role "in real and perceived relationships with audience members"

(Rubin, 2002, p. 177).

For instance, Rubin and Step (2000) found that audiences parasocially interacting with radio show hosts predicted their planned and frequent listening. This concept can be explored by testing whether viewers experience *parasocial interaction* such as identity formation with actors and popular figures to meet social needs (i.e. bloggers). The influence of celebrities on behavior has been tested and established in research, such as laypeople imitating professional athletes (i.e. using Mark McGuire and Magic Johnson as aspirational models for behavior) (Brown & Basil, 1995; Brown, Basil, & Bocarnea, 2003). Likewise, female celebrities on popular television shows can communicate "psychosocial" product benefits and desirable visual presentations of clothing and makeup products (Stafford, Spears, & Hsu, 2003).

Because celebrities often have high attractiveness, their credibility is perceived as higher, meaning that consumers put their trust in celebrities as aspirational figures (Amos, Holmes, & Strutton, 2008). Schmid and Klimmt (2011) found that admiration and attraction to the Harry Potter character predicted forming a parasocial relationship with the character across collectivist and individualistic cultures. Over 375 million copies of the series have been sold worldwide and the series has been successfully adapted as a film series of the books with international release and distribution, making Harry Potter a model for a legion of Potter branded products (i.e. video games, apparel, etc.) (Schmid & Klimmt, 2011).

In regard to social media advertising and blogging, research has found that parasocial interaction is a good way to advertise (i.e. endorsements integrated with personal stories, such as marketing on Twitter and Instagram by reality TV star Kim

Kardashian) (Lueck, 2015). Kardashian has received stardom by working in the "reality" TV and media system; she gained popularity by starring on reality TV; she promotes her brand via social media posts and blogs (Bowles, 2014). In regard to Instagram, Kardashian said, "it's intimate. It has a little bit more texture than just words" (Bowles, 2014). Thus, bloggers and celebrities can gain influence by posting online, especially to young female audiences. However, this influence can be very detrimental to young users' health. For example, Kim Kardashian's sister, 17-year-old Kylie Jenner, had a sufficient media presence to spur a dangerous trend and beauty emulation: teens trying to achieve her plump lips (achieved by Jenner with fillers) by sucking on shot glasses and plastic bottles for long periods of time and posting the results on social media with the hashtag #KylieJennerChallenge (Leeson, 2015). This resulted in bruising and swelling in teens who attempted this "challenge" (Leeson, 2015). These examples demonstrate that parasocial interaction and behavioral modeling can have very potent effects on young women.

Identification and parasocial interaction are conceptually distinct. Identification "occurs when one individual shares the interests of another individual or believes that he or she shares the interests of another" (Brown & Bocarnea, 2007). This means that identification occurs when a consumer feels that he or she is homogenous with a character or celebrity's activities and interests (i.e. behaviors, looks, dress, etc.). Conversely, parasocial interaction is the process of aspiring to be like a persona, which can be a real person, such as an actor, athlete, or performing artist (i.e. Ellen Pompeo who acts on *Grey's Anatomy*), or it can be a fictional character (such as Meredith Grey on *Grey's Anatomy*) (Brown & Bocerna, 2007). This interaction is a specific aspirational

involvement and feeling of friendship with a real or fictional character through enduring or repeated exposure to famous figures that appear on mediated content.

Parasocial interactions become stronger when the viewer "forgets" that the person is in a television studio or on a TV set (Horton & Wohl, 1956). This experience can be intensified by film effects, such as a character who is attractive to the viewer, directly facing the viewer or verbally addressing the viewer (Hartmann & Goldhoorn, 2011). The effects make the relationship more connected and more "real." This has important implications for extension of the relationship in the social media space, where characters can directly tweet to their fans or post photos and videos about their consumption or buying activities. Those with parasocial relationships are also likely to extend this relationship in online microblogging on sites such as Instagram, Twitter, and Facebook (Ding, Qiu, & Li, 2012). This is also encouraged by the entertainment industry as celebrities and bloggers are encouraged to communicate casually and to imitate the image of a "real" friend to the public via social media, by appearing to be candid and uncensored (Marwick, 2011).

Parasocial Versus Real Relationships

Parasocial and real social relationships are similar (Perse & Rubin, 1989). Both types of relationships develop over time and become stronger when media depictions look like interpersonal interaction (Horton & Wohl, 1956; Meyrowitz, 1986; Norlund, 1978). Viewers feel that they know the parasocial character like they know their real friends even though there is no two-way interaction (Perse & Rubin, 1989). Instead, the interaction is vicarious through the process of media viewing (Perse & Rubin, 1989). In Rubin and Perse (1987), viewer involvement was conceptualized as motivations to view

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(e.g., for entertainment, to pass time, etc.), attitudes about realism and viewing quality, and attention to viewing. The findings were that entertainment and social utility, perceived realism of content, and attention to content were related to parasocial interaction, cognitive processing after viewing, and discussion of the viewing experience (Rubin & Perse, 1987). Based on these findings, the following hypothesis is proposed.

> **H1**: Those with higher parasocial interaction (PSI) toward the blogger will have greater parasocial interaction toward the blogger's video and posts compared to those with lower PSI.

It is also of specific interest to this study to explore message processing regarding e-cigarette compared to other types of health behavior (e.g., alcoholic drinking and product purchase) and to examine the interaction between types of health behavior messages and the stance the message employs for its arguments. However, existing research is lacking. Thus, the following research question is proposed:

> **RQ1**: What stances (anti versus pro) and topics (e-cigarette, versus drinking, beauty product, news about beauty product, or blogger video) presented will create the most PSI response after reading the posts?

Based on the theoretical argument of motivated cognition approach, this study hypothesizes that during the processing of a blogger's message, a higher level of PSI (as the reader identifies herself close to the author) can lead to a greater level of motivational relevance. It has been theorized and tested that increased motivational relevance can lead to greater automatic activation of motivational systems (that is, increased activation in appetitive system), to an increased positive emotional experience and to cognitive resource allocation to processing information. Those with higher PSI are predicted to

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have greater positive emotional experience (self-reported positivity and physiological arousal) and decreased heart rate and increased cued recall as compared to those with lower PSI toward a blogger. This is also in line with the argument of the terror management health model that higher PSI may act as a buffer or a protection between the person and thoughts of mortality (in the case of anti-e-cigarette and drinking messages). Higher PSI toward the blogger may make self-oriented behaviors more salient or palatable (e.g., product buying and drinking and e-cigarette initiation). Thus, the next hypothesis and research question are proposed in regard to changes in the level of experienced PSI toward the message, and the emotional and cognitive responses as a function of the level of participants' PSI toward bloggers.

> **H2**: Those with higher level of PSI toward bloggers will have greater self-reported (1) positive emotion, (2) physiological positive emotion (measured by zygomatic), (3) cued recall, (4) attention (indicated by lower heart rate) and (5) self-reported arousal, and (6) arousal (measured by skin conductance level) compared to those with less PSI level toward the blogger.

> **RQ2**: Will there be an interaction between PSI level and stance and/or topic, such that a higher PSI level toward the blogger will have greater (1) self-reported positive emotion, (2) physiological positive emotion (measured by zygomatic), (3) cued recall, (4) attention (indicated by lower heart rate), (5) self-reported arousal, and (6) arousal (measured by skin conductance level) compared to those with less PSI level toward the blogger?

Previous studies (De Vries et al.,1995; Setodji et al., 2013) found a connection between social influences on smoking and smoking intentions. For instance, perceived

smoking behavior of others and pressure to smoke from others have been found to be related to current and future smoking initiation (De Vries et al., 1995). Setodji et al. (2013) suggested that when among friends, people who are exposed to pro-smoking media, may gain higher intentions to smoke and a lower ability to refuse smoking. Based on the association between social influences (like a friend or a blogger) and audiences' (i.e., young women in particular) behaviors, this study argues that the influence of bloggers on audience (the level of PSI) may influence an audience's emotion, arousal, and attention in regard to smoking and drinking content written by the bloggers. That is, the audience may take the same stance as the blogger's stance. Thus, this research proposes the following:

RQ3: What is the effect of stance (in an interaction between stance and topic) on positive emotional response, attention, and arousal such that messages regarding pro-e-cigarette and pro-drinking stance posts will provoke greater (1) positive emotional response, (2) attention, and (3) arousal in a way that messages regarding pro-e-cigarette and pro-drinking stance posts will elicit (1) greater positive response (in pleasantness self-report), (2) greater zygomatic response, (3) greater cued recall, (4) lower heart rate and (5) greater self-reported arousal, and (6) higher skin conductance level compared to other types of posts (the anti-e-cigarette post, anti-drinking posts, anti- and pro-beauty product posts, news story about beauty product, and blogger video)?

H3: There will be an interaction between pre-existing intention of e-cigarette and alcohol use and the exposure to pro-unhealthy behavior (e.g., e-cigarette use, alcohol use) messages, such that those with higher intention to use will have more

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(1 and 2) positive emotion (in self-reported pleasantness/positive emotional

response and greater zygomatic response) to pro-e-cigarette and pro-drinking

messages and greater attention, signified by more (3 and 4) resources allocated to

encoding and (greater recall and lower heart rate), and (5 and 6) greater

physiological and self-reported arousal (i.e., greater arousal response).

Social Influence and Smoking Refusal

Past research has shown that perceived behavior of others and pressure to smoke

significantly explains current and future smoking initiation (De Vries et al., 1995). In

more recent research, pro-smoking messages on media are associated with increased

smoking intentions and lower smoking refusal self-efficacy, defined as how capable a

person is in refusing an e-cigarette in a social setting. Setodji et al. (2013) found that in

situations where participants were with friends, pro-smoking media exposure was

associated with higher intention to smoke and lower ability to refuse smoking. Research

has also shown that self-efficacy is a key factor predicting smoking cessation and

lowering risky drinking behavior in young people (Von Ah et al., 2004). Therefore, based

on the association between refusal self-efficacy and smoking/quitting intention, this study

hypothesizes that pre-existing smoking refusal self-efficacy may impact responses to e-

cigarette posts. If one has lower refusal self-efficacy before the exposure, she might view

pro-e-cigarette messages more positively and anti-e-cigarette messages as negative, for

example.

H4: There will be an interaction between individuals' pre-existing e-cigarette

smoking refusal self-efficacy and stance and topic on cognitive and emotional

processing of the stories (e.g., a Stance X Topic X Refusal Self-Efficacy

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interaction); specifically, those with existing low self-refusal, self-efficacy will respond more positively (in (1) greater self-reported pleasantness/positive emotional response and (2) zygomatic response) to pro-e-cigarette and pro-drinking messages and greater attention, signified by (3 and 4) more resources allocated to encoding (greater recall and lower heart rate) and (5 and 6) greater arousal response (arousal self-report and skin conductance).

RQ4: Will intentions and refusal self-efficacy interact, resulting in a Drinking Intentions X Drinking Refusal Self-Efficacy and E-Cigarette Intentions X E-Cigarette Refusal Self-Efficacy interaction on (1) emotion, (2) attention, and (3) arousal. That is, will those with high intentions and low refusal self-efficacy have (1 and 2) greater positive emotion (self-reported positivity and greater zygomatic response), (3 and 4) greater attentional resources to processing (greater recall and lower heart rate), and (5 and 6) greater self-reported and physiological arousal?

Parasocial interaction and consumption. Studies have found that consumers' attitudes about products mirror their favorite characters' products via parasocial interaction (Russell & Stern, 2006). This process occurs due to consumer attachment or "friendship" with characters from TV shows (Russell & Stern, 2006). Russell and Stern (2006) argued that these attachments are made over long periods of time, such as the run of a TV series, which can last up to 5-10 years or more for any given series (i.e. *Frasier* or *Friends*). This could also apply to the social media/blogging setting. In this time period, viewers feel that they can "get to know" the characters and even live vicariously through the fictional characters' lives (Russell, Norman, & Heckler, 2004). Viewers may

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begin to model characters' product consumption and use habits through parasocial interaction (Russell & Puto, 1999). This is a natural extension of literature on spokespeople or "spokes-characters," who may influence positive brand attitudes because of their trustworthiness and relevance to brands (Garretson & Niedrich, 2004).

