USER EXPERIENCE OF MOBILE INTERACTIVITY:
HOW DO MOBILE WEBSITES AFFECT ATTITUDES
AND RELATIONAL OUTCOMES?

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ABSTRACT

Mobile media offer new opportunities for fostering communications between individuals and companies. Corporate websites are being increasingly accessed via smartphones and companies are scrambling to offer a mobile-friendly user experience on their sites. However, very little is known about how interactivity in the mobile context affects user responses to media content. In order to fill this gap, this dissertation investigates the effects of two types of interactivity upon individuals’ attitudes toward mobile websites as well as relational outcomes. An online 2 (modality interactivity: high vs. low) x 3 (message interactivity: control vs. low vs. high) between-participants factorial experiment was conducted. Modality interactivity was operationalized in terms of the number of interaction techniques employed in a mobile website, whereas message interactivity was operationalized as the degree to which the interface displayed message exchanges in a threaded manner.

Findings from this study suggest that users psychologically discriminate between the different interaction techniques available on mobile websites. When individuals were given various ways of interacting with the website content (i.e., high modality interactivity), they were more likely to express enjoyment and be engaged in website interaction, which in turn yielded better website attitudes and behavioral intentions. Modality interactivity also significantly predicted relational outcomes, and this relationship was mediated by enjoyment and user engagement, with the former preceding the latter. In the case of message interactivity, the analysis revealed two psychological processes leading to positive website attitudes and website behavioral intentions: a
cognitively effortful process via perceived contingency and dialogue and a heuristic process via perceived contingency and enjoyment. Furthermore, the level of power usage moderated the effects of the two types of interactivity on negative outcomes, including perceived bells and whistles and perceived distractions. Individuals scoring lower on power usage showed more negative outcomes when the mobile website offered higher level of interactivity, while the opposite was true for individuals scoring higher on power usage. In general, power users prefer interactivity features more than non-power users. Theoretical as well as practical implications of these findings for the study of mobile interactivity in a public relations context are discussed.
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Chapter 1

Introduction

Online access using mobile phones has become commonplace in the past several years. As of 2012, 55% of U.S. mobile phone users go online using their mobile phones, marking a 24% increase since 2009. In addition, among these mobile web users, 31% indicated that they do most of their online browsing on their phones (Smith, 2012). This increased popularity of the mobile web presents many opportunities for public relations. For example, ubiquitous information access enables publics to reach companies and access their information more conveniently, which facilitates connectivity between both parties. In addition, the GPS function of mobile phones allows companies to offer new types of services (e.g., enable users to easily locate nearby stores) that are convenient for website visitors and thus increase their satisfaction. Since the goal of public relations is to cultivate and to maintain good relationships with various publics (Grunig & Hunt, 1984), the mobile web offers a promising medium for PR practitioners, raising many important questions for companies and PR practitioners: How should companies design their mobile websites in order to leave a good impression and yield positive relationships with their publics? In previous studies, scholars have argued that “interactivity” is one of the critical factors in determining the success of online PR (Hallahan, 2003). Corporate websites offering interactive user experiences are found to be more effective in inducing better attitudinal and behavioral outcomes, including the liking the company (Guillory & Sundar, in press) and revisiting the website (Coursaris & Sung, 2012). However, the
majority of studies in this area are conducted with personal computers. Therefore, we know little about how interactivity plays a role in mobile web contexts, given that the mobile device itself and the way people use it differs from PC use (e.g., small screen size, touch screen, used on the go). In order to determine how companies could use mobile websites for organization-public communication, empirical studies of interactivity need to be conducted in the context of mobile media.

This dissertation seeks to address this need by examining the effect of interactivity on individuals’ attitudinal and behavioral outcomes towards the site and the company in the context of mobile media. Among the many conceptualizations of interactivity, this dissertation will adopt Sundar’s (2007) model of interactivity effects. Using two of the three types of interactivity proposed in the model, namely modality interactivity and message interactivity, this study will examine positive as well as negative effects of interactivity on individuals’ attitudinal and behavioral outcomes.

Furthermore, this dissertation will consider the role of interactivity on companies’ relational management with their publics. Scholars have theorized that online websites are capable of cultivating relationships between companies and their publics (Galloway, 2005), and that interactivity makes a crucial contribution to the relationship-building process (Gustavsen & Tilley, 2003; Jo & Kim, 2003). However, to date, few studies have empirically tested whether website interactivity can indeed affect relational outcomes. Needless to say, no study has looked at this issue in the context of the mobile web. Thus, this study will test the linkage between interactivity and four relational outcomes--control mutuality, trust, satisfaction, and commitment.
In sum, this study aims to answer following questions: How does the degree of interactivity offered in companies’ mobile websites affect individuals’ attitudes and behavioral intentions towards the websites as well as the relational outcomes with the company? In addition, what are the underlying psychological mechanisms of this effect? Finally, how can companies incorporate interactivity in their mobile website? In order to address these questions, this dissertation will employ an online experimental study and will manipulate the level of interactivity in a company’s mobile website.

**Background Context**

Mobile media are information technologies that can be carried around by users. Mobile media devices are often connected to wireless networks and thus can serve as a hub for users to interact with others and with information resources (Kakihara & Sorensen, 2002). Individuals interact with mobile media quite differently compared to PCs. For example, due to smaller device sizes, mobile media possesses input and display functionalities that differ from PCs. In addition, mobile media provides ubiquitous information access, which enables individuals to use the device almost anywhere and in any setting. These differences cause the user to develop new patterns of behavior associated with information access on mobile media.

Because of its potential for ubiquitous information access, mobile media, especially mobile phones, has been gaining attention by strategic communication scholars as a useful tool for companies to communicate with their consumers and with their publics (e.g., Leppäniemi, M., & Karjaluoto, 2005; Okazaki, 2009). Previously, these
studies focused mainly on mobile phones’ short message service (SMS) and treated mobile media as a tool for delivering advertisements (e.g., Kolsaker & Drakatos, 2009). However, current technological advancements enable companies to use mobile phones beyond simply sending commercial messages. Particularly, mobile website and application technology presents many opportunities for companies to interact with their publics in order to yield positive outcomes.

Some scholars in public relations and consumer psychology have pointed out that mobile websites and applications can be useful in enhancing the public’s favorable attitudes toward companies and in cultivating relationships between the two parties (Galloway, 2009; Payne & Frow, 2005; Sinisalo, Salo, Karjaluoto, & Leppaniemi, 2007). In their survey study with airline loyalty program customers, Liljander, Polsa, and Forsberg (2009) found that customers who access services through sophisticated mobile phones (i.e., mobile phones that have Internet access) showed significantly more positive attitudes toward services and the company. In another study, Bellman, Potter, Treleaven-Hassard, Robinson, and Varan (2011) found that branded mobile phone applications could increase users’ positive attitude toward the brand and likelihood to purchase the product.

Recognizing these opportunities, an increasing number of companies now develop their own mobile websites and mobile applications (Charlton, 2012). At this point, the question is not “whether” companies should offer mobile friendly information access for their publics. Instead, it is about “how” companies should develop these services, such as how to design the interface of their mobile websites and applications, in order to run effective campaigns and yield better outcomes.
Given this background, this dissertation focuses on one key design aspect—interactivity—and examines its effects on an individual’s attitudinal, behavioral, and relational outcomes. Furthermore, it focuses on interactivity offered by mobile websites rather than interactive features offered by mobile applications because mobile websites are easier to implement and are compatible across various operating systems. These advantages make mobile websites an ideal tool for companies to communicate with their target publics and for researchers to experimentally study the psychological effects of particular affordances of mobile media.
Chapter 2

Literature Review

Interactivity and the Model of Interactivity Effects

Interactivity is regarded as an important characteristic of online media and has been studied extensively over the last decade. Scholars have tried to conceptualize the concept by proposing different definitions and models. It has been defined as the medium’s ability to provide users with control over content presentations (Klein, 2003; Lombard & Snyder-Duch, 2001; Steuer, 1992), its responsiveness toward a user (Rafaeli, 1988), or the medium’s ability to facilitate two-way communication (McMillan, 2000; Pavlik, 1998), to name a few. In the field of online public relations, interactivity is often associated with media’s capability to assist bidirectional communication between companies and their publics (Kellher, 2009). Among many conceptualizations of interactivity, the one proposed by Sundar, Kalyanaraman, and Brown (2003) has been gaining attention among PR scholars to illuminate the potential benefit of online media in the practice of public relations (Kelleher, 2009; Smith, 2010; Guillory & Sundar, in press).

Two types of interactivity are identified by Sundar et al. (2003): functional interactivity and contingency interactivity. Functional interactivity focuses on interface features that allow users to interact with websites and underlying content, whereas contingency interactivity concerns the way messages are exchanged for facilitating a
dialogic loop. Both types of interactivity have been empirically studied in previous literature, and the results from these studies indicated the role of these two interactivity types in affecting users’ website viewing experiences (Kelleher, 2009; Guillory & Sundar, in press). For example, in their study of an organization’s website, Guillory and Sundar (in press) found that higher level of functional interactivity resulted in more positive perceptions of organizational reputation. Saffer, Sommerfeldt, and Taylor (in press) examined contingency interactivity employed in organizations’ twitter strategy. Their results indicated that higher level of contingency interactivity could lead to more positive perceptions of organization-public relationships.

Later, Sundar (2007) extended the initial conceptualization of interactivity and proposed the model of interactivity effects. In this model, functional and contingency interactivity are termed modality and message interactivity respectively, and are differentiated from another type of interactivity, source interactivity (i.e., the degree to which a website allows the user to be the source of information). The model has not only yielded design insights (Sundar, Xu & Bellur, 2010) but also been empirically tested in recent studies examining the mechanisms by which the three different kinds of interactivity affect cognitive, attitudinal, and behavioral outcomes (Sundar, Oh, Bellur, Jia & Kim, 2012; Sundar, Bellur, Oh, Jia, & Kim, 2012).

This study adopts the interactivity effects model, due to its relevance to public relations research and its ability to offer empirical testable propositions. In particular, it examines modality interactivity (formerly “functional interactivity”) and message interactivity (formerly “contingency interactivity”) in mobile websites.
Modality Interactivity

Modality interactivity focuses on the variety of interaction techniques employed in websites for users to interact with the interface and systems (Sundar, 2007). The concept of “modality interactivity” is different from “modality,” as modality refers to ways of presenting information (i.e., text, video, image, audio), whereas modality interactivity concerns different ways of interacting with the interface to access content (Sundar, 2007; Sundar et al., 2010a). For example, users can use the zoom function to get a closer look at the content. On the other hand, users can use the slide function to view contents in a continuum (Sundar, Xu, Bellur, Oh, & Jia, 2010). Thus, the higher the number of interaction techniques employed, the higher the modality interactivity level in the website.

Studies have shown that modality interactivity affects individuals’ attitudinal and behavioral outcomes toward websites and website content (Sicilia, Ruiz & Munuera, 2005; Xu & Sundar, in press; Sundar & Kim, 2005). According to the interactivity effects model, such effects of modality interactivity can be explained by the notion of “perceptual bandwidth” and user engagement. “Perceptual bandwidth” is referred to as “the type and number of sensory channels involved during an interaction between media and its users” (Sundar et al., 2010a, p. 2249). The level of modality interactivity can influence individuals’ “perceptual bandwidth” because each interaction technique represents certain perceptual representations. When these interaction techniques are combined, they offer individuals with richer sensory experiences and expand users’ “perceptual bandwidth.”
The outcome of such enriched sensory experiences is users’ increased engagement with the user-system interaction. User engagement has been studied in various disciplines in recent years. Research indicates that increased user engagement results in better attitudinal and behavioral outcomes, such as attitude toward the site (Sicilia et al., 2005) and intention to engage in the advocated health behavior (Lefebvre, Tada, Hilfiker, & Baur, 2010). Recent studies that adopted Sundar’s (2007) model of interactivity effects have also shown that user engagement mediates the effect of interactivity on individuals’ attitudinal and behavioral outcomes (Sundar, Xu, Bellur, Oh, & Jia, 2011; Sundar, Bellur, Oh, Jia, & Kim, 2012). For example, Xu and Sundar (2012) found that users indicated higher engagement when they are offered with more functional features (e.g., drag/click to spin the product, mouseover to zoom-in, and rotate the product) to interact with an e-commerce website. This heightened engagement leads to better attitudinal and behavioral intentions toward the website and the product.

Based on the literature above, it can be assumed that when a website offers more interaction techniques, users are more likely to engage in the interaction and, as a result, show better attitudinal and behavioral outcomes. This dissertation proposes that such effects of modality interactivity can also be observed in a mobile web environment as well. Previously, users had to depend on the keypad to interact with mobile phones or access information through mobile media. In such environments, pushing a button was almost the only interaction technique that users could use. With the advancement of mobile technology and the increasing popularity of touch screen based mobile devices, more interaction techniques have now become available to mobile users. These interaction techniques include tapping the screen, swiping the screen vertically and
horizontally, voice control, and camera-based control functions (e.g., QR code, mobile visual search engine). This dissertation will focus on two interaction techniques that are often adopted in mobile websites. One is “screen tapping,” which is currently the major interaction technique used in mobile websites. Because of its commonality, “screen tapping” will be used as a baseline interaction technique in the experiment. Another interaction technique is “swiping horizontally,” which is used relatively infrequently in mobile website contexts. This dissertation tests whether adding one interaction technique (i.e., swiping horizontally) in a company’s website influences users’ engagement and leads to better attitudinal and behavioral outcomes toward the website, by empirically examining support for the following hypotheses:

**Hypothesis 1:** Higher modality interactivity will lead to (H1a) more favorable attitudes and (H1b) more behavioral intentions toward the website.

**Hypothesis 2:** User engagement will mediate the effects of modality interactivity on (H2a) attitudes and (H2b) behavioral intentions towards the website.

**Message Interactivity**

Message interactivity concerns the manner in which messages are exchanged during an interaction process. The core variable that determines the level of message interactivity is contingency, which refers to the degree to which “subsequent messages are contingent or dependent on previous messages” (Sundar et al., 2003, p. 35). The idea of focusing on contingency in the definition of interactivity can be traced back to the work of Rafaeli (1988). In his study of group-based CMC communication, Rafaeli (1988)
proposed three levels of interactivity based on how messages are exchanged between communicators: two-way, reactive, and interactive. In two-way communication, messages are exchanged back and forth; however there is no coherence between later messages and those preceding them. In reactive communication, later messages are referred in ones immediately preceding them. When it comes to interactive communication, later messages have to refer to not only the ones immediately preceding them but also to earlier messages exchanged. The level of interactivity is therefore determined based on how much messages are interconnected with one another, which is the degree of contingency (Sundar et al., 2003).

The concept of message interactivity suggests that it is important to consider the ways messages are exchanged in order to make the communication truly interactive. Therefore, interfaces should not only offer functionalities needed for exchanging dialogue, but also ensure that the resulting messages are interconnected (Sundar et al., 2003). However, there are questions surrounding how to adopt this principle to corporate website context. What should companies do, in addition to simply providing interaction functions in their website, to heighten a sense of dialogue among users? Recent studies showed that one way to enhance users’ perceived dialogue and contingency is to provide some visual cues on the interface (Sundar et al., 2012, Bellur, 2012). For example, in their study of an online search site, Sundar et al. (2012) manipulated message interactivity through the visual display of interaction history, such as users’ browsing history and search history. Since the interaction histories are updated whenever users made new inputs on the interface (e.g., search a product), they serve as an indicator that the interface offers contingent feedback to users. As a result, when the interface showed
more interaction history (i.e., higher level of message interactivity), users perceived higher levels of dialogue and contingency.

In another study, Bellur (2012) showed that perceived contingency could be further heightened by providing visual cues to infer a looping mechanism, or threadedness, of the interaction. Specifically, Bellur (2012) examined message interactivity in an interactive health information system that asks participants a health related question and provides tailored responses based on the users’ input. In low message interactivity conditions, the system simply displayed a tailored message after users entered their responses on the interface. In the medium condition, the system also showed users’ responses to the most immediate question (e.g., Your response: Very often) right before displaying a tailored message. In the high condition, the system displayed not only users’ responses to the most immediate question but also their responses to the question one step earlier in the process. As hypothesized in the study, people in higher message interactivity conditions felt the interaction to be more contingent, which, in turn, increased user engagement, attitude, and behavioral intention toward the website.

These previous studies suggest that displaying interaction history can heighten the sense of contingency and can lead to better website evaluation. This effect may also occur even if an individual is not actually involved in the interaction. In the MAIN model, Sundar (2008) argued that the sheer presence of an interaction feature on an interface could influence users’ evaluation of the interface. This is because each interaction feature can cue a number of cognitive heuristics, or mental rules-of-thumb, that trigger positive and sometimes negative evaluations of the site and its content. For
example, if individuals go to a company’s Facebook page and see a thread of conversation between the company and other people, the presence of conversation history can trigger the contingency heuristics that leave users feeling that the company’s Facebook page is active, timely, and reliable. Such impressions can in turn serve to encourage the individual to explore more of the page and have a positive feeling toward the company’s Facebook page.