In a meta-analysis, Schiappa, Allen, and Gregg (2007) found that those who form parasocial relationships watch or consume more media than those who don't. They are more likely to perceive TV program characters as real people and as attractive (Schiappa et al., 2007). They also found a positive relationship between forming parasocial relationships and the perception of homophily with TV characters (Shiappa et al., 2007). Women are also more likely than men to form parasocial relationships (Shiappa et al., 2007). This analysis showed that with persistent media use, viewers are more likely to engage in these relationships and are more susceptible to influence from media characters. This study applies the findings from previous research on traditional media (TV) to the social media context.

Parasocial interaction and buying. Researchers have studied how parasocial interaction and purchasing behavior are linked. For instance, Park and Lennon (2004) found a positive relationship between watching television shopping programs and impulse buying and also a relationship between impulse buying and parasocial interaction with characters on those shopping programs. They also found a positive relationship between parasocial interaction, and watching TV shopping programs and watching TV in general. A more recent study found similar results. Lim and Kim (2011) found that there is a relationship between parasocial interaction and the perceived convenience of TV shopping.

This study contributes by exploring the connection between character parasocial relationships and imitative buying patterns or intentions in the social media space. However, there has been very little research examining how parasocial interaction or parasocial relationships are related to like-character buying patterns. Thus, the following hypothesis and research questions are proposed:

H5: Participants with a higher level of PSI will be more likely to have a greater purchase intention for the products featured.

RQ5: What stances and/or topics will participants favor in terms of purchase intention?

RQ6: Will stance and/or topic interact with PSI, resulting in a Stance X PSI, Topic X PSI, and/or Stance X Topic X PSI interaction where participants with a higher PSI will be more likely to have a greater purchase intention for the products featured (i.e., express purchase intention)?

Health Belief Model

The health belief model (HBM) was developed in the 1950s by Rosenstock and Colleagues for the U.S. Public Health Service over concern about the public not adopting tuberculosis screening and prevention (Rosenstock, 1974). The health belief model is a value-expectancy theory that proposes that (1) people see a health threat as serious and (2) see that it is worth it to change behavior in order to prevent a threat from occurring (like preventing TB via screening; Rosenstock, 1974). That is, the health belief model (HBM) assumes that people will change their behaviors if they see value in an anticipated or expected outcome that may result in personal behavioral changes (Rosenstock et al., 1988). The HBM assesses how perceptions of susceptibility and severity, as well as

barriers and benefits of a health behavior, impact health choices (Champion & Skinner, 2008). The original model posits that preventive health behaviors can be predicted by four individual perceptions: (1) perceived susceptibility to a disease or illness, (2) perceived severity of a particular condition, (3) perceived barriers that can prevent action, and (4) perceived benefits of a recommended behavior (Champion & Skinner, 2008; Rosenstock, 1974). The HBM combines both stimulus-response and cognitive theory paradigms because the theory was originally conceived to apply to preventive health behaviors, and then was expanded to apply to sick health behaviors and chronic disease management (both perceptual and action oriented behaviors) (Janz & Becker, 1984; Rosenstock et al., 1988).

Several studies have shown that health experiences (e.g., positive experiences with immunization), learning programs, mediated content, and other interventions can successfully lead to positive changes in knowledge, the HBM variables, and behavioral intentions or observed behavior (Janz & Becker, 1984; Moodi et al., 2011; Teitler-Regev et al., 2011). Janz and Becker (1984) specifically observed that barriers to action can be a very powerful HBM variable preventing behavioral change and saw that the model was validated across numerous studies. Education programs have been shown to be effective among young adult women, specifically at increasing knowledge and healthy HBM perceptions about breast self-examination (Moodi et al., 2011). There is also evidence that smoking education programs increase awareness and quitting in vulnerable populations (Shuter et al., 2012).

It may be concluded that testing the emotional and cognitive effects of e-cigarette promotion versus anti-e-cigarette messages among young college women ages 18-20 fits

with the extant literature and addresses many of the issues today (e.g., online communication and advertising, "wild west" regulatory environment, young people susceptibility, women susceptibility, inconclusive research on persuasion and warning label effectiveness proposed by the FDA, among other factors; Yamin et al., 2010; Palazzolo, 2013; Thun et al., 2014; FDA, 2015; CDC, 2015). However, to fill a gap in the research, this study will use HBM variables as predictors of processing effects. Most studies using the HBM have explored how the HBM variables are psychological state outcomes of an intervention (Janz & Becker, 1984).

The HBM facilitates new understanding of the topic of e-cigarette advertising, since research on mediated persuasion toward young women is lacking (Palazzolo, 2013; Yamin et al., 2010). Since the HBM was originally created to explore why individuals would not adopt preventive behaviors (Rosenstock, 1974), this research follows the original theoretical purpose; it explores how mass mediated communication that the FDA may not ever control (blog mediated) has the potential to persuade young women about e-cigarette use.

The HBM predicts that when perceptions of benefits, susceptibility, and severity are high with few perceived barriers, individuals are more likely to feel more efficacious and able to perform a positive health behavior (such as removing themselves from illness exposure). Cues to action, such as mediated content, can intensify this effect if used. In this study, health beliefs were measured before and after to see if the mediated content made the participant more or less affected by the content in terms of risk perception toward e-cigarettes.

Reisi et al. (2014) found that non-smokers and current smokers differed on HBM

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variables regarding smoking. For instance, smokers had higher perceived susceptibility to smoking health problems, perceived benefits of non-smoking, and perceived self-efficacy toward non-smoking (Reisi et al., 2014). Therefore, there is probably less awareness of the risk of e-cigarette and traditional tobacco use in young adults who may have never smoked or only tried smoking a handful of times than among regular smokers. Another recent study showed that participants who perceived e-cigarettes as a good harm reduction strategy and less harmful than cigarettes were more likely to try e-cigarettes (Choi & Forster, 2014). This research argues that media users' health beliefs regarding e-cigarette smoking will influence processing of mediated content emphasizing pro and anti stances.

H6: Health beliefs toward e-cigarette smoking will influence processing of e-cigarette messages (parasocial interaction, positive emotional response, attention, and arousal). Those with less susceptibility, less severity, higher barriers (toward not using e-cigarettes), and higher benefits (to not use e-cigarettes) beliefs will have (1) higher self-reported positive emotion, (2) greater physiological emotion (greater zygomatic response), (3 and 4) greater attention (greater cued recall and lower heart rate over time), and (5) greater self-reported arousal and (6) greater physiological arousal (greater skin conductance), and (7) higher PSI response.

In order to examine how the beliefs may interact with PSI among the group of four beliefs, and with stance and topic, the following research question is posed. The research intends to explore whether higher PSI might amplify the effect of less susceptibility, less severity, higher barriers, and higher benefits on processing and how certain topics and stances with the HBM variables are processed. This research question

is exploratory:

RQ7: Will health beliefs toward e-cigarette smoking influence processing of e-cigarette messages (parasocial interaction, positive emotional response, attention, and arousal)? Specifically, will those with less susceptibility, less severity, higher barriers (toward not using e-cigarettes), and higher benefits (to not use e-cigarettes) beliefs (when in interaction with each other, with PSI toward the blogger before exposure, or with stance and/or topic) have (1) higher self-reported positive emotion, (2) greater physiological emotion (greater zygomatic response), (3) greater memory/encoding, (4) greater attention (lower heart rate over time), (5) self-reported arousal, (6) skin conductance, and (7) higher PSI response?

Chapter 3 Method

Experimental Design and Stimuli

This study employs a 2 (Stance: Anti, Pro) X 4 (Risk Behavior: E-Cigarette, Drinking, Beauty Product, Control) X 2 (Order) X 20-30 (Seconds) mixed factorial design experiment. Stance and risk behavior were within-subject factors. Stance had two levels: anti and pro. Risk behavior had four levels: e-cigarette, drinking, beauty product, and the news story. The news story was included as control comparison to the blog message type. Presentation order (2) was the only between-subjects factor. Each participant was randomly assigned to one of two orders. The video of the blogger was another control message that was shown before exposure to all other posts.

For the experimental stimuli, the researcher wrote a total of seven messages. They were text-based blog post messages: anti-e-cigarette (176 words), anti-drinking (188 words), anti-beauty product (160 words), a news article about the blogger and a beauty product she created with BECCA (control condition, 160 words), pro-e-cigarette (152 words), pro-drinking (156 words), and pro-beauty product (177 words). In order to keep external validity, the researcher used some existing blog content and content from official sources (e.g., CDC, smokefree.gov, Bustle.com, wired.com, Blu cigarettes website, and Collectivebeautyblog.com), using good production quality to prevent potential confounding. All posts were written in the voice of the blogger and presented on her website design background as images on the TV screen in the lab. In addition to the posts, there was a YouTube video from the blogger's YouTube channel, which was downloaded from the blogger's channel ("My Morning Routine," 7 minutes, 24 seconds)

and played at the very beginning of the experiment.

Study Participants

A total of 63 participants were recruited via a convenience sampling; female students ages 18-24 at the University of Missouri who may be likely to be at risk for engaging in risk behaviors such as e-cigarette use and alcohol use (CDC, 2015). Students are an acceptable population for this study as the purpose of the study is to assess health-related persuasion strategies on this susceptible group. Additionally, while some may argue that using convenience samples makes the research non-generalizable and pre-scientific (Potter et al., 1993), this research applies the argument that student and convenience samples allow the research to move past surface inferences toward logical and theoretical inferences (Lang, 1996; Shapiro, 2002; Basil, 1996). Student sample use in the context of experimental work allow for logical inferences to be made about treatment (independent variables or factors) effects on dependent variables (while controlling for confounds and ruling out alternative explanations) (Lang, 1996). This research is not concerned as much with external validity or generalizability to the "general population" (Potter et al., 1993).

In regard to power and sample size, number of groups, number of treatments, power, and effect size should be considered *a priori* (Cohen, 1994; Levine et al., 2008; Thorson et al., 2012). This should be done in order to confirm that the effect size is large enough to produce meaningful effects, but not too large (samples with large Ns generally give more statistically significant results and lower error, regardless of the treatments; VanVoorhis & Morgan, 2007). Therefore, a power analysis was performed *a priori* in G*Power software. An effect size of .15, power of .95, 2 groups and 8 measurements for

an ANOVA: repeated measures, within factors analysis reflected that a N = 62 was needed. This was achieved. Furthermore, an N = 30~60 is appropriate as Potter & Bolls (2012) argue that 20 per condition is acceptable and VanVoorhis & Morgan (2007) argue that 30 subjects per treatment should yield 80% power. These criteria were met.

Participants were recruited via MU Info, a mass email announcement service, and were compensated with $10 Target gift cards. Recruitment took place after IRB approval. Participants were instructed to email the researcher to sign up for a time. When the researcher received an email for sign-up, the researcher enrolled such participant for a one-hour time slot in the lab. Participants ranged in age from 18 to 24 (M_{age} = 20). Regarding year in school, 17.7% were freshmen, 30.6% were sophomores, 17.7% were juniors, 25.8% were seniors, 8.1% were graduate/professional students. Among them, 62.9% were *White*, 17.7% were *Black*, 4.8% were *Hispanic/Latino*, 12.9% were *Asian*, and 1.6% were *Other*.

Experimental Procedure

Based on the survey results, the researcher chose a moderately popular blogger for the study stimuli (Jaclyn Hill, M = 2.86, SD = .53, 1 = Dislike a great deal, 5 = Like a great deal). This was necessary because a moderately popular character would provide higher PSI score for those in the high PSI group in the experiment. With over 3 million YouTube subscribers and over 2.5 million Instagram followers, Hill is a popular blogger across social media platforms and describes herself as a makeup artist (Carell, 2016). She also has released her own makeup products with the cosmetics company BECCA (Carell, 2016). A more popular blogger in the pretest results would seem inauthentic in the blog posts (since they were written by the researcher for the study, even though participants

were told that they should read the posts as if they appeared on the blogger's website). It was deemed that a celebrity status blogger would have skewed the sample, with most in the high PSI group.

Main experiment. The experiment was run with one person at a time because only one person could be in the lab at a time. Upon entering the lab, the participant read and signed a consent form. The participant answered questions about current drinking and e-cigarette use, refusal self-efficacy, intentions to use, health belief model questions, and current parasocial interaction questions in regard to the beauty and lifestyle blogger. First, the participant completed a questionnaire about baseline e-cigarette use, drinking, and other risk behaviors and intentions to use such products (Setodji et al., 2013). In order to avoid priming any specific health topic, multiple risk behaviors were presented to each participant. Each was asked about Health belief model variable items in regard to the behaviors (susceptibility, severity, benefits, and barriers), and items on current parasocial interaction and involvement with a variety of bloggers (Auter & Palmgreen, 2000; Brown & Basil, 1996). Before starting a session, the researcher instructed the participant to wash her hands in order to ensure the signal for collection of skin conductance. While the participant stepped out to wash her hands, the researcher loaded the experiment on the Media Lab and Acknowledge programs and made sure the Biopac was turned on.

When the participant returned, the researcher instructed her to sit in the recliner in the participant room and wiped her face and forearms with alcohol or distilled water. The researcher then added conductance gel to the disposable electrodes and placed the ground first on the left wrist of the participant to collect the heart rate. Then, the two other heart

rate leads were placed near the bends of both elbows. Next, two sensors were placed on the left hand for skin conductance recording. After that, two for each area of the left brow, corner of the left eye, and cheek region were placed for facial electromyography recording. After completing the preparation for physiological data collection, the researcher played a calming clip in order to 1) check connections in an Acknowledge test file and 2) collect baseline scores for the psychophysiological measures. When everything was deemed acceptable, the experiment began with the launching of the batch acquisition in Acknowledge (one of two orders ran by the researcher).

The participant then saw a video of the blogger from the blogger's YouTube channel to orient her to the blogger in an interactional way. This video had the blogger facing the participant because this kind of addressing has been found to be related to higher PSI responses (Hartmann & Goldhoorn, 2011). This was done to create a priming effect to create parasocial interaction in the participant or to amplify pre-existing parasocial interaction with the blogger.

Next, the participant was exposed to the seven blog posts. Each story was displayed for one minute. This fixed time length was chosen first, in order to uniformly collect psychophysiological data in the same length and, second to accommodate different reading levels. After completing each story, the participant answered questions about self-reported arousal and emotional reaction (pleasantness felt toward each post). She also reported the level of perceived interaction with the blogger and her purchase intention for the product featured in the message. At the completion of the seven stories, the participant completed recall questions followed by demographic questions. Upon the completion of the entire experimental, the researcher removed the sensors. The

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participant was given a wet wipe to clean her face, arms, and hands. Each participant was given a $10 Target gift card as compensation for participation. This entire process took from 45 minutes to one hour per participant.

Independent Variables

Topic. Topic was defined as the type of health behavior shown in the message. This included e-cigarette presence, drinking/alcohol presence, no health related behavior in the blog post (beauty products were discussed in these product messages), or control (a news post and a video post).

Stance. Stance was defined as the view of the author in the messages regarding health behaviors such as pro-behavior, anti-behavior, or no behavior/control (e.g., the news story). This was created for each health behavior tested in the study except for the news story about a beauty product and the blogger video (e.g., pro- and anti-drinking, pro- and anti-e-cigarette, pro- and anti-product).

Pre-existing Parasocial interaction (measured before exposure to posts). Parasocial interaction was defined as mediated interactions that potentially lead to the forming of parasocial relationships (PSRs) perceived by the viewer or media consumer (Schramm & Wirth, 2000). This was measured by having participants respond to 19 items (see appendix for items) from the Tsay and Bodine (2012) parasocial interaction measures and the Auter and Palmgreen (2000) audience-persona interaction scale. These were measured on a 7-point scale ranging from 1 = strongly disagree to 7 = strongly agree and averaged for the measure ($\alpha = .96$). It ranged from 1.00 to 5.16. Using a median split, higher PSI group ($M = 3.59$) and lower PSI group ($M = 1.74$) were created for the analysis.

Severity, Susceptibility, Benefits, and Barriers (Health belief model

variables). Participants answered six items (listed below) about their perception of

severity of risk behaviors, susceptibility to those behaviors, barriers to healthy behavior

($\alpha = .73$), and benefits of engaging in healthy behavior at the beginning of the study. The

items were *all* measured on a 7-point scale ranging from 1 = strongly disagree to 7 =

strongly agree (Teitler-Regev et al., 2011). In instances where an alpha was not listed, a

single item was used for that concept and behavior (e.g., severity toward drinking). Items

were divided into concepts based on theoretical definitions of the HBM variables

(concepts and items listed below with alphas). Except for the case of using a single item,

variables were created from an average of questions listed. High and low groups were

created based on a median split for each after the averaging.

   Severity of consequences from e-cigarette smoking. A single item, measured on

a 7-point scale, was used to measure this concept: "Chronic diseases like heart disease,

cancer, or diabetes, can be serious diseases that one can die from." It ranged from 4 to 7.

Using a median split, a higher group ($M = 7.00$) and a lower group ($M = 5.00$) were

created for the analysis.

   Susceptibility to e-cigarette use consequences. A single item, measured on a 7-

point scale, was used: "I would not be afraid of getting chronic diseases if I smoked less

with an e-cigarette." It ranged from 1 to 7. Using a median split, a higher group ($M =$

5.00) and a lower group ($M = 1.50$) were created for the analysis.

   Barriers preventing one from not using e-cigarettes. Three items, measured on a

7-point scale, were used: "Avoiding e-cigarette smoking when I'm out is difficult,"

"Avoiding e-cigarette use is time consuming," and "It's difficult to resist e-cigarette

smoking when I go out," (α = .73). It ranged from 1 to 6.67. Using a median split, a

higher group (*M* = 3.29) and a lower group (*M* = 1.17) were created for the analysis.

Benefits to not using e-cigarettes. This was measured on a 7-point scale by a

single item: "Avoiding e-cigarette use will prevent me from getting chronic disease." It

ranged from 1 to 7. Using a median split, a higher group (*M* = 6.50) and a lower group (*M*

= 3.00) were created for the analysis.

E-cigarette use and drinking intention. Participants were asked six items (three

for e-cigarette use and three for drinking) about their intentions to engage in these

behaviors (e.g., "Do you intend to smoke an e-cigarette anytime soon?"; "Do you think

you will smoke an e-cigarette anytime in the next year?"; If one of your best friends

offered you an e-cigarette, would you smoke it?"; "Do you intend to drink alcohol

anytime soon?"; "Do you think you will drink alcohol anytime in the next year?"; If one

of your best friends offered you an alcoholic drink, would you drink it?") on a 7-point

scale ranging from 1 = strongly disagree to 7 = strongly agree. This measure was adapted

from Setodji et al. (2013) (drinking intentions α = .89; e-cig smoking intentions α = .88).

These items were averaged to make a score; then, a median split was used to create high

and low groups. For e-cigarette intention, it ranged from 1 to 7. Using a median split, a

higher group (*M* = 2.96) and a lower group (*M* = 1.00) were created for the analysis. For

drinking intention, it ranged from 1 to 7. Using a median split, a higher group (*M* = 6.33)

and a lower group (*M* = 3.39) were created for the analysis.

E-cigarette use and drinking refusal self-efficacy. They were also asked about

their refusal self-efficacy with eight items (four for e-cigarette use and four for refusal

self-efficacy) This measure was adapted from Setodji et al. (2013). They include "Could

you refuse an e-cigarette if you were bored at a party?"; "Could you refuse an e-cigarette if your best friend was smoking one?"; "Could you refuse an e-cigarette if your date was smoking one?"; "Could you refuse an e-cigarette if all of your friends were smoking e-cigarettes at a party?" "Could you refuse a drink if you were bored at a party?"; "Could you refuse a drink if your best friend was drinking?"; "Could you refuse a drink if your date was drinking?"; "Could you refuse a drink if all of your friends were drinking at a party?" and measured on a 7-point scale ranging from 1 = strongly disagree to 7 = strongly agree (drinking refusal self-efficacy $\alpha = .93$; e-cig smoking refusal self-efficacy $\alpha = .96$). These items were averaged to make a score; then, a median split was used to create high and low groups. For e-cigarette refusal self-efficacy, it ranged from 1 to 7. Using a median split, a higher group ($M = 2.89$) and a lower group ($M = 1.00$) were created for the analysis. For drinking refusal self-efficacy, it ranged from 1 to 7. Using a median split, a higher group ($M = 5.56$) and a lower group ($M = 2.63$) were created for the analysis.

Dependent Variables

Parasocial interaction measured after each post. Parasocial interaction was defined as a single or several interactions perceived by the viewer or media consumer (Schramm & Wirth, 2000). It was measured by having participants respond to a shortened version made up of 13 items from the Tsay and Bodine (2012) parasocial interaction measures and the Auter and Palmgreen (2000) audience-persona interaction scale after each post. These were measured on a 7-point scale ranging from 1 = strongly disagree to 7 = strongly agree and averaged to create a scale ($\alpha = .96$).

Purchase intention. This was measured by asking if participants planned to

purchase e-cigarettes (or what is depicted in the stimuli) in the next 30 days, with a 7-point scale from 7 = *Strongly agree* to 1 = *Strongly disagree* (Berg et al., 2014).

Arousal. Arousal was measured by both physiological response and self-report. Physiological arousal was indicated by the level of skin conductance response obtained by two electrodes placed on the left palm to measure the large amount of eccrine sweat gland activity on the palm . These electrodes record electro dermal activity innervated by the sympathetic nervous system within the autonomic nervous system (shows dimensional calmness vs. excitement; Dawson et al., 2000; Ravaja, 2004). Self-reported arousal was measured by using the Self-Assessment Manikin after the exposure to each post (Lang et al., 1993)**.** The Self-Assessment Manikin uses graphics of square shaped illustrations to better represent how the participant may be feeling (e.g., for pleasantness, the drawing has a smiling face). The manikin image was used with rating questions: "Rate the following: How calming was the post?" 1 = not at all calming; 7 = very calming. The arousal questions were reverse coded so 7 = not at all calming and 1 = very calming; higher scores reflected higher arousal.

Emotional experience (valence). Emotional experience was measured by both physiological response and self-report. Physiological emotional response was assessed using facial electromyography recordings from the corrugator supercilli (above the brow) for negative emotion, zygomatic major (cheek, smile muscle) and the orbiculus oculi (underneath the eyelid) for positive emotion (Caccioppo et al., 1986). For self-reported emotional experience, the Self-Assessment Manikin was used (Lang et al., 1993)**.** Manikin images were used with rating questions: "Rate the following: How pleasant was the post? 1 = not at all pleasant and 7 = very pleasant.

Attention. Attention was defined as cognitive resources allocated to encoding information. This was indicated by a decrease in heart rate shown by the electrocardiogram distances between R-spikes (i.e., blood activity/flow) (Lang, 1990). Heart rate is dually innervated by sympathetic and parasympathetic nervous systems on a continuum; one system does not shut down or die off when the other is active (Berntson et al., 1993; Lang et al., 1997).

Memory. Cued recall items were asked to indicate how well information from each post was stored (Lee & Lang, 2009). Each participant responded to a true/false question about the video and each post shown. A sum score for each participant was created.

Data Analysis

A series of repeated measures ANOVAs were performed to address the hypotheses and research questions. Heart rate data was analyzed using the first 20 seconds of change scores to ascertain cognitive allocation to encoding the experimental stimuli (Lang, 2006), while all other psychophysiological measures were analyzed with the first 30 seconds of data/change scores.

Chapter 4 Results

This chapter presents the results of data analysis by hypotheses and research questions.

Hypothesis 1

Hypothesis 1 predicted that those with higher parasocial interaction (PSI) toward the blogger would have greater parasocial interaction toward the blogger video and posts compared to those with lower PSI. The effect of the level of the PSI to blogger on PSI to message was significant (F (1,60) = 18.33, $p < .001$, $\eta_p^2 = .23$). As predicted, the result showed that high PSI individuals had higher PSI responses ($M = 3.93$, $SD = 1.59$) to the video and posts compared to low PSI individuals, who had lower PSI responses in general ($M = 2.71$, $SD = 1.59$). Thus, Hypothesis 1 was supported.

Research Question 1

Research question 1 asked what stances and topics presented would lead the most PSI response after participants' reading of the posts. Analyses were done by running a (2) Stance X (2) Topic repeated measures ANOVA on PSI response to the posts without and with control messages (so stance was not confounded by the non-stance controls).

The main effect of stance (without control messages) on parasocial interaction toward the blog posts was statistically significant (F (1,60) = 35.82, $p < .001$, $\eta_p^2 = .37$). The results of means showed that the anti-stance messages ($M = 3.51$, $SD = 1.22$) received higher PSI responses than the pro-stance messages ($M = 2.98$, $SD = 1.09$).