Therefore, this dissertation suggests that showing conversation history in a company’s website can increase perceived contingency and yield better website evaluation. In addition, given the results from previous studies, such interaction history needs to be presented in a threaded manner in order to lead to even better outcomes. Currently, there are many websites that incorporate some sort of comment functions which allow users to make comments or check other people’s comments on the site. These comment functions may serve to increase perceived contingency and dialogue as rationalized above. In addition, some tools available on these comments applications can serve to cue individuals that the messages are interconnected. For example, when a company writes a message in response to an individual’s comment left on the company’s websites, the company can either write a message with a new dialogue box or write it using the reply function. When the reply function is used, the message will be displayed under the original comment, making a conversation thread. This way of displaying messages can increase perceived contingency, since it signifies that these messages are interconnected. This dissertation uses this type of comment application to manipulate message interactivity and investigate the effect of message interactivity on individual website evaluation, with the aid of the following hypotheses.
Hypothesis 3: Higher message interactivity will lead to (H3a) more favorable attitudes and (H3b) more behavioral intentions toward the website.

Hypothesis 4: Perceived contingency and perceived dialogue will mediate the effects of message interactivity on (H4a) attitudes and (H4b) behavioral intentions towards the website.

**The Effects of Interactivity on Relational Outcomes**

In addition to attitudinal and behavioral outcomes, modality and message interactivity can also influence relational outcomes. Relationship management has been the central focus of public relations scholarship over the last few decades (Cutlip, Center, & Broom, 1994; Ferguson, 1984). Scholars have argued that the key for a company’s success is to establish a mutually beneficial relationship with their publics (Hallahan, Holtzhausen, van Ruler, Vercic, & Sriramesh, 2007; Hon & Grunig, 1999). One of the theoretical frameworks that guides the research and practice of relationship management is the relationship maintenance strategies and outcomes (Hon & Grunig, 1999). This framework has its origin in interpersonal communication (Canary & Stafford, 1992) and was adopted later in the context of organization-public communications.

The framework proposes that relationship quality between organizations and publics can be evaluated using four dimensions: 1) control mutuality (agreeing that both parties have the rightful power to influence one another), 2) trust (confidence in and willingness to be open to the other party or parties in the relationship), 3) satisfaction (favorable feeling after positive expectations are reinforced), and 4) commitment.
(believing that the relationship is worth working on and having intention to maintain the relationship) (Hon & Grunig, 1999; Huang, 1997). In addition, the framework also suggests six strategies that companies can exercise to keep the relationship between companies and publics favorable.

One strategy is positivity, which is defined as “anything the organization or publics do to make the relationship more enjoyable for the parties involved” (Hon & Grunig, 1999, p. 14). In previous studies, positivity is found to influence the four relational outcomes (Bortree, 2010; Ki & Hon, 2009). When it comes to online public relations, positivity is often linked with interactivity. For example, in their content analysis of corporate weblogs, Cho and Huh (2010) included the presence of interactivity features as one of the measures for positivity. They argued that interactivity can make users’ website viewing experiences more fun and enjoyable. Thus offering interactivity in websites can be considered as an execution of the positivity strategy. Data from some empirical studies also indicated the effect of interactivity on users’ perceived fun and enjoyment (Cyr, Head, & Ivanov, 2009). For instance, in their study of modality interactivity, Xu and Sundar (2012) found that participants indicated higher levels of perceived fun when they are offered more interactivity features to explore the website. In another study, Cyr et al. (2009) demonstrated that perceived interactivity increased users’ enjoyment of interacting with websites and led to increased user loyalty to the website. With these findings as basis, this dissertation proposes that:

Hypothesis 5: Higher (H5a) modality interactivity and (H5b) message interactivity will lead to better relational outcomes.
Hypothesis 6: Perceived enjoyment will mediate the relationships between (H6a) modality interactivity and relational outcomes; (H6b) message interactivity and relational outcomes.

In addition, message interactivity can also affect relational outcomes via a heightened sense of dialogue. The concept of dialogue is another critical variable that has been found to yield better relationship outcomes in public relations (Kent & Taylor, 1998). Scholars in public relations argued that interactive online media is an ideal avenue to facilitate dialogue between companies and their publics (Kent & Taylor, 2002; Seltzer & Mitrook, 2007), and contingency interactivity is key in this process (Kelleher, 2009). In his study of organization blogs, Kelleher (2009) addressed two additional relational maintenance strategies that can be executed through interactive online media: communicated relational commitment (i.e., expressing organizations’ commitment to build and maintain relationships) and conversational human voice (i.e., communicating with publics by using engaging and natural styles of communication). The data from his study suggested that these two strategies related to contingency interactivity are positively correlated with relational outcomes (e.g., trust, satisfaction, commitment, and control mutuality). Based on these findings, this dissertation proposes that:

Hypothesis 7: Perceived dialogue will mediate the relationships between message interactivity and relational outcomes.

In previous studies, relational outcomes were found to affect individuals’ behavioral intentions (e.g., Ki & Ho, 2007; Park & Rhee, 2010; Kang & Yang, 2010). For example, Kang and Yang (2010) conducted a survey study of individual donors for a non-profit organization. Their data indicated an indirect as well as a direct effect of
relational outcomes on individuals’ supportive behavioral intentions toward the organization, such as whether they would continue to support the organization and would engage in positive word-of-mouth communication for the organization. In line with these previous studies, this study also examines whether increased relational outcomes can lead to better behavioral intentions toward the company.

Hypothesis 8: Relational outcomes will positively affect behavioral outcomes towards the company.

The Effects of Interactivity on Negative Outcomes

In addition to the positive effects of interactivity as mentioned above, an increase in interactivity levels may also lead to some negative effects on attitudinal and behavioral outcomes. One possible reason for negative effects occurring may be due to the fact that offering too much interactivity exhausts individuals’ cognitive resources and increases individuals’ confusion and frustration (Bucy, 2004). In the MAIN model, Sundar (2008) also pointed out that negative effects of interactivity might occur due to “the nature of cues transmitted by technological affordances” (p. 79). In addition to those cues that elicit positive outcomes, technological affordances, such as interactivity, can sometimes convey cues that promote a negative evaluation of the website and its content. For example, an interface with multiple interactive features may trigger a bells-and-whistles heuristic, causing individuals to feel that the website is “all flash and no substance” (Sundar, 2008, p. 82). Similarly, offering too much interactivity on a website might initiate a distraction heuristic, which prevents users from effectively evaluating the website’s content. If individuals fail to process the content and only have a feeling that
they are distracted, they are likely to form negative feelings toward the website (Sundar, 2008).

Mobile phones are smaller in screen size, and individuals’ cognitive resources are often divided when they access information from mobile phones (e.g., mobile phone use on the go). This suggests that these negative heuristics mentioned above may be more likely triggered in the context of mobile websites than PC websites. Therefore, it is important to test the possible negative effects of interactivity in the current study.

RQ1: Will higher level of interactivity trigger bells and whistles or distraction heuristics and lead to negative attitudinal and behavioral outcomes?

**Power Usage**

The effects of interactivity can be influenced by individual factors, including the degree of power usage. Power usage concerns “user’s motivation, efficacy, expertise and demonstration of evolved technology use” (Sundar & Marathe, 2010, p. 305). If individuals are high in power usage (i.e., power users), they are likely to consider themselves experts of information technologies and show greater confidence when testing newer technology by themselves. In contrast, non-power users often display less interest and enthusiasm toward interacting with newer technology (Sundar & Marathe, 2010).

In previous studies, the level of power usage is found to be a critical variable that influences individuals’ experiences when interacting with websites. For example, in their study of website customization, Marathe and Sundar (2011) found that power users are more likely to experience a higher sense of control while customizing the website.
compared to non-power users. Recently, Sundar et al., (2011) examined how the use of various interaction technique types leads to different levels of user engagement and website experiences. The data from their study revealed that power users prefer certain types of interaction techniques (e.g., mouseover) to others. As a result, power users displayed more positive attitudes toward the website content when they explored the site with their preferred interaction techniques.

As the mobile phone is considered one of the most up-to-date information technologies in the current market, individuals’ level of power usage can also influence their experience of using mobile phones and exploring mobile websites. In fact, some recent studies indicated that individuals are different in their self-efficacy of using mobile phones, and such differences can affect how they use mobile phones and their acceptance of mobile services (Bakke, 2010; Lee, Hsieh, & Huang, 2011). Thus, this study will also consider the role of power usage with the following research questions:

RQ2: Will the degree of power usage moderate the effect of modality interactivity and message interactivity on participants’ attitudinal, behavioral and relational outcomes?
Figure 2-1: Summary of hypotheses and research questions in the study.
Chapter 3

Method

In order to investigate the aforementioned hypotheses, a 2 (modality interactivity: low and high) × 3 (message interactivity: control, low, high) between-subject factorial experiment was conducted in online experiment setting. Six versions of stimulus mobile website were developed that varied in the level of modality interactivity and message interactivity.

Participants

Participants for this study were recruited from undergraduate courses at Penn State University. A total of 272 undergraduate students participated in this study for extra credit. Among the 272 students, 20 students were excluded from the final analysis as they encountered technical issues such as being unable to swipe to change the pictures or they indicated that they browsed the website using PCs instead of mobile phones. The age of the final sample (N = 252) ranged from 18 to 30 (M = 20.1, SD = 1.70) with 117 females and 135 males. Thirty-six percent of the students identified themselves as sophomore, followed by 33% junior, 19% freshmen, and 12% senior. One student identified him/her as freshman and sophomore. The majority of them (79%) indicated that they were currently using a mobile phone from iPhone series. The time that they spend accessing Internet through mobile phones ranged from 0 to 600 minutes per day, with an average of
70.8 minutes. On the question relating to the primary purpose for using their mobile phone, 96% indicated sending or receiving text messages, followed by 85% for making calls, 75% for using applications, 68% for browsing websites, and 63% for listening to music. Couple of participants indicated that they use mobile phones for other purposes such as GPS, e-mail, taking pictures and videos, checking time, and alarm clock.

**Stimulus**

This study used the mobile website of a fictitious catering company as the stimulus. A total of six mobile websites were created for this study. All of the websites shared the same page layout, theme color, navigational tools, and contents. Each stimulus website comprised seven webpages. All of the seven webpages had three sections. The top section showed a banner of the fictitious catering company (i.e., All Events Catering). The center section presented contents that vary in each webpage. The bottom section displayed a link that directed participants to the next webpage of the website with an exception for last webpage which displayed a link to the final questionnaire of the study (see Figure 3-1).

![Figure 3-1: The basic layout of the webpages.](image)
The first webpage was an introduction page. The center section included a greeting message and an instruction of how to change images in slideshow windows that were embedded in four of the seven webpages in the website (see Figure 3-2). The next three webpages of the website described the content of three buffet package options that the catering company offered. One page is used to show one package potion. The center section presented a series of images in the form of a slideshow. These images contain names and pictures of menus that were included in the packages. Each slideshow displayed six images. These images could be changed by either tapping or swiping the slideshow window (see Figure 3-3).

Figure 3-2: Screenshots of the introduction page (center section only). The left one is for low modality interactivity condition (i.e., tapping only) and the right one is for high modality interactivity condition (i.e., tapping and swiping).
In the fifth webpage, the center section displayed an online calculator that automatically estimates the cost based on the number of people and the package chosen. At the top of the calculator, three images of the package menu’s summary are presented in the form of a slideshow. Similar to the previous pages, participants were able to check the three images by tapping or swiping the screen (see Figure 3-3). The sixth webpage was used to manipulate message interactivity. The center section of this webpage displayed the phone number and e-mail address of the catering company. At the bottom of this contact information, the webpage displayed the interaction history between the company and its customers (see Figure 3-4). The final page of this website showed a message from the company to thank the users for browsing the website along with a picture of the company’s staff. Underneath the picture is a link that directed participants to the post-stimulus questionnaire (see Figure 3-4).

Figure 3-3: An example screenshot of a webpage that shows package menus (left), and a screenshot of the center section of the fifth webpage (right).
Modality Interactivity Manipulation

Modality interactivity was manipulated by varying the number of interaction techniques employed in the mobile website. Tap-based interaction technique was used as a baseline interaction technique in this study. In both low and high modality-interactivity conditions, participants had to tap the screen in order to proceed to the next page and make the cost estimation. This tap-based interaction technique was also used to change the images displayed in slideshow windows in low modality-interactivity condition. In the high modality-interactivity condition, swipe-based interaction technique was added. In addition to tap the screen, participants were able to swipe the screen to change the images in the slideshow window.
Message Interactivity Manipulation

Message interactivity was operationalized as the degree to which the interface displays message exchanges in a threaded manner. Six messages were used to manipulate message interactivity. Three of them were questions from customers regarding the catering company’s services. The rest of the three messages were replies from the catering company. These messages were displayed along with the company’s logo and another logo representing an anonymous customer. The content of the six messages and the two logos used in the webpage were the same across the three conditions. However, the way these messages are displayed varied across the conditions.

In the low message-interactivity condition, questions and responses were displayed separately in individual dialogue boxes. The first message displayed in the webpage was a question from a customer (Customer A) regarding the company’s drink menu. This question was followed by a company’s response. The next two messages were questions from other two customers (Customer B and Customer C) regarding the time to start a catering service and the timing to finalize orders. These questions were followed by two replies from the catering company (see Figure 3-5).
In the high message-interactivity condition, each response from the company was shown under the preceding dialogue box that contained customers’ questions. In addition, the question asked by Customer C in low condition was displayed as a reply to the preceding message by the company. This question was labeled as asked by Customer B instead of Customer C (see Figure 3-6). In this way, participants could perceive these messages are interconnected and exchanged in a threaded manner. In both low and high message interactivity conditions, the six messages were displayed under the heading “Previously asked questions by our customers.” In addition, the name of the message writer was displayed at the top of the each message such as Customer A or All Events Catering.
For control condition of message interactivity, the webpage showed the same six messages, but in a form of frequently asked questions (FAQ). The six messages were labeled as “Frequently Asked Questions” instead of “Previously asked questions by our customers.” In addition, there is no mention of who initiated the message (e.g., Customer A, All Events Catering). Instead, messages were targeted with the letter Q or A (see Figure 3-7).
Procedure

This study took the form of an online experiment and was conducted over a period of one week. Prospective participants first received an e-mail that contained the link to an online survey. They were instructed to access this first online survey through PCs (i.e., laptop or desktop computers). The online survey contained two questions that determined whether a prospective participant had an Internet accessible mobile phone. If they indicated that they did not have an Internet accessible mobile phone, they were instructed to contact the principal investigator and exit the study. If the prospective participants indicated that they had a mobile phone that was connected to Internet, they were presented with a website link to the pre-questionnaire. For those people who possessed an Internet accessible mobile phone, but they did not have it with them or the mobile phone was not connected to Internet wirelessly at the time they are taking this first online survey, they were presented with a link to the pre-questionnaire along with a message that asked them to bring the mobile phone near them and/or turn on the wireless connection before they started the study.

The first page of the pre-questionnaire was the online implied consent form of this study. Once they read the consent form and click “proceed,” they were asked to fill out a series of questions about their basic demographic information, their mobile phone usage habits, and their level of power usage. In addition, participants were asked to fill out the last four digits of their mobile phone numbers. This four-digit number was used as participants’ anonymous ID numbers that enabled the author to link participants’
responses of pre-stimulus questionnaire with that of post-stimulus questionnaire during data analysis.

After participants submitted the pre-questionnaire, they were directed to a webpage where participants saw a message that asked them to test a newly created mobile website for a catering company. There were six versions of this message. These six messages were the same except for the link embedded in the messages. Participants were randomly assigned to see only one of them. Once participants clicked the link, they were directed to an instruction website that showed a scenario of the study and steps to access the stimulus mobile website.

In the first page of the instruction website, participants were instructed to read a scenario message and imagine themselves in the scenario. Each participant was asked to imagine that s/he is one of the board members of a student organization and receives an e-mail from Lisa, the president of the student organization, who asks him/her to check a catering company’s mobile website (see Figure 3-8). After the participant read the scenario and clicked “please click here to proceed,” they were directed to the second webpage of this instruction website. In this second webpage, the participant were asked to submit an e-mail address that they usually use through their mobile phones using a dialogue box presented in the website. Once they submitted their e-mail addresses, the system automatically sent each participant an e-mail that contained the link to the stimulus mobile website. At the bottom of the dialogue box, participants were asked to check the e-mail that was automatically sent to them through their mobile phone (see Figure 3-9).
Figure 3-8: A screenshot of the first webpage of the instruction website.