A main effect of topic on parasocial interaction toward posts was significant, (F (3, 151) = 18.54, $p < .001$, $\eta_p^2 = .24$), where video and news posts (control) ($M = 3.55$, $SD = 1.24$) and (anti and pro) product ($M = 3.47$, $SD = 1.22$) posts had the highest PSI,

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versus drinking ($M = 3.16$, $SD = 1.13$) and e-cigarette posts ($M = 3.15$, $SD = 1.09$).

A Stance X Topic 2-way interaction was also statistically significant (F (3, 151) = 32.65, $p < .001$, $\eta_p^2 = .35$). The video ("My Morning Routine") had the highest PSI response ($M = 3.70$, $SD = 1.31$), followed by the anti-e-cig post ($M = 3.66$, $SD = 1.30$). See Table 1 for other means and the data pattern.

Table 1.

Stance x topic interaction on parasocial interaction means and standard deviations

Stance	Topic	Mean	Standard deviation
Anti	drinking	3.40	1.27
	e-cig	3.66	1.30
	product	3.48	1.27
	control	3.40	1.30
Pro	drinking	2.83	1.21
	e-cig	2.65	1.17
	product	3.45	1.25
	control	3.70	1.31

Hypothesis 2

Hypothesis 2 predicted that those with greater PSI level toward the blogger would have greater self-reported (1) positive emotion, (2) physiological positive emotion (measured by zygomatic), (3) cued recall, (4) attention (measured by lower heart rate) and (5) self-reported arousal, and (6) arousal (measured by skin conductance level) compared to those with less PSI level toward the blogger.

(1) There was a significant main effect of the level of PSI on self-reported positive emotion (F (1,60) = 5.35, $p < .05$, $\eta_p^2 = .08$). As predicted, those with higher PSI ($M = 4.23$, $SD = 1.26$) had higher reported pleasant feelings toward the posts than those with lower PSI ($M = 3.71$, $SD = 1.26$).

There was not a significant main effect of PSI level on (2) physiological positive

emotion (zygomatic, $F(1,50) = .14$, $p > .10$), (3) cued recall ($F(1, 60) = .19$, $p > .10$), (4) attention (indicated by lower heart rate, $F(1,25) = .13$, $p > .10$), (5) self-reported arousal ($F(1,60) = 4.04$, $p > .05$), or (6) arousal (measured by skin conductance level ($F(1,50) = 1.06$, $p > .10$)).

Research Question 2

Research question 2 asked if there would be an interaction between PSI level and stance and/or topic, such that higher PSI level toward the blogger would have greater (1) self-reported positive emotion, (2) physiological positive emotion (measured by zygomatic response), (3) cued recall, (4) attention (measured by lower heart rate), (5) self-reported arousal, and (6) arousal (measured by skin conductance level) compared to those with less PSI level toward the blogger. A (2) Stance X (4) Topic X (2) PSI repeated measures ANOVA was run on each dependent variable.

(1) There was a significant Topic X PSI 2-way interaction on self-reported positive emotion, ($F(2, 142) = 2.99$, $p < .05$, $\eta_p^2 = .05$). High PSI participants reported the highest self-reported positive emotion toward product posts. As shown in Table 2 below, for those with low PSI, the control messages (news and video posts) led to greater positive emotion compared to product messages (anti and pro) and drinking led to the lowest positive emotion. For those with high PSI, the e-cig post had the lowest positive emotion and product and control posts had the highest positive emotion reported.

Table 2.

PSI x topic on self-reported pleasantness means and standard deviations

PSI	Topic	Mean	Standard deviation
low	drinking	2.89	1.79
	e-cig	3.39	1.35
	product	3.94	1.77
	control	4.63	1.80
high	drinking	3.86	1.79
	e-cig	3.45	1.35
	product	4.66	1.77
	control	4.97	1.80

(1) There was a significant Stance X Topic X PSI 3-way interaction on positive emotional experience (F (3, 171) = 2.77, $p < .05$, $\eta_p^2 = .04$). Results showed that higher PSI individuals had higher pleasantness reported for pro-e-cigarette messages (versus low PSI individuals' pleasantness reported for pro-e-cigarette messages) (see Table 3).

Table 3.
PSI x stance x topic on self-reported pleasantness means and standard deviations

PSI	Stance	Topic	Mean	Standard deviation
low	anti	drinking	3.03	2.24
		e-cig	3.84	2.11
		product	3.45	2.02
		control	4.42	2.08
	pro	drinking	2.74	2.17
		e-cig	2.94	1.87
		product	4.42	2.24
		control	4.84	2.00
high	anti	drinking	3.71	2.24
		e-cig	3.45	2.11
		product	4.26	2.02
		control	5.07	2.08
	pro	drinking	4.00	2.17
		e-cig	3.45	1.87
		product	5.07	2.24
		control	4.87	2.00

There was not a significant Stance X Topic X PSI 3-way interaction on (2) physiological positive emotion (zygomatic, $F (1, 72) = .67, p > .10$), (3) cued recall ($F (2, 146) = 1.94, p > .10$), (4) attention (indicated by lower heart rate, $F (2, 52) = .34, p > .10$), (5) self-reported arousal ($F (3, 170) = .20, p > .10$), or (6) arousal (measured by skin conductance level, $F (3, 127) = .68, p > .10$).

Research Question 3

Research Question 3 asked whether pro-e-cigarette and pro-drinking stance blog posts would elicit the most positive emotional response, attention, and arousal versus other sources in physiological and self-report measures, shown by an interaction between topic and stance (a Topic X Stance 2-way interaction). Specifically, it asked whether there would be an interaction between stance and topic on (1) positive emotional

response, (2) attention, and (3) arousal such that messages regarding pro-e-cigarette and pro-drinking stance posts would elicit (1) greater positive response (in pleasantness self-report), (2) greater zygomatic response, (3) greater cued recall, (4) lower heart rate and (5) greater self-reported arousal, and (6) higher skin conductance level compared to other types of posts (the anti-e-cigarette post, anti-drinking posts, anti- and pro-beauty product posts, news story about beauty product, and blogger video). (2) Stance X (4) Topic repeated measures ANOVA was run on each dependent variable

(1) In regard to emotional response, a statistically significant Stance X Topic 2-way interaction (F (3, 171) = 7.20, $p < .001$, η_p^2 = .12) on pleasantness illuminated RQ3. Pro-product and control posts received the most self-reported pleasantness (see Table 4).

Table 4.
Stance x topic interaction on self-reported pleasantness means and standard deviations

Stance	Topic	Mean	Standard deviation
anti	drinking	3.37	1.59
	e-cig	3.65	1.50
	product	3.86	1.43
	control	4.74	1.47
pro	drinking	3.37	1.54
	e-cig	3.19	1.32
	product	4.74	1.59
	control	4.86	1.41

In regard to cued recall, there was a statistically significant Stance X Topic 2-way interaction on (3) cued recall (F (2, 146) = 11.77, $p < .001$, η_p^2 = .16). Pro-drinking, pro-e-cigarette, video, and anti-drinking posts had the highest recall (see Table 5).

Table 5.

Stance x topic interaction on cued recall means and standard deviations

Stance	Topic	Mean	Standard deviation
anti	drinking	1.00	.00
	e-cig	.71	.45
	product	.87	.34
	control	.89	.31
pro	drinking	.95	.22
	e-cig	.98	.13
	product	.74	.44
	control	1.00	.00

(5) In regard to arousal, there was a statistically significant Stance X Topic 2-way interaction on self-reported arousal (F (3,171) = 3.78, $p < .05$, $\eta_p^2 = .06$), showing that anti-drinking and anti-e-cigarette posts received the highest self-reported arousal (see Table 6).

Table 6.

Stance x topic on self-reported arousal means and standard deviations

Stance	Topic	Mean	Standard deviation
anti	drinking	5.05	1.43
	e-cig	4.87	1.43
	product	4.07	1.48
	control	3.86	1.40
pro	drinking	4.86	1.37
	e-cig	4.65	1.41
	product	3.68	1.54
	control	4.28	1.47

A Stance X Topic 2-way interaction was not statistically significant for (2) zygomatic response (F (1, 72) = .63, $p > .10$), (4) heart rate (F (2, 52) = .68, $p > .10$), nor (6) skin conductance (F (3, 127) = .27, $p > .10$).

Hypothesis 3

Hypothesis 3 examined whether pre-existing intentions to use e-cigarette smoking and alcohol would impact the effect of exposure to risk behavior (e.g., e-cigarette use, alcohol use), such that intentions would be a significant factor with stance and topic (Drinking Intentions X Stance X Topic and E-Cigarette Intentions X Stance X Topic 3-way interactions) on self-report and physiological arousal, attention, and emotional response in interaction effects; Specifically, H3 predicted that there would be an interaction between pre-existing intention of e-cigarette and alcohol use and the exposure to pro-unhealthy behavior (e.g., e-cigarette use, alcohol use) messages, such that those with higher intention to use will have more (1 and 2) positive emotion (in self-reported pleasantness/positive emotional response and greater zygomatic response) to pro-e-cigarette and pro-drinking messages and greater attention, signified by more (3 and 4) resources allocated to encoding and (greater recall and lower heart rate), and (5 and 6) greater physiological and self-reported arousal (i.e., greater arousal response). A (2) Drinking Intentions X (2) Stance X (4) Topic interaction and a (2) E-Cigarette Intentions X (2) Stance X (4) Topic interaction were run (repeated measures ANOVA) on a series of outcomes proposed in this study.

In regard to (1) emotional response, there was not a statistically significant 3-way Drinking Intention X Stance X Topic interaction (F (3, 152) = 1.40, p > .10), nor an E-Cigarette Intention X Stance X Topic 3-way interaction (F (3, 152) = .55, p > .10) on the self-reported positive emotion (pleasantness). There was not a statistically significant 3-way Drinking Intention X Stance X Topic interaction (F (1, 62) = .30, p > .10), nor a 3-way E-Cigarette Intention X Stance X Topic interaction (F (1, 62) = .27, p > .10) on the

zygomatic response (2).

(3) There was not a statistically significant Drinking Intention X Stance X Topic 3-way interaction (F (2, 128) = .30, p > .10), nor a 3-way E-Cigarette Intention X Stance X Topic interaction (F (2, 128) = 2.03, p > .10) on cued recall (4). There was not a statistically significant Drinking Intention X Stance X Topic 3-way interaction (F (2, 36) = .30, p > .10), nor a E-Cigarette Intention X Stance X Topic 3-way interaction (F (2, 36) = .83, p > .10) on heart rate data.

(5) There was not a statically significant Drinking Intention X Stance X Topic 3-way interaction (F (3, 147) = .21, p > .10), nor a E-Cigarette Intention X Stance X Topic 3-way interaction (F (3, 147) = .73, p > .10) on self-reported arousal. (6) There was not a statistically significant Drinking Intention X Stance X Topic interaction 3-way (F (3, 116) = .63, p > .10, η_p^2 = .01), nor a E-Cigarette Intention X Stance X Topic 3-way interaction (F (3, 116) = 1.65, p > .10) on the skin conductance data.

Hypothesis 4

Hypothesis 4 stated that there would be an interaction between individuals' pre-existing e-cigarette smoking refusal self-efficacy and stance and topic on cognitive and emotional processing of the stories (e.g., a Stance X Topic X Refusal Self-Efficacy 3-way interaction); specifically, those with existing low self-refusal self-efficacy would respond more positively (in (1) greater self-reported positive emotion (pleasantness) and (2) zygomatic response) to pro-e-cigarette and pro-drinking messages and greater attention, signified by (3 & 4) more resources allocated to encoding (indicated by greater recall and lower heart rate) and (5 & 6) greater arousal response (measured by arousal self-report and skin conductance level). A Stance (2) X Topic (4) X Drinking Refusal Self-Efficacy

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(2) interaction and a Stance (2) X Topic (4) X E-Cigarette Smoking Refusal Self-Efficacy

(2) interaction were run (repeated measures ANOVA) on a series of outcome variables.