Figure 3-9: A screenshot of the second webpage of the instruction website.
The e-mail was designed as if it was sent by Lisa who was described as the president of a student organization in the scenario message. In this e-mail, participants were asked to review the catering company’s student package menus and to think about which package they would recommend. A link to the stimulus mobile website was included at the end of message and participants were asked to click the link to access the mobile website (see Figure 3-10). Six e-mail messages were created for this study. Each e-mail message contains a link to one of the six stimulus mobile websites. Participants received one of the six e-mail messages depending on the condition to which they were assigned after they completed the pre-questionnaire.

![Catering service](image)

Figure 3-10: E-mail sent from Lisa.

In the stimulus mobile website, participants explored the seven webpages one by one, in the order described in the stimulus section above. When they reached the seventh webpage, they clicked the link at the bottom of the screen to go to the final questionnaire. This questionnaire contained all the measures for the mediating and dependent variables in the study.
Measures for Mediating Variables

This study measured a series of mediating variables between the effects of the independent variables and the dependent variables in the study model.

*User engagement:* User engagement was measured in the form of participants’ level of psychological absorption (Bellur, 2012; Xu & Sundar, in press). Thirteen items adopted from Agarwal and Karahanna (2000) was used with seven-point Likert-type scales ranging from 1 (strongly disagree) to 7 (strongly agree). These items included “Time appeared to go by very quickly when I was browsing the product page,” and “While browsing the product page, I was absorbed in what I was doing.” An exploratory factor analysis using principal components extraction and oblimin rotation was conducted to test the factor structure of the fourteen items. The initial analysis revealed a low communality for one item “Time appeared to go by very quickly when I was browsing the mobile website” (h² = .46). As a result, this variable was dropped. The subsequent analysis revealed four factors with eigenvalues greater than 1 that accounted for 70.90% of the variance. Table 3-1 reports the items and factor loadings for these four factors. The first factor was labeled “interest level” (Cronbach’s α = .8, M = 3.80, SD = 1.19) and included the following items: “I had fun interacting with the product page,” “Browsing the product page bored me,” “Browsing the product page excited my curiosity,” “Browsing the product page aroused my imagination,” and “Interacting with the product page made me interested in it.” The second factor was labeled “immersion” (Cronbach’s α = .88, M = 5.00, SD = 1.18) and included these items: “While browsing the product page, I was able to block out most other distractions,” “While browsing the product page,
I was absorbed in what I was doing,” and “While browsing the product page, I was immersed in the task that I was performing.” The third factor was labeled “time transformation” \((r = .42, p < .001)\) and including the following two items: “I lost track of time when I was browsing the product page” and “I spent more time on the product page than I had intended.” The final factor labeled “control” \((r = .56, p < .001)\) included these two items: “I felt in control while I was browsing the product page” and “I felt that I had no control over my interaction with the product page (R).” Four scales were created by averaging the ratings of the items that represented these four factors.

Table 3-1: Results of Factor Analysis for user engagement.

<table>
<thead>
<tr>
<th>Factor Item</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Time appeared to go by very quickly when I was browsing the mobile website.</td>
<td>excluded from the final analysis</td>
</tr>
<tr>
<td>2. I lost track of time when I was browsing the mobile website.</td>
<td>.13  .21  .66  -.00</td>
</tr>
<tr>
<td>3. I spent more time on the mobile website than I had intended.</td>
<td>-.00  .03  .87  -.00</td>
</tr>
<tr>
<td>4. While browsing the mobile website, I was able to block out most other distractions.</td>
<td>-.05  .86  .04  -.01</td>
</tr>
<tr>
<td>5. While browsing the mobile website, I was absorbed in what I was doing.</td>
<td>.02  .88  .06  .04</td>
</tr>
<tr>
<td>6. While browsing the mobile website, I was immersed in the task that I was performing.</td>
<td>.05  .86  .06  .03</td>
</tr>
<tr>
<td>7. I had fun interacting with the mobile website.</td>
<td>.65  .20  -.02  .14</td>
</tr>
<tr>
<td>8. Browsing the mobile website bored me (R).</td>
<td>.67  .26  -.28  -.03</td>
</tr>
<tr>
<td>9. I felt in control while I was browsing the mobile website.</td>
<td>.14  -.04  .12  .84</td>
</tr>
<tr>
<td>10. I felt that I had no control over my interaction with the mobile website (R).</td>
<td>-.11  .04  -.12  .91</td>
</tr>
<tr>
<td>11. Browsing the mobile website excited my curiosity.</td>
<td>.90  -.10  .07  -.05</td>
</tr>
<tr>
<td>12. Browsing the mobile website aroused my imagination.</td>
<td>.84  -.15  .16  -.01</td>
</tr>
<tr>
<td>13. Interacting with the mobile website made me interested in it.</td>
<td>.76  .08  .10  .12</td>
</tr>
</tbody>
</table>

Note: The current analysis adopted the principal component extraction method and the oblimin rotation. (R) denotes items that were reverse coded for consistency.

Perceived contingency: Six items adopted from Sundar et al. (2012) were used to measure perceived contingency. The measures included “I felt that the company carefully
registered customers’ concerns and gave feedback based on the questions they asked,” “I felt as if the company gave an exclusive response to customers’ questions,” “The interaction between the company and its customer felt like a continuous thread or a loop,” “The company’s responses seemed interconnected with each other,” “The company involved in several back and forth interactions with its customer,” and “The company’s interaction with their customers felt like a logical progression.” Items were measured using seven-point Likert-type scales ranging from 1 (describes very poorly) to 7 (describes very well). These were averaged to form a scale (Cronbach’s $\alpha = .85$).

*Perceived dialogue:* Perceived dialogue was measured using the items adopted from Sundar et al. (2012), with seven-point Likert-type scales ranging from 1 (strongly disagree) to 7 (strongly agree). The measure consisted of five items including “I felt the companies considered its customers’ unique requests” and “I felt like the company was engaged in an active dialogue with their customers,” “The company’s interaction with their customers felt like a back and forth conversation,” “The company responded quickly to its customers’ questions and requests,” and “The company was efficient in responding to its customers’ questions.” The five items constituted a reliable scale (Cronbach’s $\alpha = .90$).

*Perceived enjoyment:* To measure perceived enjoyment, three items adopted from Cyr et al. (2009) was used in this study. These items included “I found my visit to this mobile website entertaining,” “I found my visit to this mobile website enjoyable,” and “I found my visit to the mobile website pleasant.” Items were measured using seven-point Likert-type scales ranging from 1 (strongly disagree) to 7 (strongly agree). The reliability for this scale was .92.
**Bells and Whistles:** Five items were created to measure perceived bells and whistles. These items included “the site is quite fancy but lacks useful content,” “the site has a lot of bells and whistles,” and “the site is very flashy but no substance,” “The site has a lot of features that are nonessential,” and “The site has many extravagant functions that are not necessary.” Items were measured using seven-point Likert-type scales ranging from 1 (strongly disagree) to 7 (strongly agree). These items were averaged to form a scale (Cronbach’s $\alpha = .81$)

**Distraction:** Three items was created for this study to measure perceived distraction. These items included “I felt that I could not focus on the content while I was browsing the site,” “I felt that I got distracted from processing the information on the site,” and “I felt that my attention was diverted while I was browsing the site.” Items were measured using seven-point Likert-type scales ranging from 1 (strongly disagree) to 7 (strongly agree). The reliability for this scale is .89.

**Measures for Dependent Variables**

**Attitude towards the website:** Participants’ attitude towards the mobile website was measured using 15 adjectives borrowed from Sundar et al. (2012). Participants were asked to indicate their agreement using a 7-point Likert-type scale ranging from 1 (describes very poorly) to 7 (describes very well). These adjectives included “appealing,” “useful,” “positive,” and “good.” An exploratory factor analysis using principal components extraction and oblimin rotation was conducted to test the factor structure of the fourteen items. The initial analysis was evaluated using the 60/40 rule. As a result,
four items were found to be cross-loading, and therefore dropped from further analysis.

These four items were “Appealing,” “High Quality,” “Likable,” and “Attractive.” The subsequent analysis with the remaining 11 items revealed two factors with eigenvalues greater than 1 that accounted for 73.7% of the variance.

**Table 3-2: Results of Factor Analysis for attitude towards the website.**

<table>
<thead>
<tr>
<th>Factor Item</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Appealing</td>
<td>excluded from the final analysis</td>
<td></td>
</tr>
<tr>
<td>2. Useful</td>
<td>-.15</td>
<td>.89</td>
</tr>
<tr>
<td>3. Positive</td>
<td>-.00</td>
<td>.83</td>
</tr>
<tr>
<td>4. Good</td>
<td>.04</td>
<td>.88</td>
</tr>
<tr>
<td>5. Favorable</td>
<td>.19</td>
<td>.74</td>
</tr>
<tr>
<td>6. Attractive</td>
<td>excluded from the final analysis</td>
<td></td>
</tr>
<tr>
<td>7. Exciting</td>
<td>.80</td>
<td>.07</td>
</tr>
<tr>
<td>8. Pleasant</td>
<td>.24</td>
<td>.66</td>
</tr>
<tr>
<td>9. Likable</td>
<td>excluded from the final analysis</td>
<td></td>
</tr>
<tr>
<td>10. High Quality</td>
<td>excluded from the final analysis</td>
<td></td>
</tr>
<tr>
<td>11. Interesting</td>
<td>.80</td>
<td>.10</td>
</tr>
<tr>
<td>12. Fun</td>
<td>.89</td>
<td>-.02</td>
</tr>
<tr>
<td>13. Cool</td>
<td>.87</td>
<td>.01</td>
</tr>
<tr>
<td>14. Imaginative</td>
<td>.90</td>
<td>-.06</td>
</tr>
<tr>
<td>15. Entertaining</td>
<td>.89</td>
<td>-.01</td>
</tr>
</tbody>
</table>

Note: The current analysis adopted the principal component extraction method and the oblimin rotation.

Table 3-2 reports the items and factor loadings for these two factors. The first factor was labeled as “favorable” (Cronbach’s $\alpha = .89$, $M = 4.90$, $SD = 1.00$) and including items of “Useful,” “Positive,” “Good,” “Favorable,” and “Pleasant.” The second factor labeled “exciting” (Cronbach’s $\alpha = .93$, $M = 3.75$, $SD = 1.26$) included the items “Exciting,” “Interesting,” “Fun,” “Cool,” “Imaginative,” and “Entertaining.” Two scales were created by averaging the ratings of the items that represented these two factors.
Behavioral Intention towards the Website: Participants’ behavioral intentions towards the website was assessed by five items adopted from Bellur (2012). These items were measured using a 7-point Likert-type scale ranging from 1 (extremely unlikely) to 7 (extremely likely). These items included “I would bookmark this website for future use,” “I would recommend this website to others,” “I would forward this mobile website to my acquaintances,” “I would visit this website again in the future,” and “I would like to know more about this mobile website.” These items were averaged to form a scale (Cronbach’s $\alpha = .93$)

Relational Outcomes: Eighteen items were used to measure the four relational outcomes constructs of trust, control mutuality, commitment, and satisfaction. These items are modified from the PR Relationship Outcome Scale proposed by Hon and Grunig (1999), and measured using a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). Trust was measured using six items including “This catering company treats people like me fairly and justly,” “Whenever this catering company makes an important decision, I know it will be concerned about people like me,” “This catering company can be relied on to keep its promises,” “I believe that this catering company takes the opinions of people like me into account when making decisions,” “I feel very confident about this catering company’s skills,” and “This catering company has the ability to accomplish what it says it will do.” Four items were used to measure control mutuality. These were “This catering company and people like me are attentive to what each other say,” “This catering company believes the opinions of people like me are legitimate,” “In dealing with people like me, this catering company has a tendency to throw its weight around,” and “This catering company really listens to
what people like me have to say.” Similarly, four items were used to measure commitment. These were “I feel that this catering company is trying to maintain a long-term commitment to people like me,” “I can see that this catering company wants to maintain a relationship with people like me,” “There will be a long-lasting bond between this catering company and people like me,” and “Compared to other companies, I value my relationship with this catering company more.” Finally, satisfaction was measure using four items including “I am happy with this catering company,” “Both the catering company and people like me benefit from the relationship,” “I think most people like me are happy in their interactions with this catering company,” and “Generally speaking, I am pleased with the relationship this catering company has established with people like me.” Three of the four constructs indicated good reliability (Trust, $\alpha = .91, M = 4.63, SD = 0.98$; Commitment, $\alpha = .89, M = 4.37, SD = 1.11$, Satisfaction, $\alpha = .92, M = 4.52, SD = 1.08$). The reliability for control mutuality was low ($\alpha = .57$). A further examination revealed that one item “In dealing with people like me, this catering company has a tendency to throw its weight around” did not correlate well with other three items, and therefore dropped from the analysis. The final scale of control mutuality showed good reliability ($\alpha = .89, M = 4.63, SD = 1.07$).

Behavioral Intention towards the Company: Participants’ behavioral intentions towards the company were measured using a four-item instrument developed by Bearden, Lichtenstein, and Teel (1984). Participants were asked to indicate their likelihood of using the service from the catering company by marking on a 7-point semantic differential scale with four pairs of adjectives: unlikely/likely, improbable/probable, uncertain/certain, and definitely not/definitely. Besides their likelihood of using the
services, participants were also asked to indicate their likelihood of recommending the company to their friend by using the same four pairs of adjectives. The two scales showed high reliability (Behavioral intention towards the company, $a = .94$, $M = 4.26$, $SD = 1.48$; Recommendation, $a = .96$, $M = 4.43$, $SD = 1.43$).

**Measures for Moderating Variable**

*Power Usage:* Individuals’ power usage was assessed through twelve items adopted from Sundar and Marathe (2010). These items were “I think most of the technological gadgets are complicated to use,” “I make good use of most of the features available in any technological device,” “I have to have the latest available upgrades of the technological devices that I use,” “Use of information technology has almost replaced my use of paper,” “I love exploring all the features that any technological gadget has to offer,” “I often find myself using many technological devices simultaneously,” “I prefer to ask friends how to use any new technological gadget instead of trying to figure it out myself,” “Using any technological device comes easy to me,” “I feel like information technology is a part of my daily life,” “Using information technology gives me greater control over my work environment,” “Using information technology makes it easier to do my work,” and “I would feel lost without information technology.” These twelve items were measured using seven-point Likert-type scales ranging from 1 (strongly disagree) to 7 (strongly agree). The reliability for this scale was .82.
Manipulation Check Items

For the modality interactivity manipulation, two items were used to check if participants did use the tapping or and swiping techniques while they were exploring the website. The two items are, “While I was exploring the catering company’s mobile website, I tapped the screen to access information on the site,” and “While I was exploring the catering company’s mobile website, I swiped the screen to access information on the site.” Participants were asked to answer yes or no to the two questions.

For the message interactivity manipulation, three items were used to evaluate whether the display of interaction history between the company and its customers was psychologically apparent. These three items are, “The catering company’s mobile website displayed a history of interaction between the catering company and its customers,” “The catering company’s mobile website displayed a back and forth interaction between the catering company and its customers,” and “The catering company’s mobile website displayed a threaded conversation between the catering company and its customers.” They were measured on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Data Analysis

The study first employed exploratory factor analysis using principal components extraction and oblimin rotation to identify the components for potentially multifaceted variable in the study (i.e., User engagement, Attitude towards the website). A chi-square
test and a one-way analysis of variance (ANOVA) were used to check whether the manipulations of modality interactivity and message interactivity were effective. For testing H1, H3, H5, H7, and RQ1, i.e., the hypotheses and research question pertaining to the relationships between interactivity and dependent variables (e.g., attitude towards of the site, behavioral intentions towards the site, relational outcomes, and behavioral intention towards the company, perceived bells and whistles, perceived distraction), a series of Factorial ANOVAs was employed. In addition, a multiple regression was used to test H8 that examined the effect of relational outcomes on behavioral intentions towards the company.

For H2, H4, and H6—the hypotheses regarding indirect effects—bootstrapping procedures using 5,000 bootstrap samples was employed to test the mediating roles of user engagement, perceived contingency, perceived dialogue and perceived enjoyment. Finally, in order to examine RQ2, an omnibus General Linear Model (GLM) was used with power usage entered as a moderator.
Chapter 4

Results

This chapter will describe the results in the following order. The first section will present the manipulation-check results of the two independent variables in this study (i.e., modality interactivity, message interactivity). The second section will report on the main and interaction effects of the two independent variables on each dependent variable. The third section will present the mediation tests that were proposed in the model. This will be followed by a summary of GLM results that examined the moderating role of power usage. Finally, results for the effect of relational outcomes on behavioral intentions towards the company will be reported.