(1) In regard to emotional response, the Stance X Topic X Refusal Self-Efficacy

interaction 3-way interaction was not statistically significant on either self-reported

positive emotion (F (3, 165) = 2.00, $p > .10$ for drinking; F (3, 165) = .60, $p > .10$ for

smoking), nor (2) zygomatic response (F (1, 69) = .57, $p > .10$ for drinking; F (1, 69) =

.77, $p > .10$ for smoking).

There was a statically significant Stance X Topic X Drinking Refusal Self-

Efficacy 3-way interaction on (4) heart rate (F (1,22) = 5.32, $p < .05$, $\eta_p^2 = .26$). Results

showed that among those with low drinking refusal self-efficacy, the anti-e-cigarette and

pro-drinking messages had the most negative heart rate change (see Table 7), supporting

the hypothesis in the case of drinking behavior.

Table 7.
Drinking refusal self-efficacy x stance x topic on heart rate means and standard deviations

Drinking refusal self-efficacy	Stance	Topic	Mean	Standard deviation
low	anti	drinking	-.20	3.40
		e-cig	-.54	2.47
		product	-.28	2.28
		control	.08	1.42
	pro	drinking	-.50	2.49
		e-cig	.24	2.46
		product	-.08	2.07
		control	.25	2.01
high	anti	drinking	.04	3.29
		e-cig	-.21	2.39
		product	-.27	2.21
		control	-.07	1.37
	pro	drinking	.01	2.41
		e-cig	-.60	2.39
		product	.60	2.01
		control	-.81	1.94

There was also a statistically significant Stance X Topic X Smoking Refusal Self-Efficacy 3-way interaction on heart rate, (F (1,22) = 6.15, $p < .05$, $\eta_p^2 = .29$). Results showed that for those with low smoking refusal self-efficacy, pro-e-cigarettes and control (video) messages had the most negative change whereas for those high smoking refusal self-efficacy, anti-e-cigarettes posts had the most negative change (resources allocated or attention) (see Table 8). Thus, these results supported the hypothesis in the case of e-cigarette behavior.

Table 8.
Smoking refusal self-efficacy x stance x topic on heart rate means and standard deviations

Smoking refusal self-efficacy	Stance	Topic	Mean	Standard deviation
low	anti	drinking	-.35	4.83
		e-cig	-.09	3.50
		product	-.19	3.24
		control	-.16	2.02
	pro	drinking	.10	3.54
		e-cig	-.76	3.50
		product	.98	2.94
		control	-1.06	2.85
high	anti	drinking	.08	2.43
		e-cig	-.54	1.77
		product	-.32	1.64
		control	.10	1.02
	pro	drinking	-.46	1.79
		e-cig	.17	1.76
		product	-.17	1.49
		control	.18	1.43

There were no statistically significant results supporting the hypothesis (in terms of Stance X Topic X Refusal Self-Efficacy 3-way interactions) for some outcome variables, including (3) cued recall ($F(2, 141) = .37$, $p > .10$ for drinking; $F(2, 141) = 2.45$, $p > .05$ for smoking, (5) self-reported arousal ($F(3, 176) = 2.35$, $p > .05$ for

drinking; $F(3, 176) = .62, p > .10$ for smoking) nor for (6) skin conductance ($F(3, 125) =$ .43, $p > .10$ for drinking; $F(3, 125) = 2.25, p > .05$ for smoking).

Research Question 4

RQ4 asked whether intentions and refusal self-efficacy would interact, resulting in a Drinking Intentions X Drinking Refusal Self-Efficacy and E-Cigarette Intentions X E-Cigarette Refusal Self-Efficacy interaction on (1) emotion, (2) attention, and (3) arousal. That is, this question asked if those with high intentions and low refusal self-efficacy would have (1 and 2) greater positive emotion (shown in greater self-reported positivity and greater zygomatic response), (3 and 4) greater allocation of attentional resources to processing (shown in greater recall and lower heart rate), and (5 and 6) greater self-reported and physiological arousal.

In order to explore the research question, Stance (2) X Topic (2) X Drinking Intentions (2) X Drinking Refusal Self-Efficacy (2) X Time (seconds, physiological data only) and Stance (2) X Topic (2) X E-Cigarette Intentions (2) X E-Cigarette Refusal Self-Efficacy (2) X Time (seconds, physiological data only) repeated measures ANOVAs were performed.

In regard to attention, (4) the results on heart rate data showed a statistically significant Drinking Intentions X Drinking Refusal Self-Efficacy X Times 3-way interaction, ($F (5, 67) = 3.38, p < .05, \eta_p^2 = .18$). The results showed that those with low drinking refusal self-efficacy and high intentions to drink *and* those with high drinking refusal self-efficacy and low drinking intentions had the most allocation of cognitive resources to encoding the message overall, shown in deceleration of heart rate when the

stories appeared on screen during the first 5 second (see Figure 2 and Table 9 (in Appendix)).
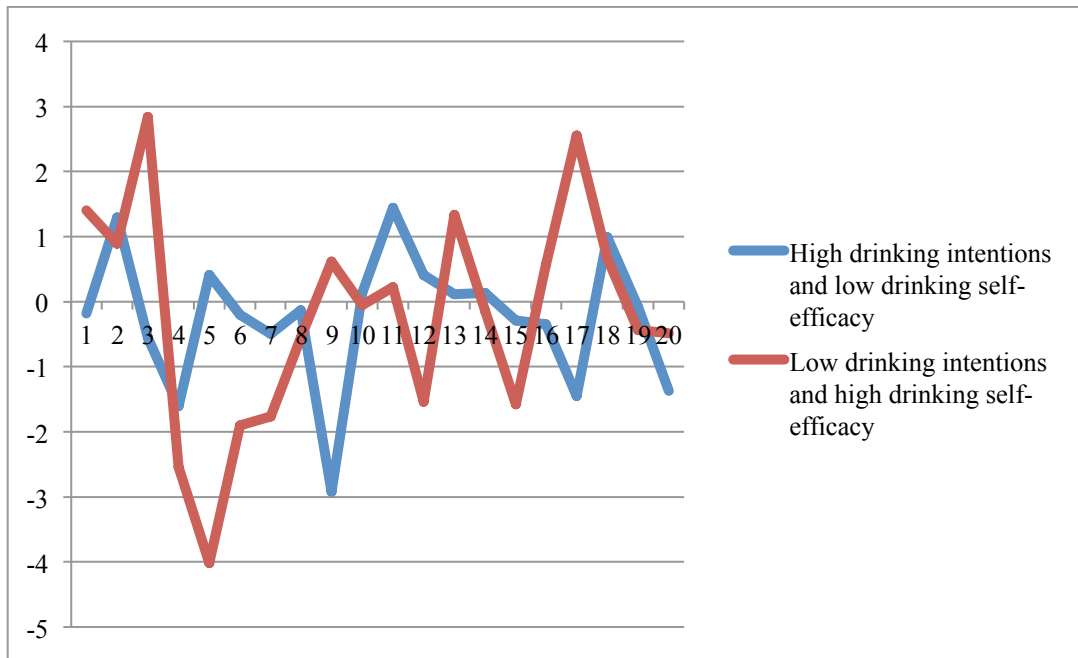
Figure 2. The effect of drinking refusal self-efficacy x drinking intentions x seconds on heart rate among those with low drinking refusal self-efficacy and high drinking intentions and among those with high drinking refusal self-efficacy and low drinking intentions

(5) In regard to arousal, there was a statistically significant of Topic X Drinking Self Refusal Self Efficacy X Drinking Intentions 3-way interaction (self-reported arousal, (F (2,103) = 7.59, p < .01, η_p^2 = .14). The means indicated that self-reported arousal were higher for drinking and e-cig posts among those with lower drinking refusal self-efficacy and higher drinking intentions and among every other combination of drinking refusal self-efficacy and drinking intentions (see Table 10).

Table 10.

Interaction of drinking refusal self-efficacy x drinking intentions x topic on self-reported arousal means and standard deviations

Drinking refusal self-efficacy	Drinking intentions	Topic	Mean	Standard deviation
low	low	drinking	5.50	5.44
		e-cig	5.69	5.30
		product	2.57	6.12
		control	3.31	5.88
	high	drinking	4.74	3.57
		e-cig	4.67	3.47
		product	3.91	4.01
		control	4.09	3.86
high	low	drinking	4.32	3.35
		e-cig	4.32	3.25
		product	4.22	3.76
		control	4.03	3.61
	high	drinking	4.95	5.34
		e-cig	5.45	5.20
		product	3.40	5.99
		control	3.50	5.76

Beyond heart rate and self-reported arousal, there were no other statically significant findings to answer RQ4 [e.g., an Intentions X Self-Efficacy interaction on (1) self-reported positive emotion ($F(1, 46) = .00$, $p > .10$ for drinking; $F(1, 46) = 3.73$, $p > .05$ for smoking), or (2) zygomatic response ($F(1, 38) = .09$, $p > .10$ for drinking; $F(1, 38) = .03$, $p > .10$, for smoking), (3) cued recall ($F(1, 46) = 1.04$, $p > .10$ for drinking; $F(1, 46) = .06$, $p > .10$ for smoking), (4) heart rate ($F(1, 15) = .00$, $p > .10$ for smoking), (5) self-reported arousal ($F(1, 46) = .39$, $p > .10$ for smoking), or (6) skin conductance level ($F(1, 38) = .03$, $p > .10$ for drinking; $F(1, 38) = .07$, $p > .10$ for smoking].

Hypothesis 5

Hypothesis 5 stated that there would be a main effect of blogger PSI level on purchase intention, such that participants with higher PSI would be more likely to have

greater purchase intention for the products featured.

There was a statistically significant main effect of PSI on purchase intention, (F (1, 60) = 7.96, $p < .01$, $\eta_p^2 = .12$), and as predicted, higher PSI participants had greater purchase intention (see Table 11).

Table 11.
Main effect of PSI on purchase intention means and standard deviations

PSI	Mean	Standard deviation
low	2.06	1.16
high	2.65	1.16

Research Question 5

Research question 5 asked what stances and/or topics would participants favor in terms of purchase intention, shown by a Stance X Topic 2-way interaction. A Stance (2) X Topic (4) interaction was run (repeated measures ANOVA). There was a statically significant Stance X Topic 2-way interaction (F (3, 154) = 6.61, $p < .01$, $\eta_p^2 = .10$) where the pro-drinking post received the most purchase intention (see Table 12).

Table 12.
Stance x topic interaction on purchase intention means and standard deviations

Stance	Topic	Mean	Standard deviation
anti	drinking	2.98	2.13
	e-cig	1.16	.80
	product	1.37	.69
	control	2.90	1.71
pro	drinking	3.48	2.23
	e-cig	1.40	1.15
	product	2.61	1.61
	control	2.90	1.70

Research Question 6

Research question 6 asked whether stance and/or topic would interact with PSI,

resulting in a Stance X Topic X PSI interaction (a repeated measures ANOVA was run)

in order to ascertain what stances and topics among high and low PSI groups are favored

in terms of purchase intention.

There was a statistically significant Stance X Topic X PSI 3-way interaction (F

$(3, 154) = 5.39$, $p < .01$, $\eta_p^2 = .08$) on purchase intention. Results showed that high PSI

participants had the highest purchase intention after pro-drinking messages, followed by

the news story (coded as anti-control) (see Table 13).

Table 13.
PSI x Stance x topic on purchase intention means and standard deviations

PSI	Stance	Topic	Mean	Standard deviation
Low	anti	drinking	3.13	3.02
		e-cig	1.00	1.13
		product	1.19	.98
		control	2.42	2.38
	pro	drinking	2.90	3.16
		e-cig	1.23	1.62
		product	1.87	2.28
		control	2.74	2.41
High	anti	drinking	2.84	3.02
		e-cig	1.32	1.13
		product	1.55	.98
		control	3.39	2.42
	pro	drinking	4.07	3.16
		e-cig	1.58	1.62
		product	3.36	2.28
		control	3.06	2.41

Hypothesis 6

Hypothesis 6 predicted that those with less susceptibility, less severity, higher

barriers (toward not using e-cigarettes), and higher benefits (to not use e-cigarettes) beliefs would have (1) higher self-reported positive emotion, (2) greater physiological emotion (greater zygomatic response), (3 and 4) greater attention (indicated by increased cued recall and decreased heart rate over time), and (5) greater self-reported arousal and (6) increased physiological arousal (indicated by the level of skin conductance), and (7) higher PSI response.

First, main effects of the HBM variables on the dependent variables were examined. There was a statistically significant difference between benefits toward not using e-cigarettes groups (F (1, 16) = 10.29, $p < .01$, $\eta_p^2 = .39$), where the high benefits group had more (4) decreased heart rate change ($M = -.43$, $SD = .84$) than the low group ($M = -.02$, $SD = .60$). This finding supports the hypothesis.

However, there were not any other statistically significant findings for susceptibility, severity, barriers (toward not using e-cigarettes), or benefits (to not use e-cigarettes) on (1) self-reported positive emotion that supported the hypothesis (Table 14), (2) physiological positive emotion (zygomatic; Table 15), (3) cued recall (Table 16), (4) attention (decrease in heart rate change over time; $F(1, 16) = .56$, $p > .10$ for susceptibility, $F(1, 16) = .05$, $p > .10$ for severity, $F(1, 16) = 2.78$, $p > .10$ for barriers), on (5) self-reported arousal (Table 17), (6) skin conductance (Table 18), or on (7) PSI response (Table 19).

Table 14.
N.S. results of main effects of the HBM variables on positive self-reported emotion

Variable	Degrees of Freedom	F	P-value
Susceptibility	1, 50	.05	> .10
Severity	1, 50	1.26	> .10
Benefits	1, 50	.35	> .10
Barriers	1, 50	1.06	> .10

Table 15.
N.S. results of main effects of the HBM variables on zygomatic

Variable	Degrees of Freedom	F	P-value
Susceptibility	1, 40	1.47	$> .10$
Severity	1, 40	.10	$> .10$
Benefits	1, 40	2.02	$> .10$
Barriers	1, 40	4.15	$> .05$

Table 16.
N.S. results of main effects of the HBM variables on cued recall

Variable	Degrees of Freedom	F	P-value
Susceptibility	1, 50	1.47	$> .10$
Severity	1, 50	2.16	$> .10$
Benefits	1, 50	.75	$> .10$
Barriers	1, 50	.59	$> .10$

Table 17.
N.S. results of main effects of the HBM variables on self-reported arousal

Variable	Degrees of Freedom	F	P-value
Susceptibility	1, 50	1.24	$> .10$
Severity	1, 50	1.26	$> .10$
Benefits	1, 50	.16	$> .10$
Barriers	1, 50	1.93	$> .10$

Table 18.
N.S. results of main effects of the HBM variables on skin conductance

Variable	Degrees of Freedom	F	P-value
Susceptibility	1, 40	1.06	$> .10$
Severity	1, 40	.34	$> .10$
Benefits	1, 40	.65	$> .10$
Barriers	1, 40	.23	$> .10$

Table 19.
N.S. results of main effects of the HBM variables on PSI

Variable	Degrees of Freedom	F	P-value
Susceptibility	1, 50	1.41	$> .10$
Severity	1, 50	.01	$> .10$
Benefits	1, 50	.05	$> .10$
Barriers	1, 50	1.58	$> .10$

Research Question 7

Research question 7 asked whether health beliefs toward e-cigarette smoking would influence processing of e-cigarette messages (parasocial interaction, positive emotional response, attention, and arousal)—specifically, whether those with less susceptibility, less severity, higher barriers (toward not using e-cigarettes), and higher benefits (to not use e-cigarettes) beliefs (when in interaction with each other, with PSI toward the blogger before exposure, and/or with stance and topic) would have (1) higher self-reported positive emotion, (2) greater physiological emotion (greater zygomatic response), (3) greater memory/encoding, (4) greater attention (lower heart rate over time), (5) greater self-reported arousal, (6) greater physiological arousal (level of skin conductance), and (7) higher PSI response. A Susceptibility (2) X Severity (2) X barriers (2) X benefits (2) X PSI (2) X Stance (2) X Topic (4) repeated measures ANOVA was run on the series of dependent variables.

Health belief model variables.

a) Susceptibility to risks from using e-cigarettes.

There were no statistically significant results on (1) self-reported positive emotion on pleasantness (e.g., Table 14) or (2) zygomatic response (e.g., Table 15) as function of the level of susceptibility.

In regard to attention, there was a statistically significant Susceptibility X Barriers 2-way interaction on cued recall (3), (F (1, 50) = 6.03, $p < .05$, $\eta_p^2 = .11$), where those with low barriers and high susceptibility reported the highest attention across messages (see Table 20).

Table 20.

Susceptibility for e-cig x Barriers for e-cig on cued recall means and standard deviations

Susceptibility	Barriers	Mean	Standard deviation
low	low	7.44	2.04
	high	7.53	2.80
high	low	7.54	1.80
	high	6.47	2.31

In regard to (5) self-reported arousal, there was a statistically significant PSI X Susceptibility X Barriers 3-way interaction (F (1, 40) = 4.79, $p < .05$, $\eta_p^2 = .11$), where those with low barriers, low PSI, and high susceptibility had the highest arousal in general (see Table 21).

Table 21.

PSI x susceptibility for e-cig x barriers for e-cig on self-reported arousal means and standard deviations

PSI	Susceptibility	Barriers	Mean	Standard deviation
low	low	low	4.28	2.76
		high	4.53	4.50
	high	low	5.49	3.00
		high	4.38	4.24
high	low	low	4.26	2.35
		high	2.83	3.74
	high	low	4.13	2.69
		high	4.04	3.31

There was also a statistically significant PSI X Susceptibility X Benefits X Barriers 4-way interaction (F (1, 40) = 5.83, $p < .05$, $\eta_p^2 = .13$) on self-reported arousal (5). Those with high benefits to not engage in e-cigarette smoking and high susceptibility toward e-cigarette smoking and low PSI and barriers had the highest arousal reported in general (see Table 22).

Table 22.

Interaction of PSI x susceptibility x benefits x barriers on self-reported arousal means and standard deviations

PSI	Susceptibility	Benefits	Barriers	Mean	Standard deviation
low	low	low	low	4.30	3.90
			high	3.75	7.35
		high	low	4.26	3.92
			high	5.31	5.19
	high	low	low	4.48	3.00
			high	4.31	5.19
		high	low	6.50	5.19
			high	4.50	7.35
high	low	low	low	4.14	3.00
			high	3.56	4.24
		high	low	4.50	3.67
			high	1.38	7.35
	high	low	low	4.30	3.28
			high	4.08	4.24
		high	low	3.96	4.24
			high	3.94	5.19

There was no statistically sificant main effect of susceptibility on (4) heart rate (F (1, 16) = .56, p > .10), (6) skin conductance (e.g., Table 18), and (7) PSI (e.g., Table 19).

b) *Severity toward risks from using e-cigarettes.*

After removing the control messages from consideration, there was a statistically significant Stance X Severity for E-cigarettes X Barriers 3-way interaction on PSI (7), (F (1, 40) = 4.34, p < .05, η_p^2 = .10). Among those with high severity perception, those with low barriers to not smoke had higher PSI for anti-stance messages versus pro messages (see Table 23).

Table 23.

Severity x barriers x stance interaction on PSI means and standard deviations

Severity	Barriers	Stance	Mean	Standard deviation
low	low	anti	2.89	5.33
		pro	2.80	4.76
	high	anti	3.57	5.84
		pro	3.50	5.22
high	low	anti	3.62	1.73
		pro	2.91	1.55
	high	anti	3.78	3.01
		pro	3.50	2.69

There was no statistically significant main effect of Severity on (1) self-report positive emotion (e.g., Table 14) or on (2) zygomatic response (e.g., Table 15), (3) cued recall (e.g., $F(1, 60) = .84, p > .10$), (4) attention/heart rate (e.g., $F(1, 16) = .05, p > .10$), (5) self-reported arousal (e.g., $F(1, 60) = 3.86, p > .05$), and (6) skin conductance data (e.g., $F(1, 49) = .13, p > .10$).

c) *Benefits toward not using e-cigarettes.*

In regard to (1) pleasantness self-report, there was a statistically significant 3-way interaction of Stance X Topic X Benefits ($F(3, 115) = 2.96, p < .05, \eta_p^2 = .07$). Among the low benefits group, the means for drinking and e-cigarettes were lower than those for product and control. In the high benefits group, the pro-drinking and pro-e-cigarette means were lower than pro-product and the video (pro-control). Additionally, the anti-drinking and anti-e-cigarette means were higher than the pro-drinking and pro-e-cigarette means among the high benefits group (see Table 24).

Table 24.

Benefits x stance x topic on self-reported pleasantness means and standard deviations

Benefits	Stance	Topic	Mean	Standard deviation
low	anti	drinking	3.25	2.66
		e-cig	3.42	2.40
		product	4.15	2.39
		control	4.91	2.69
	pro	drinking	3.62	2.81
		e-cig	3.63	2.11
		product	4.97	2.91
		control	4.96	2.57
high	anti	drinking	4.37	3.14
		e-cig	4.50	2.83
		product	4.03	2.81
		control	4.67	3.17
	pro	drinking	3.78	3.32
		e-cig	3.12	2.49
		product	5.09	3.43
		control	5.15	3.04

There was no main effect of Benefits on the (2) zygomatic response (see Table 15).

In regard to attention, there were no significant differences between benefits groups on (3) cued recall (e.g., Table 16) or on (4) heart rate (e.g., $F(1, 24) = 3.49$, $p > .05$).

There was a statistically significant PSI X Benefits 2-way interaction ($F(1, 40) = 8.94$, $p < .01$, $\eta_p^2 = .18$) on (5) self-reported arousal where those with high PSI and high benefits had the highest self-reported arousal (see Table 25).

The PSI X Susceptibility X Benefits X Barriers 4-way interaction on self-reported arousal is discussed above.

Table 25.

PSI x benefits on self-reported arousal means and standard deviations

PSI	Benefits	Mean	Standard deviation
low	low	4.24	2.54
	high	4.97	2.61
high	low	3.98	1.97
	high	3.44	2.65

There were no statistically significant differences between benefits groups on (6) physiological arousal (skin conductance, Table 18).

After removing the control messages from consideration, there was a statistically significant PSI X Benefits for e-cigarette 2-way interaction on (7) PSI (F (1, 40) = 4.31, p < .05, η_p^2 = .10). Those with high PSI toward the blogger and those with high benefits had the highest mean on PSI after the posts (see Table 26).

Table 26.

PSI x benefits interaction on PSI means and standard deviations

PSI	Benefits	Mean	Standard deviation
low	low	2.76	3.17
	high	2.46	3.25
high	low	3.84	2.46
	high	4.66	3.31

d) *Barriers toward not using e-cigarettes.*

In regard to (7) PSI response, this was supported by 3-way Stance X Severity for E-Cigarettes X Barriers for E-cigarettes interaction discussed above. In regard to self-reported pleasantness, there was a statistically significant Stance X Topic X PSI X Barriers 4-way interaction (F (3, 115) = 2.93, p < .05, η_p^2 = .07). For those with low barriers and low PSI, the pro-e-cigarette post had the lowest score for PSI (see Table 27).

Table 27.

Interaction means and standard deviations of PSI x barriers (e-cig) x stance x topic on PSI

PSI	Barrier level	Stance	Topic	Mean	Standard deviation
low	low	anti	drinking	3.04	3.53
			e-cig	3.81	3.18
			product	3.31	3.17
			control	4.60	3.57
		pro	drinking	3.12	3.73
			e-cig	2.54	2.80
			product	4.61	3.86
			control	4.83	3.42
	high	anti	drinking	4.10	5.24
			e-cig	4.10	4.73
			product	4.10	4.70
			control	4.30	5.30
		pro	drinking	3.10	5.54
			e-cig	4.50	4.16
			product	4.80	5.73
			control	4.90	5.08
high	low	anti	drinking	3.94	2.98
			e-cig	3.26	2.69
			product	4.46	2.67
			control	4.86	3.01
		pro	drinking	4.04	3.15
			e-cig	3.49	2.35
			product	4.89	3.26
			control	4.81	2.88
	high	anti	drinking	3.86	4.20
			e-cig	4.19	3.80
			product	4.58	3.77
			control	5.42	4.25
		pro	drinking	4.44	4.45
			e-cig	3.33	3.33
			product	5.72	4.60
			control	5.56	4.07

There were no statistically significant results on (3) cued recall (e.g., Table 16) or (4) heart rate (F (1, 16) = 2.78, p > .10).