Section I - Manipulation Check

Modality Interactivity

A 2 x 2 chi-square was employed to examine the scores of the two manipulation items as a function of modality interactivity. The analysis revealed that most of the participants in both condition answered that they tapped the screen to access information on the mobile website (92% for low modality interactivity condition and 82% for high-modality interactivity condition), \( \chi^2 (1, N= 252) = 5.4, p < .05 \). On the other hand, significantly more participants in high modality-interactivity condition (92%) answered
that they swiped the screen to access information on the mobile website than participants in low modality-interactivity condition (44%), $\chi^2 (1, N= 252) = 66.28, p < .001$. A good portion of people in low modality interactivity condition answered that they swiped the screen. This may due to the fact that some webpages of the stimulus mobile website required them to swipe down to check the information located in the bottom of the page. However, this swipe down interaction shouldn’t affect the manipulation of modality interactivity. It is reasonable to think that participants in high modality-interactivity condition also used this “swipe down” interaction technique as the layout of the mobile website was consistent across the two conditions. Therefore, the number of interaction techniques that participants used in high-modality interactivity condition (i.e., tapping, swiping horizontally, and swiping down) was still higher than that of low-modality interactivity condition (i.e., tapping and swiping down).

**Message Interactivity**

A series of one-way analyses of variance (ANOVA) with level of message interactivity as the independent variable, and the three message interactivity manipulation check items as dependent variables was used to check whether the manipulation of message interactivity was successful. The results of the one-way ANOVAs showed that there were significant effects for all of the three items (see Table 4-1). The Tukey HSD post hoc test indicated that Low message interactivity condition evoked greater perception of the display of interaction history ($M = 4.61, SD = 1.45$), back and forth interaction ($M = 4.95, SD = 1.45$), and threaded conversation ($M = 4.89, SD = 1.66$)
between the company and its customers compared to control condition (interaction history, \( M = 3.89, SD = 1.59 \); back and forth interaction, \( M = 4.22, SD = 1.57 \), threaded conversation, \( M = 3.53, SD = 1.65 \)). However, Low message interactivity condition was not significantly different from High message-interactivity condition for all of the three items (for High message interactivity condition, interaction history, \( M = 4.32, SD = 1.53 \); back and forth interaction, \( M = 4.53, SD = 1.64 \), threaded conversation, \( M = 4.53, SD = 1.78 \)). In addition, the differences between High and Control conditions were not significant for the item that measured the display of interaction history and back and forth conversation.

Table 4-1: Manipulation check results of message interactivity.

<table>
<thead>
<tr>
<th>Items</th>
<th>Control</th>
<th>Low</th>
<th>High</th>
<th>( F )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The catering company's mobile website displayed a history of</td>
<td>3.89(_b)</td>
<td>4.61(_a)</td>
<td>4.32(_{ab})</td>
<td>4.75**</td>
</tr>
<tr>
<td>interaction between the catering company and its customers.</td>
<td>(1.59)</td>
<td>(1.45)</td>
<td>(1.53)</td>
<td></td>
</tr>
<tr>
<td>2. The catering company's mobile website displayed a back and forth</td>
<td>4.22(_b)</td>
<td>4.95(_a)</td>
<td>4.53(_{ab})</td>
<td>4.63*</td>
</tr>
<tr>
<td>interaction between the catering company and its customers.</td>
<td>(1.57)</td>
<td>(1.45)</td>
<td>(1.64)</td>
<td></td>
</tr>
<tr>
<td>3. The catering company's mobile website displayed a threaded</td>
<td>3.53(_b)</td>
<td>4.98(_a)</td>
<td>4.53(_a)</td>
<td>14.49**</td>
</tr>
<tr>
<td>conversation between the catering company and its customers.</td>
<td>(1.65)</td>
<td>(1.66)</td>
<td>(1.78)</td>
<td></td>
</tr>
</tbody>
</table>

Note. \( *p < .05, **p < .001 \). Means that do not share lowercase subscripts are significantly different at \( p < .05 \) according to Tukey-Kramer HSD post-hoc test.

These results indicated that the manipulation for high message interaction conditions was not fully successful. Especially, the high condition scored less compared to the low condition for all the three items. This may be due to the fact that although the manipulation for message interactivity in this study resembled the comment function that appears in many websites, the design of the manipulation did not allow participants to
actually leave comments or exchange messages with the company. It is possible that participants in low and high message interactivity conditions expected the presence of the commenting function, such as a dialogue box or send message button, when they are exposed to the interaction history. Such expectations would be higher for high message-interactivity conditions because the threaded design of interaction history may have led participants to remember similar online communication activities such as leaving a comment on a friends’ blog or Facebook page. When they discovered that there was no commenting function available in the webpage, they may have formed a somewhat negative impression about the companies’ willingness to communicate with their customers via the mobile website. This negative impression may have led them to become suspicious of the authenticity of the comments shown on the mobile web page by way of the interaction history between the company and its customers.

There is some evidence in the data to support these interpretations. The current study included two items that measured how much the participants felt the mobile website allowed them to interact. Those items were: “The catering company's mobile website allows me to perform a lot of actions,” and “The catering company's mobile website is interactive.” The ANOVAs revealed a significant effect for performing a lot of actions, $F(1, 249) = 4.09, p < .05$, and a borderline significant effect for perceived website interactivity, $F(2, 249) = 2.94, p = .05$. For both items, high message interactivity scored the lowest when compared to the other two conditions (see Table 4-2). In addition, a simple linear regression analysis revealed that “performing a lots of actions” positively affected “perceived website interactivity,” $\beta = 0.55, p < .001$. Subsequent mediation analysis using Baron and Kenny (1986) revealed that the effect of
message interactivity on perceived website interactivity reduced significantly when “performing a lot of actions” was included as a covariate in the analysis (from $F = 2.94, p = .05$ to $F = 1.05, p = .40$). Since the three conditions were consistent in the degree of interactive functions presented in the mobile website, the only reasons for these results to occur was because participants in the high message-interactivity condition had higher expectations to be able to perform a lot of actions in the website, such as leaving a comment or exchanging messages with the company. When these expectations were not met, they felt that the website had lesser interactivity, which in turn led them to score lower on the three message-interactivity manipulation-check items. Thus, these results support the above claims for the failure of high message interactivity manipulation.

Table 4-2: Results for website interactivity.

<table>
<thead>
<tr>
<th>Items</th>
<th>Control</th>
<th>Low</th>
<th>High</th>
<th>$F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The catering company's mobile website is interactive.</td>
<td>5.10$\text{ab}$</td>
<td>5.18$\text{a}$</td>
<td>4.69$\text{b}$</td>
<td>2.94*</td>
</tr>
<tr>
<td></td>
<td>(1.36)</td>
<td>(1.45)</td>
<td>(1.53)</td>
<td></td>
</tr>
<tr>
<td>2. The catering company's mobile website allows me to perform a lot of actions.</td>
<td>4.03$\text{a}$</td>
<td>4.03$\text{a}$</td>
<td>3.48$\text{b}$</td>
<td>4.09**</td>
</tr>
<tr>
<td></td>
<td>(1.57)</td>
<td>(1.45)</td>
<td>(1.64)</td>
<td></td>
</tr>
</tbody>
</table>

*Note. *$p < .10$, **$p < .05$. Means with no lowercase subscripts in common are significantly different.

Section II – The Effects of the Two IVs on DVs

*Attitude and behavioral intentions towards the mobile website*

The following hypotheses examined the effect of modality interactivity and message interactivity on attitude and behavioral intentions towards the website.
Hypothesis 1: Higher modality interactivity will lead to (H1a) more favorable attitudes and (H1b) more behavioral intentions toward the website.

Hypothesis 3: Higher message interactivity will lead to (H3a) more favorable attitudes, and (H3b) more behavioral intentions toward the website.

The results of 2 x 2 Factorial ANOVA indicated that there were no significant main or interaction effects of the two independent variables on attitude towards the website (see Table 4-3). For behavioral intention towards the website, a main effect for modality interactivity was found, $F(1, 246) = 4.07, p < .05$. Specifically, participants in the high modality-interactivity condition ($M = 3.57, SE = .13$) indicated significantly higher level of behavioral intentions towards the website than did participants in the low modality-interactivity condition ($M = 3.19, SE = .13$) (see Figure 4-4). Therefore, H1b was supported, whereas H1a, H3a, and H3b were not supported.
Relational outcomes

Hypothesis 5 examined the effects of the two independent variables on relational outcomes. As can be seen from Table 4-5, there were significant main effects from modality interactivity on control mutuality, $F (1, 246) = 3.93, p < .05$, and commitment, $F (1, 246) = 6.37, p < .05$. Specifically, participant in high modality-interactivity condition perceived a higher level of control mutuality ($M = 4.78, SE = .09$) and
commitment ($M = 4.55$, $SE = .10$) when compared to those in low modality-interactivity condition (control mutuality, $M = 4.49$, $SE = .09$; commitment, $M = 4.19$, $SE = .10$).

Table 4-5: Main and interaction effects on relational outcomes.

<table>
<thead>
<tr>
<th></th>
<th>Modality Interactivity (MoI)</th>
<th>Message Interactivity (MeI)</th>
<th>MoI x MeI interaction</th>
<th>Hypotheses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust</td>
<td>$F = 1.00$</td>
<td>$F = 1.71$</td>
<td>$F = 1.15$</td>
<td></td>
</tr>
<tr>
<td>Control Mutuality</td>
<td>$F = 3.93^{**}$</td>
<td>$F = 2.66^{*}$</td>
<td>$F = 0.49$</td>
<td>H5a, H5b</td>
</tr>
<tr>
<td>Commitment</td>
<td>$F = 6.37^{**}$</td>
<td>$F = 1.18$</td>
<td>$F = 0.61$</td>
<td></td>
</tr>
<tr>
<td>Satisfaction</td>
<td>$F = 3.76^{*}$</td>
<td>$F = 0.81$</td>
<td>$F = 0.27$</td>
<td></td>
</tr>
</tbody>
</table>

Note: * $p < .10$, ** $p < .05$.

Table 4-6: Means and standard errors on relational outcomes.

<table>
<thead>
<tr>
<th></th>
<th>Modality Interactivity</th>
<th>Message Interactivity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
<td>Control</td>
</tr>
<tr>
<td>Trust</td>
<td>4.56</td>
<td>4.70</td>
<td>4.59</td>
</tr>
<tr>
<td></td>
<td>(0.09)</td>
<td>(0.09)</td>
<td>(0.10)</td>
</tr>
<tr>
<td>Control Mutuality</td>
<td>4.49</td>
<td>4.78</td>
<td>4.52$^b$</td>
</tr>
<tr>
<td></td>
<td>(0.09)</td>
<td>(0.09)</td>
<td>(0.11)</td>
</tr>
<tr>
<td>Commitment</td>
<td>4.19</td>
<td>4.55</td>
<td>4.30</td>
</tr>
<tr>
<td></td>
<td>(0.10)</td>
<td>(0.10)</td>
<td>(0.12)</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>4.38</td>
<td>4.66</td>
<td>4.45</td>
</tr>
<tr>
<td></td>
<td>(0.10)</td>
<td>(0.10)</td>
<td>(0.11)</td>
</tr>
</tbody>
</table>

Note: Means with no lowercase subscripts in common are significantly different. Means without subscripts are not significantly different from each other.

A marginally significant effect from modality interactivity to satisfaction was also found, $F (1, 246) = 3.93$, $p = .05$, such that high modality-interactivity condition evoked higher level of satisfaction ($M = 4.66$, $SE = .10$) than did low modality interaction condition ($M = 4.38$, $SE = .10$). In addition, there was a marginally significant effect of message interactivity on control mutuality, $F (2, 246) = 2.66$, $p = 0.07$. The subsequent post-hoc comparison with student’s $t$ test indicated that low-message interactivity
condition \((M = 4.87, SE = .12)\) differed significantly from control condition \((M = 4.52, SE = .11)\) with regard to control mutuality. However, high message interactivity condition \((M = 4.54, SE = .11)\) did not significantly differ from both low and control conditions for control mutuality. These results indicated that H5a and H5b were partially supported.

**Negative outcomes**

Research question RQ1 explored whether the modality interactivity and/or message interactivity are likely to trigger bells and whistles heuristics and distraction heuristics. The results indicated that there were no significant main or interaction effects from the two IVs on perceived bells and whistles (see Table 4-7).

<table>
<thead>
<tr>
<th></th>
<th>Modality Interactivity (MoI)</th>
<th>Message Interactivity (MeI)</th>
<th>MoI x MeI interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Bells &amp; Whistles</td>
<td>(F = 0.64)</td>
<td>(F = 0.78)</td>
<td>(F = 1.92)</td>
</tr>
<tr>
<td>Perceived Distraction</td>
<td>(F = 0.02)</td>
<td>(F = 1.35)</td>
<td>(F = 0.11)</td>
</tr>
</tbody>
</table>

Table 4-8 summarized the results of means and standard errors. As can be seen from this table, the means on perceived bells and whistles and distraction were on the lower end of the 7-point scale. This demonstrates that participants in general perceived less bells and whistles and distraction regardless of the manipulation of the independent variables.
Summary

In summary, high modality interactivity led to better behavioral intentions towards the company and three of the relational outcomes variables, control mutuality, commitment, and satisfaction. For message interactivity, a non-linear pattern (i.e., an inverted-V shape) was found for its effect on control mutuality. However, neither modality interactivity nor message interactivity had main or interaction effects on attitude towards the mobile website, perceived bells and whistles, and perceived distraction.

Section III – The roles of mediating variables

This section explores whether the four mediating variables proposed in this study are likely to mediate the effects of the two independent variables on dependent variables. Prior to the mediation analysis, a 2 x 2 factorial ANOVA was run to examine the effect of two independent variables on the mediating variables. As can be seen from Table 4-9, there were significant main effects of modality interactivity on enjoyment, $F(1, 246) = 5.68, p < .05$, such that participants in high modality-interactivity condition indicated
significantly higher level of enjoyment ($M = 4.17, SE = .12$) when compared to those in the low modality-interactivity condition ($M = 3.76, SE = .12$). Marginally significant main effects of modality interactivity were also found on interest level aspect of user engagement, $F(1, 246) = 2.78, p = .097$, and control aspect of user engagement, $F(1, 246) = 2.97, p = .09$. In both cases, high modality-interactivity condition resulted better user engagement (Interest Level, $M = 3.89, SE = .11$; Control, $M = 5.16, SE = .11$) than that of low modality-interactivity condition (Interest Level, $M = 3.63, SE = .11$; Control, $M = 4.87, SE = .11$). In addition, there were significant main effects of message interactivity on perceived contingency, $F(2, 246) = 3.90, p < .05$, and perceived dialogue, $F(1, 246) = 5.82, p < .001$. Specifically, participants in low message-interactivity condition indicated higher level of perceived contingency ($M = 4.47, SE = .11$) and perceived dialogue ($M = 4.60, SE = .13$) than did the control condition (Perceived Contingency, $M = 4.04, SE = .10$; Perceived Dialogue, $M = 3.98, SE = .12$). However, high message-interactivity condition (Perceived Contingency, $M = 4.25, SE = .11$; Perceived Dialogue, $M = 4.26, SE = .13$) did not significantly differ from low and control condition.
Table 4-9: Main and interaction effects on mediating variables.

<table>
<thead>
<tr>
<th></th>
<th>Modality Interactivity (MoI)</th>
<th>Message Interactivity (MeI)</th>
<th>MoI x MeI interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Engagement (Interest Level)</td>
<td>$F = 2.90^*$</td>
<td>$F = 0.48$</td>
<td>$F = 0.14$</td>
</tr>
<tr>
<td>User engagement (Control)</td>
<td>$F = 2.97^*$</td>
<td>$F = 2.30$</td>
<td>$F = 0.25$</td>
</tr>
<tr>
<td>User Engagement (Time Transformation)</td>
<td>$F = 0.02$</td>
<td>$F = 1.18$</td>
<td>$F = 1.22$</td>
</tr>
<tr>
<td>User Engagement (Immersion)</td>
<td>$F = 0.34$</td>
<td>$F = 1.23$</td>
<td>$F = 1.00$</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>$F = 5.86^{**}$</td>
<td>$F = 0.16$</td>
<td>$F = 0.32$</td>
</tr>
<tr>
<td>Perceived Contingency</td>
<td>$F = 2.57$</td>
<td>$F = 3.90^{**}$</td>
<td>$F = 0.39$</td>
</tr>
<tr>
<td>Perceived Dialogue</td>
<td>$F = 1.24$</td>
<td>$F = 5.82^{***}$</td>
<td>$F = 0.47$</td>
</tr>
</tbody>
</table>

Note: * $p < .10$, ** $p < .05$, *** $p < .001$.