The PSI X Susceptibility X Barriers 3-way interaction on (5) self-reported arousal is discussed above. A PSI X Susceptibility X Benefits X Barriers 4-way interaction on (5)

self-reported arousal is discussed above. There were no statistically significant results on (6) level of skin conductance (e.g., $F(1, 49) = .00$, $p > .10$, $\eta_p^2 = .00$) or (1) self-reported positive emotion (e.g., Table 14) and (2) zygomatic response (e.g., Table 15).

Chapter 5 Discussion

Just as interpersonal relationships might help us manage terror (i.e. much like strong parental relationships and romantic relationships), following certain favorite bloggers might help a young person to fit in with normative standards and manage terror by buffering anxiety inherent to being human (Wyszynski, Greenberg, & Arndt, 2012). This may be due to the fact that threats to relationships can increase thoughts of mortality (Pyszczynski et al., 2012). This behavior may also be a form of self-expansion because individuals self-expand largely via close relationships (Mattingly & Lewandoski, 2013). As we begin to participate more with social and interactive media, media personality relationships could become increasingly important. This could be especially true if interpersonal relationships "in real life" become less meaningful as social norms or constructs.

This study sought to explore if and when bloggers may be influential in regard to beauty products and risky products (e-cigarettes and alcohol). It found that bloggers can be influential in terms of health communication (due to a preference for anti-e-cigarette posts in many instances), even though bloggers may be seen as communicating or encouraging unhealthy behaviors. For instance, Hypothesis 1 stated that higher PSI toward the blogger would result in greater PSI toward the blogger after the posts. The research found that participants with higher PSI had higher PSI responses than those with lower PSI for the blogger before reading the posts. It was interesting that *anti-stance* posts led to higher PSI responses than pro-stance posts (without the controls that had no stance: the news and video posts). Perhaps the participants felt more compelled by or

friendly with the blogger when she took an anti-stance toward drinking and using e-cigarettes. This may show that self-motivations (vs. health) may be less guiding of preference than predicted, based on the TMHM (Arndt & Goldenberg, 2011). Participants were perhaps guided more so by health motivations (prevention, choosing not to favor risk behaviors).

The participants had greater PSI responses to control and product posts than to drinking and e-cigarette posts, perhaps because the product and control stories were more typical of a blogger. In a Topic X Stance interaction, however, the anti-e-cigarette post and the video control post received the greater mean PSI responses, suggesting that the anti-e-cigarette post may have been the most favorable or compelling. Thus, the results for H1 and RQ1 suggest that beauty bloggers may be useful sources for health communication, in that anti-risk behavior messages could be compelling in this setting. Relating the results to terror management, a blogger could allow the follower or subscriber to engage in self and health goals. It might also be that e-cigarette and drinking use may not be parallel or congruent behaviors to beauty or self-help. Beauty pill use, plastic surgery, mental health, sexual health, or extreme dieting may be self-behaviors compromising health that may be more compelling or congruent in this setting. Regardless, it is useful to explore blogging as a newer arena in which to promote healthy behavior in terms of risky behaviors like smoking and/or drinking.

In regard to Hypothesis 2, the prediction that higher PSI individuals would have higher attention, arousal, and emotional response in both self-reported and psychophysiological data was supported. In terms of emotional response, it was found that higher PSI people (by median split) had higher reported pleasantness across posts.

Other results reflected the findings in RQ2. A Topic X PSI interaction showed that high PSI led to highest reported pleasantness for product and control posts. Moreover, a 3-way PSI x Stance X Topic interaction showed that those with low PSI perceived pro-e-cig and pro-drinking posts *as least pleasant*. These results, like the ones of H1, demonstrate that *anti-risk* behavior posts and information could be very persuasive in discouraging behavior that is harmful to health, especially in the areas of smoking and substance abuse.

While physiological data did not show significance to support the self-reported pleasantness data, the self-reported pleasantness data can triangulate the PSI response results in H1. The attention data (cued recall and heart rate) and arousal data (self-report and skin conductance) did not reveal significant differences between low and high PSI groups.

Research Question 3 asked whether pro-e-cigarette and pro-drinking posts would receive the most self-reported and psychophysiological responses of positive emotion, attention, and arousal. A Stance X Topic interaction showed that pro-product and control posts had the most pleasantness reported. While the facial EMG, heart rate, and skin conductance data showed no significant results in regard to RQ3, the self-reported data revealed additional results buttressing the pleasantness self-report results.

There was a Stance X Topic interaction on self-reported arousal where anti-drinking and anti-e-cigarette posts received the most self-reported arousal. RQ3 also shows that while anti-drinking and e-cigarette posts may demand emotional and cognitive processing, they were not met with feelings of pleasantness from the participants. Again, it seems that followers would allocate more attention, or resources to encoding the anti-risk behavior messages on a real blog. Particularly, the pro-e-cigarette post was viewed as

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less pleasant than the anti-e-cigarette post; so, an anti-e-cigarette post on a real blog may trigger higher arousal, pleasantness, and persuasiveness.

Hypothesis 3 stated that intentions to drink and smoke e-cigarettes would impact the effect of exposure to risk behavior (e.g., e-cigarette use, alcohol use), such that intentions would be a significant factor with stance on self-report and physiological arousal, attention, and emotional response in interaction effects. There were no significant results. However, Hypothesis 4 (predicting that *refusal self-efficacy* toward drinking and smoking e-cigarettes would impact the effect of exposure to risk behavior (e.g., e-cigarette use, alcohol use), positing that intentions would be a significant factor with stance on self-report and physiological arousal, attention, and emotional response in interaction effects) was supported. There was a Stance X Topic X Drinking Refusal Self-Efficacy interaction on heart rate such that among those with low drinking refusal self-efficacy, the anti-e-cigarette and pro-drinking messages had the most negative heart rate change. There was also a Stance X Topic X Smoking Refusal Self-Efficacy interaction on heart rate where among low smoking refusal self-efficacy people, pro-e-cigarettes and control (video) messages had the most negative change. Among high smoking refusal self-efficacy people, anti-e-cigarettes posts had the most negative change (resources allocated or attention). These results signify that low refusal self-efficacy for drinking and e-cigarette smoking leads to greater encoding (or attention to) pro-drinking and pro-e-cigarette messages, respectively. This also shows that refusal ability influences what kinds of messages are attended to, perhaps in order to lessen cognitive dissonance. It may also show that those with lower self-efficacy would be harder to reach with pro-health messages because those people are likely more self (vs. health) oriented (Arndt &

Goldenberg, 2011).

RQ4 asked whether intentions and refusal self-efficacy would interact, resulting in an Intention X Refusal Self-Efficacy interaction on emotion, attention, and arousal. That is, would those with high intentions and low refusal self-efficacy have greater positive emotion (greater zygomatic response and self-reported positivity/pleasantness), greater attentional resources to processing (lower heart rate and greater recall), and greater physiological and self-reported arousal? Results for heart rate and self-reported arousal were significant, while all other data considered did not produce significant results in regard to RQ4 (e.g., pleasantness, facial EMG, cued recall, and skin conductance). For heart rate, there was a Drinking Intentions X Drinking Refusal Self-Efficacy X Seconds interaction, showing a notable orienting response among the low drinking refusal self-efficacy and high drinking intention participants across posts. For the self-reported arousal data, there was a Drinking Intentions X Drinking Refusal Self-Efficacy X Topic interaction. The means for self-reported arousal were higher for drinking and e-cig posts among those with lower drinking refusal self-efficacy and higher drinking intentions and among every other combination of drinking refusal self-efficacy and drinking intentions.

These findings show that for those with higher intentions to drink alcohol and lower self-efficacy to refuse a drink, there may be greater attention and immediate resources allocated to encoding of drinking and e-cigarette posts. This means that there could be potential appetitive activation, involving the parasympathetic nervous system, toward drinking and e-cigarette messages among those susceptible to drinking. This group of people may allocate more resources to encoding (i.e. allocate attention to the

message) of messages about risk behaviors *and* they may be harder to convince that health goals are more important than self-goals; this means that it may be more difficult to get these people to engage with mortality thoughts (often avoided via focus on self-motives and improvements like smoking and drinking to be normative or "cool") (Arndt & Goldenberg, 2011).

Hypothesis 5 stated that participants with higher PSI will be more likely to have greater purchase intention for the products featured (i.e., express purchase intention); this was supported by a between subjects effect of PSI on purchase intention. These results are aligned with the literature in which parasocial interaction has been found to lead to purchasing behavior in the TV media space (Park & Lennon, 2004; Lim & Kim, 2011).

A Stance X Topic X PSI interaction further illuminated (in regard to RQ6) that high PSI participants had the highest purchase intention after pro-drinking messages. There was also a Stance X Topic interaction (in regard to RQ5) on purchase intention. The Stance X Topic interaction showed that the pro-drinking post received the most purchase intention. The findings of H5, RQ5, and RQ6) demonstrate that parasocial interaction could be a mechanism through which actual behavior could occur. This information is useful to health communication in that parasocial interaction may lead to behaviors that bloggers recommend (e.g., healthy behavior). However, it is troubling that pro-drinking messages may persuade young women to purchase alcohol through PSI with bloggers or media persona.

Hypothesis 6 stated that health beliefs would influence exposure outcomes (parasoocial interaction, positive emotional response, attention, and arousal) in regard to e-cigarette messages particularly (reflecting less susceptibility and severity as predicting

intention to use e-cigarette use). Specifically, it stated health beliefs would influence the effect of the messages on PSI and physiological and self-report measures of arousal, attention, and emotional response. Less susceptibility and severity beliefs and higher benefits (toward not using e-cigs) and barriers (to not use e-cigs) would predict higher positive physiological/self-report response and higher PSI response. This was partially supported. There was a significant difference between benefits toward not using e-cigarettes groups where the high benefits group had more negative heart rate change than the low group. However, there were not any other significant findings for susceptibility, severity, barriers (toward not using e-cigarettes), or benefits (to not use e-cigarettes) on PSI response, physiological emotion (greater zygomatic response), attention (lower heart rate over time), or on self-reported positive emotion that supported the hypothesis.

There were more exploratory findings reported in regard to RQ7 (whether and how the HBM variables interact with PSI and stance and topic). In regard to susceptibility to risks from using e-cigarettes, there was a Susceptibility X Barriers interaction on cued recall, where those with low barriers and high susceptibility reported the highest attention across messages. For self-reported arousal, there was a PSI X Susceptibility X Barriers interaction where those with low barriers, low PSI, and high susceptibility had the highest arousal in general. A PSI X Susceptibility X Benefits X Barriers interaction revealed that those with high benefits toward not smoking e-cigarettes and susceptibility toward e-cigarette smoking and low PSI and barriers toward not smoking e-cigarettes had the highest self-reported arousal overall. These results show that those with high susceptibility (to e-cig risks and outcomes) and low barriers (toward not using e-cigs) are (1) more likely to engage in health motivation (versus self) when

thinking and behaving in regard to health and (2) are more likely to attend to health messages.

In regard to severity toward risks from using e-cigarettes, there was Stance X Severity X Barriers interaction. Among those with high severity perception, those with low barriers to not smoke e-cigarettes had higher PSI for anti-stance messages. This result shows that those that are probably engaged with health motives (versus self) are more likely to attend to anti-e-cigarette and anti-drinking messages (and probably other anti-risk behavior messages). They might also be more appetitive toward anti-risk behavior or health communication messages in general.

In regard to the benefits of not using e-cigarettes, there was a PSI X Benefits interaction on PSI, such that those with high PSI toward the blogger and those with high benefits attitude about not using e-cigarettes had the highest mean on PSI response after the posts. The findings show that the high benefits group is probably more receptive to health communication because they are most likely appetitively (engaged with the appetitive—approach—system over the aversive system) and health (versus self) motivated in processing. For the pleasantness self-report data, there was a significant Stance X Topic X Benefits interaction; among the low benefits group, the means for drinking and e-cigarettes were lower than those for product and control (suggesting self-motivation in that they preferred to not engage with the mortality/health outcome related posts). In the high benefits to not smoking e-cigarettes group, the pro-drinking and pro-e-cigarette means were lower than pro-product and the video (pro-control). Additionally, the anti-drinking and anti-e-cigarette means were higher than the pro-drinking and pro-e-cigarette means among the high benefits group, reflecting the results early in the

paragraph (e.g., those with high PSI toward the blogger and those with high benefits attitude about not using e-cigarettes had the highest mean on PSI response after the posts). Those that perceived higher benefits by not using e-cigs saw anti-e-cigarette and anti-drinking messages as more pleasant and had a higher PSI response (i.e., connected more with the blogger in an interactional way).

There was also a significant PSI X Benefits interaction, in which those with high PSI and high benefits to not use e-cigarettes had the highest self-reported arousal, probably because, again, the high benefits are more likely from a TMHM perspective to engage with health messaging and think about mortality (instead of avoiding it via self-motivations and actions). The PSI X Susceptibility X Benefits X Barriers interaction was discussed above.

For barriers toward not using e-cigarettes, there was a Stance X Severity for E-Cigarettes X Barriers for E-Cigarettes interaction on PSI response discussed above. In regard to self-reported pleasantness, there was a Stance X Topic X PSI X Barriers interaction where the pro-e-cigarette post among those with low barriers and low PSI had the lowest mean, following the HBM (Rosenstock, 1974; Champion & Skinner, 2008) in that those with low barriers to not use e-cigarettes would be more likely to not see the pro-e-cigarette post; these people would theoretically not be likely to be interested in or to agree with the pro-e-cigarette post. This relationship becomes even stronger when the interaction felt with the blogger is not present.

While having a friend "relationship" with a blogger could help someone manage terror, this behavior could also encourage negative or harmful behaviors. Following fashion and beauty bloggers may not be much better for physical and mental health than

following models or famous people because they create unattainable ideals; they are edited via social media applications. Many of these bloggers engage in or promote products that lead to non-healthful thoughts and behaviors, such as negative body image, disordered eating, tanning, plastic surgery, body modification, etc. (Lunde, 2013). This fits with the notion that women accept objectification because it is normalized in a societal pursuit to hide creature aspects of the body (Goldenberg & Roberts, 2010). However, this paper focuses on how bloggers can covertly or less obviously sell e-cigarettes along with lofty beauty and body ideals.

Media blogging could be an avenue to reach young media consumers or blog followers for the sale of *helpful products* or healthy advice—aiding the self to expand by benefitting the individual and exposing health threats. This research hypothesizes that media blogging about positive health messages can be persuasive since the anti-e-cigarette message was predominantly viewed as more favorable; this is especially true about susceptibility toward e-cigarette use, severity of e-cigarette use, and benefits to not using e-cigarettes.

In terms of theoretical contribution, this study made efforts to advance embodied cognition, terror management health model, and health belief model frameworks by exploring e-cigarette use and drinking behaviors as a function of having perceived interpersonal interaction or connections with a beauty blogger. From an embodied cognition perspective, few studies, if any, have explored the blogging phenomenon and its influence on parasocial interaction (e.g., interpreting attention, arousal, and emotional responses to blog content and triangulating those responses with the parasocial interaction self-report data).

In regard to the health belief model, it was unique to study e-cigarette use, a harm reduction behavior, as a risk behavior; e-cigarette use can be viewed as a helpful behavior for those who smoke already. This study had findings that were consistent with the HBM, however. For example, the high benefits group (high benefits toward *not* smoking an e-cigarette) had more negative heart rate change (signifying more attention) than the low group and anti-drinking and anti-e-cigarette means were higher (in regard to positive emotional response) than the pro-drinking and pro-e-cigarette means among the high benefits group. So, the high benefits toward *not* smoking an e-cigarette belief people had congruent beliefs in their preferences for anti-cigarette and anti-drinking posts. From a practical perspective, framing health issues based on benefits of performing the healthy behavior (e.g., e-cigarette use) because the study also found that the High PSI toward the blogger group and those with high benefits toward not smoking e-cigs had the highest mean on PSI after the posts. For instance, in a health campaign against e-cigarette initiation, the message may be more successful if it emphasizes what is to be gained from not using an e-cigarette.

The study also employed the terror management health model in a novel experimental setting. This model has been typically applied in the case of tanning, burn smoking, healthy eating, exercise, and body image (Arndt & Goldenberg, 2011). Also, the theory typically explains behavior via the self vs. health motivation dichotomy (Arndt & Goldenberg, 2011). This study also explains behavior through self vs. health, but in future studies, self vs. health should be examined as coactive; this means that when self motives are at play, the health motives of a person should not necessarily 'shut down.' This may be similar to the appetitive and aversive motivational systems; these systems

are coactive, meaning that both are operational but one might be more so acting in a certain situation (e.g., aversive activation may occur when an individual encounters a threat in the environment, like a snake; Lang, 2006). For example, since anti-stance posts had higher PSI responses than the pro-stance posts, *and* the video and anti-e-cigarette post had the highest PSI reported, self-motivations may be less guiding than health motivations for preference or interaction. However, with PSI as a predictor, the higher PSI group reported higher pleasantness toward the pro-e-cigarette messages. So, both self and health motivation become active, depending on pre-existing parasocial interaction.

Another way to think about this is that self and health are poles of a sliding scale and not separate choices or states of being. An additional example of self and health acting at the same time could be when individuals choose to work out or exercise. A young woman may be dually motivated by self motives (to look better over time) and health motives (to be and feel healthier over time). Drinking may also fulfill health and self goals in that it might make the person feel better or "high" physically and make the person more psychologically satisfied (e.g., by "fitting in"). Self and health coactivation of these motivations warrants further exploration in future research.

Limitations

There are a few limitations regarding external and internal validity. Regarding external validity, the study may not generalize to the general population because this is an experiment, but the study can achieve theoretical generalizability (i.e. HBM, TMHM). Lang (1996) emphasized that the use of a convenience sample can allow researchers to make meaningful statistical inferences relative to theory. Concerning internal validity, there may be high internal validity because the experiment was mostly controlled;

extraneous variables were probably not causing the outcome. There may be some issues with this because participants were exposed to a multitude of other media in addition to assigned treatments as a part of daily life.

This study is also limited because it explored responses to one blogger and mostly to text media. In the future, more research should be done on other types of blog content on varying levels of parasocial interaction in individuals, among other concepts (e.g., identification, liking, etc.).

A major limitation was that there were not any significant results for the skin conductance and facial EMG data that supported the hypotheses or answered the RQs. This might be because the stimuli were not very happy or very negative (e.g., using a lot of humor, fear, disgust, etc.) in that they were mostly written posts. The video used was also quite neutral as if a friend were talking to the viewer about her morning routine (wake up, get in the shower, walk the dog, etc.). In the future, it might be better to test other modalities and other types of photo blog content.

Future Research

The results show that there is a possibility of using media blogs through which positive health communication can take place. Considered a key component to improving population health, reducing health risk, preventing illness and saving money, health communication has the ability to provide beneficial information to consumers through mass media about their health and safety (Goetzel, 2009). The US Department of Health and Human Service as a part of the Healthy People objectives of 2020, recognized that health communication serves an important role to inform individuals about threats to their health (Healthy People 2020, 2016). Using mass communication theory and strategies,

health messages must be developed to communicate risk that will effectively motivate individuals to avoid making unhealthy choices (Wolburg, 2006). Given that positive health outcomes could occur at least partially due to good health messaging; public health departments could use blog communities to promote good health. Future research could also focus on whether bloggers can be used to foster healthy attitudes toward behaviors such as plastic surgery, dieting, exercise, tanning, etc. Topic exploration could also be examined further with the consideration of self and health motives as coactive. For example a research question could explore in which media or behaviors do both self and health motivations enter the decision making process.

This research could lead to more research on social media and other forms of covert sponsorships and marketing. E-cigarette advertising and behavior are understudied, yet burgeoning, areas of research. Existing research suggests that an individual's personality traits could influence the persuasiveness of social media marketing on e-cigarette behaviors. For instance, Ashe and McCutcheon (2001) examined the effect of shyness and loneliness on the likelihood of parasocial relationships. They found that shyness and loneliness were not strong predictors of parasocial relationships with highly visible celebrities. Shyness and loneliness could impact parasocial relationships with less visible beauty and lifestyle bloggers, however. Other research has found that parasocial relationships are formed in the absence of relationships (where relational needs are not met) or in a state of loneliness (Lim & Kim, 2011). Future research could also explore whether self-esteem and self-concept strengthen the impact of parasocial interaction or relationships on buying behaviors (i.e. risky products such as e-cigarettes) or other media behaviors (i.e. following certain

bloggers or social media use).

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Appendix

Figure 1. Items used to measure PSI toward the blogger prior to posts

1. I like the way she handles problems.

2. I wish I could handle problems as well as she does.

3. I feel included in her friend group.

4. I would like to be more like her.

5. I can relate to her attitudes.

6. I usually agree with her.

7. I am familiar with her habits.

8. If given the opportunity, I would contact her.

9. I have a good understanding of her.

10. I am happy turning to her for guidance.

11. I see her as a role model.

12. I see her as a close friend.

13. I feel good when I turn to her for advice.

14. I use advice I learn from her.

15. I look up to her.

16. She makes me feel comfortable, as if I am with a friend.

17. I seek information about her.

18. I would be happy to meet her in person.

19. I would talk to her if I saw her on the street.

Table 9.

Drinking refusal self-efficacy * drinking intentions * seconds interaction on heart rate means and standard deviations

Drinking refusal self-efficacy	Drinking intentions	Seconds	Mean	Standard deviation
low	low	1	1.30	1.61
		2	-.34	1.40
		3	1.38	1.98
		4	-1.86	1.96
		5	4.93	2.22
		6	1.93	1.38
		7	-7.48	2.13
		8	-2.49	2.43
		9	2.56	1.71
		10	.50	2.34
		11	-.48	1.43
		12	-3.16	2.45
		13	4.45	1.58
		14	-4.64	1.81
		15	1.65	1.45
		16	2.17	1.11
		17	-2.45	2.40
		18	-3.65	2.19
		19	3.59	1.80
		20	1.64	1.17
	high	1	-.18	1.40
		2	1.30	1.22
		3	-.55	1.73
		4	-1.61	1.71
		5	.41	1.94
		6	-.20	1.21
		7	-.49	1.86
		8	-.13	2.12
		9	-2.92	1.49
		10	.14	2.04
		11	1.44	1.25
		12	.41	2.14
		13	.12	1.38
		14	.14	1.58
		15	-.29	1.27
		16	-.35	.97
		17	-1.45	2.14
		18	.99	1.91
		19	-.08	1.57
		20	-1.37	1.03
high	low	1	1.40	1.28
		2	.89	1.12
		3	2.84	1.58
		4	-2.54	1.56
		5	-4.02	1.77
		6	-1.90	1.10
		7	-1.76	1.70
		8	-.55	1.93
		9	.62	1.36
		10	-.05	1.87
		11	.22	1.14
		12	-1.54	1.95
		13	1.34	1.26
		14	-.14	1.44
		15	-1.58	1.16
		16	.57	.88
		17	2.56	1.95
		18	.67	1.74
		19	-.44	1.43
		20	-.48	.94
	high	1	1.87	1.52
		2	.74	1.32
		3	.42	1.87
		4	.04	1.85
		5	2.07	2.09
		6	-.54	1.31
		7	-.66	2.01
		8	.50	2.29
		9	.70	1.61
		10	-2.56	2.21
		11	-.63	1.35
		12	-1.19	2.31
		13	-1.50	1.49
		14	1.83	1.71
		15	.46	1.37
		16	-.79	1.05
		17	-1.06	2.31
		18	.08	2.06
		19	-1.23	1.69
		20	-.01	1.11

VITA

Erika Johnson will receive her Ph.D. from the Missouri School of Journalism and her Master of Public Health. She was born in St. Louis, Missouri and grew up in Union, Missouri.

She earned her B.A. at the American University in Washington, D.C. in Communication. She also graduated from the University of Missouri with her M.A. in Journalism. Johnson is a health communication scholar. Her primary research agenda includes how interactive and entertainment media formats may impact psychological processing and health behavior. She additionally studies how social media and media attributes can effectively reach publics in crisis situations involving health.

Her research on health and strategic communication intersects at source, meaning she is interested in how source components reach the self from a psychological perspective. She is interested in how source can create relationships with the user (conversational human voice, parasocial relationships, identification).

She approaches her research agenda from various methodological perspectives. While much of her research explores source in regard to communication persuasiveness from an experimental perspective, she also has done qualitative research. Additionally, she is trained in and has done research projects using psychophysiological measures. In her dissertation, she explored how bloggers persuade young female users to engage in risk behaviors.