Table 4-10: Means and standard errors on user engagement.

<table>
<thead>
<tr>
<th></th>
<th>Modality Interactivity</th>
<th>Message Interactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>Low</td>
</tr>
<tr>
<td>User Engagement (Interest Level)</td>
<td>3.68 (0.11)</td>
<td>3.93 (0.11)</td>
</tr>
<tr>
<td>User engagement (Control)</td>
<td>4.87 (0.11)</td>
<td>5.16 (0.11)</td>
</tr>
<tr>
<td>User Engagement (Time Transformation)</td>
<td>3.33 (0.12)</td>
<td>3.31 (0.12)</td>
</tr>
<tr>
<td>User Engagement (Immersion)</td>
<td>4.96 (0.11)</td>
<td>5.04 (0.11)</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>3.75 (0.12)</td>
<td>4.16 (0.12)</td>
</tr>
<tr>
<td>Perceived Contingency</td>
<td>4.14 (0.09)</td>
<td>4.36 (0.09)</td>
</tr>
<tr>
<td>Perceived Dialogue</td>
<td>4.17 (0.10)</td>
<td>4.36 (0.10)</td>
</tr>
</tbody>
</table>

Note: Means with no lowercase subscripts in common are significantly different. Means without subscripts are not significantly different from each other.
Testing indirect effects

In order to test the indirect effects of the independent variable on the dependent variables via mediator(s), this study used Hayes’ PROCESS macro for SPSS with 5000 bootstrap resamples and 95% confidence intervals (Hayes, in press). The presence of indirect effect can be inferred if the confidence intervals do not contain zero. All coefficients from this set of analyses are unstandardized estimates obtained by using the ordinary-least-squares regression method.

Mediating variables for modality interactivity

This study proposed three hypotheses (H2a H2b, and H6a) that examined whether user engagement and enjoyment would mediate the relationships between modality interactivity and the three dependent variables, website attitude, website behavioral intentions, and relational outcomes. These hypotheses were tested through PROCESS macro (Model 4) by entering modality interactivity as independent variable, the four aspects of user engagement and enjoyment as mediating variables operating in parallel, and dependent variables respectively. In addition, power usage and message interactivity were entered as covariates in the analysis. Table 4-11 summarized the results of indirect effect of modality interactivity on attitude and behavioral intentions toward the website via the mediators of user engagement and enjoyment. There were significant indirect effects of modality interactivity on both aspects of website attitude (favorability and exciting) and behavioral intentions (to use the site) via the interest-level aspect of user engagement and enjoyment. In addition, for website favorability, a significant indirect
effect via control aspect of user engagement was also found. These data suggest that the higher the number of interaction techniques employed (i.e., high modality interactivity), the greater the level of user engagement and perceived enjoyment, which in turn leads to positive attitudinal and behavioral intention towards the website.

Table 4-11: Indirect effects of modality interactivity via mediators.

<table>
<thead>
<tr>
<th>Mediators</th>
<th>Indirect Effect Bootstrap Estimate (b)</th>
<th>Indirect Effect 95% Confidence Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LL</td>
</tr>
<tr>
<td><strong>Dependent Variable: Attitude towards the Website (Favorable)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User Engagement (Interest Level)</td>
<td>.07*</td>
<td>.003</td>
</tr>
<tr>
<td>User Engagement (Control)</td>
<td>.05*</td>
<td>.003</td>
</tr>
<tr>
<td>User Engagement (Time Transformation)</td>
<td>.00</td>
<td>-.01</td>
</tr>
<tr>
<td>User Engagement (Immersion)</td>
<td>-.00</td>
<td>-.05</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>.09*</td>
<td>.02</td>
</tr>
<tr>
<td><strong>Dependent Variable: Attitude towards the Website (Exciting)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User Engagement (Interest Level)</td>
<td>.10*</td>
<td>.00</td>
</tr>
<tr>
<td>User Engagement (Control)</td>
<td>.00</td>
<td>-.02</td>
</tr>
<tr>
<td>User Engagement (Time Transformation)</td>
<td>.00</td>
<td>-.02</td>
</tr>
<tr>
<td>User Engagement (Immersion)</td>
<td>.00</td>
<td>-.02</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>.16*</td>
<td>.04</td>
</tr>
<tr>
<td><strong>Dependent Variable: Behavioral Intentions towards the Website</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User Engagement (Interest Level)</td>
<td>.11*</td>
<td>.004</td>
</tr>
<tr>
<td>User Engagement (Control)</td>
<td>-.00</td>
<td>-.05</td>
</tr>
<tr>
<td>User Engagement (Time Transformation)</td>
<td>-.00</td>
<td>-.03</td>
</tr>
<tr>
<td>User Engagement (Immersion)</td>
<td>-.00</td>
<td>-.03</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>.15*</td>
<td>.06</td>
</tr>
</tbody>
</table>

Note: * p < .05.

For relational outcomes, there were significant indirect effects of modality interactivity on the four variables of relational outcomes through interest level and control aspects of user engagement (Table 4-12). In addition, enjoyment was also found to mediate the relationship between modality interactivity and satisfaction.
Further more, a multiple mediation analysis revealed that enjoyment was also a significant mediator for trust, control mutuality, and commitment only if the interest level of user engagement was excluded from the model. This suggests some connections between the two mediating variables. To further understand the relationships between enjoyment and interest level of user engagement, the study used Model 6 in PROCESS.

Table 4-12: Indirect effects of modality interactivity on relational outcomes via mediators.

<table>
<thead>
<tr>
<th>Mediators</th>
<th>Indirect Effect Bootstrap Estimate (b)</th>
<th>Indirect Effect 95% Confidence Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dependent Variable: Trust</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User Engagement (Interest Level)</td>
<td>.08*</td>
<td>.01</td>
</tr>
<tr>
<td>User Engagement (Control)</td>
<td>.06*</td>
<td>.001</td>
</tr>
<tr>
<td>User Engagement (Time Transformation)</td>
<td>.00</td>
<td>-.02</td>
</tr>
<tr>
<td>User Engagement (Immersion)</td>
<td>.00</td>
<td>-.01</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>.01</td>
<td>-.05</td>
</tr>
<tr>
<td><strong>Dependent Variable: Control Mutuality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User Engagement (Interest Level)</td>
<td>.07*</td>
<td>.01</td>
</tr>
<tr>
<td>User Engagement (Control)</td>
<td>.05*</td>
<td>.00</td>
</tr>
<tr>
<td>User Engagement (Time Transformation)</td>
<td>.00</td>
<td>-.02</td>
</tr>
<tr>
<td>User Engagement (Immersion)</td>
<td>-.00</td>
<td>-.02</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>.04</td>
<td>-.02</td>
</tr>
<tr>
<td><strong>Dependent Variable: Commitment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User Engagement (Interest Level)</td>
<td>.09*</td>
<td>.002</td>
</tr>
<tr>
<td>User Engagement (Control)</td>
<td>.04*</td>
<td>.001</td>
</tr>
<tr>
<td>User Engagement (Time Transformation)</td>
<td>.00</td>
<td>-.02</td>
</tr>
<tr>
<td>User Engagement (Immersion)</td>
<td>.00</td>
<td>-.01</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>.03</td>
<td>-.02</td>
</tr>
<tr>
<td><strong>Dependent Variable: Satisfaction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User Engagement (Interest Level)</td>
<td>.07*</td>
<td>.001</td>
</tr>
<tr>
<td>User Engagement (Control)</td>
<td>.04*</td>
<td>.002</td>
</tr>
<tr>
<td>User Engagement (Time Transformation)</td>
<td>.00</td>
<td>-.02</td>
</tr>
<tr>
<td>User Engagement (Immersion)</td>
<td>.00</td>
<td>-.01</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>.11*</td>
<td>.03</td>
</tr>
</tbody>
</table>

Note: * p < .05.
macro, which examined the indirect effects of independent variable on dependent variable via multiple mediators operating in serial. The analyses included modality interactivity as independent variable and interest level of user engagement and enjoyment as mediating variables. The three relational outcome variables were entered as dependent variable respectively. Control, immersion, and time transformations aspects of user engagement were entered as covariate along with power usage and message interactivity.

Table 4-13: Indirect effects of modality interactivity on relational outcomes via mediators.

<table>
<thead>
<tr>
<th>Mediation Path</th>
<th>Indirect Effect Bootstrap Estimate (b)</th>
<th>Indirect Effect 95% Confidence Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LL</td>
</tr>
<tr>
<td>IV → Interest Level → Enjoyment → Trust</td>
<td>.00</td>
<td>-.02</td>
</tr>
<tr>
<td>IV → Enjoyment → Interest Level → Trust</td>
<td>.07*</td>
<td>.01</td>
</tr>
<tr>
<td>IV → Interest Level → Enjoyment → Control Mutuality</td>
<td>.02</td>
<td>-.01</td>
</tr>
<tr>
<td>IV → Enjoyment → Interest Level → Control Mutuality</td>
<td>.06*</td>
<td>.01</td>
</tr>
<tr>
<td>IV → Interest Level → Enjoyment → Commitment</td>
<td>.02</td>
<td>-.01</td>
</tr>
<tr>
<td>IV → Enjoyment → Interest Level → Commitment</td>
<td>.07*</td>
<td>.01</td>
</tr>
<tr>
<td>IV → Interest Level → Enjoyment → Satisfaction</td>
<td>.05</td>
<td>-.00</td>
</tr>
<tr>
<td>IV → Enjoyment → Interest Level → Satisfaction</td>
<td>.06*</td>
<td>.01</td>
</tr>
</tbody>
</table>

Note: * p < .05.

As can be seen from Table 4-13, the indirect effects of modality interactivity on the four relational outcomes variables were significant only when the two mediators were included in the order of enjoyment and interest level of user engagement. These results suggested that high modality interactivity let to higher level of enjoyment, which in turn had a significantly positive effect on interest level of user engagement. The increased
interest level of user engagement in turn resulted in better relational outcomes. Figure 4-1 and 4-2 illustrate these two-step mediation analyses results.

Figure 4-1: Two-step mediation on trust and control mutuality.

Figure 4-2: Two-step mediation on commitment and satisfaction.
Mediating variables for message interactivity

A series of mediation analysis using PROCESS macro was also conducted to examine whether enjoyment, perceived contingency, and perceived dialogue were likely to mediate the effect of message interactivity on dependent variables. However, since the macro requires the independent variable to be either dichotomous or continuous variable, message interactivity was dummy-coded as the first step of the mediation analysis. After referring the manipulation check results, this study recorded message interactivity into a dummy-coded variables “HighLow-Control” that compared the addition of High and Low message interactivity conditions with Control condition. Both the High and Low conditions were coded as 1 whereas the Control condition was coded as 0. This dummy-coded variable reflected the manipulation results for the item of threaded conversation. High and Low message interactivity conditions were significantly different from control condition, while there was no difference between high and low conditions. Modality interactivity and power usage were entered as covariates in the analysis.

Table 4-14 reported the results of mediation analysis. There were significant indirect effects of message interactivity on attitude towards the website and behavioral intentions via perceived dialogue. To summarize, the presence of message interactivity led to greater level of perceived dialogue, which in turn, led to better attitude towards the website and behavioral intentions.
In the case of relational outcomes, perceived dialogue was found to mediate the effects of message interactivity on all the four variables of relational outcomes (see Table 4-15). In addition, perceived contingency was a significant mediator for trust, control mutuality and satisfaction. No significant indirect effects were found via enjoyment. Hence, higher the level of message interactivity, greater the perceived contingency and perceived dialogue, which in turn, led to better relational outcomes.
As can be seen from the results above, perceived contingency was not a significant mediator for the effects of message interactivity on website attitude and behavioral intentions. However, additional analyses revealed that for HighLow-to-Control message interactivity comparison, the mediating effects of perceived contingency on the two outcome variables become significant once enjoyment or perceived dialogue was excluded from the model. In order to further investigate the relationships between the three mediating variables (i.e., perceived contingency, perceived dialogue, enjoyment), the study employed Model 6 in PROCESS macro. The analyses included message interactivity as independent variable and enjoyment, perceived contingency, and

<table>
<thead>
<tr>
<th>Mediators</th>
<th>Indirect Effect Bootstrap Estimate (b)</th>
<th>Indirect Effect 95% Confidence Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dependent Variable: Trust</td>
<td></td>
</tr>
<tr>
<td>Enjoyment</td>
<td>.01</td>
<td>-.03</td>
</tr>
<tr>
<td>Perceived Contingency</td>
<td>.07*</td>
<td>.02</td>
</tr>
<tr>
<td>Perceived Dialogue</td>
<td>.17*</td>
<td>.07</td>
</tr>
<tr>
<td></td>
<td>Dependent Variable: Control Mutuality</td>
<td></td>
</tr>
<tr>
<td>Enjoyment</td>
<td>.01</td>
<td>-.04</td>
</tr>
<tr>
<td>Perceived Contingency</td>
<td>.08*</td>
<td>.02</td>
</tr>
<tr>
<td>Perceived Dialogue</td>
<td>.17*</td>
<td>.07</td>
</tr>
<tr>
<td></td>
<td>Dependent Variable: Commitment</td>
<td></td>
</tr>
<tr>
<td>Enjoyment</td>
<td>.01</td>
<td>-.04</td>
</tr>
<tr>
<td>Perceived Contingency</td>
<td>.05</td>
<td>-.00</td>
</tr>
<tr>
<td>Perceived Dialogue</td>
<td>.21*</td>
<td>.08</td>
</tr>
<tr>
<td></td>
<td>Dependent Variable: Satisfaction</td>
<td></td>
</tr>
<tr>
<td>Enjoyment</td>
<td>.02</td>
<td>-.08</td>
</tr>
<tr>
<td>Perceived Contingency</td>
<td>.10*</td>
<td>.03</td>
</tr>
<tr>
<td>Perceived Dialogue</td>
<td>.12*</td>
<td>.04</td>
</tr>
</tbody>
</table>

Note: * p < .05.
perceived dialogue as mediating variables. Website attitude and behavioral intentions were entered as dependent variable respectively. Power usage and modality interactivity were included in the model as covariates. The results indicated a significant mediation path in the order of message interactivity, perceived contingency, perceived dialogue or enjoyment, and attitude and behavioral intentions towards the website (see Table 4-16, Figure 4-3, 4-4, and 4-5). These results suggested that HighLow-to-Control message interactivity influenced website attitude and behavioral intentions through two paths. One is via perceived contingency and perceived dialogue, and another is via perceived contingency and enjoyment. Hence, higher HighLow-to-Control message interactivity let to higher level of perceived contingency, which in turn had a significantly positive effect on perceived dialogue or enjoyment. The increased perceived dialogue or enjoyment in turn resulted in better website attitude and behavioral intentions.

Table 4-16: Indirect effects of HighLow-to-Control message interactivity on website attitudes and behavioral intentions via mediators.

<table>
<thead>
<tr>
<th>Mediation Path</th>
<th>Indirect Effect Bootstrap Estimate (b)</th>
<th>Indirect Effect 95% Confidence Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV (\rightarrow) Contingency (\rightarrow) Dialogue (\rightarrow) Website Attitude (Favorable)</td>
<td>.07*</td>
<td>.02 .16</td>
</tr>
<tr>
<td>IV (\rightarrow) Contingency (\rightarrow) Enjoyment (\rightarrow) Website Attitude (Favorable)</td>
<td>.05*</td>
<td>.01 .12</td>
</tr>
<tr>
<td>IV (\rightarrow) Contingency (\rightarrow) Dialogue (\rightarrow) Website Attitude (Exciting)</td>
<td>.05*</td>
<td>.01 .15</td>
</tr>
<tr>
<td>IV (\rightarrow) Contingency (\rightarrow) Enjoyment (\rightarrow) Website Attitude (Exciting)</td>
<td>.09*</td>
<td>.02 .20</td>
</tr>
<tr>
<td>IV (\rightarrow) Contingency (\rightarrow) Dialogue (\rightarrow) Behavioral Intentions</td>
<td>.07*</td>
<td>.01 .18</td>
</tr>
<tr>
<td>IV (\rightarrow) Contingency (\rightarrow) Enjoyment (\rightarrow) Behavioral Intentions</td>
<td>.09*</td>
<td>.02 .20</td>
</tr>
</tbody>
</table>

Note: * \(p < .05\).
Similar results were found for relational outcomes. In addition to its solo mediating effects on relational outcomes (see Table 4-15), perceived contingency also
mediated the relationships between message interactivity and relational outcomes via perceived dialogue and enjoyment (see Table 4-17, Figure 4-6, 4-7, 4-8, and 4-9).

Table 4-17: Indirect effects of HighLow-to-Control message interactivity on relational outcomes via mediators.

<table>
<thead>
<tr>
<th>Mediation Path</th>
<th>Indirect Effect Bootstrap Estimate (b)</th>
<th>Indirect Effect 95% Confidence Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV → Contingency → Dialogue → Trust</td>
<td>.11*</td>
<td>.03 .21</td>
</tr>
<tr>
<td>IV → Contingency → Enjoyment → Trust</td>
<td>.02*</td>
<td>.003 .05</td>
</tr>
<tr>
<td>IV → Contingency → Dialogue → Control Mutuality</td>
<td>.11*</td>
<td>.03 .22</td>
</tr>
<tr>
<td>IV → Contingency → Enjoyment → Control Mutuality</td>
<td>.02*</td>
<td>.005 .06</td>
</tr>
<tr>
<td>IV → Contingency → Dialogue → Commitment</td>
<td>.13*</td>
<td>.04 .26</td>
</tr>
<tr>
<td>IV → Contingency → Enjoyment → Commitment</td>
<td>.02*</td>
<td>.01 .07</td>
</tr>
<tr>
<td>IV → Contingency → Dialogue → Satisfaction</td>
<td>.07*</td>
<td>.02 .16</td>
</tr>
<tr>
<td>IV → Contingency → Enjoyment → Satisfaction</td>
<td>.04*</td>
<td>.01 .11</td>
</tr>
</tbody>
</table>

Note: * p < .05.

Figure 4-6: Multi-step mediation on relational outcomes (trust).
Figure 4-7: Multi-step mediation on control mutuality

Figure 4-8: Multi-step mediation on commitment.

Figure 4-9: Multi-step mediation on satisfaction.
Section IV – The Role of Power Usage

The current study proposed a research question exploring the likelihood of power usage moderating the effects of the two independent variables. In order to answer this research question, a General Linear Model (GLM) was employed. Modality interactivity, message interactivity, and power usage were included as predictor variables, along with interaction terms. Table 4-18 summarizes the results of the analysis.

Power usage is a significant predictor on several outcome variables, including immersion aspects of user engagement and perceived distraction. In terms of interaction effects, there is a significant two-way interaction between modality interactivity and power usage on the time-transformation aspect of user engagement, $F(1, 240) = 4.18, p < .05$. As can be seen from Figure 4-10, the degree of engagement depends on the individuals’ level of power usage. Specifically, individuals who scored high on power usage were more likely to feel that they lost track of time and spend more time on the mobile website when they used both tapping and swiping interaction techniques. On the other hand, those scoring low on power usage felt higher level of time transformation when they used only one interaction technique (i.e., tapping). In general, the higher the power usage, the lower the engagement with low modality-interactivity.
Table 4-18: Main and interaction effects of power usage.

<table>
<thead>
<tr>
<th></th>
<th>Power Usage (PU)</th>
<th>Modality Interactivity (MoI) x (PU)</th>
<th>Message Interactivity (Mel) x (PU)</th>
<th>MoI x Mel x PU</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attitude towards the Mobile Website</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Favorable</td>
<td>$F = 2.74^{^\wedge}$</td>
<td>$F = 0.01$</td>
<td>$F = 0.39$</td>
<td>$F = 0.66$</td>
</tr>
<tr>
<td>Exciting</td>
<td>$F = 0.39$</td>
<td>$F = 0.37$</td>
<td>$F = 0.43$</td>
<td>$F = 2.56^{^\wedge}$</td>
</tr>
<tr>
<td><strong>Relational Outcomes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trust</td>
<td>$F = 1.32$</td>
<td>$F = 0.35$</td>
<td>$F = 0.62$</td>
<td>$F = 1.04$</td>
</tr>
<tr>
<td>Control Mutuality</td>
<td>$F = 3.18^{^\wedge}$</td>
<td>$F = 0.59$</td>
<td>$F = 0.20$</td>
<td>$F = 2.43^{^\wedge}$</td>
</tr>
<tr>
<td>Commitment</td>
<td>$F = 2.45$</td>
<td>$F = 0.11$</td>
<td>$F = 0.37$</td>
<td>$F = 1.75$</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>$F = 0.38$</td>
<td>$F = 0.01$</td>
<td>$F = 1.17$</td>
<td>$F = 1.13$</td>
</tr>
<tr>
<td><strong>Behavioral Intentions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Website</td>
<td>$F = 0.02$</td>
<td>$F = 0.11$</td>
<td>$F = 0.34$</td>
<td>$F = 0.70$</td>
</tr>
<tr>
<td>Company</td>
<td>$F = 0.00$</td>
<td>$F = 0.12$</td>
<td>$F = 0.51$</td>
<td>$F = 0.96$</td>
</tr>
<tr>
<td>Company (Recommendation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>User Engagement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest Level</td>
<td>$F = 3.69^{^\wedge}$</td>
<td>$F = 0.23$</td>
<td>$F = 0.60$</td>
<td>$F = 0.93$</td>
</tr>
<tr>
<td>Control</td>
<td>$F = 0.99$</td>
<td>$F = 0.04$</td>
<td>$F = 0.06$</td>
<td>$F = 1.64$</td>
</tr>
<tr>
<td>Time Transformations</td>
<td>$F = 1.56$</td>
<td>$F = 4.18^{*}$</td>
<td>$F = 0.68$</td>
<td>$F = 1.55$</td>
</tr>
<tr>
<td>Immersion</td>
<td>$F = 497.08^{***}$</td>
<td>$F = 0.20$</td>
<td>$F = 1.37$</td>
<td>$F = 0.13$</td>
</tr>
<tr>
<td><strong>Enjoyment, Perceived Contingency, and Dialogue</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enjoyment</td>
<td>$F = 0.00$</td>
<td>$F = 0.12$</td>
<td>$F = 0.21$</td>
<td>$F = 1.08$</td>
</tr>
<tr>
<td>Perceived Contingency</td>
<td>$F = 1.84$</td>
<td>$F = 0.13$</td>
<td>$F = 0.19$</td>
<td>$F = 2.00$</td>
</tr>
<tr>
<td>Perceived Dialogue</td>
<td>$F = 3.63^{^\wedge}$</td>
<td>$F = 0.64$</td>
<td>$F = 0.53$</td>
<td>$F = 0.90$</td>
</tr>
<tr>
<td><strong>Negative Outcomes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Bells &amp; Whistles</td>
<td>$F = 0.72$</td>
<td>$F = 0.07$</td>
<td>$F = 1.17$</td>
<td>$F = 3.64^{*}$</td>
</tr>
<tr>
<td>Perceived Distraction</td>
<td>$F = 8.99^{**}$</td>
<td>$F = 0.31$</td>
<td>$F = 0.77$</td>
<td>$F = 3.16^{*}$</td>
</tr>
</tbody>
</table>

Note: $^{^\wedge}p < .10$, $^{*}p < .05$, $^{**}p < 0.01$, $^{***}p < 0.001$
Figure 4-10: Two-way interaction on time transformation aspect of user engagement.

The analysis also revealed three-way interactions among modality interactivity, message interactivity, and power usage on the two negative outcomes, perceived bells and whistles, $F(2, 240) = 3.64, p < .05$, and perceived distraction, $F(2, 240) = 3.16, p < .05$. As can be seen from Figure 4-11, when modality interactivity is low (i.e., only tapping), the increase in the level of power usage led to more negative outcomes (i.e., high in perceived bells and whistles, and perceived distraction) with high message interactivity, and less negative outcomes with control and low message interactivity. When the modality interactivity is high (i.e., both tapping and swiping), higher level of power usage led to less negative outcomes with high and low message interactivity, more perceived bells and whistles with control message interactivity. The degree of perceived distraction stays the same regardless of power usage when the modality interactivity is high and message interactivity is control. The results also indicated that individuals high in power usage felt the mobile website has highest level of bells and whistles and distraction with the combinations of low modality interactivity and high message interactivity, or with high modality interactivity and control message interactivity. On the
other hand, individuals low in power usage perceived the highest level of bells and whistles and distraction with the combination of low modality interactivity and control message interactivity, or the combination of high modality interactivity and high message interactivity.

Figure 4.11: Three-way interaction effects on perceived bells and whistles and perceived distraction.
Section V – The Effect of Relational Outcomes

The current study proposed a hypothesis (H8) that examined the effect of relational outcomes on behavioral intentions towards the company. In order to test this hypothesis, a multiple regression was conducted. Table 4-21 summarized the analysis results. The multiple regression model with all four predictors produced $R^2 = .34$, $F(4, 247) = 32.44$, $p < .001$ for likelihood of using the service from the company by themselves, and $R^2 = .48$, $F(4, 247) = 58.89$, $p < .001$ for likelihood of recommending the company to their friends. As can be seen in Table 4-19, only satisfaction had a significant effect on both of the dependent variables. Thus, H8 was partially supported.

Table 4-19: Multiple regression results of relational outcomes on behavioral intentions towards the company ($\beta$).

<table>
<thead>
<tr>
<th></th>
<th>Trust</th>
<th>Control Mutuality</th>
<th>Commitment</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using the Service</td>
<td>-.13</td>
<td>.14</td>
<td>-.04</td>
<td>.61*</td>
</tr>
<tr>
<td>Recommendation</td>
<td>.10</td>
<td>-.05</td>
<td>.06</td>
<td>.60*</td>
</tr>
</tbody>
</table>

Note: *$p < .001$

Additional Analysis: Testing the effect of modality and message interactivity on behavioral intentions towards the company

The current study also tested whether independent variables (i.e., modality interactivity and message interactivity) affected individuals’ behavioral intentions towards the company via mediating variables proposed in this study’s model (see Figure...
In order to test these indirect effects, the study employed Hayes’ PROCESS macro for SPSS with 5000 bootstrap resamples and 98% confidence intervals (Hayes, in press).

First, a series of analyses with PROCESS macro Model 6 was used to examine whether modality interactivity affected behavioral intentions towards the company via enjoyment and relational outcomes. Modality interactivity was entered as independent variable; enjoyment and one of the relational outcomes variables (i.e., trust, control mutuality, commitment, and satisfaction) were included as mediating variables; and one of the variables for behavioral intentions towards company (i.e. likelihood of using the service by themselves and likelihood of recommend it to their friends) was entered as dependent variable. In addition, message interactivity and power usage were treated as covariates.

Table 4-20: Indirect effects of modality interactivity on behavioral intentions towards the company via mediators.

<table>
<thead>
<tr>
<th>Mediators</th>
<th>Indirect Effect Bootstrap Estimate ($b$)</th>
<th>Indirect Effect 95% Confidence Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LL</td>
</tr>
<tr>
<td>Dependent Variable: Using the service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV $\rightarrow$ Enjoyment $\rightarrow$ Trust $\rightarrow$ DV</td>
<td>.06*</td>
<td>.01</td>
</tr>
<tr>
<td>IV $\rightarrow$ Enjoyment $\rightarrow$ Control Mutuality $\rightarrow$ DV</td>
<td>.07*</td>
<td>.01</td>
</tr>
<tr>
<td>IV $\rightarrow$ Enjoyment $\rightarrow$ Commitment $\rightarrow$ DV</td>
<td>.07*</td>
<td>.02</td>
</tr>
<tr>
<td>IV $\rightarrow$ Enjoyment $\rightarrow$ Satisfaction $\rightarrow$ DV</td>
<td>.14*</td>
<td>.03</td>
</tr>
<tr>
<td>Dependent Variable: Recommendation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV $\rightarrow$ Enjoyment $\rightarrow$ Trust $\rightarrow$ DV</td>
<td>.07*</td>
<td>.02</td>
</tr>
<tr>
<td>IV $\rightarrow$ Enjoyment $\rightarrow$ Control Mutuality $\rightarrow$ DV</td>
<td>.07*</td>
<td>.02</td>
</tr>
<tr>
<td>IV $\rightarrow$ Enjoyment $\rightarrow$ Commitment $\rightarrow$ DV</td>
<td>.08*</td>
<td>.02</td>
</tr>
<tr>
<td>IV $\rightarrow$ Enjoyment $\rightarrow$ Satisfaction $\rightarrow$ DV</td>
<td>.15*</td>
<td>.04</td>
</tr>
</tbody>
</table>

Note: * $p < .05$.

As can be seen from Table 4-20, Enjoyment and all of the four variables in relational outcomes mediated the effects of modality interactivity on behavioral
intentions towards the company. This implied that the higher level of modality interactivity resulted in better enjoyment of exploring the mobile website. Such heightened enjoyment let to better trust, control mutuality, commitment, or satisfaction, which in turn yield better behavioral intentions towards the company.

In addition, the study also used PROCESS macro Model 6 to examine whether message interactivity had effects on behavioral intentions towards the company via two mediation paths. One is through enjoyment and relational outcomes, and another is through perceived dialogue and relational outcomes. In these analyses, HighLow-to-Control message interactivity was entered as independent variable; enjoyment, perceived dialogue, and one of the relational outcomes variables (i.e., trust, control mutuality, commitment, and satisfaction) were included as mediating variables; and one of the variables for behavioral intentions towards company (i.e. likelihood of using the service by themselves and likelihood of recommend it to their friends) was entered as dependent variable. In addition, modality interactivity and power usage were treated as covariates. The results of this analysis are summarized in Table 4-21.

The data supported one mediation path mentioned above. That is the path via perceived dialogue and relational outcomes (i.e., path 1). Although enjoyment was not significantly affected by message interactivity, it was influenced indirectly via perceived dialogue (i.e., path 2 and path 3). Enjoyment from perceived dialogue could directly predict behavioral intentions towards the company (i.e., path 2), and at the same time could also predict behavioral intentions toward the company via relational outcomes (i.e., path 3). These results suggest that perceived dialogue is a critical mediator in influencing behavioral intentions towards the company. The presence of message interactivity led to
higher level of perceived dialogue. Increased perceived dialogue in turn resulted in better enjoyment or relational outcomes, which in turn enhanced behavioral intentions.

Alternatively, enjoyment from perceived dialogue could have increased relational outcomes, which in turn led to better behavioral intentions towards the company.

Table 4-21: Indirect effects of HighLow-to-Control message interactivity on behavioral intentions towards the company via mediators.

<table>
<thead>
<tr>
<th>Mediators</th>
<th>Indirect Effect Bootstrap Estimate (b)</th>
<th>Indirect Effect 95% Confidence Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LL</td>
</tr>
<tr>
<td>Dependent Variable: Using the service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relational Outcomes: Trust</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. IV → Dialogue → Trust → DV</td>
<td>.15*</td>
<td>.05</td>
</tr>
<tr>
<td>2. IV → Dialogue → Enjoyment → DV</td>
<td>.05*</td>
<td>.02</td>
</tr>
<tr>
<td>3. IV → Dialogue → Enjoyment → Trust → DV</td>
<td>.02*</td>
<td>.005</td>
</tr>
<tr>
<td>Relational Outcomes: Control Mutuality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. IV → Dialogue → Control Mutuality → DV</td>
<td>.15*</td>
<td>.06</td>
</tr>
<tr>
<td>2. IV → Dialogue → Enjoyment → DV</td>
<td>.05*</td>
<td>.01</td>
</tr>
<tr>
<td>3. IV → Dialogue → Enjoyment → Control Mutuality → DV</td>
<td>.02*</td>
<td>.01</td>
</tr>
<tr>
<td>Relational Outcomes: Commitment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. IV → Dialogue → Commitment → DV</td>
<td>.14*</td>
<td>.06</td>
</tr>
<tr>
<td>2. IV → Dialogue → Enjoyment → DV</td>
<td>.05*</td>
<td>.01</td>
</tr>
<tr>
<td>3. IV → Dialogue → Enjoyment → Commitment → DV</td>
<td>.02*</td>
<td>.01</td>
</tr>
<tr>
<td>Relational Outcomes: Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. IV → Dialogue → Satisfaction → DV</td>
<td>.17*</td>
<td>.07</td>
</tr>
<tr>
<td>2. IV → Dialogue → Enjoyment → DV</td>
<td>.01</td>
<td>-.01</td>
</tr>
<tr>
<td>3. IV → Dialogue → Enjoyment → Commitment → DV</td>
<td>.05*</td>
<td>.02</td>
</tr>
<tr>
<td>Dependent Variable: Recommendation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relational Outcomes: Trust</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. IV → Dialogue → Trust → DV</td>
<td>.16*</td>
<td>.06</td>
</tr>
<tr>
<td>2. IV → Dialogue → Enjoyment → DV</td>
<td>.07*</td>
<td>.03</td>
</tr>
</tbody>
</table>
Figure 4-12: Summary of the results from interactivity on behavioral intentions towards the company.
Summary of Findings

The current study found that modality interactivity had significant main effects on behavioral intentions towards the website, control mutuality, commitment, and satisfaction. For all the cases, the high modality interactivity condition resulted in better outcomes than did the low modality-interactivity condition. In addition, modality interactivity also had a significant main effect on the proposed mediating variables, including interest aspect of user engagement, control aspect of user engagement, and enjoyment. The three variables, in turn, mediated the effects of modality interactivity on attitude towards the website and behavioral intention towards the website. Interest level aspect and control aspect of user engagement also mediated the effect of modality interactivity on relational outcomes variables (i.e., trust, control mutuality, commitment, satisfaction). Further, the analysis revealed two-step mediations on relational outcomes. High level of modality interactivity led to greater perceptions of enjoyment, which in turn resulted in higher interest level of user engagement. The heightened interest level of user engagement in turn significantly predicted relational outcomes.

In the case of message interactivity, significant main effects were found on control mutuality such that the low-message interactivity condition led to significantly higher level of control mutuality than did control condition. However, high message-interactivity condition did not significantly differ from either low or control conditions. The same pattern was found for the effect of message interactivity on perceived contingency and dialogue. Mediation analysis revealed that the comparison between HighLow message interactivity and Control had significant indirect effects on attitude
towards the website, behavioral intentions towards the website, and all the four variables of relational outcomes via perceived dialogue. Perceived contingency also mediated the relationship between HighLow-to-Control message interactivity on trust, control mutuality and satisfaction. Further, a series of multistep mediation analyses revealed that the presence of message interactivity had significant indirect effect on the dependent variables via the combinations of perceived contingency and perceived dialogue, or perceived contingency and enjoyment. Presence of message interactivity led to greater perceptions of perceived contingency, which in turn resulted in higher level of perceived dialogue or enjoyment. The heightened perceived dialogue and enjoyment in turn significantly influenced website attitudes, website behavioral intentions, and relational outcomes.

The current study also found the moderating effects of power usage. First, the level of power usage moderated the effect of modality interactivity on time transformation aspect of user engagement. The data suggested a preference of higher modality interactivity by power user and a preference of low modality interactivity by non-power user. Specifically, individuals who scored high on power usage were more likely to feel that they lost track of time and spend more time on the mobile website when the mobile website offered both tapping and swiping interaction techniques (i.e., high modality interactivity). On the other hand, those scoring low on power usage indicated higher level of time transformation when the mobile website offered only one interaction technique (i.e., low modality interactivity). The study also found three-way interactions effects of power usage and the two independent variables on the two negative outcomes, perceived bells and whistles and perceived distraction. The results suggest that the higher
the power usage, the higher the perception of bells and whistles and distraction among participants exposed to high message interactivity in the low modality-interactivity condition. The reverse is true for participants in the high modality-interactivity condition. On the other hand, for those participants in the control condition, power usage negatively predicted perceptions of bells and whistles and distraction in the low modality-interactivity condition and positively predicted them in the high modality-interactivity condition. The relationship between power usage and perceptions of bells and whistles and distraction was slightly negative for participants in the low message-interactivity condition, regardless of whether it was accompanied by high or low modality interactivity.

Lastly, the study also indicated significant main effects of satisfaction on behavioral intentions towards the company. In addition, the two types of interactivity had significant indirect effects on behavioral intentions towards the company via the hypothesized mediators. While the effect of modality interactivity was mediated by perceived enjoyment and relational outcomes, that of message interactivity was mediated by perceived dialogue, enjoyment, and relational outcomes.
Chapter 5

Discussion

This study was designed to investigate the effect of modality and message interactivity in the context of mobile websites. Particularly, by adopting the model of interactivity effects (Sundar, 2007), the study examined how the two types of interactivity affected individuals’ attitude towards the website, behavioral intentions towards a mobile website, and relational outcomes with a company. In addition, the study aimed to uncover the underlying psychological mechanism for the effect of the two types of interactivity, and provide design implications to companies wanting to incorporate interactivity in their mobile websites.

As predicted, modality interactivity and message interactivity had significant main and/or indirect effects on user attitude toward the mobile website, behavioral intentions toward the mobile website, and relational outcomes with the company. The interest level of user engagement and perceived dialogue were found to be particularly important mediators for the effect of interactivity on the outcomes. In addition, power usage moderated the effects of these two interactivity types on negative user perceptions of the mobile website.

This chapter interprets these findings and draws implications for advancing theory and practice. It concludes by discussing limitations of the study and outlining directions for future research.
Effects of Modality Interactivity

One of the main objectives of this study was to examine how interactivity influences individuals’ attitudinal and behavioral outcomes in the context of mobile media. Based on the interactivity effects model (Sundar, 2007), this study hypothesized that modality interactivity would increase user engagement and induce better website attitudes and behavioral intentions. As expected, interest level and control aspect of user engagement significantly mediated the relationship between modality interactivity and the outcome variables.

Although not hypothesized in this study, user engagement also mediated the effects of modality interactivity on relational outcomes. However, this effect of user engagement should be interpreted along with the construct of enjoyment. Scholars have pointed out that heightened enjoyment is what makes interactivity result in better relational outcomes with companies. Indeed, the initial mediation analysis did indicate a significant mediating effect of enjoyment on the four relational outcomes variables. However, once the interest level aspect of user engagement was included in the model, enjoyment was no longer a significant mediator for the effects of modality interactivity on trust, control mutuality, and commitment. Subsequent two-way mediation analyses revealed a significant indirect effect path of modality interactivity on the three relational outcomes via enjoyment and interest level of user engagement. These results suggest that modality interactivity must be incorporated in the mobile website in a manner that makes users enjoy the website while providing content that may arouse user interest and curiosity. This may be accomplished by pairing interaction techniques with content that
has sufficient depth to interest the user. Take, for example, the stimulus mobile website in this study. The swiping technique in high modality interactivity condition was used to check the various pictures of menus offered by the catering company. The action of swiping resembled the turning of pages in a book or catalogue, which fits the purpose of incorporating the swiping technique into the stimulus website. Such match not only provided users more enjoyable experiences, but also made users more likely to engage in their interaction with the content. Therefore, the pathway from enhanced modality interactivity to relational outcomes involves the pleasure of using the interactive feature, followed by concomitant exposure to interesting content when the user engages the feature. Theoretically, this means modality-interactivity features may initially serve as “peripheral cues” (or features not central to the content of the site, to use the language of Elaboration Likelihood Model), but in order for them to translate to positive public-relations outcomes, these cues would have to lead users to content that is interesting and engaging.

**Cue Effects of Message Interactivity**

Another goal of this study was to test cue effects of message interactivity. In previous message interactivity studies, participants were asked to interact with the system, and message interactivity manipulation occurred during user-system interactions (i.e., use effect) (e.g., Bellur, 2012; Sundar et al., 2012). In contrast, this study incorporated the MAIN model (Sundar, 2008) and proposed that the effects of contingency interactivity could even take place when individuals were simply exposed to
threaded interaction history as a third person (i.e., cue effect). Despite the subtle manipulation, the comparison of the two message interactivity conditions to the control condition indicated a significant main effect and multiple indirect effects of message interactivity on attitudinal and behavioral outcomes, and, therefore, provided support for the cue effects of message interactivity.

More importantly, a mediation analysis indicated that message interactivity influenced website attitude and behavioral intentions via two routes. One route is through perceived contingency and perceived dialogue. Presenting message interactivity cues in a mobile website led individuals feeling that there were contingent interactions going on between the company and its customers. Exposure to such contingency in turn made individuals think that the company engaged in dialogic communication with their customers, which resulted in a better attitude toward the company’s website and greater intentions to revisit the website in the future. Another route is though perceived contingency and enjoyment. Exposure to contingent interactions made users’ website viewing experiences more enjoyable. Such heightened enjoyment led users to have positive website attitude and behavioral intentions.

The results of these mediation analyses are consistent with the MAIN model (Sundar, 2008), which predicts that the mere presence of interactivity could trigger various cognitive heuristics such as contingency. These heuristics could lead directly to heuristic processing and/or guide systematic processing of the content. According to dual-processing models in social psychology (Chaiken, 1980; Petty, & Cacioppo, 1986), systematic processing refers to a thorough and extensive mode of processing information, whereas heuristic processing is a less effortful information processing mode. It was likely
that, on the one hand, contingency led individuals to analytically examine the message content and link the threaded interaction style with dialogic communications. On the other hand, contingency served as a cue that was used by individuals to make a snap judgment about the website and the content. If the judgment is positive, individuals were more likely to think that their interaction with the mobile website was enjoyable, which resulted in better website attitude and behavioral intentions. Therefore, the two paths discovered in this study represent the two processes articulated by dual process models, with one focusing on a cognitively effortful appraisal of the value of interactivity on a mobile website and other representing the fun element of exposed to a conversation history on the site.

**Effects of Power Usage**

Another key finding of this study was the moderating role of power usage on the effect of interactivity. The results indicated that, in general, power users preferred higher interactivity levels compared to non-power users. For instance, participants scoring high on power usage indicated greater time transformations when modality interactivity was high. However, for participants scoring low on power usage, time transformations were higher when modality interactivity was low. In the same vein, the three-way interaction results for the two negative outcomes (i.e., bells and whistles, website distraction) indicated that, when the mobile website presented high modality interactivity in the presence of message interactivity (i.e., high or low message interactivity), non-power users felt more bells and whistles and website distraction than did power users (see the
right part of Figure 4-11). These results suggested a general pattern that power users prefer interactive features, while non-power users prefer simpler mobile interfaces.

Interestingly, the three-way interaction results for the two negative outcomes also revealed that power users were more likely to feel bells and whistles and website distractions when one type of interactivity was paired with another type of interactivity at different interactivity levels (e.g., low modality interactivity and high message interactivity; high modality interactivity and low message interactivity). Perhaps individuals scoring higher on the level of power usage are more likely to use mobile websites and are then exposed to many types of interactive website features. Exposure to one type of high-level interactivity might trigger them to think that they will encounter more interactive features when they are exploring a mobile website. When such expectations are not met, the user might perceive the high level of interactivity as an irrelevant design feature that distracts from the website viewing experience.

In the case of non-power users, the combination of low modality interactivity and low message interactivity also generated a higher level of bells and whistles and perceived website distraction. This seemed to be counterintuitive as other findings of this study suggested that lower level of interactivity was generally preferred by non-power users. Perhaps individuals who scored low in power usage felt that, for a small company, having a mobile website itself is already fancy, since they are not exposed to such sites as often as compared to individuals with high power usage. However, since the stimulus mobile website only included limited content, non-power users might have felt that the website did not match their heightened expectation from the company’s mobile presence.
This might have led them to feel that the stimulus mobile website was fancy but had no substance.

**Theoretical Implications**

The current study offers several important theoretical implications that advance our understanding of interactivity effects. First, this dissertation adopted the model of interactivity effects (Sundar, 2007) and examined two types of interactivity as proposed in the model. Although the effects of modality interactivity and message interactivity have been investigated in previous studies, including those in public relations (Guillory & Sundar, in press; Kelleher, 2009), none of these studies tested the model in a mobile media context. Particularly, interaction techniques offered in a mobile media interface are quite different from that of PCs (i.e., touch screen based vs. mouth based). Therefore, it was uncertain that whether the effects of modality interactivity still remain in a mobile context, and it was also questionable whether users can even psychologically differentiate various interaction techniques offered by mobile websites (e.g., tap vs. swipe). The findings from this study revealed that an increase in interaction techniques offered by mobile websites positively influenced individuals' attitudinal and behavioral outcomes. In addition, the effects of modality interactivity were mediated via user engagement as proposed by the model of interactivity effects (Sundar, 2007). Therefore, this study provided support for using the model of interactivity effects to understand the effects of interactivity in a mobile context.
This study also identified the psychological mechanisms underlying the cue effects of message interactivity. As expected, message interactivity had a positive influence on perceived contingency, which in turn positively affected website attitude and behavioral intentions. A notable finding is that contingency likely served as a heuristic that led individuals to process the content in both a systematic and heuristic manner. While such effects of contingency were already predicted in MAIN model, few studies had actually tested them previously. By identifying the relationship of contingency to perceived dialogue and enjoyment, this study advanced our understanding of the cue effects of message interactivity.

The current study also contributed to our knowledge about how interactivity may lead to negative outcomes. This study tested two negative outcome variables, assuming that the unique characteristics of mobile devices might make it easier for individuals to perceive interactive features as annoying or distracting. However, the results of this study did not find any main effects or interaction effects of modality and message interactivity on these negative outcomes. Instead, such negative outcomes emerged after considering the moderating effects of power usage. These results suggest that considering individual differences, such as power usage level, is important to uncover how interactivity may lead to negative perceptions of the interface.

This study also provided some theoretical implications for research in public relations, especially in the area of relational maintenance strategies and outcomes. Scholars and practitioners in public relations have argued that online media, such as companies’ websites, can be an effective tool for cultivating relationships between companies and their publics. Studies in this area often use content analysis methods to
investigate whether companies’ online media platforms have certain features (e.g., interactivity) that are regarded as executions of relational maintenance strategies (Cho & Huh, 2010). However, few studies have empirically tested whether such features can indeed positively affect relational outcomes. Through an online experiment, this study provided empirical support for the effect of interactivity on relational outcomes.

In addition, the study also identified a key variable, user engagement, in explaining the effects of interactivity on relational outcomes. Previous studies in public relations theorized that interactivity features employed in the company’s website would result in better relational outcomes, since such features represented the company’s effort to make users’ website viewing experiences more fun and enjoyable (Cho & Huh, 2010). However, the psychological process, from enjoyment to relational outcomes, was seldom discussed and examined in previous studies. This study showed that the level of user engagement was the key variable in explaining how and why enjoyment mediates the effects of modality interactivity on relational outcomes. It is likely that offering users various ways of interacting with the content provided a richer experience of the content. When the content is pleasurable, like the food pictures used in this study, users will show higher levels of enjoyment, which in turn caused more engagement in the website and finally led to better relational outcomes. Interestingly, while enjoyment had a direct effect on satisfaction, the effects of enjoyment on trust, commitment, and satisfaction could not be explained without the consideration of user engagement. Such results suggest that there is something inherently different between the variable of satisfaction and other relational outcome variables including trust, control, mutuality, and commitment. Future studies using relational maintenance strategies and outcomes may need to treat these
variables individually rather than aggregating them into one variable of relational outcomes.

In addition to relational outcomes, the results of this study implied that the effects of interactivity could even be extended to behavioral intentions towards the company. According to the mediation analyses, the increased relational outcomes from interactivity could make individuals have greater intentions of using companies’ services and recommending companies to friends. These results echo recent discussions in the literature about how technological features, such as interactivity, contribute to individuals’ behavioral change (e.g., Sundar, Oh, Kang, & Sreenivasan, 2013).

Traditionally, studies in public relations tended to focus on messages and communicators (i.e., audience) when it comes to examining publics’ behavioral outcomes (i.e., Grunig, 1997; Kim, Ni, & Sha, 2008). The results of this study suggest that technological features could also have significant effects on publics’ behaviors, and should therefore be greater theoretical and empirical attention in future research.

**Practical Implications**

This dissertation offered several practical implications for public relations practitioners and website designers. Mobile websites are gaining attention from companies as a new platform for disseminating information and communicating with their publics. However, due to a lack of empirical studies in this area, PR practitioners and website designers are left uncertain of how to design mobile website in order to yield better user experiences and generate better attitudes toward companies and their websites.
This study focused on those interaction techniques that are unique to mobile devices. Therefore, the results from this study are more useful than studies conducted in PC environments in helping PR practitioners and website designers develop mobile website interfaces.

Previous studies in public relations argue that companies might enhance their relationships with publics using corporate websites by ensuring that publics have an enjoyable experience while browsing the website (e.g., Cho & Huh, 2010). In order to promote user enjoyment, public practitioners can consider increasing the number of interaction techniques employed in their companies’ mobile websites. Although the current study only tested tapping or swiping, other interaction techniques, such as visually-based (e.g., QR code) or sound-based (e.g., sound control) interaction techniques can be also considered, not only because these enhance the perceptual representation of site content but also promise greater user enjoyment—both elements that appear to be critical in shaping the effects of modality interactivity on PR outcomes. However, as found in this study, if users’ perceived enjoyment resulted from modality interactivity cannot trigger users’ interest and curiosity, an increase in interaction techniques might not have the desired positive effects on some relational outcomes. Thus, public relations practitioners also need to pay attention to the way these interaction techniques are incorporated in a mobile website. For example, the swiping technique can be incorporated in a mobile website page where users check the lineup of products offered by companies or where companies put their annual reports, similar to the way swiping interaction was used in the stimulus website in this study.
In addition, the results suggest that simply presenting threaded conversation history in a company’s mobile website is effective in improving users’ relational outcomes with companies. Similar to how this study translated the FAQ section into interaction history, public relations practitioners can change the structure of some website content in a manner that resembles interaction history between companies and their publics. In addition, companies can also incorporate commenting tools, such as Facebook comments, into their website and actively reply to comments received in order to automatically accumulate an interaction history with their publics (Smith & Sundar, 2011). If it is difficult to include such functions in their website, companies can at least encourage website visitors to check other communication-focused online media that companies are operating, such as companies’ blogs, Facebook, and Twitter. In this way, website visitors would be exposed to the interaction history that the companies have had with their publics, which is likely to improve their relational outcomes with the company.

Public relations practitioners and website designers can also refer to this study’s findings regarding the relationship between power usage and the negative outcomes of interactivity to guide their companies’ mobile website design. This study found that individuals’ preferences for interactivity level differ depending on their level of power usage. In general, power users prefer mobile websites that incorporate various types of interactivity features, while non-power users prefer simpler ones. Thus, public relations practitioners and website designers need to clarify who are the main visitors of the mobile website and change the level of interactivity according to them. For example, if the website visitors are members of younger generations or are tech savvy, the website can employ various types of interactivity features. On the other hand, if a website is likely to
be used by those who are incompetent with information technology, features with lesser interactivity are preferred. In fact, scholars in HCI have long argued that simpler websites are preferred by users and tend to yield better user experiences (e.g., Nielsen, 2007). This may be especially true in the mobile platform, which is often used in contexts (urgent, public, on the go, limited bandwidth, small screen size) that do not lend themselves to elaborate interactivity. Practitioners and designers would do well to consider these pressures on different kinds of users developing sites for mobile use.

**Limitations and Future Research**

This study has several limitations that need to be discussed. First, the manipulation checks results for message interactivity did not indicate significant differences between high and low message interactivity conditions. As explained in the results section, this failure of manipulation might be due to the fact that the stimulus mobile website did not actually offer users with tools that allowed them to communicate with the company (e.g., comment box). This could have led participants in high message interactivity conditions to feel that the manipulation was unnatural, resulting in a lower score for manipulation check items. Such communication tools were intentionally excluded in this study for the purpose of eliminating confounds introduced by participants creating different content in different conditions. However, future studies can include these functions and try to control for confounding variables statistically (Klimmt, Vorderer, & Ritterfeld, 2007).
In addition, this study used food related products in the stimulus (i.e., catering company). While it was not under the scope of this research to examine how product categories influence the effect of interactivity, there are already studies indicating that the effects of interactivity on individuals’ website attitudes are influenced by users’ anticipated degree of interactivity, which in turn is determined by the types of products that the website offers (Sohn, Gi, & Lee, 2007). Also, these studies suggest that individuals expect to experience higher levels of interactivity on websites that offer technology-related products (e.g., automobiles) than websites that offer other types of products (e.g., furniture). Thus, the results of this study, especially for perceived bells and whistles and distractions, may be different if other types of products, such as technology-related products, are selected. Future research can test the same manipulated variables with different product categories.

Furthermore, this study did not explore novelty effects that are associated with swiping interaction techniques. Previously, users were only able to access information by tapping the keypad of their mobile phones. Swiping became available only after the penetration of smartphone. Therefore, when compared to the tapping technique, swiping is newer and novel to users. Such differences in novelty may have led users to perceive the two interaction techniques differently. Hence, once swiping technique becomes common to users, it may become harder for users to psychologically differentiate the two interaction techniques. Future research should examine how novelty is likely to influence the psychological effects of interaction techniques noted in this study.

Finally, this study used scenarios to simulate the task. While the use of scenarios allowed the study to control additional variables that might emerge during the online
experiment, it also poses some threats to the ecological validity of the study. Participants may have had lower levels of involvement with the product compared to their level of involvement in a real situation. Such differences are likely to influence the generalizability of this study, since individuals’ level of involvement is generally considered by psychologists as a critical variable determining how users process information (Petty, Cacioppo, & Schumann, 1983). In addition, the scenarios guided participants what kind of information they should look for while they were exploring the mobile website. Therefore, participants were not likely to encounter issues of not being able to find needed information from the website. However, in a real situation, users may not always find information they need and this is likely to make them feel frustrated about using the mobile website. Such negative feelings could possibly affect how users feel about interactivity.

In fact, ecological validity is a critical issue when researching mobile media, especially when experimental methodology is employed in the study. Experiments are often conducted under a controlled environment for the sake of maximizing internal validity. However, individuals use mobile media in various contexts, and such environmental and contextual factors highly influence user information processing and website design preferences (e.g., Mallat, Rossi, Tuunainen, and Oorni, 2009). Therefore, the generalizability can particularly be an issue if an experiment is about mobile media. To alleviate this problem, future research may take the form of field experiments with statistical controls to rule out confounding variables. In addition, researchers can also record individuals’ contextual information during the field experiment and actively examine how contextual factors moderate the effects of the independent variables of the
study. In the case of the current study, the cue effects of message interactivity may be minimized if an individual is checking the mobile website while walking or watching TV since the individual is likely to pay less attention to mobile website content under such circumstances. Future studies of mobile media should pay more attention to the influence of contextual factors in order to provide a better understanding of how to utilize mobile media for achieving persuasive outcomes, i.e., changing individuals’ attitudes and behaviors.

**Conclusion**

As we continue to increase our dependency on mobile media to access information, we must consider the psychological aspects of mobile website design. This study focused on interactivity, one of the most important variables in website design, and investigated its effects on individuals’ website attitudes, website behavioral intentions, and relational outcomes toward companies. The results of this study highlight the importance of several psychological variables (i.e., enjoyment, user engagement, contingency, and dialogue) as they come together to inform theoretical mechanisms underlying the effects of mobile website interactivity on outcome variables of interest to corporate public relations. In addition, this study also revealed how interactivity affects individuals differently depending on users’ dispositional differences (i.e., level of power usage). These results have advanced our understanding of interactivity’s effects and provided useful design implications to guide public relations practitioners and website designers when constructing mobile websites for corporations. It is clear that mobile
media will continue to serve as an important information source and become an
indispensable communication medium for corporations. This dissertation is one of the
first attempts to explore the role played by interactivity in mobile websites in shaping the
relationship between companies and its publics. Further research would do well to
explore the role of other affordances of mobile media that play a critical role in public
relations and enhance our theoretical understanding of the overall user experience of
mobile websites.
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Appendix A

Pretest Questionnaire

Q1. Please enter the last four digits of your mobile phone number. This will be your anonymous ID number throughout the study.

Q2. What is your primary purpose of using mobile phone? Please select all that apply.
   Sending or receiving text messages
      a. Sending or receiving text messages
      b. Make calls
      c. Listening to music
      d. Use applications
      e. Browsing websites via mobile phones
      f. Other (Please specify)

Q3. What is the type of your current mobile phone? (e.g., Samsung galaxy s2, iPhone 4S, HTC One S)

Q4. Can you access Internet through your phone?
   a. Yes, I have unlimited wireless data plan.
   b. Yes, but my wireless data plan is not unlimited.
   c. No, I cannot access Internet through my mobile phone.

Q5. How long do you often access Internet through mobile phones each day? (Please enter in number). For example, if you use Internet through mobile phones about 30 mins per day, just enter 30 in the box below.

Power Usage
Q6. Please indicate your response towards the following statements about technological device/information technology (like email, cellphone, Internet, iPod, GPS, and etc.) use. (Strongly Disagree = 1; Strongly Agree = 7)
   1. I think most of the technological gadgets are complicated to use. (R)
   2. I make good use of most of the features available in any technological device.
   3. I have to have the latest available upgrades of the technological devices that I use.
   4. Use of information technology has almost replaced my use of paper.
   5. I love exploring all the features that any technological gadget has to offer.
   6. I often find myself using many technological devices simultaneously.
   7. I prefer to ask friends how to use any new technological gadget instead of trying to figure it out myself. (R)
   8. Using any technological device comes easy to me.
9. I feel like information technology is a part of my daily life.
10. Using information technology gives me greater control over my work environment.
11. Using information technology makes it easier to do my work.
12. I would feel lost without information technology.

Demographics

Q7. What is your age? (Please enter in number). For example, if you are 20-years old, just enter the numbers 20 in the box below.

Q8. What is your gender?
   1. Male
   2. Female
   3. No answer

Q9. If you are currently associated with Penn State University, kindly let us know what your academic affiliation is to the University:
   1. Freshman
   2. Sophomore
   3. Junior
   4. Senior
   5. Graduate Student
   6. Staff
   7. Other (Please specify)
   8. Not Applicable
Appendix B

Posttest Questionnaire

Q1. Please enter the last four digits of your mobile phone number. This will be your anonymous ID number throughout the study.

Manipulation

Q2. Please think back to the catering company's mobile website and answer the questions below.
   1. While I was exploring the catering company's mobile website, I tapped the screen to access information on the site.
      a. Yes
      b. No
   2. While I was exploring the catering company's mobile website, I swiped the screen to access information on the site.
      a. Yes
      b. No

Q3. Please indicate your agreement with the following statements on a scale of 1 = Strongly Disagree 7 = Strongly Agree.
   1. The catering company's mobile website displayed a history of interaction between the catering company and its customers.
   2. The catering company's mobile website displayed a back and forth interaction between the catering company and its customers.
   3. The catering company's mobile website displayed a threaded conversation between the catering company and its customers.
   4. The catering company's mobile website is interactive.
   5. The catering company's mobile website is easy to browse.
   6. The catering company's mobile website allows me to perform a lot of actions.
   7. The catering company's mobile website allows me to access information in a variety of ways.

User Engagement

Q4. Please indicate your agreement with the following statements about your interaction with the catering company’s mobile website on a scale of 1 = Strongly Disagree 7 = Strongly Agree.
   1. Time appeared to go by very quickly when I was browsing the mobile website.
   2. I lost track of time when I was browsing the mobile website.
   3. I spent more time on the mobile website than I had intended.
   4. While browsing the mobile website, I was able to block out most other distractions.
   5. While browsing the mobile website, I was absorbed in what I was doing.
   6. While browsing the mobile website, I was immersed in the task that I was performing.
   7. I had fun interacting with the mobile website.
8. Browsing the mobile website bored me. (R)
9. I felt in control while I was browsing the mobile website.
10. I felt that I had no control over my interaction with the mobile website. (R)
11. Browsing the mobile website excited my curiosity.
12. Browsing the mobile website aroused my imagination.
13. Interacting with the mobile website made me interested in it.

Perceived Enjoyment
Q5. Please indicate your agreement with the following statements about your interaction with the catering company’s mobile website on a scale of 1 = Strongly Disagree 7 = Strongly Agree
1. I found my visit to this mobile website entertaining.
2. I found my visit to this mobile website enjoyable.
3. I found my visit to the mobile website pleasant.

Perceived Bells and Whistles
Q6. Please indicate your agreement with the following statements on a scale of 1 = Strongly Disagree 7 = Strongly Agree
1. The site is quite fancy but lacks useful content.
2. The site has a lot of bells and whistles.
3. The site is very flashy but no substance.
4. The site has a lot of features that are nonessential
5. The site has many extravagant functions that are not necessary

Distraction Heuristics
Q7. Please indicate your agreement with the following statements on a scale of 1 = Strongly Disagree 7 = Strongly Agree
1. I felt that the design of the site made me unable to focus on the content while I was browsing the site.
2. I felt that the website is designed in a way that distracted me from processing the information on the site.
3. I felt that my attention was diverted while I was browsing the site due to the design of the site.

Perceived Contingency
Q8. Please indicate your agreement with the following statements regarding your thoughts about the catering company after interacting with their mobile website.
(Strongly Disagree = 1; Strongly Agree = 7)
1. I felt that the company carefully registered customers’ concerns and gave feedback based on the questions they asked.
2. I felt as if the company gave an exclusive response to customers’ questions.
3. The interaction between the company and its customer felt like a continuous thread or a loop.
4. The company’s responses seemed interconnected with each other.
5. The company involved in several back and forth interactions with its customer.
6. The company’s interaction with their customers felt like a logical progression.

**Perceived Dialogue**

Q9. Please indicate your agreement with the following statements regarding your thoughts about the catering company after interacting with their mobile website.

(Strongly Disagree = 1; Strongly Agree = 7)
1. I felt the company considered its customers’ unique requests.
2. I felt like the company was engaged in an active dialogue with their customers.
3. The company’s interaction with their customers felt like a back and forth conversation.
4. The company responded quickly to its customers’ questions and requests.
5. The company was efficient in responding to its customers’ questions.

**Attitude towards the Website**

Q10. Please indicate how well each of the following adjectives describes the overall MOBILE WEBSITE that you interacted with on a scale of 1 = Describes Very Poorly and 7 = Describes Very Well.
Appealing / Useful / Positive / Good / Favorable / Attractive / Exciting / Pleasant / Likeable / High Quality / Interesting / Fun / Cool / Imaginative / Entertaining

**Relational Outcomes**

Q11. Please indicate your agreement with the following statements regarding your opinion about the catering company on a scale of 1 = Strongly Disagree 7 = Strongly Agree

(Trust)
1. This catering company treats people like me fairly and justly.
2. Whenever this catering company makes an important decision, I know it will be concerned about people like me.
3. This catering company can be relied on to keep its promises.
4. I believe that this catering company takes the opinions of people like me into account when making decisions.
5. I feel very confident about this catering company’s skills.
6. This catering company has the ability to accomplish what it says it will do.

(Control Mutuality)
1. This catering company and people like me are attentive to what each other say.
2. This catering company believes the opinions of people like me are legitimate.
3. In dealing with people like me, this catering company has a tendency to throw its weight around. (R)
4. This catering company really listens to what people like me have to say.

(Commitment)
1. I feel that this catering company is trying to maintain a long-term commitment to people like me.
2. I can see that this catering company wants to maintain a relationship with people like me.
3. There will be a long-lasting bond between this catering company and people like me.
4. Compared to other companies, I value my relationship with this catering company more.

(Satisfaction)
1. I am happy with this catering company.
2. Both the catering company and people like me benefit from the relationship.
3. I think most people like me are happy in their interactions with this catering company.
4. Generally speaking, I am pleased with the relationship this catering company has established with people like me.

Behavioral Intentions towards the Website
Q13. Please indicate the likelihood that you will perform the following behaviors in the future on a scale of 1 = Extremely Unlikely and 7 = Extremely Likely
1. I would bookmark this mobile website for future use.
2. I would recommend this mobile website to others.
3. I would forward this mobile website to my acquaintances.
4. I would visit this mobile website again in the future.
5. I would like to know more about this mobile website.

Behavioral Intention toward the Company
Q14. Suppose this catering company is located near where you live, what is the likelihood that you will use their service?
unlikely/likely, improbable/probable, uncertain/certain, and definitely not/definitely

Q15. If your friends asked you about this catering company, what is the likelihood that I will recommend them to use this catering company?
unlikely/likely, improbable/probable, uncertain/certain, and definitely not/definitely
Appendix C

Images of Menus used in the Stimulus Mobile Website

Package 1

- **Salad Cup**
- **Raised Pork Pie**
- **Spanish Quiche**
- **Sliced Cold Ham & Sliced Cold Turkey**
- **Hot New Potatoes**
- **Pear Tart & Lemon Cheesecake**

Package 2

- **Shrimp Cheese Cup**
- **Italian Style Appetizer Platter**
Package 3

- Eggplant Shrimp Rolls
- Sausage Skewer
- Salami Cheese Antipasto
- Apple Pie and Cream & Sherry Trifle

Grapefruit Shrimp Cup
Asian Style Salad
Coronation Chicken
Vegetarian Brochette
Summary images of the Three Packages

<table>
<thead>
<tr>
<th>Package 1</th>
</tr>
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<tbody>
<tr>
<td>Salad Cup</td>
</tr>
<tr>
<td>Raised Pork Pie</td>
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<td>Spanish Quiche</td>
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<tr>
<td>Pear Tart</td>
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<tr>
<td>Lemon Cheesecake</td>
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<tr>
<th>Package 2</th>
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<tbody>
<tr>
<td>Shrimp Cheese Cup</td>
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<td>Italian Style Appetizer Platter</td>
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<tr>
<td>Eggplant Shrimp Rolls</td>
</tr>
<tr>
<td>Sausage Skewer</td>
</tr>
<tr>
<td>Salami Cheese Antipasto</td>
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<tr>
<td>Apple Pie and Cream</td>
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<td>Sherry Trifle</td>
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<tr>
<th>Package 3</th>
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<tbody>
<tr>
<td>Grapefruit Shrimp Cup</td>
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<td>Asian Style Salad</td>
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<td>Coronation Chicken</td>
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<tr>
<td>Vegetarian Brochette</td>
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<td>Sushi Platter</td>
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<tr>
<td>Pear and Chocolate Tart</td>
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<tr>
<td>Lemon Mousse</td>
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</tbody>
</table>
VITA

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